

# THE EFFECT OF A SCHOOL PREVENTION PROGRAM ON ALCOHOL CONSUMPTION A SOLOMON FOUR GROUP DESIGN

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## Abstract

The aim of this study was to investigate the direct and indirect effect of the Unplugged program on alcohol consumption (AC) as reported by schoolchildren a year after program implementation within a Solomon four group design. A randomized control trial using the Unplugged program was carried out among schoolchildren at 24 primary schools. Twelve schools were assigned to the experimental group (EG,  $n = 798$ ,  $n = 401^{EG \text{ no pre-test}}$ ,  $n = 397^{EG \text{ pre-test}}$ ) while 12 schools were assigned to the control group (CG,  $n = 622$ ,  $n = 298^{CG \text{ no pre-test}}$ ,  $n = 333^{CG \text{ pre-test}}$ ). The mean age of the schoolchildren was 13.5 years,  $SD = 0.59$ ; 47.5% girls. The sample consisted of 1420 schoolchildren in total. The data collection was carried out immediately before implementing the program (T1, experimental and control group with a pre-test), immediately after implementing the program (T2) and a year after program implementation (T3). The consumption of alcohol during the last 30 days (Hibbel, Guttormsson, Ahlström, & Kraus, 2012) was dichotomized for the purposes of the statistical analysis. A serial mediation analysis was performed through the Hayes' PROCESS tool in SPSS 25 (Model 6). The controlled variables in the serial mediation analysis were  $AC^{T2}$ , pretest, and gender. The mediation effect was tested on 5000 samples by means of Bootstrapping. The direct effect of Unplugged on  $AC^{T3}$  was confirmed. The effect of Unplugged on  $AC^{T3}$  was serially mediated by meaningful participation in the community<sup>T3</sup> and satisfaction with oneself<sup>T3</sup>. The results of this study have contributed to the effectiveness of the European school-based drug use prevention program Unplugged among Slovak schoolchildren.

**Keywords:** *Unplugged, alcohol consumption, meaningful participation in the community, satisfaction with oneself, schoolchildren.*

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## 1. Introduction

Alcohol consumption is a health problem that can negatively affect the life perspective of young people. The ESPAD Group (2020) reported that 33% of the pupils who participated in the ESPAD study had first tried an alcoholic drink at age 13 or younger and that alcohol was perceived to be easily available. In most countries, the rates of availability of alcohol among boys and girls were found to be similar. Slovakia reported an increase in current alcohol use of five or more percentage points between 2015 and 2019 (ESPAD Group, 2020).

Interventions directed at schoolchildren are essential in preventing drug use initiation, in delaying the age of first use and reducing rates of drug use (Miller & Hendrie, 2009). The European Monitoring Centre for Drugs and Drug Addiction (2019) introduced Unplugged as an effective school-based prevention program designed to reduce substance use in adolescents aged 11-14 across different contexts. The Unplugged program incorporates components focused on critical thinking, decision-making, problem-solving, creative thinking, effective communication, interpersonal relationship skills, self-awareness, empathy, coping with emotions and stress, normative beliefs and knowledge about the harmful health effects of substances (European Monitoring Centre for Drugs and Drug Addiction, 2019, Caria, Faggiano, Bellocco et al., 2011). This study was focused on the direct and indirect effect of this EU-Dap Unplugged program (Vigna-Taglianti, Galanti, Burkhart et al., 2014) on alcohol consumption among Slovak schoolchildren. Firstly, it was hypothesized that there would be a direct effect of Unplugged on schoolchildren's alcohol consumption one year after program implementation. Secondly, it was hypothesized that there would be a direct effect of Unplugged on schoolchildren's meaningful participation in the community (ComPart), as part of a serial mediation. It was assumed that Unplugged as a school-based comprehensive social influence program would have a favourable effect outside

the home on school group activities, on sports and artistic activities and on schoolchildren's willingness to help other people. There has been evidence to suggest the importance of meaningful free-time substance-free activities in drug use prevention that can contribute to the development of new skills, fostering of self-esteem, a sense of meaning, social connectedness, mental well-being and resilience (Santini, Meilstrup, Hinrichsen et al., 2020). Thirdly, in a recent study it was hypothesized that there would be a direct effect of schoolchildren's ComPart on satisfaction with oneself as well as a direct effect of satisfaction with oneself on their alcohol consumption. In order to further clarify the effect of Unplugged, the present study tested a serial mediation model by proposing a theoretically based hypothetical causal chain.

## 2. Design

This study was a randomized control trial using a Solomon four-group design which enabled testing for the presence of pre-test sensitization (Nakazwe & Chanda, 2018, Braver & Braver, 1988).

## 3. Objective

To investigate the direct and indirect effect of the Unplugged program on alcohol consumption as reported by schoolchildren a year after program implementation within a Solomon four group design.

## 4. Methods

### 4.1. Sample and procedure

A randomized control trial using the Unplugged program was carried out among schoolchildren 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 on the basis of their geographical locations in East, Central and West Slovakia with six clusters based on population size.

