# Testing the Effect of Social Norms Theory-Based Interventions: Are They Harmful to University Students Who Drink Less Than the Peer Norm?

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**Abstract.** *Background*. Social norms theory-based interventions have been widely used to reduce alcohol consumption among college and university students. Lately, it has been argued that such interventions may actually increase alcohol use among light drinkers. However, little studies have been focused on testing this possible negative effect. *Objectives*. The aim of this study was to examine the possible negative impact of descriptive normative feedback (DNF) on drinking intentions among students whose baseline drinking scores were below the average of a reference group. We also studied the preventive effect of injunctive normative feedback (INF). *Methods.* Actual descriptive and injunctive norms were collected from 234 university students. From those who reported drinking below the norm, 26 were randomly assigned to a control or intervention condition that received normative feedback via PowerPoint presentations over two meetings. *Results.* DNF increased students' intentions of spirits drinking frequency and quantity. Meanwhile intentions to drink beer, cider, wine and cocktails remained the same. Increased intentions to drink spirits were not reduced by INF. *Conclusions.* Findings suggest that DNF-based interventions might negatively affect the use of spirits among those students who consume less than their peer norm by increasing their intentions to drink spirits more often and in larger quantities. Ways other than the INF to prevent this negative effect need to be further explored.

**Keywords:** social norms theory, boomerang effect, normative feedback, drinking intentions, students.

## Socialinių normų teorija pagrįstų intervencijų poveikis: ar jos gali būti žalingos mažiau už bendraamžių normą alkoholio vartojantiems studentams?

**Santrauka.** *Įvadas.* Socialinių normų teorija pagrįstų intervencijų efektyvumo mažinant studentų alkoholio vartojimą tyrimų rezultatai prieštaringi. Manoma, kad šios intervencijos veiksmingai mažina rizikingų vartotojų alkoholio vartojimą, tačiau gali skatinti mažiau ir rečiau už referentinės grupės narius alkoholio vartojančių asmenų vartojimą. *Tyrimo tikslas* – išsiaiškinti 1) galimą neigiamą normatyvinio grįžtamojo ryšio, perteikiančio realius alkoholio

vartojimo rodiklius (aprašomosios normos poveikis), poveikį mažiau už referentinės grupės vidurkį vartojančių alkoholio studentų ketinimams jo vartoti; 2) ar grįžtamojo ryšio pateikiama informacija apie alkoholio vartojimo priimtinumą referentinėje grupėje (įsakomosios normos poveikis) gali apsaugoti nuo minėto neigiamo poveikio. *Metodai*. Studentų alkoholio vartojimo ir požiūrio į bendraamžių vartojimą rodikliai buvo surinkti apklausiant 234 universiteto studentus. Iš jų eksperimente dalyvavo 26 mažiau ir rečiau už visų apklaustų studentų vidurkį alkoholio vartojantys studentai. Intervenciją sudarė normatyvinio grįžtamojo ryšio, perteikiančio studentų alkoholio vartojimą ir požiūrį į bendraamžių vartojimą, pristatymas. *Rezultatai*. Aprašomosios normos poveikį patyrę tyrimo dalyviai spiritinius gėrimus nurodė ketinantys vartoti didesniais kiekiais nei šio poveikio nepatyrę tyrimo dalyviai. Ketinimai suvartoti daugiau spiritinių gėrimų patyrus įsakomosios normos poveikį nesumažėjo. *Išvados*. Aprašomosios normos poveikio taikymas gali sustiprinti mažiau už referentinės grupės narius vartojančių studentų ketinimus vartoti spiritinius gėrimus didesniais kiekiais. Įsakomosios normos poveikis, kaip priemonė eliminuoti šį neigiamą efektą, galbūt nėra veiksmingas.

**Pagrindiniai žodžiai:** socialinių normų teorija, bumerango efektas, normatyvinis grįžtamasis ryšys, alkoholio vartojimo ketinimai, studentai.

University and college students are one of the social groups that report the heaviest drinking. In the United States, university/college attenders are significantly more likely to engage in binge and high-intensity drinking than their peers who are not students (Patrick & Terry-McElrath, 2017; Substance Abuse and Mental Health Services Administration, 2014). In Europe, binge drinking is most typical for Belgian, Irish, British and Polish students (Dantzer et al., 2006). In Lithuania, almost all university students reported alcohol consumption during the last 12 months and the last 30 days (92.4 and 84.9% respectively) (Dobrovolskij & Stukas, 2014). Although male students from Lithuania report drinking alcohol almost twice as often and in larger quantities as females (e. g. 5.98 times a month for men and 3.37 for women) (Baltrušaitytė & Bulotaitė, 2011), the consumption among women still remains risky.

