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Perceived vulnerability moderates the relations between the use of protective behavioral strategies and alcohol use and consequences among high-risk young adults

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Abstract

Drinking protective behavioral strategies (PBS) have been associated with reductions in alcohol use and alcohol-related consequences in young adults. PBS subscales, Limiting/Stopping (LS), Manner of Drinking (MOD), and Serious Harm Reduction (SHR), have been examined in the literature; LS, MOD, and SHR have mixed support as protective factors. Understanding moderators between PBS and alcohol use and related consequences is an important development in PBS research in order to delineate when and for whom PBS use is effective in reducing harm from alcohol use. Perceptions of vulnerability to negative consequences, included in health-risk models, may be one such moderator. The current study examined whether two types of perceived vulnerability (perceived vulnerability when drinking; perceived vulnerability in uncomfortable/unfamiliar situations) moderated the relations between LS, MOD, SHR strategies and alcohol use and related negative consequences. High-risk young adults ($N = 400$; 53.75% female) recruited nationally completed measures of PBS, alcohol use and related consequences, and measures of perceived vulnerability. Findings demonstrated that perceived vulnerability when drinking moderated the relations between MOD strategies and alcohol use. The interactions between perceived vulnerability when drinking and PBS did not predict alcohol-related consequences. Perceived vulnerability in unfamiliar/uncomfortable social situations moderated relations between MOD strategies and both alcohol use and related negative consequences; no other significant interactions emerged. Across both perceived vulnerability types and MOD strategies, those with

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Contributors

All authors have materially participated in the participated in the research and/or manuscript preparation. Drs. Garcia, Lewis, and Litt designed the study. Drs. Garcia and Litt conducted literature searches and summarized previous research. Drs. Lewis, Garcia, and Ms. Waldron wrote the first draft of the method section. Dr. Garcia conducted statistical analyses. Drs. Garcia and Fairlie wrote the first draft of the discussion section. Ms. Waldron found and checked the references. All authors contributed substantially to subsequent versions of the manuscript, including the final version. All authors have approved the final version of the manuscript.

Conflict of interest

All authors declare that they have no conflicts of interest.

the highest levels of perceived vulnerability and who used MOD strategies the most had the greatest decrements in alcohol use and related negative consequences. Prevention and intervention implications are discussed.

Keywords

Alcohol; Young adults; Protective behavioral strategies; Perceived vulnerability

1. Introduction

Young adult alcohol use continues to be a public health concern (Kann et al., 2014); with roughly 38% of young adults aged 18 to 25 engaging in heavy episodic drinking (4 + drinks for women, 5 + drinks for men; SAMHSA, 2014). Alcohol-related negative consequences occur in school, interpersonal, social, and health domains (Hingson & White, 2014; USDHHS, 2007; White, Macinnes, Hingson, & Pan, 2013). Additionally, alcohol-related deaths are the third leading preventable cause of death in the United States (Blackwell, Lucas, & Clarke, 2014). Thus, attaining a better understanding of the psychological and behavioral factors linked to increased alcohol use and consequences is an important step toward further refinements of alcohol use prevention and intervention strategies for young adults.

1.1. Protective behavioral strategies

One way to reduce heavy drinking and alcohol-related consequences is to promote the use of protective behavioral strategies (PBS), which are behaviors that individuals can engage in *before, while, or after* drinking to limit alcohol intake, intoxication, or negative consequences (Martens et al., 2004; Sugarman & Carey, 2007). Three types of PBS have been examined: Strategies for limiting or stopping drinking (LS; e.g., stop drinking at a predetermined time), manner of drinking (MOD; e.g., drink slowly rather than gulped or chugged), and serious harm reduction (SHR; e.g., use a designated driver) (Martens et al., 2005). Cross-sectional and longitudinal studies demonstrate that greater use of LS and MOD strategies are associated with less alcohol use and fewer consequences among college students (Frank, Thake, & Davis, 2012; Napper, Kenney, Lac, Lewis, & LaBrie, 2014; Pearson, 2013). However, three studies found that on days which participants reported above average increases of LS and SHR strategies (but not MOD), they also experienced greater drinking and consequences that day (Lewis et al., 2012, 2015; Pearson, D'Lima, & Kelley, 2013). While PBS are related to reduced alcohol use and consequences, young adults use of PBS is mixed (Nguyen, Walters, Wyatt, & DeJong, 2011; Ray, Stapleton, Turrissi, & Phillion, 2012). One possibility for varied use of PBS may lie with the perception of vulnerability.

