



Risks & Challenges: Effectiveness Assessment of a Preventive Program on Addictive Behaviors and Dependencies amongst Students in Higher Education

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Abstract

Background: There is relevant scientific evidence supporting the need to invest in preventing the use of psychoactive substances in higher education, particularly amongst first-year university students.

Goals: The purpose of this research was to assess the effectiveness of an original prevention program, the *Risks & Challenges*, in reducing psychoactive substance use and its negative consequences, as well as to assess its effectiveness in reducing the exposure to risk factors and enhancing the effect of protection factors related to addictive behaviors among university students.

Methods: This is a community based open-label controlled trial. The sample consisted of first-year students from the University of Minho, in Portugal, who voluntarily enrolled in the Risks & Challenges Program. Data were collected at baseline, post-intervention and at a 6-months follow-up. Students were randomly assigned to intervention and control groups. In addition to collecting sociodemographic and psychoactive substance-use data, the following instruments were self-administered: AUDIT, Self-Control Scale, Sensation Seeking Scale Version V, Academic Experience Questionnaire, Rosenberg Global Self-esteem Scale and Beck Depression Inventory.

Results: The study involved 228 students. Students allocated to the intervention group ($n = 98$) reported a significant reduction in alcohol consumption as well as in the expectations for cannabis and alcohol use. Furthermore, the intervened students improved in personal and interpersonal dimensions of academic experiences and in self-esteem, with significant decrease of depression, anger and tension indicators.

Discussion: These findings support the conclusion that the Risks & Challenges Program can be a valuable tool for preventing drug use in first-year university students. Significant preventive effects were found, reinforcing the relevance of using this program among higher-education students.

Keywords: Prevention, Addiction, Risk behavior, Effectiveness evaluation, Adolescents.

Introduction

The science of prevention postulates that negative health outcomes such as alcohol abuse can be prevented by reducing or eliminating risk factors and by reinforcing protective factors in individuals and their contexts throughout development (Becoña, 2002; Hawkins, Catalano & Miller, 1992). Risk and protection

factors cover different spheres (community, family, school, peer group and individual) and allow to better understand, explain and predict, in many cases, the drug or non-drug use.

Taking into consideration that not every risk and protective factors tend to have an enduring character, preventive programs are geared toward promoting

protectors (e.g., social skills, perception of self-efficacy, adaptive skills, positive social orientation, future aims, etc.) and reducing the risk factors (e.g., depression, aggressiveness, favorable attitudes toward drug use, lack of healthy ethical and moral values, etc.) (Becoña, 2010; Catalano et al, 2012).

Interventions that reduce multiple risk factors in individuals and their socialization contexts are promising in preventing many health and behavioral problems in adolescents, including tobacco and other drug abuse, sexual risk behavior, violence, delinquency and school drop-out (Becoña, 1999, 2002, 2012; Brook, Brook, Richter & Whiteman, 2006; Hawkins, Catalano & Weis, 2002; Lochman, 2006).

One of the most suitable environments for developing these programs are educational settings, from pre-school to university education. The prevalence of psychoactive substance use increases with age and reaches its peak in early adulthood, particularly in the transition from secondary school to higher education (Becoña, 2010; Botvin & Griffin, 2007; Catalano et al., 2012, Centre for Addictions Research of British Columbia, 2008; Kirst et al., 2014). In several countries, studies carried out at university show high prevalence of consumption, especially alcohol, followed by cannabis and psychostimulants (Ferreira et al., 2013; Helmer et al., 2014; Terry-McElrath et al., 2013; Van Well et al., 2016). University students are vulnerable to intensive drinking, being easily exposed to immediate health risks such as alcohol and substance use. Long-term exposure can lead to alcohol dependency or similar risk effects (Hingson & White, 2010; Karam, Kypri & Salamoun, 2007; Scott-Sheldon, Carey, Elliott, Garey & Carey, 2014). University is, for many young people, the place of first contacts with substances, such as tobacco, alcohol, cannabis, synthetic drugs, cocaine, etc. Hence the importance of working with these young people who, in addition, are under strong pressure from the recreational industry to experiment drugs.

Research reveals the importance of changing social contexts in this age group, usually characterized by greater freedom and less social control. For example,

admission to university, when leaving parents' home, is related to an increase in substance use (Stone, Becker, Huber & Catalano, 2012). Additional demands appear, such as making new friends, developing autonomy, academic success, and peer pressure, which may constitute risk factors for drug use and abuse (Larimer et al., 2005; Polymerou, 2007; Stone, Becker, Huber & Catalano, 2012). The age of entry into higher education is associated with distinct developmental transitions. An appropriate transition will promote success, whereas a maladaptive transition can be a source of problems, especially if drug use is present and is intense (abuse or addiction). Likewise, inadequate transitions, maladaptation, emotional or personal problems and substance use, all increase the likelihood of poor academic outcomes.

In many preventive programs, risk and protective factors are analyzed as variables mediating efficacy. Indeed, facilitating good functioning in all walks of life is essential considering that this will promote the development of a healthy lifestyle. It can attenuate the enormous social and personal cost of addictions (abuse and addiction, physical illness, mental disorders, dropping out of college, family conflicts, legal problems, etc.). These aspects were considered in the design and validation of the Risks & Challenges Program here proposed ("Programa Riscos & Desafios", in its Portuguese formulation).