Because of the frequent and intense alcohol use, students are at great risk to experience such chronic and infectious diseases as cancer, cardiovascular and liver diseases (Patra et al., 2009; Rehm & Shield, 2014), tuberculosis (Lönnroth et al., 2008) and HIV/AIDS (Baliunas et al., 2010). Risky drinking among students is also related to sexual abuse, depression, traumas, etc. (Geisner et al., 2012; Hingson et al., 2005; Kaysen et al., 2006). These negative physical and mental health consequences confirm the need and importance of alcohol prevention programs targeting university/college students.

For many years, Social norms approach (SNA)-based interventions have been successfully applied in order to reduce alcohol consumption among university/college students (Berkowitz, 2005; Doumas & Andersen, 2009; Miller et al., 2013; Perkins, 2003). SNA interventions mostly focus on how perceived descriptive norms (i. e. perceived prevalence of a particular behavior (Berkowitz, 2004)) influence human behavior (Berkowitz, 2005; Perkins, 2003). Empirical data show that students' perceptions of peer drinking has been linked to their own drinking directly (Perkins et al., 2005) or through intentions to drink (Pedersen et al., 2009; Rimal & Mollen, 2013). Further, most students tend to believe that other students drink more frequently and in larger quantities than they actually do (e.g. Granfield, 2005; Hagman et al., 2007; Perkins et al., 2005), i. e. they misperceive descriptive norms for drinking behaviour. Thus, SNA interventions-focused studies at-

tempt to reduce discrepancies between the perceived and the actual drinking behavior by providing students with actual group-specific normative rates of drinking (Berkowitz, 2005; Doumas & Andersen, 2009; Doumas & Haustveit, 2008; Glassman et al., 2016; Perkins, 2003; Perkins & Craig, 2006). The reference group should be sufficiently similar to individuals (e. g. same sex, age, etc.) to have influence on their behavior (Berkowitz, 2005; Larimer et al., 2011; Perkins, 2003; Phua, 2013).

However, despite the widespread use, efficacy studies have produced mixed results. Although the effectiveness of descriptive normative feedback (DNF) in reducing alcohol use among binge or risky drinkers is confirmed by numerous studies (e.g. Doumas & Andersen, 2009; Doumas & Haustveit, 2008; Glassman et al., 2016; Neighbors et al., 2016; Ridout & Campbell, 2014), there is empirical evidence that show no significant changes in students' alcohol consumption after the intervention. For example, Granfield (2005) found no significant differences in students' drinking frequency and quantity between the baseline year and the 3rd year follow-up. Moreover, few studies discovered that SNA interventions may have the opposite effect, i.e. increase students' alcohol consumption (Wechsler et al., 2003).

There are only few studies focused on the negative impact of DNF (Prince et al., 2014; Schultz et al., 2007). Schultz et al. (2007) found significant increases in electric energy consumption after DNF was provided but only for those who reported using less electricity than the average of their neighborhood. According to Berkowitz (2004), descriptive norms act as a standard which people strive to conform. Typically, people measure the appropriateness of their behavior by how far they are from the norm. Since SNA interventions provide people with DNF, it can serve as a standard of comparison for their own behavior with the one of the reference group and being above or below the norm is perceived as being deviant (Schultz et al., 2007). Therefore, descriptive normative information may have an impact on behavior of individuals who are both above and below that norm. According to this, initial individuals' drinking rates (being above or below the norm) might be a convincing explanation for a negative impact of SNA interventions on alcohol consumption (Wechsler et al., 2003). Therefore, it might be assumed that DNF may increase drinking among individuals who normally consume less than the reference group norm. This negative impact is called a *boomerang effect* (Schultz et al., 2007). According to the focus theory of normative conduct, the norm that is prominent in individuals' consciousness will influence their behaviour (Cialdini et al., 1991). Since injunctive norm that reflects the approval of a particular behavior in a referent group is the second type of social norms (Berkowitz, 2004), it might be efficient to add injunctive normative information to SNA interventions. Since the descriptive-plus-injunctive normative feedback produced no change in energy consumption for low-consuming households (Schultz et al., 2007), it could be believed to have potential to also prevent the boomerang effect for drinkers who consume less than the norm. However, Prince et al. (2014) examined four samples of lighter drinkers (consumed less than the typical student) who received personalized normative feedback and found no increase in drinking. Nevertheless, since only few research that studied the boomerang effect were found, it can be assumed that

possible negative impact of DNF for people who drink less than the norm is still unclear and more research is needed to better understand it.

Thus, the primary aim of this study was to examine possible negative impact of DNF on intentions to drink among students whose baseline drinking scores were below the average of the reference group (boomerang effect). Moreover, we sought to investigate the preventive effect of INF in the case of the boomerang effect. To the best of our knowledge this is the first randomized controlled trial which examines the potential boomerang effect among lighter drinkers. Furthermore, unlike previous research (e.g. Doumas & Andersen, 2009; Neighbors et al., 2016; Prince et al., 2014), we focused on intentions to drink specific types of alcoholic beverages (beer, wine, cider, alcoholic cocktails and spirits) rather than drinking in general.