1.2. Perceived vulnerability

Most models of health-risk behavior assess perceived vulnerability (i.e., perceptions of being vulnerable to negative consequences associated with a health behavior) (Gerrard, Gibbons, & Bushman, 1996; van der Plight, 1998). There is evidence that people are aware of the link between risk behavior and consequences (Gerrard, Gibbons, Houlihan, Stock, & Pomery, 2008; Gerrard & Luus, 1995). Importantly, perceived vulnerability may affect the strength of

the relations between PBS and alcohol use and consequences. Negative relations between PBS use and alcohol use and consequences may be stronger among those with higher perceived vulnerability. Individuals with lower perceived vulnerability may be less motivated to engage in PBS given their perception that negative consequences are unlikely; thus, weakening the PBS—alcohol link. This variation may partially explain contrary relations found across studies examining specific types of PBS and alcohol consumption and consequences (for review, see Pearson, 2013). Further, feelings of vulnerability in specific circumstances (e.g., when drinking; in unfamiliar or uncomfortable social situations) could differentially impact the relations between PBS types and alcohol and alcohol-related problems. Examining perceptions of vulnerability related to situational risk is important given the role social influence plays in young adult alcohol use. Additionally, using conditional measures of perceived vulnerability (i.e., asking participants what their personal risk would be *if they were* to engage in drinking) may better indicate health compromising behavior compared to generalized perceived vulnerability (e.g., how likely is it that something bad will happen to someone who drinks) as individuals often underestimate their likelihood of experiencing negative consequences, especially when compared to peers or more generally.

1.3. The present study

The present study sought to determine if the relations between MOD, LS, and SHR strategies and 1) typical weekly drinking and 2) alcohol-related negative consequences were moderated by both perceived vulnerability when drinking (i.e., the likelihood that something bad would happen if the individual drank alcohol and engaged in heavy episodic drinking) and perceived vulnerability in uncomfortable/un-familiar situations (i.e., the likelihood that something bad would happen if the individual were in an unfamiliar/uncomfortable social situation with and without alcohol use). We hypothesized that the strength of the negative relations between the PBS subscales (i.e., LS, SHR, MOD) and typical weekly drinking as well as the PBS subscales and alcohol-related negative consequences would be stronger among those with higher levels of both types of perceived vulnerability.

2. Method

2.1. Participants and procedures

Participants included a national sample of high-risk young adults in a randomized controlled trial designed to examine the efficacy of web-based personalized feedback interventions on alcohol-related risky sexual behavior (Lewis et al., 2018, manuscript accepted for publication). Participants were recruited nationally through various methods; online and in-person, in-print advertisements, and friend referral. Individuals from 50 states completed the web-based screening survey ($N = 10,242$; 55.4% female; 59.9% Caucasian/White; 84.6% non-Hispanic/Latino; $M_{age} = 24.3$, $SD = 6.07$, age range 13 to 55). Exclusion criteria included: not residing in the US (0.29% did not); not between the ages of 18–25 (20.1% were outside of age range); in a monogamous relationship (55.9% were in a monogamous relationship); not using a condom while having vaginal or anal sex after drinking in the past month (50.3% did not meet this criteria); not having an alcoholic drink at least once a week on average over the past 3 months (46.0% did not meet this criteria); and not having an

episode of heavy episodic drinking (4 + /5+ drinks for women/men in one sitting) in the past month (40.7% did not meet this criteria).

After these exclusions, 860 participants (8.4% of screening participants) were contacted for telephone screening to verify information supplied during the online screening. Individuals ($n = 457$, 53.1%) who completed telephone screening were invited to the baseline survey, and of those, 402 (88.0%) enrolled in the study and completed the baseline survey. After baseline, participants were automatically randomized to intervention condition using stratified random assignment based on gender. All study procedures were approved by the University's institutional review board.

