Chapter # 19

DESCRIPTIVE NORMATIVE BELIEFS AS PREDICTOR OF SMOKING AND ALCOHOL CONSUMPTION AMONG YOUNG ADOLESCENTS

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ABSTRACT

The aims of this study were to explore (i) the effect of the Unplugged program and gender over time on adolescents' descriptive normative beliefs about smoking (DNB^S) and alcohol consumption (DNB^{AC}), and (ii) the effect of the Unplugged program and descriptive normative beliefs on smoking (S) and alcohol consumption (AC) before (T1), immediately (T2), and one year after program implementation (T3). Method: A cluster randomized control trial using a Solomon four-group design was carried out (1420 adolescents in total, the mean age = 13.5 years, SD = 0.59; 47.5% girls). To increase the effect of Unplugged, booster-sessions called nPrevention were carried out (EG+) after T2. Results: DNB^S and DNB^{AC} increased over time and were positively associated with smoking and alcohol consumption. The results showed (i) that descriptive normative beliefs about alcohol consumption increased in all groups, but this increase was more pronounced only in control group and experimental group, and (ii) a decline of descriptive normative beliefs about alcohol consumption in girls in experimental group with nPrevention. Conclusion: The implementation of Unplugged with booster sessions and without pretesting could be an important factor for prevention of alcohol consumption.

Keywords: descriptive normative beliefs, young adolescents, alcohol consumption, smoking, unplugged.

1. INTRODUCTION

Key findings of the European School Survey Project (ESPAD Group, 2020) and Health Behaviour in School-aged Children international report (Charrier et al., 2024) underline the need to enhance the evidence-based universal and targeted initiatives. These are aimed at prevention and provide support to young people who are already using substances by increased efforts to reduce the attractiveness of substance use to young people. Correcting misconceptions about the normativity of drug use is an important component of the most effective preventive programs (Maina et al., 2020, Botvin & Griffin, 2007).

Peer descriptive normative beliefs, age, and intentionality emerged as key the predictors of alcohol, cigarette, and marijuana use (Hansen, Saldana, & Ip, 2022). Descriptive norms are defined as social norms that refer to what is considered to be a typical or usual behavior within certain social groups (Stok & de Ridder, 2019). Descriptive peer norms refer to perceptions about friends' behaviors, typically assessing the perceived prevalence of use among peers (Hansen et al., 2022). In adolescence, as Hansen et al. (2022) noted, these norms have been found to be the most important predictors regarding smoking initiation, smoking, alcohol use, and the use of other drugs (Hansen et al., 2022).

Studies focusing on social norms within the school context showed that social norms in schools, normative beliefs about the prevalence of drinking (descriptive norms), and availability of alcohol were linked to increases in adolescent substance use (Dimova et al., 2023, Lombardi, Coley, Sims, & Mahalik, 2019, Sanchez et al., 2019). A systematic review of literature (Yamin, Fei, Lahlou, & Levy, 2019) provided evidence for the effectiveness of interventions based on the social norm approach. Particularly, descriptive norm education was found to be an effective method in changing adolescents' inaccurate perceptions of self-confirming assumptions about others' alcohol use (François, Lindstrom Johnson, Waasdorp, & Bradshaw, 2017). Therefore, the EU-Dap Unplugged program emphasizes normative education, with a particular focus on normative beliefs as potential mediators. It consists of 12 lessons and is primarily designed for 12–14-year-old adolescents. In this program, correct information about peer group norms and behaviours is expected to diminish normative misperceptions and enhance health-promoting beliefs and attitudes. The Unplugged prevention program has been frequently adopted different countries in Europe showing reasonable effectiveness (Vadrucci, Vigna-Taglianti, van der Kreeft, & EU-Dap Study Group, 2016).

2. DESIGN

This study was a randomized control trial adopting the Solomon four-group design which enabled testing for the presence of pretest sensitization (Campbell & Stanley, 1963).

3. OBJECTIVE

To explore (i) the effect of the Unplugged program and gender over time on adolescents' descriptive normative beliefs about smoking (DNB^S) and alcohol consumption (DNB^{AC}), and (ii) the effect of the Unplugged program and descriptive normative beliefs on smoking and alcohol consumption immediately and one year after program implementation. A moderation effect of the program on the association between descriptive normative beliefs (DNB) and smoking / alcohol consumption was also explored.