## Method

### Participants

Undergraduate and postgraduate students from the Faculty of Social Sciences at Vytautas Magnus University (Lithuania) were invited to participate in the baseline study during different lectures. Students who reported drinking less than the average of the reference group were eligible to participate in the experiment. Of 234 volunteer students (208 women and 26 men) who filled out a questionnaire at the baseline, 124 (52.9%) met the inclusion criteria and 46 (37%) of them expressed interest in participating in the further study. In the original study, participants were randomly assigned into 3 groups, but taking into account the aim of this study, the results of only two groups were analyzed. Thus, the final sample of the experiment consisted of 26 students (24 female, $=24.04$ years, SD $= 5.702$).

### Measures

*Alcohol use.* The modified version of Drinking Patterns Scale from Student Alcohol Questionnaire (SAQ) (Engs, 1997) consisted of ten 5-point Likert-type items and asked participants to report how often and how much they usually drink beer, wine, cider, alcoholic cocktails and spirits. Drinking frequency was investigated with the questions: "How often on the average do you usually have a specific beverage?". Drinking quantity was measured using the questions: "When you drink a specific beverage, how much, on the average, do you usually drink at any one time?". The alternatives ranged from 1 (every day; more than 6 standard drinks) to 5 (once a year or less; less than 1 standard drink). We defined a standard drink as a beverage that contains approximately 10 ml of ethyl alcohol (specifically, 250 ml of beer or cider, 120 ml of wine and 32 ml of spirits (Babor & Higgins-Biddle, 2001; World Health Organization, 2000). In case of not drinking any particular beverage at all, students were asked to proceed to other questions. The scale had high internal consistency (Cronbach's α = 0.815). Participants' baseline drinking rates were used to create DNF on beverage-specific drinking frequency and quantity and to recruit those who drank less than the average of other students.

Personal approval of peer drinking. In order to create INF, participants were presented with 5 different situations and asked to rate how much they approve of other students' drinking on a five-point Likert scale. According to previous studies (Collins & Spelman, 2013; Krieger et al., 2016), drinking situations included drinking every day, drinking every weekend, driving after drinking, drinking until getting very drunk and drinking until passing out. Item responses ranged from "1 – strongly disapprove" to "5 – strongly approve". In addition, participants were asked to answer two open-ended questions: "What is your opinion of students who drink alcohol every day?" and "What is your opinion of students who drink alcohol every weekend?". Since most answers were negative, some of them were used as examples that illustrated students' disapproval of drinking among their peers.

Drinking intentions. On the basis of Drinking Patterns Scale (Engs, 1997), participants were asked to report how often and how much beer, wine, cider, alcoholic cocktails and spirits they intend to drink (Cronbach's $\alpha = 0.806$). The only difference between this scale and Drinking Patterns Scale (Engs, 1997) was the measure of how often and how much participants intend to drink a specific beverage instead of actually drink it.
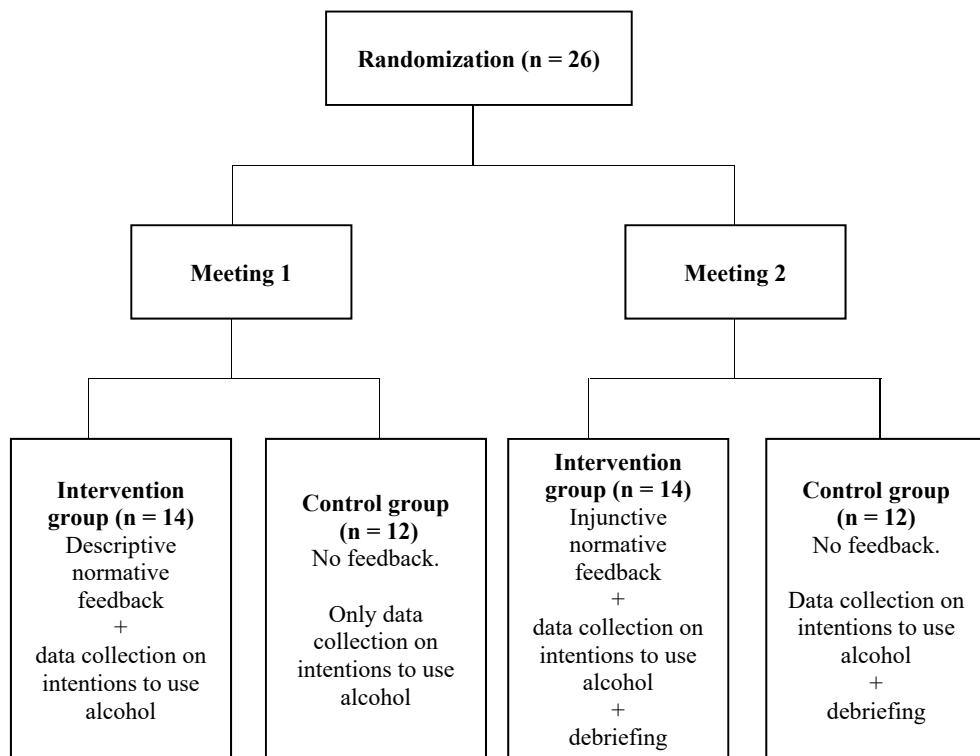
*Procedure*