Data used in the present analyses were collected at baseline; thus, prior to intervention delivery. Participants were excluded from the present analyses if they indicated no past month alcohol consumption ($n = 2$), as using alcohol PBS is contingent on alcohol use; resulting in an analytic sample of 400 participants. At baseline, the analytic sample's mean age was 22.44 years old ($SD = 1.89$). Gender, ethnic, and racial representation of the sample was as follows: 53.75% female, 14.32% Hispanic/Latino, 68.26% Caucasian/White (i.e., including those designating Hispanic/Latino origin), 11.84% Other/Mixed, 11.08% Black/African American, 6.80% Asian/Asian American, 1.26% American Indian/Alaska Native, and 0.76% Native Hawaiian/Pacific Islander.

2.2. Measures

2.2.1. Drinking Protective Behavioral Strategies Survey (Martens et al, 2005)

—PBS were assessed using the Protective Behavioral Strategies Survey consisting of 14 items; responses range from 1 “never” to 5 “always.” Participants were asked to indicate use of 14 protective behavioral strategies over the past month when using alcohol or “partying”. Internal consistency for three subscales were MOD (0.68), LS (0.78), and SHR (0.60), similar to scores ($\alpha = 0.73$, $\alpha = 0.81$, $\alpha = 0.63$, respectively) reported by Martens et al. (2005).

2.2.2. Perceived vulnerability—Perceived vulnerability was assessed for alcohol use as well as situational risk (Gibbons, Gerrard, & Lane, 2003). Responses ranged from 1 “very unlikely” to 5 “very likely.” Two items (e.g., “How likely is it that something bad would happen to you if you drank alcohol”) assessed PV when consuming alcohol and heavy amounts of alcohol ($\alpha = 0.78$). Four items assessed PV in unfamiliar/uncomfortable social situations with and without alcohol (e.g., “How likely is it that something bad would happen if you went to a party with people you didn't know very well when drinking 4/5 or more drinks”) ($\alpha = 0.81$). Mean scores were calculated for each scale.

2.2.3. Typical drinks per week—The Daily Drinking Questionnaire (DDQ; Collins, Parks, & Marlatt, 1985) assessed number of typical drinks per week. Participants were asked to “Consider a typical week in the past month. How much alcohol, on average (measured in number of drinks), do you drink on each day of a typical week?” Weekly drinking was computed by summing the number of drinks reported for each day of the week.

2.2.4. Alcohol-related negative consequences—Alcohol-related negative consequences were assessed using the Brief Young Adult Alcohol Consequences Questionnaire (BYAACQ; Kahler, Strong, & Read, 2005). Participants indicated which of 24 problems they had experienced as a result of their drinking in the past month.

2.2.5. Covariates—Given consistent findings that PBS use varies by gender (for review, see Pearson, 2013), self-reported gender was included as a covariate for all analyses. Two individuals identified as transgendered; however, given the small number of individuals who identified as transgendered, gender was dichotomized (0 = female, 1 = male). The two transgendered participants were not included in the present analyses as little information can be garnered from analyses with only two participants.

2.3. Data analyses

Analyses were conducted with Stata SE 14.1 (StataCorp, 2015). As outcomes are count data and the variances were greater than their respective means, negative binomial regressions with robust standard errors (i.e., Huber-White sandwich estimators; Huber, 1967; White, 1980) were used to model number of drinks per week and negative consequences. All continuous predictors were mean centered before analyses (Cohen, Cohen, West, & Aiken, 2003). We tested the six possible interactions in our theoretical model, namely three PBS subscales (i.e., MOD, LS, and SHR) $\times$ two perceived vulnerability types (i.e., when drinking and in unfamiliar/uncomfortable social situations), controlling for gender. Results are presented for the main effects models (without interactions) as well as the models that included main effects and interactions in Tables 2 and 3.

3. Results

3.1. Correlations

Perceived vulnerability when drinking and perceived vulnerability in uncomfortable/unfamiliar social situations were positively correlated yet distinct constructs (Table 1). MOD, LS, and SHR strategies were positively related to each other. Perceived vulnerability when drinking and perceived vulnerability in uncomfortable/unfamiliar social situations were not significantly associated to typical drinks per week; however, perceived vulnerability when drinking and perceived vulnerability in uncomfortable/unfamiliar social situations were positively related to alcohol-related negative consequences. MOD, LS, and SHR strategies were negatively related to typical drinks per week and alcohol-related negative consequences.