The purpose of this research was the implementation of a community trial to examine the effectiveness of an original prevention program in reducing consumption, in minimizing negative consequences of substance consumption, and in reducing risk factors and promoting protection factors related to consumer behavior among university students.

The hypothesis of the study was that students who participated in the Risks & Challenges Program would show significantly less consumption of alcohol, tobacco and cannabis, less negative consumption consequences, fewer risk factors and greater gains in protection factors, when compared to students not participating in the Program. Specifically, it was considered that students of the intervention group would

develop significantly less positive attitudes towards substance use, more accurate perception of risk of substance consumption, reduced awareness of drug availability and of drug-use among friends. In relation to the other variables mediating the consumption of psychoactive substances, it was hypothesized that students allocated to the intervention group would develop significantly more self-esteem, more self-control, better emotional regulation, better adaptation to university, less sensation seeking and less depression than students allocated to the control group.

Methods

This study followed an experimental design. It is an open-label community controlled trial with evaluations at baseline, post-intervention and follow-up (six months after the end of the intervention).

Participants

The target population of this research were students attending the first year of the University of Minho, who voluntarily enrolled in the Risks & Challenges Program in the academic years of 2012/2013 and 2013/2014. The recruitment of the participants followed a non-probabilistic sampling, resulting from different forms of dissemination, addressed to new students of the University of Minho (e.g., email message, posters, information leaflets, direct dissemination by peers during the reception week and by health professionals in the classroom context). Enrolled students were randomly assigned to the intervention group and to the control group

Intervention: Risks & Challenges Program

The Risks & Challenges Program is an extracurricular, comprehensive and multi-component competence enhancement-based preventive intervention. The program is aimed at students attending the first year of higher education (university) and is composed of a set of eight two-hours weekly sessions, implemented in group format (Rocha & Becoña, 2017). It addresses cognitive, attitudinal, emotional, behavioral and social contents related to the use of alcohol and other psychoactive substances (e.g., communication, problem

solving and decision making, emotional regulation, assertiveness, college adaptation, positive relations, risk perception, normative beliefs). These skills are practised using a combination of interactive techniques including group discussion, dynamic games, demonstration and brainstorming, among others. The program handbook (*Risks & Challenges Program Manual*, in press) has detailed plans for the sessions, supporting texts, worksheets and informative guides for students. In order to implement the Risks & Challenges Program, facilitators must attend a specific training program.

The program follows national and international recommendations (Becoña, 2012; Botvin & Griffin 2007; Burkhart, 2002; Conduct Problems Prevention Research Group, 2002; Faggiano et al., 2008; Hawkins et al., 2002; MacBride, 2003; McGrath, Sumnall, McVeigh & Bellis, 2006; Nation et al., 2003; NIDA, 2004; Pérez & Vinaccia, 2007; Skara & Sussman, 2003; Skiva, Monroe & Wodarsky, 2004; Tobler, 2000). It is inspired by proven programs and is based on robust theoretical bases: Public Health, Health Beliefs and Competence Model (Becker & Maiman, 1975; Costa & López, 1998; Winett, King & Altman, 1991); Fishbein and Ajzen's Rational Action Model (Ajzen & Fishbein, 1980); Bandura's Social Learning Theory (Bandura, 1977, 1986); Catalano and Hawkins's Social Development Model (Catalano, Kosterman, Hawkins, Newcomb & Abbott, 1996); Jessor and Jessor's Theory of Risk Conduct for Adolescents (Jessor, 1991); Botvin's Life Skills Model (Botvin, 2000); Becoña Comprehensive and Sequential Model of drug use (Becoña, 1999); Chickering and Reisser's Seven Vectors Theory (Chickering & Reisser, 1993); and Narrative Model (Gonçalves, 2000).

Measures

Besides socio-demographic characterization items, the questionnaire included questions about individual consumption throughout life, within last 12 months and in the last 30 days, relating to the use of tobacco, alcohol, cannabis and other drugs use, estimates of consumption by friends, use expectations of tobacco, alcohol and cannabis, perceived drugs availability, perceived risk of substance use, attitudes towards drug use and consequences of alcohol consumption.

These items were adapted from the European School Survey Project on Alcohol and Other Drugs (Hibell et al., 2009) and from the National Survey on drug consumption, targeted to the general population (Balsa, Vital, Urbano & Pascueiro, 2008). The following instruments were also used: Alcohol Use Disorders Identification Test (Babor, Higgins-Biddle, Saunders & Monteiro, 2001; Cunha, 2002), Self-Control and Emotional Deregulation Scale (Wills, Ainette, Mendonza, Gibbons, & Brody, 2007), Sensation Seeking Scale V (Zuckerman, 1979), Academic Experience Questionnaire - Short Version (Almeida & Ferreira, 1997, 2002), Rosenberg's Global Self-esteem Scale (Rosenberg, 1965; Faria & Silva, 2000; Santos, 2008) and Beck's Depression Inventory (Vaz-Serra & Abreu, 1973).

Procedure

All students performed the pre-intervention evaluation (baseline assessment). In what concerns the questionnaire administration procedure, it was completed by students during an initial intervention planning meeting (self-administration). This meeting was delivered by the program organisers and took place outside curricular hours. The questionnaire was completed in one session of around 45 minutes under constant supervision and guidance from the program organisers. The process of selection and allocation to each of the study arms (intervention and control) was random and communicated to participants via e-mail. This e-mail contained information on starting dates of the Program: for the intervention group, a week after the first assessment; for the control group, after the conclusion of the post-intervention assessments and subsequent follow-up (so, students allocated to the intervention group were able to benefit from the Risks & Challenges Program after the end of the study).