Twelve schools were assigned to the experimental group ( $n = 798$ ) while twelve schools were assigned to the control group ( $n = 622$ ). The sample consisted of 1420 schoolchildren in total. The mean age of the schoolchildren was 13.5 years,  $SD = 0.59$ ; 47.5% girls. In this design, both the experimental and control groups had two subgroups: a pretested group and a non-pretested group. The number of schoolchildren in the pretested experimental group was 397 while the number of schoolchildren in the non-pretested experimental group was 401. The number of schoolchildren in the pretested control group was 333 and the number of schoolchildren in the non-pretested control group was 289.

The data collection was carried out immediately before implementing the program (T1, experimental and control group with a pre-test), immediately after implementing the program (T2) and a year after program implementation (T3).

The data collection was carried out with the informed consent of Parents/guardians and questionnaires were filled in during one lesson in the presence of a trained research team member, without the presence of a teacher. All the data that was collected 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

**4.2.1. Alcohol consumption.** Alcohol consumption was measured by single item measure: "How often (if ever) have you drunk alcohol during the last 30 days?" The item was rated on a 4-point scale: 1=not at all; 4= 5 or more times (Hibbel, Guttormsson, Ahlström, & Kraus, 2012). For the purpose of this study, the item was dichotomized (0=not used, 1=used).

**4.2.2. Meaningful participation in community (ComPart).** 3 items assessed opportunities for meaningful participation in the community (the Resilience Youth Development Module of the California Healthy Kids Survey, Furlong, Ritchey, & O'Brennan, 2009). The scale measures schoolchildren's meaningful participation or involvement in relevant, engaging, and interesting activities with opportunities for responsibility and contribution in the community. The response scale was: not at all true, a little true, pretty much true, and very much true. A sample item was: "I help other people". The mean scores were created based on the schoolchildren's responses across all items, with higher scores indicating higher meaningful participation in the community. The Cronbach's alpha for the subscale in this questionnaire was 0.69 (T3).

**4.2.3. Satisfaction with oneself.** Satisfaction with oneself (“How satisfied are you usually with yourself?”) was measured on a five-item Likert scale from very satisfied to very dissatisfied (Hibbel, Guttormsson, Ahlström, & Kraus, 2012).

**4.3. Statistical analyses**

The serial mediation analysis was performed through Hayes’ *PROCESS* tool (Field, 2013) in SPSS 25 (Model 6). The mediation effect was tested on 5000 samples by means of Bootstrapping. The controlled variables in the serial mediation analysis were alcohol consumption<sup>T2</sup>, pretest, and gender.

**5. Results**

**5.1. Descriptive analysis**

A chi-square test for independence indicated no significant associations between the groups (experimental group and control group) and alcohol consumption immediately after implementing the program (T2), a year after program implementation (T3) (Table 1) or between gender and alcohol use among schoolchildren of the control group and experimental group at T2 (immediately after program implementation) and T3 (one year after program implementation) (Table 2).

*Table 1. Descriptive results of alcohol use by control / experimental group and pretest at two follow up measures.*

Group	T3		Group	T2		T3		T2				T3			
	ComPart	S		not used	used	not used	used	Pretest							
								no		yes		no		yes	
				not used	used	not used	used	not used	used	not used	used	not used	used	not used	used
CG	Mean 8.21	Mean 3.42	CG	361	91	294	138	178	46	183	45	136	74	158	64
	SD 2.88	SD 1.16		79.90%	20.1%	68.10%	31.90%	79.50%	20.50%	80.30%	19.70%	64.80%	35.20%	71.20%	28.80%
EG	Mean 8.56	Mean 3.39	EG	477	144	430	164	240	82	237	62	219	75	211	89
	SD 2.70	SD 1.15		76.80%	23.20%	72.40%	27.60%	74.50%	25.50%	79.30%	20.70%	74.50%	25.50%	70.30%	29.70%
$\chi^2$				ns		ns		ns		ns		5.57 <sup>*</sup>		ns	

Notes: control group (CG), experimental group (EG), T2 (immediately after program implementation), T3 (one year after program implementation), ComPart = Meaningful participation in the community, S = satisfaction with oneself,  $\chi^2$  = Chi-square test, \*p<0.05

*Table 2. Descriptive results of alcohol use by gender at two follow up measures<sup>1</sup>.*

	T2				T3			
	CG		EG		CG		EG	
	not used	used	not used	used	not used	used	not used	used
boys	178	50	224	79	148	74	206	84
	78.10%	21.90%	73.90%	26.10%	66.70%	33.30%	71.00%	29.00%
girls	179	40	250	63	143	62	222	78
	81.70%	18.30%	79.90%	20.10%	69.80%	30.20%	74.00%	26.00%

<sup>1</sup>Notes: control group (CG), experimental group (EG), T2 (immediately after program implementation), T3 (one year after program implementation)

A chi-square test for independence indicated a significant association between the group which did not receive the pretest, (experimental group and control group) and alcohol consumption a year after program implementation (T3). 74.50% of the schoolchildren in the non-prettested experimental group and 64.80% of schoolchildren in the non-prettested control group reported alcohol consumption a year after program implementation (T3) (Table 1).