3.2. Typical drinks per week

2.2.1. Perceived vulnerability when drinking—The main effects model was significant overall Wald $\chi^2(5) = 66.57, p < .001$. Gender significantly predicted number of drinks per week, indicating that the incidence rate for males is 1.35 times the incidence rate for females. The only other significant predictor was MOD strategies; a one unit increase in MOD strategies decreases the number of drinks per week by a factor of 0.84 holding all other variables constant. The model including the interaction terms was also significant overall, Wald $\chi^2(8) = 75.47, p < .001$ (Table 2). MOD strategies and perceived vulnerability

when drinking was the only significant interaction ($IRR = 0.88, p = .01$). Inspection of margins indicates that the decrement in percent change between MOD strategies and the incidence rate of typical drinks per week was stronger among those higher in perceived vulnerability when drinking (Fig. 1).

3.2.2. Perceived vulnerability in unfamiliar/uncomfortable social situations—

The main effects model was significant overall Wald $\chi^2(5) = 62.87, p < .001$ (Table 2). Similar to the perceived vulnerability when drinking main effects, MOD strategies decreased the incidence of drinks per week, while being male was associated with an increased incidence of drinks per week. The model including interaction terms was significant overall, Wald $\chi^2(8) = 74.50, p < .001$ (Table 2); however, only perceived vulnerability in unfamiliar/uncomfortable social situations and MOD strategies interacted, $IRR = 0.88, p = .04$. Inspection of margins indicates the percent change between MOD strategies in the incidence rate of drinks per week was stronger at higher levels of perceived vulnerability in unfamiliar/uncomfortable social situations (Fig. 2).

3.3. Alcohol-related negative consequences

3.3.1. Perceived vulnerability when drinking—The main effects model was significant overall Wald $\chi^2(5) = 79.79, p < .001$ (Table 3). Perceived vulnerability when drinking predicted alcohol-related negative consequences, such that a one unit increase in perceived vulnerability when drinking increases the rate of alcohol-related negative consequences by 1.17. MOD and SHR strategies both predicted alcohol-related negative consequences, indicating that a one-unit increase in MOD and SHR strategies decreases the rate of alcohol-related negative consequences by 0.83 and 0.92, respectively. No other predictors were significant in the main effects model. Further, despite the overall interaction model's significance, Wald $\chi^2(8) = 93.64, p < .001$, all interactions were *ns* (Table 3).

3.3.2. Perceived vulnerability in unfamiliar/uncomfortable social situations—

The main effects only model was significant overall Wald $\chi^2(5) = 63.79, p < .001$ (Table 3). Perceived vulnerability in unfamiliar/uncomfortable social situations predicted alcohol-related negative consequences, such that a one unit increase in perceived vulnerability in unfamiliar/uncomfortable social situations increases the rate of alcohol-related negative consequences by 1.12. MOD and SHR strategies were inversely related to alcohol-related negative consequences; increases in MOD and SHR strategies related to a decrement in alcohol-related negative consequences. The overall model including interaction terms was significant, Wald $\chi^2(8) = 87.41, p < .001$ (Table 3). The interaction between perceived vulnerability in unfamiliar/uncomfortable social situations and MOD strategies was negatively associated with alcohol-related negative consequences ($IRR = 0.87, p = .03$). The decrement in percent change between MOD strategies and alcohol-related negative consequences increases in strength as perceived vulnerability in unfamiliar/uncomfortable social situations increases; those who had the highest levels of perceived vulnerability in unfamiliar/uncomfortable social situations and who used more MOD strategies had fewer alcohol-related negative consequences (Fig. 3).

4. Discussion

Greater use of PBS, and in particular MOD strategies, has been linked to less alcohol use and fewer alcohol-related negative consequences, with less consistent evidence for LS and SHR strategies. Using a national sample of high-risk young adults, we examined if associations between PBS use (i.e., LS, SHR, MOD) and alcohol use and alcohol-related negative consequences varied as a function of two types of perceived vulnerability. Only MOD strategies interacted significantly with perceived vulnerability. When perceived vulnerability when drinking and perceived vulnerability in uncomfortable/unfamiliar social situations increased and MOD strategies increased, typical drinks per week decreased. However, only increases in MOD strategies and perceived vulnerability in uncomfortable/unfamiliar social situations related decreases in alcohol-related negative consequences. Thus, perceived vulnerability may serve as a protective factor in conjunction with the use of MOD strategies. It should be noted that perceived vulnerability (both situation and drinking) was positively related to alcohol-related negative consequences.