Students from the intervention condition were divided into groups of about 12 elements. Each group participated in the Risks & Challenges Program in different days, with different facilitators. The program was facilitated by clinical psychologists, prevention technicians from the Addictive Behaviors and Dependencies Intervention Division of the North Regional Health Administration, previously trained by one of the authors of this paper (R.C.). Supervision was also

assured throughout the entire program implementation process. The Program was based on group work and run for 8 sessions of 2 hours each, on a weekly basis (with few exceptions), mainly out of curricular hours. Students who were in the control groups were not targeted for this intervention nor participated in any preventive drug program during this time period. Once the intervention was completed, subjects from both groups were reassessed in the day of the last session of the Risks & Challenges Program. Six months later, a follow-up evaluation was performed. The protocol of evaluation in these two moments followed the same norms of the protocol used in the pre-test moment.

Data analysis

Data treatment and analysis were performed using the statistical program IBM-SPSS version 20. Descriptive statistics were used for the characterization of the sample and of each variable. To test the homogeneity between the intervention and control groups (for dependent variables) at the baseline moment, the independent samples *t*-test was used. Chi-square test was used for the evaluation of statistically significant associations regarding the frequency of substance consumption (ordinal scales). To evaluate the statistically significant changes between baseline, post-intervention and follow-up moments, inter- and intra-subject measurements were used. For the inter-subject measurement, *t*-test and its non-parametric Mann-Whitney test were used. For the intra-subject, comparison of means was conducted with the repeated measures ANOVA and Friedman tests. In cases where it was necessary to run the post-hoc ANOVA tests, the Mann-Whitney test was used, with a Bonferroni correction adjusted to three groups ($p < .016$). A per-protocol analysis approach was used.

Ethical issues

The study was authorised by the Bioethics Committee of the University of Santiago de Compostela. After being provided with all information about the study, participants signed an informed consent form. All participants were informed about the format of the investigation. In the initial meeting, all procedures relating to their participation in the Risks and Challenges

Program were rightfully explained, including their assignment to both intervention and control groups and how that decision was achieved. Students were explained that there would be no wrong or right answers and no personal judgement would be allowed. Confidentiality would be paramount throughout the whole process (intervention and data collection).

From an ethical point of view, it was considered pertinent to respond to the request of all students to participate in this intervention, so the follow-up evaluation was carried out in that same school year (six months after the post-intervention) to ensure the afterwards intervention of individuals previously allocated to the control group.

Results

Sample characteristics

The sample consisted of 228 participants, of which 192 (85.7%) were female and 32 (14.3%) were male. Participants' ages ranged from 17 to 48 years ($M = 19.43$; $DP = 3.75$; $Mdn = 18$). In terms of marital status, 219 (97.3%) were single, 4 (1.8%) were married, 1 (0.4%) was in cohabitation and 1 (0.4%) in other civil partnership status. Regarding to professional situation, only 16 individuals (7.1%) were student workers. Entry into higher education caused 111 (49.8%) participants to leave home; most of the sampled students were living with their parents at the moment ($n = 104$; 48.1%), 77 (35.6%) lived in an apartment with other students, 19 (8.8%) in a university residence and the remaining (7.5%) in other accommodation types. The 228 students were randomly allocated to the intervention group ($n = 98$) or to the control group ($n = 130$). The sample loss at the post-intervention time was 14 subjects in the intervention group and 46 subjects in the control group. At the time of follow-up, one more participant was lost for the intervention group and 21 participants for the control group.

Substance consumption behaviors: comparison between groups

When comparing consumption behaviors between groups, only the subjects that remained in the three

moments of evaluation were considered: 80 students in the intervention group and 59 in the control group. There were 3 students in the intervention group and 4 students in the control group that did not respond to the post-test evaluation.

Table 1 shows the prevalence of psychoactive substances use throughout life, within the last 12 months and within the previous month, according to the study arm and evaluation moment. Inter-subject homogeneity was verified at baseline (no significant differences between groups).

Statistically significant associations were registered between groups and their recent (last 12 months) beer and spirit-drinks consumption at the follow-up assessment. Specifically, the percentage of young people who reported drinking beer in the last 12 months is significantly higher for the control group (77.8%) than for the intervention group (51.6%; $\chi^2_{(1)} = 7.74$, $p < .01$). Similarly, the percentage of young people who reported spirit drinks consumption in the last 12 months is significantly higher in the control group (83.3%) compared to the intervention group (64.9%; $\chi^2_{(1)} = 4.14$, $p < .05$).

Depression, planning and problem solving skills, interpersonal academic experience: comparison between groups

Results of the comparison between groups (intervention versus control) at different moments (at baseline, at post-intervention and at follow-up), relating to risk or protecting variables for psychoactive substances consumption are shown in Table 2. Inter-subject homogeneity at baseline was verified.