4. METHODS

4.1. Sample and Procedure

A randomized control trial using the Unplugged program was carried out among young adolescents at 24 primary schools. The sampling used a list of primary and secondary schools in Slovakia retrieved from the Institute of Information and Prognosis of Education. The schools were selected from different municipalities based on their geographical locations in the Eastern, Central and Western Slovakia with six clusters based on population size.

The data collection was carried out immediately before implementing the Unplugged program (T1, experimental and control group with a pretest), immediately after implementing the Unplugged program (T2) and one year after implementation (T3). Twelve schools were assigned to the experimental group and twelve schools were assigned to the control group (Table 1). The sample consisted of 1420 adolescents in total (the mean age = 13.5 years, SD = 0.59; 47.5% girls). In this design, both the experimental group and control group had two subgroups: a pretested group[PT] and a non-pretested[nPT] group. In order to increase the effect of Unplugged, booster-sessions called nPrevention (neuroPrevention,

Department of Addictology, First Faculty of Medicine, Charles University) were carried out (EG+) after T2. The aim of nPrevention was to strengthen the preventive effect of Unplugged.

Table 1.
The description of the sample size (n).

	Pretest		Total
	no	Yes	
Control group	289	333	622
Experimental group	183	191	374
Experimental group with nPrevention	218	206	424
Total	690	730	1420

The data collection was carried out after obtaining the informed consent of Parents/guardians and questionnaires were filled in during a lesson in the presence of a trained research team member, without the presence of a teacher. All collected data was anonymized. The protocol of this study was reviewed and approved by the Ethics Committee at the Faculty of Arts of P. J. Šafárik University.

4.2. Measures

Descriptive normative beliefs were measured by two items: "According to your estimation, how many of the pupils at your school use alcohol/smoke cigarettes?" (Elek, Miller-Day, & Hecht, 2006). Each item was rated on a 4-point scale with the scale from 1 = almost none to 4 = most.

Smoking and alcohol consumption were assessed using single-item measures: "How often (if ever) have you smoked cigarettes/drunk alcohol during the last 30 days?" Responses were recorded on a 4-point scale: 1-not at all; 4-5 or more times (Hibbel, et al., 2012). For the purposes of analysis in this study, the items were dichotomized into 0=not used and 1=used.

4.3. Statistical Analyses

Outcome variables were examined with GLM repeated measure analyses and with binary logistic regression (BLR) to assess the impact of group and DNB on the likelihood that adolescents would report smoking / alcohol consumption, controlling for smoking / alcohol consumption $^{T1 / T2}$ and gender. The BLR models contained one interaction group x DNB. In cases when moderation effect was not confirmed, the interaction was excluded from the analysis and the analysis was repeated. Firstly, the adolescents were compared based on the number of waves they participated in both with and without a pretest. Firstly, the descriptive analysis showed that 32.8 %$^{without\ pretest}$ and 19.2 %$^{with\ pretest}$ of the adolescents participated only in one wave, 67.2 %$^{without\ pretest}$ and 27.2 %$^{with\ pretest}$ in two waves, 53.6%$^{with\ pretest}$ in three waves. There were no significant differences in descriptive normative beliefs about smoking and alcohol consumption between the respondents who took part in different waves.

5. RESULTS

Table 2 and Table 3 show smoking and alcohol consumption prevalence, the descriptive normative beliefs scores about smoking and alcohol consumption among adolescents in groups without, as well as with pretesting. Only one statistically significant value of the

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chi-square tests was found, the lowest percentage of adolescents in experimental group with nPrevention (EG+) reported alcohol consumption one year after implementing the program (T3), $\chi^2 = 8.06$, $p < 0.05$.

Table 2.

Smoking (n / %) and descriptive normative beliefs about smoking (M, (SD))
in groups without and with pretesting.