MOD strategies have been found to be the most consistently effective type of strategies for reducing alcohol use and alcohol-related negative consequences (Frank et al., 2012; Lewis et al., 2012; Martens, Ferner, & Cimini, 2007; Napper et al., 2014; Pearson et al., 2013). The present study indicates use of MOD strategies is possibly strengthened under conditions where one feels more vulnerable among those who are high-risk. When individuals who engage in risky behavior believe that “something bad” may happen when drinking or in uncomfortable/un-familiar social situations they may be more likely to enact MOD strategies; thus, less likely to engage in heavier drinking and suffer from alcohol-related consequences. However, these relations were not found among SHR or LS strategies. As LS strategies involve more pre-planning than MOD strategies, high-risk young adults may have problems following through with these plans, especially in unexpected risk-conducive situations.

Our findings in the main effect analyses mirror the inconsistency of LS and SHR in predicting alcohol consumption and alcohol-related negative consequences; neither LS nor SHR predicted typical drinking and only SHR predicted alcohol-related negative consequences. LS strategies, in general, may be less effective at independently reducing alcohol and alcohol-related consequences (Napper et al., 2014). LS strategies are primarily self-determined (e.g., “determine not to exceed a set number of drinks”) and can be flexible (e.g., “leave the bar/party at predetermined time”); these strategies may be ineffective in the face of intoxication or problematic in general (e.g., leave bar at predetermined time, which is closing). SHR strategies target a smaller range of behaviors (i.e., have few scale items; focused on heavy drinking) and may be more relevant to consequences, although the directionality of these relations remains equivocal. Similar to work examining anxiety and PBS use (Linden, Lau-Barraco, & Millettich, 2013), feelings of vulnerability may relate to a lessened ability to focus on using strategies given the cognitive resources needed to use PBS effectively. However, it seems that strategies focused primarily on avoidance (i.e., MOD) may be an avenue worth pursuing given that those with the highest levels of perceived vulnerability, who used MOD the most, had the greatest decrements in alcohol consumption and alcohol-related negative consequences.

In studies examining PBS as a change process mechanism, PBS mediated intervention effects and alcohol use and alcohol-related problems when the intervention successfully modified PBS use (Larimer et al., 2007; Murphy et al., 2012); however, other studies have found no significant intervention effects on PBS (e.g., Kulesza, Apperson, Larimer, & Copeland, 2010; Neighbors, Lee, Lewis, Fossos, & Walter, 2009). Therefore, understanding what affects this process is important. Examining constructs that have potential to modify the relation between PBS and alcohol use would help delineate constraints for protective effects as PBS may not be equally protective across situations and people. Understanding under what conditions PBS are effective, and specifically, what types of PBS are effective are important next steps.

As the current study's findings are suggestive that a general vulnerability to risk (hypothesized in most health behavior models) does not necessarily result in risk behavior, conditional vulnerability linked to an activity (e.g., drinking or attending a party with unfamiliar people) might give a more complete picture of the type of impetus needed to strengthen the use of PBS among those who engage in risky behavior, specifically MOD strategies. Helping high-risk young adults dispel the notion that "it won't happen to me" and increasing their mindfulness of potential negative outcomes, beyond negative outcomes they can readily remember (i.e., heuristic and representativeness bias) has potential to improve adoption of health-protective behavior.

4.1. Limitations and future directions

Despite the strengths of the study, there are limitations. Perceived vulnerability and precautionary behavior are hypothesized to be reciprocal (Gerrard et al., 1996) and perceived vulnerability may vary with experience; it is unknown whether perceived vulnerability as currently measured represents perceived vulnerability that has been affected by the absence or occurrence of previous negative or positive outcomes. Thus, we are unable to understand the causal sequence of events. Perceived vulnerability can vary by situation; future work should measure other types of perceived vulnerability to further expand our findings. We also measured perceived vulnerability outside of actual risk situations and are limited to participants' retrospective recall and projection of feelings in a situation that does not ecologically match where the decision to use PBS or alcohol occurs. The use of a cross-sectional design prevents us from being able to disentangle within-person and between-person effects and instead attests to general associations among constructs. Using longitudinal ecological momentary assessment may provide a solution to these issues through tracking of these constructs over the course of drinking events.