Depression was the unique variable for which between-groups significant differences were found at both post-intervention and follow-up assessments. Statistically significant differences were found between groups in post-intervention scores ($t_{(133.44)} = 3.08$, $p < .01$) and follow-up ($t_{(77.76)} = 2.67$, $p < .01$). Specifically, the intervention group presented lower scores of depression in both post-intervention ($M = 4.86$) and follow-up moments ($M = 3.59$), when compared to control ($M = 8.45$ and $M = 6.97$, respectively). Statistically significant differences between

Table 1. Prevalence of drug experimentation, recent and current consumption of psychoactive substances as a function of the experimental condition and valuation point

	Prevalence of consumption at baseline			Prevalence of consumption at post-intervention			Prevalence of consumption at follow-up		
	Intervention n = 80	Control n = 59	χ^2	Intervention n = 80	Control n = 59	χ^2	Intervention n = 80	Control n = 59	χ^2
	n (%)	n (%)		n (%)	n (%)		n (%)	n (%)	
Tobacco									
Throughout life	42 (52.5%)	25 (43.1%)	1.19	46 (57.5%)	34 (56.7%)	0.00	46 (57.5%)	35 (60.3%)	0.11
Last 12 months	28 (54.9%)	13 (36.1%)	2.99	28 (54.9%)	15 (37.5%)	2.72	25 (48.1%)	19 (47.5%)	0.00
Last month	18 (36.0%)	10 (28.6%)	0.51	18 (36.7%)	8 (21.6%)	2.28	18 (35.3%)	12 (32.4%)	0.08
Beer									
Throughout life	55 (68.8%)	41 (69.5%)	0.01	55 (68.8%)	42 (71.2%)	0.10	61 (77.2%)	42 (72.4%)	0.41
Last 12 months	30 (49.2%)	29 (65.9%)	2.91	31 (54.4%)	30 (66.7%)	1.58	33 (51.6%)	35 (77.8%)	7.74**
Last month	17 (29.8%)	21 (47.7%)	3.39	17 (30.4%)	19 (42.2%)	1.53	22 (37.3%)	23 (52.3%)	2.30
Wine									
Throughout life	40 (50.0%)	34 (57.6%)	0.79	46 (58.6%)	34 (57.6%)	0.01	47 (58.8%)	37 (63.8%)	0.36
Last 12 months	24 (53.3%)	21 (56.8%)	0.10	30 (61.2%)	25 (64.1%)	0.08	25 (50.0%)	24 (60.0%)	0.90
Last month	14 (33.3%)	12 (35.3%)	0.03	19 (42.2%)	14 (35.9%)	0.35	16 (34.0%)	13 (34.2%)	0.00
Spirits drinks									
Throughout life	50 (62.5%)	42 (71.2%)	1.15	57 (71.2%)	45 (76.6%)	0.44	54 (67.5%)	42 (73.7%)	0.61
Last 12 months	41 (74.5%)	33 (76.7%)	0.06	45 (76.6%)	34 (70.8%)	0.41	37 (64.9%)	35 (83.3%)	4.14*
Last month	24 (45.3%)	22 (52.4%)	0.47	24 (42.1%)	24 (53.3%)	1.27	20 (40.0%)	20 (48.8%)	0.71
Cannabis									
Throughout life	18 (22.5%)	10 (16.9%)	0.65	17 (21.2%)	12 (20.3%)	0.02	18 (22.5%)	7 (11.9%)	2.60
Last 12 months	11 (39.3%)	6 (33.3%)	0.17	8 (36.4%)	8 (36.4%)	0.00	10 (43.5%)	2 (14.3%)	3.38
Last month	3 (11.1%)	4 (23.5%)	1.20	3 (15.0%)	1 (4.8%)	1.22	6 (27.6%)	1 (9.1%)	1.45

* $p < .05$; ** $p < .01$; *** $p < .001$

Note 1: % of Last 12 months and Last month corresponds only to the group of students that consumed psychoactive substances throughout life.

Note 2: Considered only the subjects that participated in the three moments of the evaluation, 80 in the intervention group and 59 in the control group, to circumvent the limitation associated with intervention mortality.

Table 2. Comparison between groups in the different moments of evaluation, regarding variables associated with psychoactive substance consumption