	Without pretesting						With pretesting								
	T2 /S			T3 / S			T1 / S			T2 / S			T3 / S		
Group	No	yes	Group	no	yes	Group	no	yes	Group	no	yes	Group	no	yes
CG	203 / 89.80%	23 / 10.20%	CG	179 / 84.80%	32 / 15.20%	CG	228 / 96.60%	8 / 3.40%	CG	212/ 93.00%	16 / 7.00%	CG	185 / 83.00%	38 / 17.00%
EG	288 / 88.90%	36 / 11.10%	EG	100 / 79.40%	26 / 20.60%	EG	296 / 93.40%	21 / 6.60%	EG	284 / 94.70%	16 / 5.30%	EG	123 / 84.80%	22 / 15.20%
			EG+	147 / 87.00%	22 / 13.00%							EG+	121 / 77.10%	36 / 22.90%
	T2 / DNB^S			T3 / DNB^S			T1 / DNB^S			T2 / DNB^S			T3 / DNB^S	
CG	2.72 (0.92)		CG	2.91 (0.79)		CG	2.50 (0.89)		CG	2.57 (0.88)		CG	2.88 (0.81)	
EG	2.85 (0.84)		EG	2.95 (0.89)		EG	2.42 (0.88)		EG	2.61 (0.87)		EG	2.62 (0.85)	
			EG+	2.95 (0.72)								EG+	2.96 (0.83)	

Notes: T1 = baseline measure, T2 = immediately after Unplugged implementation, T3 = one year after implementing the program, Group = control group (CG), experimental group (EG), experimental group with nPrevention (EG+), S = smoking, DNB^S = descriptive normative beliefs about smoking

Table 3.

Alcohol consumption (n / %) and descriptive normative beliefs about alcohol consumption
(M, (SD)) in groups without and with pretesting.

	Without pretesting						With pretesting								
	T2 /AC			T3 / AC			T1 / AC			T2 / AC			T3 / AC		
Group	no	yes	Group	no	yes	Group	no	yes	Group	no	yes	Group	no	yes
CG	178 / 79.50%	46 / 20.50%	CG	136 / 64.80%	74 / 35.20%	CG	194 / 82.90%	40 / 17.10%	CG	183 / 80.30%	45 / 19.70%	CG	158 / 71.20%	64/ 28.80%
EG	240 / 74.50%	82 / 25.50%	EG	87 / 69.60%	38 / 30.40%	EG	243 / 77.10%	72 / 22.90%	EG	237 / 79.30%	62 / 20.70%	EG	99 / 68.30%	46 / 31.70%
			EG+	132 / 78.10%	37 / 21.90%							EG+	112 / 72.30%	43 / 27.70%
	T2 / DNB^{AC}			T3 / DNB^{AC}			T1 / DNB^{AC}			T2 / DNB^{AC}			T3 / DNB^{AC}	
CG	2.66 (0.86)		CG	2.90 (0.80)		CG	2.25 (0.78)		CG	2.43 (0.87)		CG	2.72 (0.79)	
EG	2.77 (0.85)		EG	2.86 (0.91)		EG	2.30 (0.82)		EG	2.54 (0.82)		EG	2.65 (0.81)	
			EG+	2.86 (0.79)								EG+	2.96 (0.76)	

Notes: T1 = baseline measure, T2 = immediately after Unplugged implementation, T3 = one year after implementing the program, Group = control group (CG), experimental group (EG), experimental group with nPrevention (EG+), AC = alcohol consumption, DNB^{AC} = descriptive normative beliefs about alcohol consumption

5.1. Unplugged, Descriptive Normative Beliefs about Smoking, and Smoking Among Adolescents

Firstly, the effects of prevention program and gender across time on adolescents' DNB^S was explored. There was a significant main effect of time[with pretesting, times: T1 and T2 and T3] on DNB^S and contrasts revealed significantly higher level of DNB-smoking at T2 $F(1, 456)$ = 8.365, $p < 0.01$, and significantly higher level of DNB^S at T3 $F(1, 387) = 25.750$, $p < 0.001$. There was a significant main effect of time ([without pretesting]$F(1, 411) = 4.827$, $p < 0.05$, on DNB^S and contrasts revealed significantly higher level DNB^S at T3 (one year after implementing the program). The interaction effects group (CG, EG, as well as CG, EG, EG+) x time, group x time x gender on DNB^S were not significant.

