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A longitudinal study among young adults into the predictive effect of perceived efficacy of behavioural strategies and the moderating role of drinking motives on use of protective behavioural strategies

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Abstract

Introduction. *Although protective behavioural strategies (PBS) have shown to be effective in minimising alcohol-related negative consequences, research on the explanatory factors of their use is very scarce. Perceived efficacy has been demonstrated to be one of the most relevant explanatory factors in the use of health-related protective behaviours. The present study prospectively examines the relationship between the perceived efficacy of PBS in reducing alcohol-related negative consequences and the use of PBS in a community-based sample of young adults. In addition, the moderating role of drinking motives in this relationship is also examined.* ***Methods.*** *Prospective design with a baseline assessment and a 2-month follow up. Using a targeted sampling procedure, 339 young adults were recruited from the community [mean age: 21.1 (SD = 2.21); female = 50.7%] and completed questionnaires to measure perceived efficacy of PBS and drinking motives at baseline and PBS use at follow up.* ***Results.*** *Perceived efficacy of PBS at baseline was positively associated with PBS use at follow up, and these relationships were weaker as social, enhancement and coping motives scores increased.* ***Discussion and Conclusions.*** *Our findings support the need to include the perceived efficacy of PBS to reduce alcohol-related negative consequences in future interventions aimed at promoting PBS use. Moreover, these interventions should be personalised according to the initial levels of participants' drinking motives, incorporating elements that allow for neutralising their negative effects on PBS use (e.g. training in coping skills for those with strong coping motives).* [González-Ponce BM, Carmona-Márquez J, Díaz-Batanero C, Vera BDV, Pilatti A, Fernández-Calderón F. A longitudinal study among young adults into the predictive effect of perceived efficacy of behavioural strategies and the moderating role of drinking motives on use of protective behavioural strategies. *Drug Alcohol Rev* 2022;41:795–802]

Key words: alcohol use, young adult, perceived efficacy, drinking motives, protective behavioural strategies.

Introduction

Alcohol use is prevalent among young adults. In Europe, it is estimated that 54.4% of the population aged 20–24 have used alcohol in the past year, and this age group is the one with the highest estimated prevalence (33.9%) of binge drinking among past-year drinkers [1]. Alcohol use has been linked to a variety of physical and social problems including violent behaviour, depression, physical abuse, social maladjustment, poor academic performance, risky sexual behaviour and driving after drinking [2]. In addition, premature deaths attributable to alcohol consumption are disproportionately higher in the 20–39 age group (13.5%) than other age groups [1]. People who consume alcohol, use behaviours to reduce alcohol-related negative consequences; for example, alternating alcoholic and non-alcoholic drinks or stopping drinking at a predetermined time [3]. Numerous studies have shown that using these behaviours, conceptualised as protective behavioural strategies (PBS), is associated

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with less intensive drinking and fewer alcohol-related negative consequences [3,4].

Previous research has shown the moderating role of PBS between the effects of specific psychological constructs, including personality and mental health symptoms [5], and alcohol consumption and alcohol-related negative consequences. However, few studies have aimed to determine the explanatory factors of PBS use. For example, Anthenien *et al.* [6] found that high positive expectancies of alcohol effects were associated with higher PBS use, and Treeby *et al.* [7] detected that a higher guilt-prone personality style was associated with the use of these strategies. Previous interventions have aimed to increase PBS use in alcohol consumers [8], and therefore identifying the determinants of PBS use could be helpful for increasing the effectiveness of such interventions.