	Baseline assessment			Post-intervention assessment			Follow-up assessment		
	Intervention M (DP)	Control M (DP)	t _(df)	Intervention M (DP)	Control M (DP)	t _(df)	Intervention M (DP)	Control M (DP)	t _(df)
Expectations: tobacco	42.46 (5.97)	41.37 (6.88)	-1.23 ₍₂₁₇₎	40.58 (7.13)	41.55 (6.25)	0.92 ₍₁₆₀₎	41.83 (5.77)	41.62 (6.66)	-0.20 ₍₁₄₀₎
Expectations: cannabis	41.33 (7.89)	41.13 (8.37)	-0.18 ₍₂₁₇₎	39.55 (8.95)	40.54 (8.24)	0.74 ₍₁₆₃₎	42.00 (7.83)	41.06 (8.77)	-0.68 ₍₁₄₃₎
Expectations: alcohol	40.32 (7.18)	39.54 (7.51)	-0.77 ₍₂₁₅₎	38.79 (8.54)	39.72 (6.91)	0.76 _(153.48)	40.82 (7.40)	39.69 (8.00)	-0.86 ₍₁₃₅₎
Consequences of alcohol use	0.40 (1.28)	0.76 (1.91)	1.67 ₍₂₁₉₎	0.46 (0.91)	0.69 (1.50)	1.21 _(137.69)	0.38 (0.96)	0.53 (1.23)	0.84 ₍₁₄₄₎
Perceived availability	10.04 (4.89)	12.30 (5.97)	2.80** _(177.71)	11.70 (5.94)	11.94 (5.36)	0.24 ₍₁₂₉₎	10.89 (4.77)	13.44 (6.57)	2.31* _(86.24)
Estimate consumption	8.07 (3.26)	8.42 (3.16)	0.81 ₍₂₂₃₎	8.17 (3.29)	8.52 (3.13)	0.71 ₍₁₆₃₎	8.62 (3.85)	8.46 (2.92)	-0.27 ₍₁₄₂₎
Drugs-related attitudes (SPA)	21.28 (3.25)	20.78 (3.45)	-1.10 ₍₂₂₄₎	21.06 (3.24)	20.85 (3.48)	-0.41 ₍₁₆₆₎	20.89 (3.56)	21.06 (3.46)	0.30 ₍₁₄₁₎
Risk perception	18.15 (1.58)	17.65 (1.97)	-2.11* _(221.49)	17.86 (1.44)	17.76 (1.58)	-0.41 ₍₁₆₄₎	17.93 (1.91)	17.98 (1.80)	0.18 ₍₁₄₃₎
Alcohol-related problems (AUDIT)	2.76 (2.55)	3.54 (3.62)	1.68	2.93 (2.38)	3.38 (3.21)	0.96	2.82 (2.66)	3.49 (2.92)	1.30
EMOTIONAL DEREGULATION									
Instant gratification	8.04 (2.88)	8.22 (2.96)	0.44 ₍₂₂₀₎	8.00 (2.54)	8.17 (2.80)	0.40 ₍₁₆₅₎	7.79 (3.10)	8.11 (2.60)	0.66 ₍₁₄₂₎
Impulsiveness	6.52 (3.82)	7.15 (3.65)	1.26 ₍₂₂₁₎	6.45 (3.59)	6.41 (3.64)	-0.07 ₍₁₆₆₎	5.90 (3.57)	6.02 (3.74)	0.19 ₍₁₄₁₎
Tension	6.92 (2.85)	7.13 (2.58)	0.59 ₍₂₂₅₎	6.27 (2.79)	6.85 (2.81)	1.33 ₍₁₆₄₎	5.60 (2.87)	6.45 (2.75)	1.82 ₍₁₄₄₎
Rage	2.34 (1.91)	2.87 (2.38)	1.81 ₍₂₂₂₎	2.06 (1.92)	2.36 (2.46)	0.88 _(154.98)	1.74 (1.81)	2.37 (2.42)	1.71 _(108.95)
SELF-CONTROL									
Planning	14.53 (2.77)	13.73 (3.28)	-1.91 ₍₂₁₉₎	13.94 (2.94)	14.11 (3.17)	0.36 ₍₁₆₄₎	13.54 (3.30)	14.65 (3.06)	2.08* ₍₁₄₃₎
Postponement gratification	11.57 (3.38)	10.83 (3.38)	-1.61 ₍₂₂₁₎	11.11 (3.24)	11.00 (3.44)	-0.21 ₍₁₆₆₎	10.73 (3.44)	11.62 (3.45)	1.54 ₍₁₄₂₎
Calmness	5.18 (2.94)	5.44 (3.13)	0.65 ₍₂₂₂₎	5.92 (3.12)	5.73 (3.04)	-0.40 ₍₁₆₇₎	5.85 (2.84)	5.83 (2.85)	-0.06 ₍₁₄₂₎
Reset location	10.49 (3.78)	10.24 (3.54)	-0.51 ₍₂₂₄₎	11.39 (3.62)	10.70 (3.50)	-1.24 ₍₁₆₅₎	10.62 (3.89)	10.98 (3.68)	0.57 ₍₁₄₃₎
Problems solving	13.85 (5.04)	13.01 (4.06)	-1.35 _(182.37)	14.01 (4.23)	13.43 (3.87)	-0.93 ₍₁₆₅₎	13.28 (4.07)	14.71 (4.00)	2.13* ₍₁₄₄₎
Sensation seeking	24.93 (6.22)	24.04 (6.32)	-1.05 ₍₂₂₂₎	24.36 (6.20)	23.73 (6.10)	-0.66 ₍₁₆₄₎	24.18 (6.33)	23.13 (6.55)	-0.98 ₍₁₄₂₎
ACADEMIC EXPERIENCES									
Personal dimension	44.61 (9.73)	42.48 (10.52)	-1.54 ₍₂₂₀₎	46.34 (9.71)	43.05 (11.71)	-1.94 ₍₁₆₀₎	44.61 (9.73)	42.48 (10.52)	-1.54 ₍₂₂₀₎
Interpersonal dimension	47.31 (6.82)	47.21 (8.74)	-0.09 _(217.54)	50.02 (6.56)	47.98 (7.90)	-2.70* ₍₁₆₃₎	47.31 (6.82)	47.21 (8.74)	-0.09 ₍₂₁₈₎
Career dimension	51.81 (8.02)	51.47 (9.19)	-0.29 ₍₂₂₁₎	51 (9.66)	51.73 (9.10)	0.50 ₍₁₆₃₎	51.81 (8.02)	51.47 (9.19)	-0.29 ₍₂₂₁₎
Study dimension	44.79 (7.79)	43.56 (6.86)	-1.26 ₍₂₂₂₎	43.81 (7.06)	42.28 (7.98)	-1.30 ₍₁₆₃₎	44.79 (7.79)	43.55 (6.86)	-1.26 ₍₂₂₂₎
Institutional dimension	39.91 (4.29)	32.69 (4.35)	-0.37 ₍₂₁₉₎	33 (4.11)	32.90 (4.64)	-0.14 ₍₁₆₀₎	32.81 (4.29)	32.69 (4.35)	-0.37 ₍₂₁₉₎
Self-esteem	30.79 (5.19)	28.91 (6.06)	-2.42* ₍₂₁₉₎	32.58 (5.05)	30.01 (6.18)	-2.95** ₍₁₆₆₎	32.27 (5.30)	31.53 (5.85)	-0.77 ₍₁₃₆₎
Depression	7.29 (6.27)	9.23 (8.63)	1.92 ₍₂₁₇₎	4.86 (5.31)	8.45 (9.22)	3.08** _(133.44)	3.59 (4.09)	6.97 (9.23)	2.67** _(77.76)