Secondly, BLR was performed to assess the impact of the group[CG, EG] and DNB$^{S\_T2}$ on the likelihood that adolescents would report smoking[T2], controlling for smoking[T1] and

gender. The BLR model[with pretesting] for smoking^{T2} contained one interaction group x DNB$^{S–T2}$. The results can be found in Table 4. The model explained 19.7% of the variance in smoking^{T2} and correctly classified 94.6% cases. The effect of the group and DNB$^{S–T2}$, as well as the moderation effect of the group on the association between DNB$^{S–T2}$ and smoking^{T2} was not found.

Thirdly, BLR was performed to assess the impact of group$^{CG, EG, EG+}$ and DNB$^{S–T3}$ on the likelihood that adolescents would report smoking^{T3}, controlling for smoking^{T2} and gender. The BLR models for smoking^{T3} (without and with pretesting) contained also one interaction group x DNB$^{S–T3}$. Descriptive analyses and BLR results can be found in Table 2 and Table 4. The model[without pretesting] explained 32.3% of the variance in smoking^{T3} and correctly classified 89.4% cases. The effects of the group and DNB$^{S–T3}$, as well as the moderation effect of the group on the association between DNB$^{S–T3}$ and smoking^{T3} was not found. The model[with pretesting] explained 31.9% of the variance in smoking^{T3} and correctly classified 81.5% cases. DNB$^{S–T3}$ made a unique, statistically significant contribution to the model. Adolescents with a higher level of DNB$^{S–T3}$ were three times more likely to report smoking at T3, controlling for all other factors in the model. The effect of the group, as well as the moderation effect of the group on the association between DNB$^{S–T3}$ and smoking^{T3} was not found.

Table 4.
Logistic regression predicting likelihood of reporting smoking.

	With pretesting Smoking at T2				Without pretesting Smoking at T3				With pretesting Smoking at T3		
		95% C.I.for EXP(B)				95% C.I.for EXP(B)				95% C.I.for EXP(B)	
	OR	Lower	Upper		OR	Lower	Upper		OR	Lower	Upper
Smoking^{T1}	14.711***	5.173	41.834	Smoking^{T2}	21.116***	9.825	45.381		63.444***	13.305	302.519
Gender	0.457	0.183	1.142	Gender	1.455	0.751	2.816		1.373	0.74	2.544
Group (CG, EG)	0.676	0.275	1.661	CG	Ref.				Ref.		
DNB$^{S–T2}$	1.565	0.924	2.652	EG	1.227	0.567	2.655		1.055	0.504	2.209
				EG+	0.742	0.346	1.591		0.829	0.414	1.657
				DNB$^{S–T3}$	1.448	0.961	2.181		3.044***	1.96	4.727

Notes: T1 = baseline measure, T2 = immediately after Unplugged implementation, T3 = one year after implementing the program, DNB^{S} = descriptive normative beliefs about smoking, group = control group (CG), experimental group (EG), experimental group with nPrevention (EG+), ***p < 0.001

5.2. Unplugged, Descriptive Normative Beliefs about Alcohol Consumption, and Alcohol Consumption

Firstly, the effects of prevention program and gender across time on adolescents' DNB^{AC} was explored. There was a significant main effect of time (with pretesting, times: T1 and T2) on DNB^{AC} and contrasts revealed significantly higher level DNB^{AC} at T2 $F(1, 453) = 25.112$, $p < 0.001$. The interaction effects of group (CG, EG) x time, group x time x gender on DNB^{AC} were not significant.

Secondly, BLR was performed to assess the impact of group$^{CG, EG}$ and DNB$^{AC–T2}$ on the likelihood that adolescents would report alcohol consumption^{T2}, controlling for alcohol consumption^{T1} and gender. The BLR model for alcohol consumption^{T2} contained one interaction group x DNB$^{AC–T2}$ (Table 5). The model explained 22% of the variance in alcohol consumption^{T2} and correctly classified 79.7% cases. DNB^{AC} at T2 made a unique statistically significant contribution to the model. Adolescents with a higher level of DNB^{AC} at T2 were almost 2 times more likely to report alcohol consumption at T2, controlling for all other factors in the model. The effect of group, as well as moderation effect of group on the association between DNB$^{AC–T2}$ and alcohol consumption^{T2} was not found.