*Figure 1. The scheme of the experiment*

The study consisted of the baseline assessment and the experiment. During the baseline session, participants were asked to sign an informed consent and filled out the questionnaire that consisted of demographic questions, Alcohol Drinking Patterns Scale and questions measuring students' approval of their peer drinking in different situations. The experimental study consisted of two meetings separated by 7 days. Before coming to the 1st meeting, participants were randomly assigned to *intervention* (received both DNF and INF, n = 14) and *control* (no feedback, n = 12) *groups.* The scheme of the experiment is shown in Figure 1. The study was approved by the University's Institutional Review Board.

At the beginning of the first meeting, all participants signed another informed consent related to the participation in the experiment. At the end of the second meeting, all participants received an oral debriefing during which the original idea of the research, key SNA assumptions and real results of the baseline study were discussed. Few students claimed that information that they were drinking less often and in smaller amounts than others encouraged them to keep that drinking level.

### Intervention

DNF and INF were based on the baseline scores of personal drinking and approval of other students' drinking. Both feedbacks were presented using *powerpoint* presentations. The referent group was typical student of the Faculty of Social Sciencies at Vytautas Magnus University. We chose a gender-neutral feedback because of a very small number of men participated in the experiment (n = 2).

Descriptive normative feedback. The prevalence of drinking was calculated among students who reported current drinking at the baseline. Overall, results revealed sufficiently low levels of students' drinking frequency (mean – 3,88) and quantity (mean – 4,04) – actual drinking norms were drinking more than once a year but less than once a month and consuming 1 or 2 standard drinks at any one time. Looking at each beverage separately, results showed that the majority of the participants reported drinking beer and wine at least once a month, but less than once a week (38,8% and 35,5% respectively), alcoholic cocktails and spirits – more than once a year, but less than once a month (38,6% and 44,2% respectively), cider was used least often – only once a year or even less (50,7%). On a single occasion, most of the students reported having only 1 or 2 standard drinks of beer (52,4%), cider (57,5%), wine (40,9%), alcoholic cocktails (50,6%) and slightly more spirits – 3 or 4 standard drinks (31,2%). For more detailed distribution of participants' drinking frequency and quantity, see Appendix.

According to the purpose of this study, the sample of the experiment should have been consisted of those students who drank less than their peers (i.e., less than actual drinking norms collected at baseline study). Thus, according to the above-mentioned drinking averages of the reference group, those students who reported drinking different alcoholic beverages once a year or less and consuming less than 1 standard drink per one occasion (n = 14) should have been invited to participate in the further experiment. In such case, however, a potential sample would have been consisted of the minority of students who participated in the baseline study. Therefore, in order to maximize the number of

participants who met the main inclusion criteria (drinking less than the norm), actual norms of drinking frequency and quantity were purposely increased. As actual rates of drinking frequency and quantity varied across different beverages with the highest rates of drinking at least once a week but not every day (e.g., beer, wine) and consuming 3 or 4 standard drinks (e.g., spirits), we increased actual norms by one point from the highest rate and decided to make them equal for all beverages. Thus, actual drinking norms were considered as *drinking at least once a week but not every day* and *consuming 5 or 6 standard drinks per one occasion*. This means that participants were presented with falsified results of the baseline study when delivering DNF during the first session. For instance, most of the students actually drank beer at least once a month, but less than once a week (38,8%) and consumed 1 or 2 standard drinks per one ocassion (52,4%) (*actual norm*). Instead, participants were told that most of their peers drink beer at least once a week but not every day (70%) and consume 5 or 6 standard drinks per one occasion (58%) (*falsified norm*). For actual and falsified norms of all beverages' drinking frequency and quantity see Appendix. Overall, 124 students who reported drinking less than above-mentioned falsified norms were invited to participate in further experiment.

*Injunctive normative feedback.* Overall, baseline results revealed negative students' attitudes towards drinking among their peers. The majority of students strongly disapproved of their peers' drinking every day (74.9%), driving after drinking (95.7%), drinking until getting very drunk (61.5%) and drinking until passing out (90.9%). Students held most permissive but still negative attitudes towards drinking every weekend (39.9% disapproved and 29.9% strongly disapproved). Therefore, INF reflected actual results of the baseline study. In order to strengthen its effect, several answers that illustrated students' disapproval of their peers' drinking were also presented (e.g. "I think they have serious psychological, social or family problems", "Self disrespect, misunderstanding, waste of time. I do not agree!", "This is very irresponsible behavior that promotes the degradation of society").

