

DESCRIPTIVE NORMATIVE BELIEFS AMONG YOUNG ADOLESCENTS. A SOLOMON FOUR GROUP DESIGN

Oľga Orosová, Ondrej Kalina, Beáta Gajdošová, & Jozef Benka
*Department of Educational Psychology and Health Psychology, Faculty of Arts,
Pavol Jozef Šafárik University in Košice (Slovak Republic)*

Abstract

The EU school-based universal drug use prevention program Unplugged is based on education regarding drugs and drug use, normative beliefs and improving life skills. It consists of 12 lessons and is primarily designed for 12-14-year-old adolescents. The aim of this study was to explore the effects of Unplugged and gender over time on adolescents' descriptive normative beliefs about smoking (DNB^S) and alcohol consumption (DNB^{AC}). Method: A cluster randomized control trial using a Solomon four-group design, which enabled testing for the presence of pre-test sensitization, was carried out. 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 one year after implementation (T3). Twelve schools were assigned to the experimental group (EG, n = 798) and twelve schools were assigned to the control group (CG, n = 622). The sample consisted of 1424 adolescents in total (the mean age = 13.5 years, SD = 0.59; 47.5% girls). In this design, both EG and CG had two subgroups: a pretested group^{PT} and a non-pretested^{nPT} group (n/EG^{PT} = 397, n/EG^{nPT} = 401, n/CG^{PT} = 333, n/CG^{nPT} = 289). In order to increase the effect of Unplugged, booster-sessions called nPrevention were carried out (EG+) after T2. The aim of nPrevention was to strengthen the preventive effect of Unplugged. Outcome variables were examined with GLM repeated measures analyses. DNB^S and DNB^{AC} increased over time (from T1 to T2 and from T2 to T3). There was a significant interaction effect between DNB^{AC} x Group (CG, EG, EG+ all without pretesting). DNB^{AC} increased from T2 to T3 among adolescents of all groups, but this increase was more pronounced only for adolescents of CG and EG. Next, the interaction DNB^{AC} x Group (CG, EG, EG+, all without pretesting) x Gender was significant. DNB^{AC} increased from T2 to T3 in boys in all groups, but only in girls from CG and EG. The decline of DNB^{AC} in girls of EG+ was found from T2 to T3. An increase in DNB^S and DNB^{AC} was found over time. The implementation of Unplugged with booster sessions and without pretesting could be an important factor for prevention of alcohol consumption. One of the possible interpretations is that it supports intrinsic motivation, which can be assumed especially for girls who participated of the prevention program.

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

1. Introduction

Descriptive normative beliefs among peers in adolescence have been found to be predictors of primary importance regarding smoking initiation, smoking, alcohol use and use of other drugs (Hansen, Saldana, & Ip, 2022).

The studies focusing on social norms within the school context found that social norms in schools, normative beliefs about the prevalence of drinking (descriptive norms), and availability of alcohol were linked with 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) presented the effectiveness of intervention based on social norms. 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, EU-Dap Unplugged program emphasized normative education, with a particular focus on normative beliefs as potential mediators. Correct information about peer group norms and behaviors was anticipated to diminish normative misperceptions and enhance health-promoting attitudes and beliefs (Vadrucci, Vigna-Taglianti, van der Kreeft, & EU-Dap Study Group, 2016).

The Unplugged prevention program that has been frequently adopted in Europe with evidence of effectiveness. Unplugged consists of 12 lessons and is primarily designed for 12–14-year-old adolescents.

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 (Campbell & Stanley, 2015).

3. Objective

To explore the effects of the Unplugged program and gender over time on adolescents' descriptive normative beliefs about smoking (DNB^S) and alcohol consumption (DNB^{AC}).