Thirdly, the effects of prevention program and gender across time on adolescents' DNB^{AC} at T3 was explored. There was a significant main effect of time ($^{without\ pretesting}F(1, 412) = 12.081$, $p = 0.001$) on DNB^{AC} and contrasts revealed significantly higher level of DNB^{AC} at T3. There was a significant interaction effect between DNB^{AC} and group. The effect indicates that DNB^{AC} differed in Control^{CG}, Experimental^{EG}, and Experimental group with booster sessions^{EG+}, $F(2, 412) = 3.071$, $p < 0.05$. The interaction graph shows (Figure 1) that DNB^{AC} increased between T2 and T3 among adolescents of all groups, but this increase from T2 to T3 was more pronounced for adolescents of CG and EG than EG+.

Table 5.
Logistic regression predicting likelihood of reporting alcohol consumption.

	With pretesting Alcohol consumption at T2				Without pretesting Alcohol consumption at T3			With pretesting Alcohol consumption at T3		
		95% C.I.for EXP(B)				95% C.I.for EXP(B)			95% C.I.for EXP(B)	
	OR	Lower	Upper		OR	Lower	Upper	OR	Lower	Upper
Alcohol consumption^{T1}	6.045***	3.579	10.21	Alcohol consumptio^{T2}	8.232***	4.774	14.194	6.749***	3.85	11.831
Gender	0.801	0.481	1.333	Gender	0.94	0.574	1.539	0.927	0.563	1.526
Group (CG, EG)	0.907	0.544	1.512	CG	Ref.					
DNB$^{AC\_T2}$	1.635**	1.203	2.221	EG	0.427**	0.228	0.802	1.081	0.603	1.939
				EG+	0.357***	0.2	0.637	0.589	0.329	1.053
				DNB^{T3}	1.487*	1.086	2.036	1.965***	1.397	2.764

Notes: T1 = baseline measure, T2 = immediately after Unplugged implementation, T3 = one year after implementing the program, DNB^{AC} = descriptive normative beliefs about alcohol consumption, control group (CG), experimental group (EG), experimental group with nPrevention (EG+), $p < 0.05$, **$p < 0.01$, ***$p < 0.001$

Figure 1.
Changes in descriptive normative beliefs about alcohol consumption (DNB-AC).
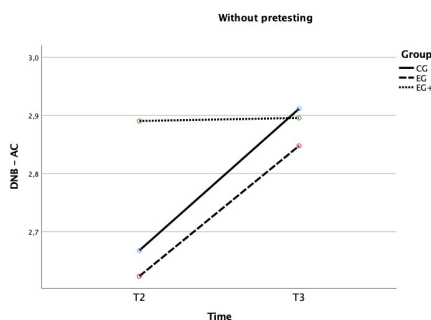
Notes: CG = control group, EG = experimental group, EG+ = experimental group with booster-sessions, T2 = immediately after implementing the program, T3 = one year after implementing the program

The interaction DNB^{AC} x Group x Gender was significant. This indicates that the DNB^{AC} x group interaction described previously was different in boys and girls $F(2, 412) = 3.648$, $p < 0.05$. The interaction graphs (Figures 2, 3) show that DNB^{AC} increased from T2 to T3 among boys in all groups, but DNB^{AC} increased from T2 to T3 only in girls of CG and EG in contrast to girls of EG+. The decline of DNB^{AC} in girls of EG+ was found from T2 to T3.

There was a significant main effect of time ($^{with\ pretesting}F(1, 387) = 47.188$, $p = 0.001$) on DNB^{AC} and contrasts revealed significantly higher level DNB^{AC} at T3. There was a significant interaction effect between DNB^{AC} and Gender. This effect indicates that

DNB^{AC} differed in boys and girls F (1, 387) = 4.917, $p < 0.05$. DNB^{AC} increased between T2 and T3 among boys and girls, but this increase was more pronounced for girls.

Fourthly, BLR was performed to assess the impact of group$^{CG, EG, EG+}$ and DNB$^{AC\_T3}$ on the likelihood that adolescents would report alcohol consumption^{T3}. The BLR models for alcohol consumption^{T3} (without and with pretesting) contained one interaction group x DNB$^{AC\_T3}$. Descriptive analyses and BLR results can be found in Table 3 and Table 5.