## Results

Version 16 of Statistical Package for the Social Sciences (SPSS) was used for statistical data analysis. Due to the very small number of male participants (n = 2), the results of men and women were analyzed together. Missing values for baseline drinking and intentions to drink different beverages were coded as 1 (doesn't drink or doesn't intend to drink at all). Overall, drinking variables were reversed and coded on a 6-point scale ranging from 1 (no drinking/intentions to drink) to 6 (drinking/intend to drink every day and consuming/intend to consume more than 6 standard drinks). Since these variables were ordinal and did not follow a normal distribution (according to Shapiro Wilk test, $p < .05$) we used non-parametric tests for statistical data analysis.

### Baseline drinking differences

Baseline drinking differences between intervention and control groups were calculated using Mann-Whitney U test. As shown in Table 1, neither drinking frequency nor con-

sumed amount of beer, cider, wine, alcoholic cocktails and spirits significantly differed between intervention and control groups at the baseline study (p > .05). Thus, it can be assumed that randomization was successful.

*Table 1. **Mann-Whitney U tests scores showing group differences in baseline drinking between intervention and control groups.***

| | Group | M (SD) | 95% CI | | Mean Rank | U | p |
|---|---|---|---|---|---|---|---|
| | | | Lower | Upper | | | |
| *Beer* | | | | | | | |
| Frequency | Intervention (n = 14) | 3,00 (1,038) | 2,40 | 3,60 | 14,79 | 66,000 | 0,333 |
| | Control (n = 12) | 2,50 (1,382) | 1,62 | 3,38 | 12,00 | | |
| Quantity | Intervention (n = 14) | 2,93 (0,829) | 2,45 | 3,41 | 15,00 | 63,000 | 0,255 |
| | Control (n = 12) | 2,33 (1,303) | 1,51 | 3,16 | 11,75 | | |
| *Cider* | | | | | | | |
| Frequency | Intervention (n = 14) | 2,00 (0,961) | 1,45 | 2,55 | 13,50 | 84,000 | 1,000 |
| | Control (n = 12) | 2,00 (0,953) | 1,39 | 2,61 | 13,50 | | |
| Quantity | Intervention (n = 14) | 2,14 (1,027) | 1,55 | 2,74 | 13,64 | 82,000 | 0,913 |
| | Control (n = 12) | 2,08 (0,900) | 1,51 | 2,66 | 13,33 | | |
| *Wine* | | | | | | | |
| Frequency | Intervention (n = 14) | 2,79 (0,699) | 2,38 | 3,19 | 13,50 | 84,000 | 1,000 |
| | Control (n = 12) | 2,83 (0,937) | 2,24 | 3,43 | 13,50 | | |
| Quantity | Intervention (n = 14) | 3,00 (0,555) | 2,68 | 3,32 | 14,36 | 72,000 | 0,495 |
| | Control (n = 12) | 2,83 (0,835) | 2,30 | 3,36 | 12,50 | | |
| *Cocktails* | | | | | | | |
| Frequency | Intervention (n = 14) | 2,29 (1,139) | 1,63 | 2,94 | 12,96 | 76,500 | 0,687 |
| | Control (n = 12) | 2,42 (0,996) | 1,78 | 3,05 | 14,13 | | |
| Quantity | Intervention (n = 14) | 2,36 (1,082) | 1,73 | 2,98 | 12,79 | 74,000 | 0,591 |
| | Control (n = 12) | 2,58 (0,996) | 1,95 | 3,22 | 14,33 | | |
| *Spirits* | | | | | | | |
| Frequency | Intervention (n = 14) | 2,50 (0,855) | 2,01 | 2,99 | 15,89 | 50,500 | 0,071 |
| | Control (n = 12) | 1,83 (1,030) | 1,18 | 2,49 | 10,71 | | |
| Quantity | Intervention (n = 14) | 2,93 (1,207) | 2,23 | 3,63 | 15,14 | 61,000 | 0,218 |
| | Control (n = 12) | 2,17 (1,403) | 1,27 | 3,06 | 11,58 | | |

*Note. Raw means, SDs and confidence intervals for means are provided in order to facilitate interpretation. Higher means indicate more frequent drinking and larger amounts of alcohol consumed (ranging from 1 (not drinking at all) to 6 (drinking every day and consuming 6 or more standard drinks).*

### The impact of DNF on drinking intentions

The dependent variables of interest were intended beverage-specific drinking frequency and quantity. In order to test the effect of DNF, we analysed group differences in drinking intentions after the first meeting using Mann-Whitney U test (see Table 2).