* p < .05; ** p < .01; *** p < .001

the groups in follow-up evaluation were also found for both planning ($t_{(143)} = 2.08, p < .05$) and problem solving ($t_{(144)} = 2.13, p < .05$). Specifically, the intervention group presented significantly lower values at follow-up assessment, for planning ($M = 13.54$) and for problem solving ($M = 13.28$), when compared to the control group ($M = 14.65$ and $M = 14.71$, respectively); the lower the value, the worse the problem solving and planning skills.

Statistically significant differences were found between groups in the post-intervention assessment for the interpersonal dimension of Academic Experiences ($t_{(163)} = 2.70, p < .05$). The intervention group presented significantly higher values ($M = 50.02$) than the control group ($M = 47.98$) (the higher the value, the better the interpersonal dimension of academic experiences).

Regarding the variables of perceived availability of substances, risk perception and self-esteem, there was no evidence of homogeneity between the individuals at baseline, which invalidates the analysis of the *a-posteriori* registered differences.

Intra-subject analysis for the intervention group

In the intervention group, the comparison between different moments of evaluation regarding risk or protecting variables for psychoactive substances consumption revealed significant differences for: expectations for tobacco, cannabis and alcohol consumption, tension, anger, personal and interpersonal dimension of academic experiences, self-esteem and depression.

Expectations for the consumption of alcohol, tobacco and cannabis

Concerning expectations for tobacco consumption, there were statistically significant differences between baseline and post-intervention ($F_{(2, 138)} = 4.48, p < .05$). In the post-intervention assessment, students had more positive expectations regarding tobacco consumption ($M = 41.00$) compared to the baseline ($M = 42.81$) (the lower the value, the higher the consumption expectations). However, it should be noted that, for all three moments of evaluation, the values

reveal expectations that are always low in relation to consumption (the total scale score is 48, revealing low expectations regarding tobacco consumption). Likewise, regarding the expectations for consumption of cannabis, there are significant differences between moments of observation ($F_{(2, 152)} = 5.01, p < .01$). The post-hoc test allowed to verify that from the first moment ($M = 42.04$) to the second ($M = 40.16$), the expectations about use of cannabis became more positive, but from the second to the third one ($M = 42.34$) a statistically low level was registered again. Regarding alcohol consumption expectations, statistically significant differences were found between post-intervention and follow-up ($F_{(2, 142)} = 3.96, p < .05$): students presented less positive expectations regarding alcohol consumption at follow-up ($M = 40.06$) compared to the post-intervention moment ($M = 39.25$).

Emotional deregulation: tension and anger

As for emotional deregulation, the results reveal significant differences between moments of observation regarding the tension ($F_{(1.84, 143.87)} = 11.93, p < .001$) and anger ($F_{(2, 152)} = 3.47, p < .05$) subscales. Students reported significantly decreased tension between baseline ($M = 7.03$) and post-intervention ($M = 6.27$) as well as between baseline and follow-up ($M = 5.62$). Similarly, there were statistically significant differences between the baseline ($M = 2.38$) and follow-up ($M = 1.77$) for the anger subscale, which decreased significantly between these two moments.

Academic experiences: personal and interpersonal dimensions

As for academic experiences the results reveal statistically significant differences between assessment moments for the personal ($F_{(2, 144)} = 10.45, p < .001$) and interpersonal ($F_{(2, 152)} = 11.74, p < .001$) dimensions. The values of the personal dimension increased significantly between baseline ($M = 44.10$) and post-intervention ($M = 46.81$), as well as between baseline and follow-up ($M = 47.78$). Likewise, the interpersonal dimension values increased significantly between the baseline ($M = 47.47$) and the post-intervention ($M = 51.26$), and between baseline and follow-up ($M = 49.74$) (the higher the value, the better the results regarding academic experiences).

Self-esteem

Regarding self-esteem, the results revealed also statistically significant differences between observations moments ($F_{(2, 142)} = 10.06, p < .001$). Self-esteem values increased significantly between the baseline ($M = 30.33$) and the post-intervention ($M = 32.44$), as well as between baseline and follow-up assessments ($M = 32.39$).

Depression

With regards to depression, there were statistically significant differences between all moments in the evaluation process ($F_{(314.51, 13)} = 24.19, p < .001$): the values decreased significantly over time: baseline ($M = 7.15$), post-intervention ($M = 4.74$) and follow-up ($M = 3.38$).

Intra subject analysis for the control group

The analysis of the results presented by students who were not targeted with the Risks & Challenges Program revealed significant differences in the perceived availability of substances, impulsivity and self-esteem.

Perceived availability of substances

Regarding the perceived availability of substances, there were statistically significant differences between baseline and follow-up ($F_{(2, 72)} = 3.94, p < .05$). In the follow-up moment ($M = 12.80$) students manifested a higher perception of availability of substances compared to the baseline ($M = 10.16$).