The outcome expectancies of a given health-related behaviour are considered one of the fundamental explanatory factors in numerous health-related psychological theories, among them, the Health Belief Model [9], the Theory of Planned Behavior [10], the Social Cognitive Theory [11] and the Protection Motivation Theory [12]. In the field of alcohol consumption, there is consistent evidence that those who have positive expectations about alcohol (e.g. desired effects) consume alcohol more frequently and in more significant quantities [13]. As posited by Protection Motivation Theory [12], the outcome expectancies of a protective behaviour are related to the perceived efficacy of that behaviour in reducing potential health threats (i.e. response efficacy). Thus, sensing that a behaviour (e.g. PBS) will be effective in reducing the harm of a potential threat (e.g. alcohol-related negative consequences) is related to greater use of that behaviour (e.g. PBS). Along with response efficacy, this theory also considers self-efficacy (one's ability to carry out the protective behaviour) as part of coping evaluative processes (coping appraisal) and threat appraisal, which refers to the person's assessment of threat severity and personal susceptibility to the threat [12]. Various meta-analyses have shown that coping appraisal components (i.e. response efficacy and self-efficacy) are more explanatory of protective behaviours than threat appraisal components [14]. However, despite of the relevance of response efficacy to the field of health-related behaviours, to our knowledge, only four previous studies have examined the relationship between the perceived efficacy of PBS in reducing alcohol-related negative consequences and PBS use [15–18]. All these studies found that high perceived efficacy of protective strategies was associated with greater PBS use. However, these four studies were conducted using a cross-sectional design with samples of US college students, limiting the ability to draw predictive conclusions or to generalise the findings to other populations and contexts.

Another cognitive factor that has shown a close relationship with alcohol consumption and its associated consequences is drinking motives [19], which are based on the motivational model of alcohol use [20]. According to this model, drinking motives can be categorised as a function of two dimensions, valence (positive–negative) and source (internal–external), from which four drinking motives emerge: Two positive motives, social motives (external source-drinking to obtain positive social reinforcement) and enhancement motives (internal source-drinking to enhance positive mood); and two negative motives, coping motives (internal source-drinking to reduce negative emotional states) and conformity motives (external source-drinking to avoid social disapproval or rejection). Positive drinking motives (social and enhancement) have been strongly associated with higher alcohol consumption [21], whereas negative drinking motives (coping and conformity) are more strongly linked to significant alcohol-related negative consequences [22].

It could be hypothesised that, although someone perceives PBS as effective in reducing potential alcohol-related negative consequences, he or she may decide to use them less frequently because of a strong drinking motivation. However, to our knowledge, there are no studies that have analysed the moderating role of drinking motives in the relationship between the perceived efficacy of PBS and PBS use. Considering the above, this study aims to: (i) longitudinally examine the association between perceived efficacy of PBS for reducing alcohol-related negative consequences and PBS use in a community sample of young adults; and (ii) examine the moderating role of drinking motives in the relationship between perceived efficacy and PBS use. As we reported in another study [4] that alcohol consumption measures are negatively related to later PBS use, we will include these variables as control variables in the analysis. Building upon previous psychological theories that include response efficacy [9–12], and previous empirical findings [15–18], we anticipate that young adults with high perceived efficacy of PBS would report higher PBS use. Also, since being highly motivated to use alcohol can be a barrier to using protective strategies, we hypothesise that increases in the scores for the four motives will be associated with decreases on the strength of the positive relationship between perceived efficacy and PBS use. Furthermore, given that positive motives are more strongly associated with an increase in alcohol use [21] and numerous PBSs are aimed at reducing alcohol consumption (e.g. set a maximum limit of the number of drinks to be consumed), we hypothesise that positive motives (social and enhancement) will attenuate the impact of perceived efficacy on PBS use to a greater extent than negative motives (coping and conformity).

Methods

Participants and procedure

We recruited 360 young adults (September to December 2019) from various community settings in Huelva, a province in the extreme Southwest of Spain with 521 870 inhabitants [23], where the main employment sectors are service, fishing and agricultural sectors, and chemical and energy industry [24]. To participate in the study, candidates had to: (i) be between 18 and 25 years of age; and (ii) report having consumed alcohol on two or more occasions in the past month. A targeted sampling procedure was used to select participants [25]. First, we identified the contexts in which the potential participants of our study were involved. Next, a psychologist with experience in psychosocial research recruited the participants. He informed candidates who met the age criterion about the objectives and characteristics of the study. Those who met the age criterion and agreed to participate in the study subsequently received a telephone call to confirm whether they met the alcohol consumption criterion. Posters including basic information about the study were also posted in the pre-selected areas.