Table 2. **Mann-Whitney U tests scores showing group differences in drinking intentions between intervention and control groups after the first meeting.**

| | Group | M (SD) | 95% CI | | Mean Rank | U | p |
|---|---|---|---|---|---|---|---|
| | | | Lower | Upper | | | |
| *Beer* | | | | | | | |
| Frequency | Intervention (n = 14) | 2,93 (1,385) | 2,13 | 3,73 | 13,11 | 78,500 | 0,772 |
| | Control (N = 12) | 3,08 (1,165) | 2,34 | 3,82 | 13,96 | | |
| Quantity | Intervention (n = 14) | 2,79 (1,311) | 2,03 | 3,54 | 13,43 | 83,000 | 0,957 |
| | Control (N = 12) | 2,75 (1,055) | 2,08 | 3,42 | 13,58 | | |
| *Cider* | | | | | | | |
| Frequency | Intervention (n = 14) | 1,86 (1,027) | 1,26 | 2,45 | 12,79 | 74,000 | 0,585 |
| | Control (N = 12) | 2,00 (0,853) | 1,46 | 2,54 | 14,33 | | |
| Quantity | Intervention (n = 14) | 2,14 (1,512) | 1,27 | 3,02 | 13,25 | 80,500 | 0,849 |
| | Control (N = 12) | 2,00 (0,953) | 1,39 | 2,61 | 13,79 | | |
| *Wine* | | | | | | | |
| Frequency | Intervention (n = 14) | 3,14 (1,027) | 2,55 | 3,74 | 13,64 | 82,000 | 0,914 |
| | Control (N = 12) | 3,08 (0,793) | 2,58 | 3,59 | 13,33 | | |
| Quantity | Intervention (n = 14) | 3,00 (0,679) | 2,61 | 3,39 | 14,57 | 69,000 | 0,410 |
| | Control (N = 12) | 2,83 (1,030) | 2,18 | 3,49 | 12,25 | | |
| *Cocktails* | | | | | | | |
| Frequency | Intervention (n = 14) | 2,57 (1,158) | 1,90 | 3,24 | 13,46 | 83,500 | 0,978 |
| | Control (N = 12) | 2,58 (0,669) | 2,16 | 3,01 | 13,54 | | |
| Quantity | Intervention (n = 14) | 2,64 (1,008) | 2,06 | 3,22 | 12,57 | 71,000 | 0,443 |
| | Control (N = 12) | 3,00 (0,603) | 2,62 | 3,38 | 14,58 | | |
| *Spirits* | | | | | | | |
| Frequency | Intervention (n = 14) | 2,57 (0,756) | 2,13 | 3,01 | 16,57 | 41,000 | **0,019** |
| | Control (N = 12) | 1,75 (0,965) | 1,14 | 2,36 | 9,92 | | |
| Quantity | Intervention (n = 14) | 3,07 (1,328) | 2,30 | 3,84 | 16,50 | 42,000 | **0,026** |
| | Control (N = 12) | 1,92 (1,311) | 1,08 | 2,75 | 10,00 | | |

*Note. During the first meeting, DNF was delivered to intervention group. Raw means, SDs and confidence intervals for means are provided in order to facilitate interpretation. Higher means indicate more frequent drinking and larger amounts of alcohol consumed (ranging from 1 (not drinking at all) to 6 (drinking every day and consuming 6 or more standard drinks).*

As can be seen in Table 2, only intentions of spirits drinking frequency (p < 0.05) and quantity (p < 0.05) significantly differed between intervention and control groups. Participants in the intervention condition reported intentions to drink spirits more frequently and in larger quantities (means were 3.01 and 3.84 respectively) than those in the control group (means were 2.36 and 2.75 respectively). Effect sizes *r* were .46 (for spirits drinking frequency) and .44 (for spirits drinking quantity) that, according to Cohen's guidelines (Coolican, as cited in Fritz et al., 2012), indicated medium effects.

### The protective effect of INF on drinking intentions

Having known that only intentions to drink spirits were affected by DNF, in order to test the protective effect of INF, we analysed within-group changes in intentions to drink spirits during the study using Wilcoxon signed-rank test. Results showed no significant differences between intended spirits drinking frequency and quantity after the 1st meeting compared to the intentions after the 2nd meeting neither within intervention nor within control groups (p > .05) (see Table 3).

*Table 3.* **Results of Wilcoxon signed-rank test of changes in intentions to drink spirits during the study.**

| | Intervention group (N = 14) | | Control group (N = 12) | |
|---|---|---|---|---|
| Spirits | After the 1st meeting | After the 2nd meeting | After the 1st meeting | After the 2nd meeting |
| *Frequency* | | | | |
| M (SD) | 2,57 (0,756) | 2,64 (0,929) | 1,75 (0,965) | 1,83 (1,030) |
| 95% CI (lower; upper) | (2,13; 3,01) | (2,11; 3,18) | (1,14; 2,36) | (1,18; 2,49) |
| Negative Ranks, n (Sum of Ranks) | 1 (2) | | 0 (0) | |
| Positive Ranks, n (Sum of Ranks) | 2 (4) | | 1 (1) | |
| Z | −0,577 | | −1,000 | |
| p | 0,564 | | 0,317 | |
| *Quantity* | | | | |
| M (SD) | 3,07 (1,328) | 2,86 (1,351) | 1,92 (1,311) | 2,00 (1,348) |
| 95% CI (lower; upper) | (2,30; 3,84) | (2,08; 3,64) | (1,08; 2,75) | (1,14; 2,86) |
| Negative Ranks, n (Sum of Ranks) | 3 (10) | | 0 (0) | |
| Positive Ranks, n (Sum of Ranks) | 2 (5) | | 1 (1) | |
| Z | −0,707 | | −1,000 | |
| p | 0,480 | | 0,317 | |