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 on the basis of 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 pre-test), immediately after implementing the Unplugged program (T2) and one year after implementation (T3). Twelve schools were assigned to the experimental group (EG, $n = 798$) and twelve schools were assigned to the control group (CG, $n = 622$). The sample consisted of 1424 adolescents in total (the mean age = 13.5 years, $SD = 0.59$; 47.5% girls). In this design, both EG and CG had two subgroups: a pretested group^{PT} and a non-pretested^{nPT} group ($n/EG^{PT} = 397$, $n/EG^{nPT} = 401$, $n/CG^{PT} = 333$, $n/CG^{nPT} = 289$). 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.

The data collection was carried out after obtaining 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 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.

4.3. Statistical analyses

Outcome variables were examined with GLM repeated measures analyses.

5. Results

5.1. The effects of prevention program and gender across time on adolescents' DNB^S

There was a significant main effect of time (without pre-testing, times: T2 and T3) on DNB^S and contrasts revealed significantly higher level DNB^S at T3 $F(1, 411) = 4.827$, $p < 0.05$. The interaction effects group (CG, EG, EG+) x time, group x time x gender on DNB were not significant.

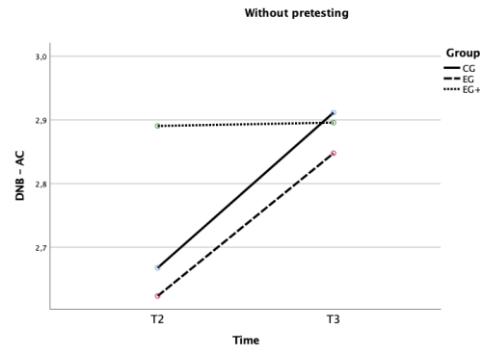
There was a significant main effect of time (with pretesting, times: T1 and T2 and T3) on DNB^S and contrasts revealed significantly higher level of DNB-smoking at T2 $F(1, 456) = 8.365$, $p < 0.01$ and significantly higher level of DNB-smoking at T3 $F(1, 387) = 25.750$, $p < 0.001$. The interaction effects group (CG, EG, as well as CG, EG, EG+) x time, group x time x gender on DNB^S were not significant.

5.2. The effects of prevention program and gender across time on adolescents' DNB^{AC}

There was a significant main effect of time (without pre-testing, times: T2 and T3) on DNB^{AC} and contrasts revealed significantly higher level of DNB^{AC} at T3 $F(1, 412) = 12.081$, $p = 0.001$.

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 with booster sessions $^{EG+}$ groups, $F(2, 412) = 3.071, p < 0.05$. 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 $EG+$.

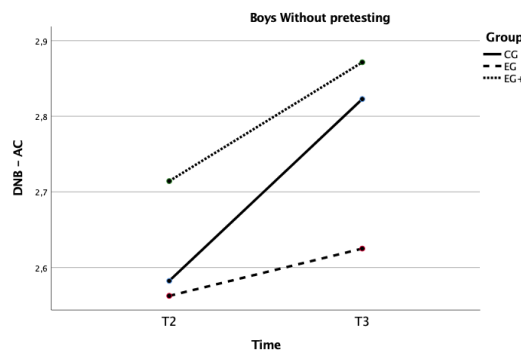
Figure 1. Changes in descriptive normative beliefs about alcohol consumption (DNB-AC) among adolescents.



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

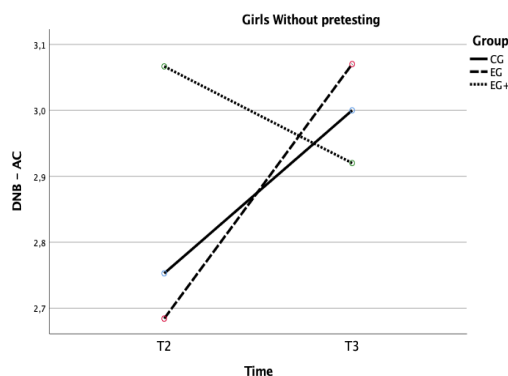
The interaction $DNB^{AC} \times Group \times Gender$ was significant. This indicates that the $DNB^{AC} \times group$ interaction described previously was different in boys and girls $F(2, 412) = 3.648, p < 0.05$. The interaction graphs (Figure 2, 3) show that DNB^{AC} increased from T2 to T3 among boys of 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.