Although our internal consistencies were aligned with Martens et al. (2005), they were still relatively low. Serious harm reduction was the lowest, which could be reflective of the three-item nature of the scale as well as the limited number behaviors assessed. Newer measures of PBS have added more items to the SHR subscale (Treloar, Martens, & McCarthy, 2015); however, at the time of this study, it was not currently available. Future studies should utilize the newer Protective Behavioral Strategies Scale that improved both content and internal consistency.

Our use of a high-risk sample may have resulted in fewer young adults who reported lower levels of perceived vulnerability. Those meeting eligibility criteria may endorse higher perceived vulnerability as they may have more accurate perceptions based on their experiences compared to individuals who seldom engage in risk behavior. Further, our findings may not be generalizable to all young adults given the relatively high-risk inclusion criteria. It should be noted that there was still considerable risk behavior and alcohol use endorsed among the screening participants prior to exclusion (e.g., of the screening sample 49.7% engaged in vaginal and/or anal sex after drinking and did not use a condom; 29.9% drank three times a week or more; 59% had past month heavy episodic drinking). Additionally, previous research has demonstrated that PBS vary in utilization by race and/or ethnicity (e.g., Clarke et al., 2016; Kenney & LaBrie, 2013); thus, findings may not generalize across race or ethnicity.

In conclusion, this is the first study examining how perceived vulnerability moderates PBS and alcohol use and alcohol-related negative consequences. As PBS continues to garner investigation and utilization in prevention and intervention contexts, it is important to further understand the contingencies that may strengthen or weaken the PBS—alcohol relations. Tentatively, results suggest that one's perception of conditional vulnerability is a possible avenue to expand on in future research, especially related to MOD strategies.

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HIGHLIGHTS

- Perceived vulnerability-drinking moderated manner of drinking and alcohol use.
- Perceived vulnerability-social moderated manner of drinking and alcohol use.
- Perceived vulnerability-social moderated manner of drinking and alcohol consequences.
- Those with highest PV and used MOD the most had greatest decreases in outcomes.

Fig. 1. Interaction of perceived vulnerability when drinking and PBS manner of drinking predicting typical drinks per week. Perceived vulnerability when drinking and manner of drinking PBS are centered values. All points plotted were statistically significant, $p < .001$.

Fig. 2.

Interaction of perceived vulnerability in unfamiliar/uncomfortable social situations and PBS manner of drinking predicting typical drinks per week. Perceived vulnerability social and manner of drinking PBS are centered values. All points plotted were statistically significant, $p < .001$.

Fig. 3.

Interaction of perceived vulnerability in unfamiliar/uncomfortable social situations and PBS manner of drinking predicting alcohol-related negative consequences. Perceived vulnerability social and manner of drinking PBS are centered values. All points plotted were statistically significant, $p < .001$.

Table 1

Correlations among study variables.

	<i>M (SD)</i>	Range	1	2	3	4	5	6
1. PV when drinking	2.47 (0.90)	1 to 5						
2. PV uncomfortable/unfamiliar social situations	2.44 (0.83)	1 to 5	0.48***					
3. PBS limiting/stopping	2.49 (0.74)	1 to 5	-0.01	0.03				
4. PBS manner of drinking	2.72 (0.81)	1 to 5	0.06	0.04	0.48***			
5. PBS harm reduction	2.57 (0.95)	1 to 5	-0.01	0.05	0.42***	0.36***		
6. Typical drinks/week	20.38 (13.81)	1 to 80	-0.04	-0.04	-0.24***	-0.30***	-0.22***	
7. Negative consequences	11.10 (5.88)	0 to 24	0.26***	0.16**	-0.11*	-0.27***	-0.23***	0.34***

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

Table 2

Typical drinks per week.