*Note. DNF was delivered to intervention group during the first meeting, INF – during the second meeting. Raw means, SDs and confidence intervals for means are provided in order to facilitate interpretation. Higher means indicate more frequent drinking and larger amounts of spirits consumed (ranging from 1 (not drinking at all) to 6 (drinking every day and consuming 6 or more standard drinks).*

Overall, the findings provided only partial confirmation of the negative effect of DNF on drinking intentions. However, no protective effect of INF was revealed.

## Discussion

This study focused on the negative effect of DNF and the protective effect of INF on drinking intentions among students who consume less than the norm.

The results revealed that only intentions of spirits drinking frequency and quantity were negatively affected by the DNF. However, intentions to drink beer, cider, wine and alcoholic cocktails remained the same. Since only few significant effects were found, it might be assumed that our findings are partially consistent with previous research that revealed the destructive power of DNF on electric energy consumption (Schultz et al., 2007). On the other hand, our results partially contradict the study where no negative effects of DNF on alcohol consumption among light drinkers who consumed less than the campus norm were found (Prince at. al., 2014). This contradiction may be explained by different ways to measure alcohol consumption. We analyzed effects of DNF on intentions to drink separate alcoholic beverages while Prince et al. (2014) measured overall drinking regardless of the type of alcohol. This suggests that more details about the effect of DNF may be revealed when studying drinking of each alcoholic beverage separately rather than together. Moreover, it is possible that DNF only negatively affected intentions to drink spirits due to the small discrepancy between the actual and presented spirits drinking norm. That is, at the baseline study most students reported consuming spirits in larger quantities (3–4 standard drinks) than other beverages (e.g., 1–2 standard drinks of beer). Since the presented norm for consumed amount of all alcoholic drinks per one ocassion was 5–6 drinks, it is possible that the negative effect of DNF on alcohol use among drinkers who drink less than their peers appears only if the discrepancy between the actual and presented norm is quite small. Comments from some intervention group participants on delivered DNF would also support this assumption: the information that other students' alcohol use exceeded their own drinking encouraged keeping that low drinking level.

Unfortunately, increased intentions to drink more spirits remained the same after INF had been delivered. Therefore, in contrary to previous findings (Schultz et al., 2007), our study does not provide support for the efficacy of INF as a tool to reduce the negative effect of DNF. Our results suggest that the negative effect of feedback that contains actual norms of spirits drinking might be much stronger than the protective power of injunctive normative information.

However, these results should be interpreted in the light of some limitations. Since only students who reported lower baseline drinking scores than their peer norm participated in the experiment, we had a very small sample size. Moreover, the majority of the participants were female. Despite the fact that one hypothesis was partially confirmed a larger sample size would have been helpful in detecting more significant relationships from the data. The effects of normative feedback could have also depended on the age of participants. Previous research suggests that students aged 18–23 years are most easily

affected and the influence of others on alcohol consumption decreases as the age of students increases (Gilla, 2012). Since the average age of this study participants was 24.04 years, it is possible that they were already more resistant to the influence of others as well as to the effect of social norms-based feedback which represent informal rules and behavioral expectations within a group of people. Furthermore, some previous studies conclude that in order to strenghten the effectiveness of normative feedback to change the behavior, the reference group should be similar to individuals' own characteristics (for instance, same sex, ethnicity, soubgroup or etc.) (Larimer et al., 2011; Phua, 2013). Therefore, it is likely that the reference group of this study (typical students of the same faculty) was too distal to cause predicted effects. Also, in this study, DNF and INF were delivered only once, which may not have been long enough to produce any significant changes (Berkowitz, 2004).

Therefore, future research should further study negative effects of normative feedback-based interventions by increasing the sample size consisting of a similar number of women and men as well as using more specific referents (e.g., same sex, year at university, occupation etc.). Moreover, investigating negative effects of DNF on drinking behavior (not only intentions) might prove important as well as conducting longer-lasting intervention. Finally, further studies should focus on ways other than INF to effectively eliminate undesirable effects of DNF.

To sum up, this study has helped in better understanding the effect of SNA interventions on alcohol use. Specifically, results showed that DNF-based interventions might negatively affect the use of spirits among those students who consume less than their peer norm by increasing intentions to drink spirits more often and in larger quantities. Nevertheless, with reference to above-mentioned limitations, more research on these assumptions needs to be conducted.