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

Figure 3. Changes in descriptive normative beliefs about alcohol consumption (DNB-AC) among girls.



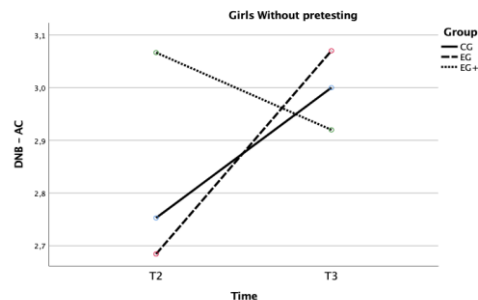
Notes: CG = control group, EG = experimental group, $EG+$ = experimental group with booster-sessions, T2 = immediately after implementing the program, T3 = one year after implementing the program

There was a significant main effect of time (with pre-testing, 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 group (CG, EG) x time, group x time x gender on DNB^{AC} were not significant.

There was a significant main effect of time (with pre-testing, times: T2 and T3) on DNB^{AC} and contrasts revealed significantly higher level DNB^{AC} at T3 $F(1, 387) = 47.188, p = 0.001$.

There was a significant interaction effect between DNB^{AC} and Gender. The effect indicates that DNB^{AC} differed in boys and girls $F(1, 387) = 4.917, p < 0.05$. The interaction graphs show that DNB^{AC} increased between T2 and T3 among boys and girls, but this increase was more pronounced for girls.

Figure 4. Changes in descriptive normative beliefs about alcohol consumption (DNB-AC) among boys and girls.



Notes: T2 = immediately after implementing the program, T3 = one year after implementing the program

6. Discussion and conclusions

The findings of this research study contribute to the important investigation of pre-testing effects (Peter, Sobowale, & Ekeanyanwu, 2013, De Villiers & Van den Berg, 2012). Firstly, it is important to consider if the effect of intervention using the pre- 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 Suicide awareness program was explored and the confirmation of pre-test sensitization effects in high school students' suicide awareness was confirmed (Spirito, Overholser, Ashworth, Morgan, & Benedict-Drew, 1988). The effect of a pre-test in terms of cognitive learning results was explored and it was found that the pre-test effect on an educational intervention depended on the type of instruction that was administered and the importance of pre-testing regarding prior knowledge related to educational intervention aims could influence the results (All, Castellar, & Van Looy, 2016). Pre-test 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 pre-testing sensitization as a factor which increases participants' sensitivity to 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). Despite the findings of the last study, it seems that the pre-test sensitization can be important especially for non-behavioural outcomes. The need of school-based studies and assessment of pre-test 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 pre-test 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...) 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 pre-testing 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, pre-testing 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).

The implementation of Unplugged with booster sessions and without pretesting could be an important factor for prevention of alcohol consumption by the decline of DNB^{AC}. This approach proves effective in fostering intrinsic motivation, particularly among girls who participated in the prevention program.

The limitations and strengths of this study must be highlighted. The most significant limitation was the use of self-reported measures, while a notable strength lies in the implementation of a cluster randomized controlled trial with a Solomon four-group design to mitigate the impact of pretest sensitization effects.