The use of snowball sampling is common when employing a targeted sampling procedure [26]. Thus, participants were asked to identify other potential participants in their social network. Since one of the pitfalls of snowball sampling is the potential homogeneity of the sample when many participants are nominated by the same person (i.e. seed), we established a maximum of five nominations per participant to maximise the sample heterogeneity. Of the total sample (n = 360), 48.3% (n = 174) of the participants were recruited directly by the researcher, 43.1% (n = 155) were identified by the participants and 8.6% (n = 31) of the participants contacted the researcher as a result of seeing a poster on the street.

The questionnaires were completed in paper and pencil format in rooms set up for this purpose at the University of Huelva. Before completing the questionnaires, the interviewer gave instructions and the participants gave their informed consent. After completion, each participant was asked for contact information for follow up and was rewarded with an Amazon voucher to the value of 15 euros.

Most participants (n = 339, 94.2%) completed a follow-up assessment at 2 months. To contact those who participated in the baseline interview and request their participation in the follow up, a mixed-method procedure was used [27]. One week before the date, they were due to complete the questionnaire (2 months after the baseline assessment), participants received a pre-notification via WhatsApp informing them that in 2–3 days they would receive a phone call to schedule an appointment. A meeting was arranged with those who agreed to participate, while those who did not respond to the initial contacts received two follow-up contacts, one via WhatsApp and the other via telephone. The completion of questionnaires followed the same procedure used in the baseline measurement and, likewise, participants were compensated with a 15-euro Amazon voucher.

Around half (50.7%) of the analytic sample (n = 339) was female, with a mean age of 21.15 years (SD = *2.23*). The primary sources of income reported were either a family allowance (51.6%) or a paid job (25.1%), and 59.0% of participants were studying at the university at the time of completing the survey. Around three out of four participants (77.6%) lived with their parents, and most (96.2%) reported being born in Spain. At baseline, 25.1% of the participants reported having consumed alcohol, on average, 1 day per week in the last year, while 39.8% reported having consumed alcohol on 2 or more days. Regarding reported alcohol use in the previous 2 months, the mean number of days of consumption at baseline was 15.79 (SD = *11.54*) and 12.42 (SD = *9.83*) at follow up.

No significant differences were found between those who participated in the follow up (n = 339) and those who did not (n = 21) in terms of: age (Mann–Whitney U = 3397.50; z = −0.353, P = 0.724), gender (χ^2 = 0.077, P = 0.782), frequency of alcohol use in the past year (χ^2 = 2.088, P = 0.837), frequency of PBS use (Mann–Whitney U = 3399.0; z = −0.347, P = 0.729) and social drinking motives (Mann–Whitney U = 3531.00; z = −0.039, P = 0.969), enhancement (Mann–Whitney U = 2985.50; z = −1.23, P = 0.220), coping (Mann–Whitney U = 3197.00; z = −0.771, P = -0.441) and conformity motives (Mann–Whitney U = 2856.50; z = −1.30, P = 0.195). However, significant differences were found in the mean number of days of past 2-months alcohol use at baseline [Mann–Whitney U = 2628.00; z = −0.2.02, P = 0.044; non-respondents = 10.62 (SD = 7.19), respondents = 5.79 (SD = 11.54)] and perceived efficacy of PBS [Mann–Whitney U = 2522.22; z = −2.18, P = 0.029; non-respondent = 68.19 (SD = 6.45), respondents = 64.32 (SD = 8.14)].

The Regional Bioethics Research Committee of Andalusia (Consejería de Sanidad, Government of Andalusia, Spain) approved the present study.

Measures

A pilot study was conducted with 127 young adults with characteristics similar to those of the target population. The final version of the questionnaire consisted of:

Sociodemographic characteristics. At baseline, we collected information on gender, age, country of birth, primary source of income, college status (being a student at the university or not) and living arrangements.

Alcohol use measures. Frequency of past-year alcohol use was assessed at baseline (response options: less than once per month, 1–3 times per month, 1 day per week, 2–3 days per week, 4–6 days a week and daily). The participants reported the number of days of alcohol use and binge drinking at baseline and follow up in the past 2 months. Baseline measures included the Daily Drinking Questionnaire [28] to assess the quantity of alcohol consumed in a typical week of the past month. We converted the reported drinking quantities into standard drink units according to the Spanish standard of 10 g of pure alcohol per unit [29].