The model$^{without pretesting}$ explained 27.1% of the variance in alcohol consumption^{T3} and correctly classified 71.8% cases. The effect of group and DNB$^{AC\_T3}$ on alcohol consumption at T3 was found. A lower percentage of adolescents in the Unplugged group (30.4%), as well as in the Unplugged+ group (21.9%), reported alcohol consumption at T3, compared to adolescents in the control group (35.2%) (Table 2). The moderation effect of group on the association between DNB$^{S\_T3}$ and alcohol consumption^{T3} was not found.

Figure 2.
Changes in descriptive normative beliefs about alcohol consumption (DNB-AC) among boys.
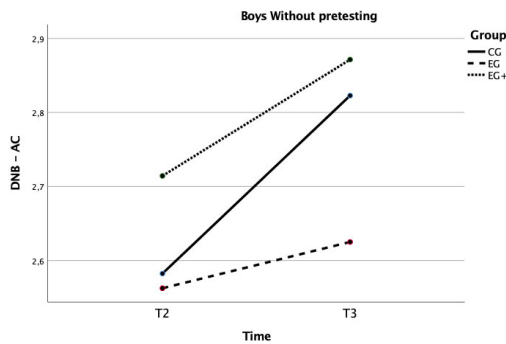
Notes: CG = control group, EG = experimental group, EG+ = experimental group with booster-sessions, T2 = immediately after implementing the program, T3 = one year after implementing the program
p, EG = experimental group, EG+ = experimental group with booster-sessions, T2 = immediately after implementing the program, T3 = one year after implementing the program

Figure 3.
Changes in descriptive normative beliefs about alcohol consumption (DNB-AC) among girls.
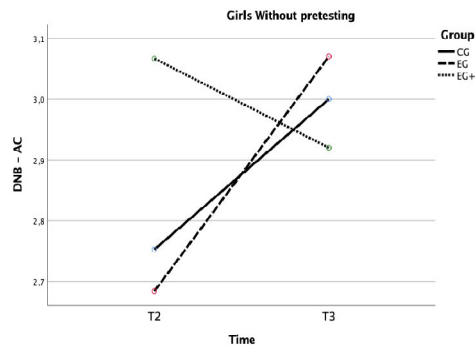
Notes: CG = control group, EG = experimental group, EG+ = experimental group with booster-sessions, T2 = immediately after implementing the program, T3 = one year after implementing the program

The model[with pretesting] explained 22.6% of the variance in alcohol consumption[T3] and correctly classified 70.8% of cases. DNB[AC_T3] made a statistically significant contribution to the model. Adolescents with a higher level of DNB[AC] at T3 were almost two times more likely to report alcohol consumption at T3, controlling for all other factors in the model. The moderation effect of group on the association between DNB[S_T3] and alcohol consumption[T3] was not observed.

6. DISCUSSION

We found a significant positive main effect of time on descriptive normative beliefs about smoking and alcohol consumption at both follow-up measurements: immediately and one year after program implementation. The non-significant interaction effects on DNB[S] do not support the expected effect of Unplugged based on normative education (Vadrucci et al., 2016). DNB[AC] increased between T2 and T3 in all groups, but the rise was more pronounced in CG and EG in comparison to EG+.

Adolescents with a higher level of DNB[S_T3] were three times more likely to report smoking one year after the program implementation. As for alcohol consumption, DNB[AC] served as a predictor of adolescents' alcohol consumption immediately (T2) and one year after the program implementation (T3). Adolescents with a higher level of DNB[AC] were almost two times more likely to report alcohol consumption at T2, as well as T3, controlling for all other factors in the model, with respect to the Solomon four-group design of this study. Our results are consistent with the findings of Hansen et al., (2022) which combined data from 25 longitudinal studies and found, that peer descriptive normative beliefs and age were the primary predictors of use.

This study showed that the effect of the group on smoking was not found at either T2 or T3. The effect of group on alcohol consumption at T3 was found but only in the group without pretesting. A lower percentage of adolescents in the Unplugged group, as well as in the Unplugged+ group, reported alcohol consumption at T3, compared to adolescents in the control group. Our findings align with the conclusions of the systematic review on effective components of school-based drug prevention programs, which confirmed that incorporating booster sessions or additional components aimed at strengthening the program's effects can enhance its effectiveness (Cuijpers, 2002).