Impulsiveness

Regarding impulsiveness, there were statistically significant differences between baseline and follow-up ($F_{(2, 108)} = 4.01, p < .05$). Students showed significantly lower impulsiveness at follow-up ($M = 5.95$) compared to baseline ($M = 6.93$).

Self-esteem

Concerning self-esteem, we found statistically significant differences between moments of assessment ($F_{(2, 106)} = 14.07, p < .001$). Students reported significantly higher self-esteem at follow-up ($M = 31.65$) when compared to the baseline ($M = 29.24$) and the post-intervention moment ($M = 30.09$).

Discussion

Our results show that the Risks & Challenges Program had significant preventive effects in the intervention group when compared to the control group in students' self-reported consumption and in risk or protecting factors for psychoactive substance use. Specifically, there were significant differences between the groups in students' self-reported alcohol consumption, in depression level and in personal and interpersonal dimensions of academic experiences. In addition, there were evident gains in the intervention group over time in: expectations/motivations for alcohol and cannabis consumption, tension and anger, personal and interpersonal dimensions of academic experiences, self-esteem and depression. On the other hand, students in the control group showed an increased perception of availability of substances between baseline and follow-up evaluations, a situation that did not occur in the intervention group, suggesting that the experience of the program had a protective effect also at this level.

When consumption behaviors were compared between groups, our results suggested significant preventive effects six months after the intervention at the level of recent consumption of beer and spirit drinks. This was one of the main objectives of the intervention as it contemplated a direct action on the consumption of alcohol, both at a preventive level and at the level of risk-reduction and minimization of harm associated with consumption.

Although this target group (university students) does not present high risk consumption, it is precisely the consumption of beer and spirits that is most relevant, namely in festive contexts and especially at the level of recent consumption, with about half of the sample reporting consumption of beer and spirits in the last year. These results are congruent with those found in literature reviews on interventions to reduce alcohol consumption in university students (Carey, Scott-Sheldon, DeMartini, 2007; Hingson, Heeren, Winter, Wechsler, 2005). It has been found that short motivational interventions, combining cognitive behavioral strategies with personalized feedback, clarification of

standards, risk-reduction strategies, challenge of expectations, goal setting and incentive to motivation, are effective in reducing the consumption of alcohol with university students, at least in the short-term (Larimer & Cronce, 2007; Marlatt, Kivlahan, Dimeff, Larimer et al, 1998; Hingson, 2010; Scott-Sheldon, Carey, Elliott, Garey & Carey, 2014). However, it should be noted that a recent study questions the effectiveness and magnitude of the effects of short motivational interventions for preventing university drinking, suggesting that there is a need to develop more effective prevention strategies (Huh et al., 2015). In this context, the Risks and Challenges Program is an innovative, comprehensive and multicomponent program, presenting positive results at the level of substance consumption. It responds to an important need in the context of university intervention: the reduction of alcohol consumption.

Our results indicate that the program produces preventive effects for depression. This is a result of great importance because depression is associated with other risk behaviors, such as university drop-out (Broonen, Pireaux, & Walgraffe, 1994; Van Vracem & De Ketele, 1983) and suicide (Campos & Gonçalves, 2004; Galaif, Sussman, Newcomb & Locke, 2007; Manza, 2009; Vasquez & Blanco, 2008). In addition, the preventive effect on substance consumption is evident since depression is a strong risk factor for consumption (Galaif et al., 2007). The study conducted in Portugal by Santana and Negreiros (2008), revealed an association between depressive symptoms and alcohol consumption amongst university students. Those findings are congruent with those of Pedrelli et al. (2011). Data from an American study with this population (SAMHSA, 2003) demonstrated that adolescents with anxiety disorders or depression are more likely to develop substance abuse than others who do not present this sort of psychopathology. Additionally, Manza (2009) refers an association between the problematic use of alcohol and the risk of suicide among university students. These studies highlight the need to promote interventions oriented towards a positive adaptation to the academic context that are multidimensional and precocious (Santana & Negreiros, 2008). Our results showed that the Risk and

Challenges Program promoted the adaptation of students to the university environment, helping them to cope with the challenges and interpersonal difficulties that they may be subjected to. Different variables and strategies have been addressed to deal with non-adaptive emotional states, namely depression.

In our study, preventive effects were also verified in terms of expectations regarding the consumption of alcohol and cannabis. These data are consistent with the results found at the level of recent alcohol consumption. The correlation between expectations regarding drug use and consumption behavior is consistent with the theoretical basis of the Risk and Challenges Program. High positive outlooks for alcohol consumption, used in combination with low expectations about negative effects, lead to excessive drinking on campus (Ham & Hope, 2003). Additionally, several studies have shown the importance of social influence preventive approaches in reducing alcohol use by correcting among young people the distorted perceptions about drinking standards of peers and adults (Epstein, Griffin & Botvin, 2008; MacBride, 2003). The importance of peers and socialization felt by university students is linked with the common fact that, once at university, young adults feel disconnected from their previous environment - parents, siblings and friends - and look for validation and integration in a new context, in this case on campus (Centre for Addictions Research of British Columbia, 2008). The literature states that social approval, peer acceptance and conformity are the most desired things by students at this stage. Conformity was identified as the main reason for high-risk drinking patterns among college students (Ham & Hope, 2003). Preventive interventions should consider these factors and help youth resist to the social pressures that encourage the consumption of substances.