Protective behavioural strategies. The Spanish version (S-PBSS-20) [30] of the Protective Behavioural Strategies Scale (PBSS-20) [31] was used to measure the use of PBS at follow up. This scale consists of 20 items grouped into three dimensions: 'stopping/limiting drinking' (SLD-7 items), 'manner of drinking' (MOD-5 items) and 'serious harm reduction' (SHR-8 items). Participants indicated the frequency with which each strategy had been used during the past 2 months in a Likert-type response format (1 = never, 5 = always). In the present study, the total score of the S-PBSS was used. Consistent with the Spanish version of the PBSS [30], internal consistency was estimated using Cronbach's ordinal alpha (0.84).

Perceived efficacy of PBS at baseline. Following Ray *et al.* [16], the Protective Behavioural Strategies scale (PBSS-20) [30] was used to measure the perceived efficacy of PBS, adapting the wording of the scale. Specifically, we used the item 'indicate how effective you think each of the following behaviours are in reducing the negative consequences of alcohol'. The response format was a 4-point Likert-type scale: not at all effective (1), somewhat effective (2), moderately effective (3) and highly effective (4). Cronbach's alpha of the scale was 0.88.

Drinking motives. At baseline, we used the drinking motives Questionnaire-Revised (DMQ-R SF) [32] adapted to Spanish by Mezquita *et al.* [33]. This instrument consists of 12 items (1 = almost never or never, 5 = almost always or always), grouped into four dimensions (with three items per dimension): social motives, coping motives, enhancement motives and conformity motives. Cronbach's alpha values were as follows: social motives = 0.87, enhancement motives = 0.83, coping motives = 0.85 and conformity motives = 0.91

Data analysis

Hierarchical regression analysis was employed to evaluate the prospective association between perceived efficacy at baseline and engagement in protective behaviours at follow up. Three blocks of predictors were entered sequentially. Since it has been shown that women and older individuals use more PBS [3], age and gender were entered as covariates in the first block; drinking motives (coping, social, enhancement and conformity motives) and alcohol use measures (frequency and quantity of alcohol use, and frequency of binge drinking) were entered in the second block, and perceived efficacy was included in the final block. Confidence intervals were computed as bootstrap 95% percentile intervals based on 10 000 samples.

To determine if any of the drinking motives moderated the relationship between the perceived efficacy of PBS and PBS use, moderation analyses were conducted using the PROCESS macro for SPSS [34]. Four independent moderation analyses were performed, one for each drinking motive. Sociodemographic variables, alcohol use and the remaining drinking motives were entered as covariates within each moderation

Table 1. *Descriptives and correlations among protective behavioural strategies (PBS), drinking motives and sociodemographic variables*

	1	2	3	4	5	M	SD
1. Social motives at baseline						9.81	3.06
2. Enhancement motives at baseline	0.73***					9.35	3.13
3. Coping motives at baseline	0.39***	0.33***				6.06	2.85
4. Conformity motives at baseline	0.35***	0.28***	0.34***			4.30	2.18
5. Perceived efficacy of PBS at baseline	−0.16**	−0.20***	−0.02	−0.10		64.54	8.09
6. PBS use at follow up	−0.34***	−0.44***	−0.12*	−0.11*	0.50***	66.83	11.03

*$P < 0.05$; **$P < 0.01$; ***$P < 0.001$.

model. The bootstrap procedure was implemented with the same parameters used in the hierarchical regression analysis: bootstrap 95% percentile intervals based on 10 000 samples.