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References

- All, A., Castellar, E. P. N., & Van Looy, J. (2016). Assessing the effectiveness of digital game-based learning: Best practices. *Computers & Education*, *92*, 90-103.
- Braver, M. W., & Braver, S. L. (1988). Statistical treatment of the Solomon four-group design: A meta-analytic approach. *Psychological bulletin*, *104*(1), 150-154.
- Campbell, D. T., & Stanley, J. C. (2015). *Experimental and quasi-experimental designs for research*. Ravenio books.
- De Villiers, M., & Van den Berg, H. (2012). The implementation and evaluation of a resiliency programme for children. *South African Journal of Psychology*, *42*(1), 93-102.
- Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological inquiry*, *11*(4), 227-268.
- Dimova, E. D., Lekkas, P., Maxwell, K., Clemens, T. L., Pearce, J. R., Mitchell, R., ... & Shortt, N. K. (2023). Exploring the influence of local alcohol availability on drinking norms and practices: A qualitative scoping review. *Drug and alcohol review*, *42*(3), 691-703.
- Elek, E., Miller-Day, M., & Hecht, M. L. (2006). Influences of personal, injunctive, and descriptive norms on early adolescent substance use. *Journal of Drug Issues*, *36*(1), 147-172.
- François, A., Lindstrom Johnson, S., Waasdorp, T. E., & Bradshaw, C. P. (2017). Associations between adolescents' perceptions of alcohol norms and alcohol behaviors: incorporating within-school variability. *American Journal of Health Education*, *48*(2), 80-89.
- Hansen, W. B., Saldana, S., & Ip, E. H. S. (2022). Psychosocial indicators of adolescent alcohol, cigarette, and marijuana use: an analysis of normalized, harmonized, and pooled data. *Evaluation & the health professions*, *45*(4), 341-353.
- Lombardi, C. M., Coley, R. L., Sims, J., & Mahalik, J. R. (2019). Social norms, social connections, and sex differences in adolescent mental and behavioral health. *Journal of Child and Family Studies*, *28*(1), 91-104.
- McCambridge, J., Butor-Bhavsar, K., Witton, J., & Elbourne, D. (2011). Can research assessments themselves cause bias in behaviour change trials? A systematic review of evidence from Solomon 4-group studies. *PLoS One*, *6*(10), e25223.
- Öztürk, B., Siyez, D. M., Esen, E., & Kağnici, Y. (2020). Effects of infertility prevention programme on college students. *Sex Education*, *20*(5), 517-534.
- Peter, A., Sobowale, I., & Ekeanyanwu, N. (2013). Theory of Planned Behavior: Measuring Adolescents Media Literacy and Alcohol Drinking Expectancies. *Covenant Journal of Communication*, *(CJOC)*, *1*(2), 118-129.
- Sanchez, Z. M., Valente, J. Y., Fidalgo, T. M., Leal, A. P., Medeiros, P. F. D. P. D., & Cogo-Moreira, H. (2019). The role of normative beliefs in the mediation of a school-based drug prevention program: A secondary analysis of the #Tamojuntto cluster-randomized trial. *PLoS One*, *14*(1), e0208072.
- Spirito, A., Overholser, J., Ashworth, S., Morgan, J., & Benedict-Drew, C. (1988). Evaluation of a suicide awareness curriculum for high school students. *Journal of the American Academy of Child & Adolescent Psychiatry*, *27*(6), 705-711.
- Ullman, J. B., Stein, J. A., & Dukes, R. (2000). Evaluation of D.A.R.E. (Drug Abuse Resistance Education) with latent variables in the context of a Solomon Four Group Design. In J. S. Rose, L. Chassin, C. C. Presson, & S. J. Sherman (Eds.) *Multivariate Applications in Substance Use Research* (pp. 203-231). Lawrence Erlbaum: Mahwah, NJ, USA.
- Vadrucci, S., Vigna-Taglianti, F. D., van der Kreeft, P., & EU-Dap Study Group. (2016). The theoretical model of the school-based prevention programme Unplugged. *Global Health Promotion*, *23*(4), 49-58.
- Yamin, P., Fei, M., Lahlou, S., & Levy, S. (2019). Using social norms to change behavior and increase sustainability in the real world: A systematic review of the literature. *Sustainability*, *11*(20), 5847.