There were also improvements in tension and anger, in our study. Negative emotions and emotional deregulation, amongst other risk factors, are known to increase the likelihood of psychoactive substance use by university students (Dennhardt & Murphy, 2013). Research by Martens et al. (2008) suggests that university students with high levels of negativity and easy

access to drinking are at higher risk of experiencing alcohol-related problems. Other authors (Ali, Ryan, Beck, & Daughters, 2013) report that university students with high levels of aggressiveness are more likely to have problematic alcohol use if they also show an inability to tolerate negative emotional states. There is evidence that maintains that the intolerance and uncertainty college students have to deal with in the context of higher education is associated with drinking, as a way to avoid negative emotions (Kraemer, MacLeish, & O'Brian, 2015). These aspects were considered for the construction of the Risks & Challenges Program; one of its main objectives is attached to the promotion of strategies of emotional regulation. Additionally, this intervention promoted the reduction of the intolerance and of the uncertainty of first-year university students in relation to academic life through the joint exploitation of psychological and social processes involved at the time of transition and through the promotion of peer sharing. These data gains greater relevance as it is known that academic success is strongly associated with various dimensions of emotional intelligence, notably to stress management skills (Parker, Summerfeld, Hogan, & Majeski, 2004). The decrease in stress is a strong predictor for the academic, personal, emotional and social adjustment of the first-year students (Friedlander, Reid, Shupak & Cribbie, 2007). Data from the Centre for Addictions Research of British Columbia (2008) suggest that destructive behavior – drinking to intoxication, smoking, etc. – is erroneously perceived by students as a way to release tension/stress. Several studies indicated a relationship between stress and problematic drinking at the university.

Other variables, such as self-esteem and academic experiences at personal and interpersonal dimensions were also potentiated through the intervention. It is known that self-esteem and social support are potent protective factors for first year university students. Making new friendships with colleagues is an important predictor of adjustment of students to the institution (Dinis & Almeida, 2005), and it is observed that the increase of support by friends from the first to the second semester promotes a better adjustment to University (Friedlander, Reid, Shupak & Cribbie, 2007). There is evidence suggesting that university

students who report a greater need of belonging are more vulnerable to the perceived effect of peer use on their substance use cognitions (Litt, Stock & Lewis, 2012). During the planning and implementation of the Risk & Challenges Program, the importance given to the creation of a social support network between participants, the promotion of interpersonal skills and communication and the exploitation of relationships between students lead us to positive outcomes regarding interpersonal dimension of academic experiences.

Increased self-esteem has been associated with lower rates of depression and better academic and social adjustment (Friedlander et al., 2007). Since the personal dimension of academic experiences refers to psychological and physical well-being, autonomy, self-awareness and emotional aspects (Almeida, Soares & Ferreira, 2002), the positive results found for the personal dimension of academic experiences are congruent with the other outcomes of our study. In fact, high levels of social support, better self-esteem and low levels of stress, are related to a better adjustment to the university and higher levels of well-being (Almeida et al., 2002; Friedlander et al., 2007). Through the gains achieved in terms of academic experiences in its personal and interpersonal dimensions, the Risks & Challenges Program successfully promoted the development of youth autonomy, identity and self-esteem. It also promoted the adaptation of students to university and the consolidation of a network amongst peers.

It is time to make some judgements about the limitations of this investigation. First of all, the sample of this study was not homogeneous in relation to sex. This has not allowed for observations at this level and it is important to replicated this study with a larger and homogeneous sample, considering all sociodemographic variants. Secondly, it would be important to replicate the evaluation at least one year after the intervention. Thirdly, this study applied one of the most widely used evaluation strategies for substance consumption research, generally considered valid and reliable (Cooper, Sobell, Sobell, & Maisto, 1981; Frier, Bell, & Ellickson, 1991; Midanik, 1989): self-administration of questionnaires. A limitation associated

with this methodology is that the respondents can distort the information. Social desirability is one of the factors that explains this bias (Forman & Liney, 1991; Midanik, 1989; Skog, 1992). An alternative strategy for self-report is the use of physiological measures. However, these measures also present some limitations, namely: the fact that they do not detect the experimental consumption (very common among young people), the resistance that their application can cause in respondents, and their high financial cost (Martín, Tamames, Fraguera, López & Pereiro, 2002). Finally, given the complexity of the phenomenon of consumption of psychoactive substances in young people, other variables could have been the target of observation. It would be important in the future to replicate the study and to consider other variables and measures, notably a more accurate assessment of the consumption of psychoactive substances in the context of academic festivities.

General conclusions

Our results validate the Program Risks & Challenges to the extent that it has been associated with the reduction of consumption of alcohol among university students, with reduced risk factors and improved protection factors for the consumption of psychoactive substances. This research is useful for young adults, particularly for university students, for health technicians, for the distinguished educators at this level of education, as well as for the managers of universities and policymakers.

Despite the clear recommendations for the use of comprehensive programs to reduce substance use amongst university students, no studies regarding implementation of multicomponent programs in this educational context have been found (Rodgers, 2012). This situation is difficult to understand and accept in view of the magnitude of the problem of substance use, particularly alcohol, in this target group and its implications on the social and academic life of students, their families and the university itself. In this scenario, the evidence found with the implementation of the Risks & Challenges Program is very important, both for its innovative character and for the challenge

it poses to educators and decision makers in higher education institutions.

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Declaration of Conflicting Interests

The authors declare no conflicts of interest with respect to the research, authorship, and/or publication of this article.

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