Results

The means, standard deviations and intercorrelations for the measures in the present study are presented in

Table 2. *Hierarchical multiple regression examining the association between baseline perceived efficacy and use of protective behavioural strategies (PBS) at follow up, controlling for sociodemographic variables, alcohol use and drinking motives*

PBS use and predictors	*b*	SE	95% CI for *b*	*P*	ΔR^2
PBS total at follow up					
Gender	1.19	1.01	−0.80, 3.20	0.242	
Age	0.02	0.23	−0.44, 0.46	0.919	0.033*
Frequency of alcohol use at baseline	−0.07	0.06	−0.19, 0.05	0.231	
Alcohol quantity at baseline	−0.08	0.04	−0.17, 0.00	0.079	
Frequency of binge drinking at baseline	−0.14	0.10	−0.34, 0.04	0.133	
Social motives at baseline	−0.07	0.23	−0.51, 0.38	0.777	
Enhancement motives at baseline	−0.94	0.22	−1.34, −0.50	<0.001	
Coping motives at baseline	0.15	0.19	−0.23, 0.51	0.440	
Conformity motives at baseline	0.09	0.26	−0.43, 0.58	0.724	0.269**
Perceived efficacy of PBS at baseline	0.44	0.07	0.29, 0.58	<0.001	0.084**

*$P < 0.01$; **$P < 0.001$. Hierarchical regression steps: Step 1 only included sociodemographic variables; Step 2 added alcohol use measures and drinking motives; Step 3 added perceived efficacy. The parameters of the final model are presented. CI, confidence interval.