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*Appendix.* **Table of actual and falsified data on different beverages' drinking frequency and quantity.**

| | Actual data n (%) | Falsified data n (%) |
|---|---|---|
| *Beer* | | |
| *Frequency* | | |
| Every day | – | – |
| At least once a week but not every day | 19 (11,2%) | **151 (70%)** |
| At least once a month but less than once a week | **66 (38,8%)** | 39 (18%) |
| More than once a year but less than once a month | 47 (27,6%) | 21 (10%) |
| Once a year or less | 38 (22,4%) | 4 (2%) |
| Total | 170 (100%) | 215 (100%) |
| *Quantity* | | |
| More than 6 standard drinks | 1 (0,6%) | 15 (7%) |
| 5 or 6 standard drinks | 9 (5,3%) | **125 (58%)** |
| 3 or 4 standard drinks | 32 (18,8%) | 49 (22,9%) |
| 1 or 2 standard drinks | **89 (52,4%)** | 11 (5,3%) |
| Less than 1 standard drink | 39 (22,9%) | 15 (6,8%) |
| Total | 170 (100%) | 215 (100%) |
| *Cider* | | |
| *Frequency* | | |
| Every day | – | – |
| At least once a week but not every day | 2 (1,4%) | **80 (54,9%)** |
| At least once a month but less than once a week | 17 (11,6%) | 57 (38,6%) |
| More than once a year but less than once a month | 53 (36,3%) | 7 (5%) |
| Once a year or less | **74 (50,7%)** | 2 (2,5%) |
| Total | 146 (100%) | 146 (100%) |
| *Quantity* | | |
| More than 6 standard drinks | – | 2 (1,4%) |
| 5 or 6 standard drinks | 2 (1,4%) | **93 (63,5%)** |
| 3 or 4 standard drinks | 13 (8,9%) | 47 (32,2%) |
| 1 or 2 standard drinks | **84 (57,5%)** | 2 (1,5%) |
| Less than 1 standard drink | 47 (32,2%) | 2 (1,4%) |
| Total | 146 (100%) | 146 (100%) |
| *Wine* | | |
| *Frequency* | | |
| Every day | – | – |
| At least once a week but not every day | 10 (4,9%) | **149 (73,2%)** |
| At least once a month but less than once a week | **72 (35,5%)** | 31 (15,3%) |
| More than once a year but less than once a month | 70 (34,5%) | 12 (6,2%) |
| Once a year or less | 51 (25,1%) | 11 (5,3%) |

| | Actual data n (%) | Falsified data n (%) |
|---|---|---|
| Total | 203 (100%) | 203 (100%) |
| *Quantity* | | |
| More than 6 standard drinks | 2 (1%) | 32 (16%) |
| 5 or 6 standard drinks | 15 (7,4%) | **159 (78,2%)** |
| 3 or 4 standard drinks | 59 (29,1%) | 5 (2,4%) |
| 1 or 2 standard drinks | **83 (40,9%)** | 4 (1,8%) |
| Less than 1 standard drink | 44 (21,7%) | 3 (1,6%) |
| Total | 203 (100%) | 203 (100%) |
| *Cocktails* | | |
| *Frequency* | | |
| Every day | – | – |
| At least once a week but not every day | 4 (2,3%) | **117 (66,6%)** |
| At least once a month but less than once a week | 42 (23,9%) | 42 (23,9%) |
| More than once a year but less than once a month | **68 (38,6%)** | 12 (6,7%) |
| Once a year or less | 62 (35,2%) | 5 (2,8%) |
| Total | 176 (100%) | 176 (100%) |
| *Quantity* | | |
| More than 6 standard drinks | 2 (1,1%) | 30 (17%) |
| 5 or 6 standard drinks | – | **103 (58,3%)** |
| 3 or 4 standard drinks | 50 (28,4%) | 36 (20,8%) |
| 1 or 2 standard drinks | **89 (50,6%)** | 5 (2,8%) |
| Less than 1 standard drink | 30 (17%) | 2 (1,1%) |
| Total | 176 (100%) | 176 (100%) |
| *Spirits* | | |
| *Frequency* | | |
| Every day | – | – |
| At least once a week but not every day | 3 (1,9%) | **116 (59,8%)** |
| At least once a month but less than once a week | 22 (14,3%) | 64 (33,2%) |
| More than once a year but less than once a month | **68 (44,2%)** | 10 (5,2%) |
| Once a year or less | 61 (39,6%) | 3 (1,8%) |
| Total | 154 (100%) | 193 (100%) |
| *Quantity* | | |
| More than 6 standard drinks | 13 (7,8%) | 73 (37,6%) |
| 5 or 6 standard drinks | 11 (7,1%) | **82 (42,4%)** |
| 3 or 4 standard drinks | **48 (31,2%)** | 15 (7,8%) |
| 1 or 2 standard drinks | 45 (29,2%) | 14 (7,1%) |
| Less than 1 standard drink | 38 (24,7%) | 9 (5,1%) |
| Total | 154 (100%) | 193 (100%) |