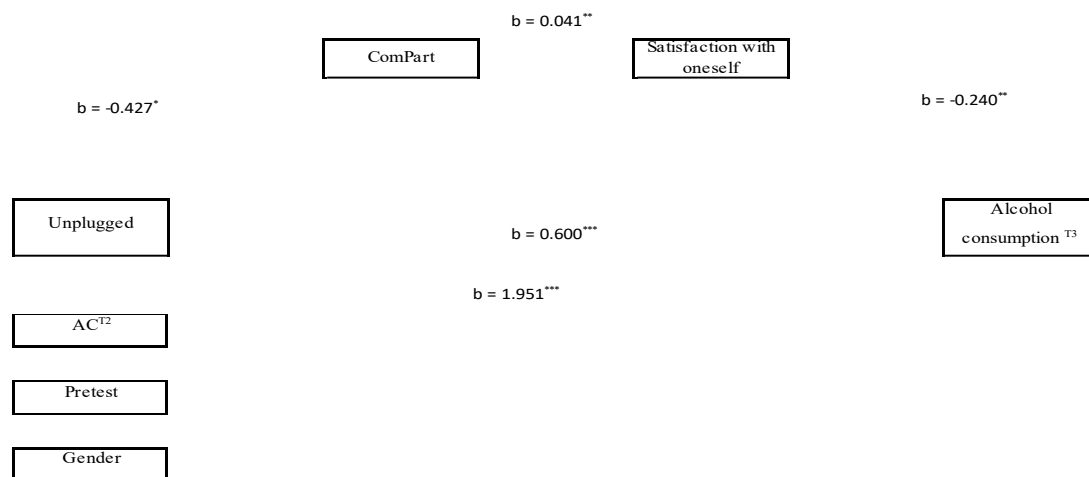
**5.2. Serial mediation**

A serial multiple mediation model was created using ComPart and satisfaction with oneself as the mediators. Alcohol consumption<sup>T2</sup>, pretest, and gender were controlled throughout these analyses. In the serial mediation, the mediators were assumed to have a direct effect on each other, and the independent

variable (Unplugged) was assumed to influence the mediators in a serial way that ultimately influences the dependent variable (alcohol consumption one year after program implementation) (Figure 1).

The data support the serial mediation hypothesis, the long-way specific indirect effect Unplugged → ComPart → satisfaction with oneself → alcohol consumption one year after program implementation was statistically significant (effect: -0.004; 95 % CI: -0.012 to -0.0001). The direct effect of the Unplugged program on alcohol consumption one year after program implementation was statistically significant (effect: -0.600,  $p < 0.001$ ). 68.10% of schoolchildren in the control group and 72.40% of schoolchildren in the experimental group did not report alcohol consumption one year after program implementation (Table 1).

Figure 1. Statistical serial mediation model.



Notes: AC T<sup>2</sup> = alcohol consumption, pretest, and gender were controlled throughout these analyses, T<sup>2</sup> = immediately after program implementation, T<sup>3</sup> = one year after program implementation, ComPart = Meaningful participation in community, a dashed line = nonsignificant effect, \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

## 6. Discussion and conclusions

The results of this study have confirmed the long-way mediation that represented a causal chain of explored mediators (Demming, Jahn, & Boztuğ, 2017). Two shortcut mediations, which each include only one of the explored mediators, were not statistically significant. It means that (i) Unplugged affected schoolchildren's ComPart although the direct effect of ComPart on alcohol consumption was not confirmed, (ii) Unplugged did not affect satisfaction with oneself directly, but a direct effect of satisfaction with oneself on alcohol consumption was found. These findings support previous findings which have confirmed that after-school programs, volunteering, community, social group activities, as well as helping behaviour were associated with self-esteem and mental health (Santini, Stougaard, Koyanagi et al., 2020, Santini, Meilstrup, Hinrichsen et al., 2020, Durlak, & Weissberg, 2007, Wilson, 2000) and support the association between self-esteem and alcohol consumption (Richardson, Kwon, & Ratner, 2013). Based on the results of this study, schoolchildren's ComPart did not affect alcohol consumption directly but indirectly through satisfaction with oneself.

A direct effect of Unplugged on schoolchildren's alcohol consumption one year after Unplugged implementation was confirmed simultaneously controlling for alcohol consumption<sup>T<sup>2</sup></sup>, pretest, and gender. These results have extended previous findings related to the effectiveness of Unplugged in reducing episodes of drunkenness among pupils in seven European countries (Vigna-Taglianti, Galanti, Burkhart et al., 2014). There was no effect of the intervention found for current alcohol use among adolescents in the Czech Republic (Gabrhelik, R., Duncan, A., Miovsky et al., 2012).

The findings of this study contribute to the growing body of evidence of the need to systematically evaluate school-based drug use prevention programmes. The limitations and strengths of this study must also be highlighted. The most important limitation of this study was that the measures were self-reported while the strength of this research was the cluster randomized controlled trial conducted with a Solomon four group design to filter out the effects of pretest sensitization (Mai, Takahashi, & Oo, 2020).

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