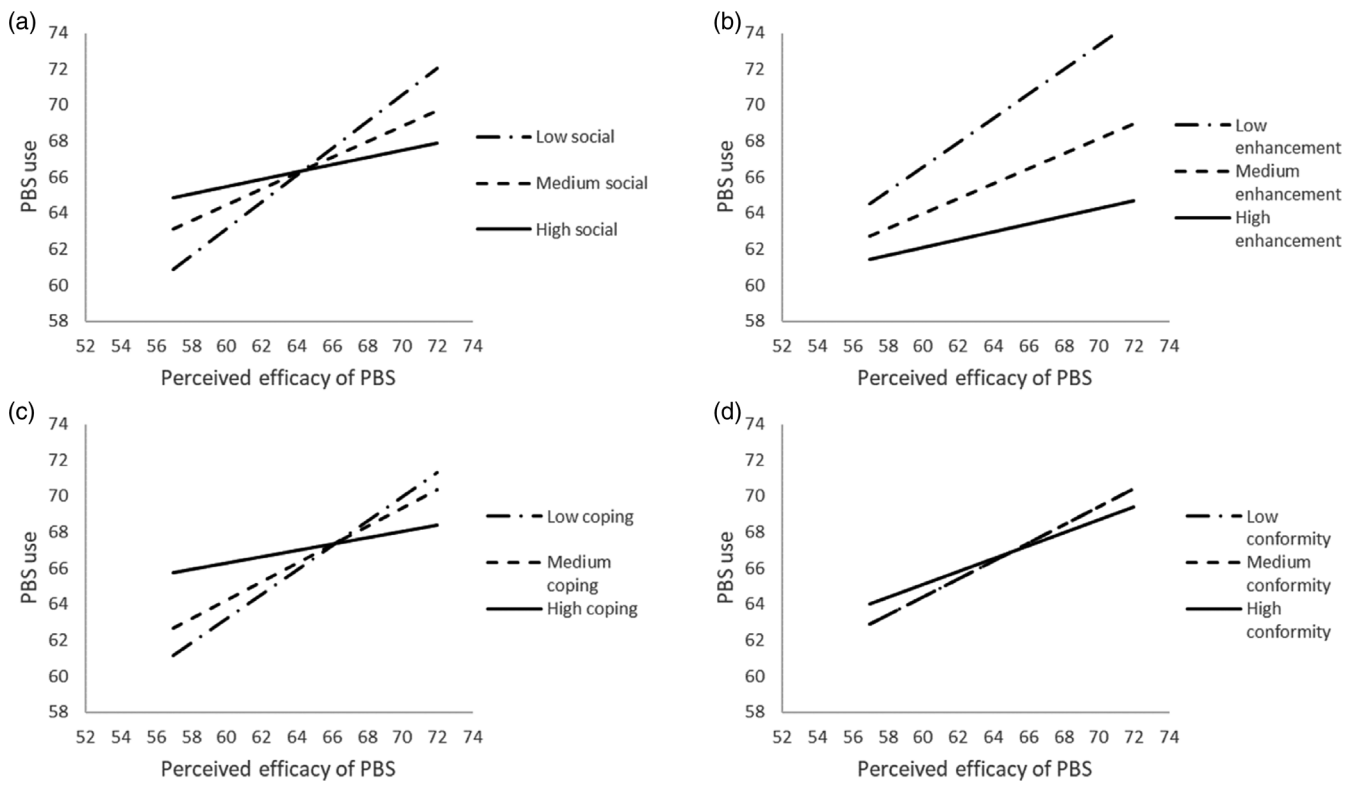

Figure 1. *Pick-a-point plots for the moderating effects of drinking motives in the relationship between perceived efficacy of protective behavioural strategies (PBS) and PBS use. Note. The conditioning values of drinking motives were established as P16 (low), P50 (moderate) and P84 (high). (a) Social motives as the moderator. (b) Enhancement motives as the moderator. (c) Coping motives as the moderator. (d) Conformity motives as the moderator.*

Table 1. Positive correlations were found among the four types of drinking motives at baseline. In addition, drinking motives correlated negatively with the use of PBS at follow up. The perceived efficacy of PBS at baseline showed a positive correlation with the use of PBS at follow up and a negative correlation with positive motives (social and enhancement).

The results of the multiple regression to explain PBS use as a function of perceived efficacy of PBS is shown in Table 2. After controlling for the effects of sociodemographic variables, alcohol use and drinking motives, it was found that the higher the scores on perceived efficacy of PBS at baseline, the higher the frequency of PBS use at follow up ($\beta = 0.44$, $P < 0.001$). Furthermore, the perceived efficacy of PBS had the highest predictive capacity for PBS use ($sr^2 = 0.084$).

In three of the four moderating models the interaction between drinking motive and perceived efficacy in explaining PBS use was statistically significant: social motives ($\beta = -0.08$, $t = 3.97$, $P < 0.001$), enhancement motives ($\beta = -0.07$, $t = 3.38$, $P < 0.001$) and coping motives ($\beta = -0.08$, $t = 3.83$, $P < 0.001$). In contrast, conformity motives did not moderate the relationship between perceived efficacy and PBS use ($\beta = -0.05$, $t = 1.65$, $P = 0.100$).

Simple slope analysis (Figure 1) revealed that the impact of perceived efficacy on PBS use declined as the motivation of the participants increased. Specifically, the simple effects predicted by the model for those participants who were less motivated (16th percentile) were clearly higher (social: $\beta = 0.74$, $P < 0.001$; enhancement: $\beta = 0.68$, $P < 0.001$; coping: $\beta = 0.68$, $P < 0.001$) compared to the simple effects predicted for the highly motivated participants (84th percentile; social: $\beta = 0.20$, $P = 0.021$; enhancement: $\beta = 0.22$, $P = 0.020$; coping: $\beta = 0.17$, $P = 0.068$).

Discussion

To our knowledge, this is the first study to prospectively examine the relationship between the perceived efficacy of PBS for reducing alcohol-related negative consequences and PBS use among a community-based sample of alcohol-using young adults. In addition, no previous research has analysed the moderating role of drinking motives in this relationship. Our results have shown that, after controlling for the effects of gender, age, alcohol use and drinking motives, a higher perception of PBS efficacy is associated with greater PBS use. Moreover, our findings suggest that three drinking motives (social, enhancement and coping motives) weaken the relationship between the perceived efficacy of PBS and PBS use.

In a recent evaluation of five meta-analyses on protection motivation theory, Ruiter *et al.* [14] showed that perceived efficacy of protective behaviours is one of the main determinants of the use of such behaviours. Moreover, four previous cross-sectional studies [15–18] have supported this relationship between the perceived efficacy of PBS and alcohol-PBS use. The present study, in addition to yielding results consistent with the previous literature, provides longitudinal evidence in a sample of young adults not exclusively comprised of college students. Thus, incorporating perceived efficacy into interventions aimed at promoting PBS use among young adults may be helpful for improving the effectiveness of such interventions.