	IRR	95% CI	S.E.	Z
Perceived vulnerability when drinking				
Main effects analyses				
Gender	1.35	1.20–1.53	0.09	4.78***
PV when drinking	0.99	0.93–1.06	0.03	–0.22
LS PBS	0.90	0.82–1.00	0.05	–1.94 +
MOD PBS	0.84	0.75–0.93	0.04	–3.36**
SRH PBS	1.00	0.93–1.08	0.04	0.05
Interaction analyses				
Gender	1.34	1.19–1.51	0.08	4.78***
PV when drinking	1.00	0.94–1.06	0.03	0.05
LS PBS	0.92	0.83–1.02	0.05	–1.71
MOD PBS	0.82	0.75–0.89	0.04	–4.41***
SRH PBS	1.01	0.94–1.09	0.04	0.37
PV when drinking x LS PBS	1.02	0.92–1.13	0.05	0.38
PV when drinking x MOD PBS	0.88	0.80–0.97	0.04	–2.55*
PV when drinking x SRH PBS	1.02	0.95–1.09	0.04	0.52
Perceived vulnerability in unfamiliar/uncomfortable social situations				
Main effects				
Gender	1.34	1.18–1.52	0.09	4.50***
PV in social situations	0.98	0.90–1.07	0.04	–0.35
LS PBS	0.91	0.82–1.01	0.05	–1.83 +
MOD PBS	0.83	0.75–0.93	0.04	–3.38**
SRH PBS	1.01	0.93–1.08	0.04	–0.13
Interaction analyses				
Gender	1.33	1.16–1.50	0.09	4.30***
PV in social situations	0.97	0.89–1.06	0.05	–0.59
LS PBS	0.91	0.82–1.01	0.05	–1.77
MOD PBS	0.82	0.73–0.89	0.04	–4.12***
SRH PBS	1.02	0.95–1.09	0.04	0.00
PV in social situations x LS PBS	1.09	0.96–1.25	0.07	1.32
PV in social situations x MOD PBS	0.88	0.77–1.00	0.06	–1.93*
PV in social situations x SRH PBS	1.00	0.92–1.10	0.05	0.06

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

Table 3

Alcohol-related negative consequences.

		IRR	95% CI	S.E.
Perceived vulnerability when drinking				
Main effects analyses				
Gender	1.01	0.92–1.13	0.06	0.35
PV when drinking	1.17	1.10–1.23	0.31	5.78***
LS PBS	1.06	0.97–1.15	0.05	1.34
MOD PBS	0.83	0.76–0.90	0.03	−4.50***
SRH PBS	0.92	0.87–0.98	0.03	−2.64**
Interaction analyses				
Gender	1.01	0.91–1.12	0.06	0.16
PV when drinking	1.18	1.12–1.25	0.03	6.00***
LS PBS	1.06	0.97–1.15	0.04	1.30
MOD PBS	0.82	0.76–0.89	0.03	−4.76***
SRH PBS	0.92	0.87–0.98	0.03	−2.65**
PV when drinking x LS PBS	1.03	0.95–1.12	0.04	0.79
PV when drinking x MOD PBS	0.96	0.87–1.06	0.05	0.82
PV when drinking x SRH PBS	1.04	0.99–1.10	0.03	1.58
Perceived vulnerability in unfamiliar/uncomfortable social situations				
Main effects analyses				
Gender	1.04	0.93–1.16	0.06	0.66
PV in social situations	1.12	1.05–1.20	0.04	3.25**
LS PBS	1.06	0.97–1.15	0.05	1.19
MOD PBS	0.83	0.77–0.91	0.04	−4.26***
SRH PBS	0.92	0.86–0.98	0.03	−2.69**
Interaction Analyses				
Gender	1.03	0.92–1.15	0.06	0.51
PV in social situations	1.11	1.03–1.19	0.04	2.86**
LS PBS	1.06	0.97–1.16	0.05	1.27
MOD PBS	0.82	0.76–0.89	0.03	−4.87***
SRH PBS	0.93	0.87–0.99	0.03	2.43
PV in social situations x LS PBS	1.10	0.98–1.24	0.06	1.67
PV in social situations x MOD PBS	0.87	0.76–0.99	0.06	−2.18*
PV in social situations x SRH PBS	1.04	0.97–1.11	0.04	0.98

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