The findings of this research study contribute to the important investigation of pretesting effects (Peter, Sobowale, & Ekeanyanwu, 2013, LavanyaKumari, 2013, De Villiers & Van den Berg, 2012).

Firstly, it is important to consider whether the effect of the intervention using the pretest and post-test design is explored with the focus on behavioural or non-behavioural outcomes (McCambridge, Butor-Bhavsar, Witton, & Elbourne, 2011). For example, the effect of a suicide awareness program was explored and the confirmation of pretest sensitization effects in high school students' suicide awareness was confirmed (Spirito, Overholser, Ashworth, Morgan, & Benedict-Drew, 1988). The effect of a pretest in terms of cognitive learning results was explored and it was found that the pretest effect on an educational intervention depended on the type of instruction that was administered and the importance of pretesting regarding prior knowledge related to educational intervention aims could influence the results (All, Castellar, & Van Looy, 2016). Pretest sensitization was confirmed for acceptance of risky behaviour and institutional bond as core constructs of D.A.R.E. (*Drug Abuse Resistance Education)* evaluation (Ullman, Stein, & Dukes, 2000). These studies were in line with the meaning of a pretesting sensitization as a factor which increases participants' sensitivity to the experimental intervention (Huck & Sandier, 1973

in Braver & Braver, 1988). However, another study confirmed the effects of an infertility prevention psycho-educational program on infertility knowledge and attitudes among university students free from the pre-post-test sensitivity (Öztürk, Siyez, Esen, & Kağnici, 2020). No pretest sensitization was found in the investigation of the effectiveness of the Selective Problem Solving Model on the development of students' creativity skills in mathematics (Kirisci, Sak, & Karabacak, 2020). Despite the findings of the lastly presented studies, it seems that the pretest sensitization can be important especially for non-behavioural outcomes. The need of school-based studies and assessment of pretest sensitization on non-behavioural, as well as behavioural outcomes of interventions is a factor which should be taken in to account (McCambridge et al., 2011).

Secondly, All et al. (2016) interpret the pretest sensitization through the combination of the motivational paradigm of some kind of intervention / education (the level of interactivity, the level of attention during the activities, etc.) and Deci and Ryan's Self-determination theory (the level of autonomy). In investigating the effectiveness of Unplugged, an interactive drug use prevention program based on the comprehensive social influence approach, our results suggest that adolescents in the experimental groups without pretesting showed expected positive effects. This may be attributed to a higher level of intrinsically motivated trends in behaviour and behaviour change, emphasizing the need for skill development. In contrast, pretesting experimental groups, possibly supported external regulation and lead to less favourable outcomes, possibly due to a certain sense of obligation as proposed by All et al. (2016).

It is important to highlight both the limitations and strengths of this study. The most significant limitation was the reliance on self-reported measures. However, a notable strength was the use of a cluster randomized controlled trial with a Solomon four-group design, which helped to mitigate the impact of pretest sensitization effects.

7. CONCLUSION

DNB^S and DNB^{AC} increased over time and were positively associated with smoking and alcohol consumption. Interaction effects showed (i) that DNB^{AC} increased in all groups, but this increase was more pronounced only in the control group and experimental group, and (ii) a decline of DNB^{AC} only in girls in experimental group with nPrevention.

The effect of Unplugged and Unplugged with nPrevention on alcohol consumption was found one year after program implementation. The moderation effect of Unplugged on the association between DNB^{T3} and $smoking^{T3}$, as well as alcohol $consumption^{T3}$, was not found.

These results suggest that implementing Unplugged with booster sessions and without pretesting, could be an important factor in preventing alcohol consumption by reducing DNB^{AC}. This approach proves effective in fostering intrinsic motivation, particularly among girls who participated in the prevention program.

However, the research results did not show the anticipated impact of the Unplugged program among Slovak adolescents within the expected range. To achieve the desired effectiveness, the program would need to be better adapted to the conditions of Slovak schools, with a comprehensive teacher preparation and training for program instructors to ensure the highest possible fidelity in its implementation.

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