A novel finding of this study is the moderating role of social, enhancement, and coping drinking motives in the relationship between the perceived efficacy of PBS and PBS use. As expected, higher scores in these motives were associated with a decreased impact of PBS perceived efficacy on PBS use. Regarding the positive drinking motives (social and enhancement), previous research has shown that these motives are related to greater alcohol use [21]. Bravo *et al.* [35] found that alcohol users reported that using PBS was counterintuitive when their goal was experiencing the effects of alcohol intoxication. Thus, those with high positive motivations to drink may believe that using PBS will diminish the desired effects of alcohol which are associated with intoxication. These individuals could therefore use PBS less frequently even though they may consider such strategies to be effective in reducing potential adverse effects. Concerning this issue, it has been pointed out that PBS use can reduce not only negative consequences but also increase positive consequences [36]. Therefore, our results support the notion that interventions aimed at promoting PBS use, in addition to integrating perceived efficacy, should consider young people's drinking motives. In those with high positive drinking motives, presenting PBSs as compatible with (and even enhancing) the positive effects of alcohol should be helpful.

As in the case of positive motives, higher coping motives were related to a decrease in the impact of the perceived efficacy of PBS at baseline on participants PBS use at follow up. Contrary to our expectations, the moderating effect of coping drinking motives was not lower than positive motives. Difficulties in regulating emotions are related to higher alcohol consumption [37] and lower PBS use [38]. Thus, drinking to cope with negative emotional states may reflect a lack of strategies for managing negative emotions [20]. Therefore, it is advisable that interventions aimed at increasing PBS use in which participants are identified as high coping-motivated include (together with PBS efficacy) training in coping skills. Similar to positive

drinking motives, determining which individuals are considered as high coping-motivated (and therefore could benefit from personalised interventions to increase PBS use) will need studies that establish cut off points for the various drinking motives. Unexpectedly, and unlike prior drinking motives, conformity motives did not impact the relationship between the perceived efficacy of PBS and PBS use. This could be related to the fact that the possible impact of these motives on alcohol use has received the least support in the literature, with contradictory results in some cases [21].

Limitations and future directions

Certain limitations should be considered when interpreting our results. In the absence of a sampling frame of alcohol-using community youth-adults, the non-probability sampling used here limits the generalisability of the results to other youth adults. However, the percentage of women in our sample was very similar (50.6%) to that of the young adult (18–25 years) Spanish population (48.8%, [23]) and we recruited both college students and their non-college counterparts. Further, since our sampling procedure also included snowball sampling, the risk of obtaining homogeneous subgroups in our sample should also be considered. To minimise this risk, we limited the number of candidates to five to be nominated by each participant. Although in the present study we used a short period (past 2-months) to collect the data (both at baseline and follow up), the validity of our results may be affected by self-report biases, including recall biases. To minimise these biases and test the validity of our findings, future research may consider using Ecological Momentary Assessment [39].

Conclusions

The present study has prospectively shown the link between perceived efficacy of PBS to reduce the negative consequences of alcohol and the use of these strategies among community youth-adults. These findings align with the tenets of various theoretical models (e.g. Health Belief Model [9], Theory of Planned Behavior [10], Social Cognitive Theory [11] and Protection Motivation Theory [12]) that integrate outcome expectancies as one of the fundamental explanatory factors of health-related behaviours. Furthermore, this research has demonstrated the importance of considering drinking motivations, as formulated by the motivational model of alcohol use [20], as moderators of the impact of perceived efficacy on PBS use. Personalised feedback interventions that include drinking motives have shown utility in reducing the frequency and quantity of alcohol consumption compared to those that do not [40]. Accordingly, our results suggest that an initial assessment of drinking motives could be useful when designing interventions aimed at increasing the perceived efficacy of PBS as a means of encouraging the use of these strategies. Based on such an assessment, the intervention should include various tailored components (e.g. coping skills for those who drink to cope) to increase its efficacy.

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Conflict of Interest

The authors have no conflicts of interest

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