Do Protective Behavioral Strategies Moderate the Relationship Between Negative Urgency and Alcohol-Related Outcomes Among Intercollegiate Athletes?

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ABSTRACT. Objective: The purpose of this study was to examine the moderating effect of protective behavioral strategies on the relationship between negative urgency and alcohol outcomes. **Method:** Participants were college students who endorsed participating in club/intramural or varsity athletics. The students ($N = 234$; 73.9% female) completed measures of negative urgency, protective behavioral strategies, alcohol use, and alcohol-related problems. Separate hierarchical multiple regression analyses were conducted for each subscale of the Protective Behavioral Strategies Scale to test for moderation. **Results:** Results indicated that protective behavioral strategies aimed at serious harm reduction moderated the relationship between negative urgency and alcohol use, whereas

strategies aimed at avoiding excessive or rapid drinking moderated the relationship between negative urgency and alcohol-related problems. Strategies that involved planning drinking activities in advance did not moderate the relationship between negative urgency and alcohol outcomes. **Conclusions:** The current investigation provides further evidence for the role of protective behavioral strategies against known risk factors for alcohol use and related problems. Further, the paper suggests that type of strategy used matters when attempting to mitigate the relationship between negative urgency and alcohol outcomes. Limitations and future directions are discussed. (*J. Stud. Alcohol Drugs*, 73, 498–503, 2012)

HEAVY EPISODIC ALCOHOL CONSUMPTION is a problem on college campuses (Johnston et al., 2010). More than 40% of college students report heavy episodic use (five or more drinks in one sitting for men, four or more for women) in the preceding 2 weeks (Wechsler et al., 2002). This pattern of use has been shown to be related to many negative consequences, including unsafe sexual practices, driving after drinking, damaging property, injuries, and death (Hingson et al., 2009; Wechsler et al., 2002). Other studies have shown almost 20% of college students met past-year diagnostic criteria for alcohol abuse or dependence (Dawson et al., 2004; Slutske, 2005). These findings highlight the importance of understanding both risk and protective factors for excessive alcohol use among this population.

Protective behavioral strategies (PBS) are defined as active behaviors individuals use while consuming alcohol to facilitate more responsible drinking, such as not exceeding a set number of drinks, avoiding drinking games, and using a designated driver (Martens et al., 2005). Thus, PBS differ from more stable protective factors (e.g., personality characteristics or family history). Studies have shown more

frequent use of PBS was associated with less alcohol use (Benton et al., 2004; Martens et al., 2005) and fewer alcohol-related problems (Benton et al., 2004; Delva et al., 2004; Martens et al., 2004). Other studies have shown PBS mediated the relationship between known risk factors and alcohol use or related consequences (LaBrie et al., 2011; Martens et al., 2008, 2009).

The aforementioned studies have shown that PBS are “protective” in that their use is directly associated with fewer alcohol-related harms. PBS may also protect individuals from alcohol harms by moderating the relationship between risk factors and negative alcohol-related outcomes. We are aware of only two studies that have examined this premise. Benton et al. (2004) and Borden et al. (2011) found the relationship between alcohol use and alcohol-related problems was weaker for those high versus low in PBS use, suggesting frequent use of PBS may result in fewer negative consequences as a result of drinking. Whether PBS moderates the relationships between other risk factors and alcohol-related outcomes is unknown. Further, both of the aforementioned studies examined PBS as a unitary construct, when research suggests that distinct types of PBS exist (Martens et al., 2005).

One risk factor whose relationship with alcohol-related outcomes may be moderated by PBS use is negative urgency, or the tendency to engage in impulsive actions when experiencing negative affect (Whiteside and Lynam, 2001). Factor analytic studies have shown negative urgency is distinct from other impulsivity-related traits like sensation seeking or lack

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of premeditation (Cyders and Smith, 2007, 2008; Cyders et al., 2007; Smith et al., 2007). The direct relationship between negative urgency and alcohol-related outcomes is unclear. Studies have shown negative urgency was correlated with both alcohol use and alcohol-related problems (Cyders et al., 2009; Smith et al., 2010). However, when the effects of other impulsivity-related traits and/or drinking motives were controlled for, it was still associated with alcohol-related problems but not alcohol use (Curcio and George, 2011; Cyders et al., 2007; Fischer et al., 2007; Gonzalez et al., 2011; Martens et al., 2011). Further, a recent longitudinal study found baseline negative urgency was not associated with follow-up alcohol use or problems after controlling for the effects of other impulsivity-related traits (Cyders et al., 2009).

Considering PBS use as a moderator variable may provide insights into the relationship between negative urgency and alcohol use/problems. A relationship between negative urgency and alcohol-related outcomes may not exist for those who protect themselves from alcohol-related harms via frequent use of PBS. Alternatively, negative urgency may be a particular risk factor among those who infrequently use PBS. The purpose of the current investigation was to address this issue by examining the moderating effect of PBS on the relationship between negative urgency and both alcohol use and alcohol-related problems. We hypothesized that these relationships would be stronger among those low versus high on PBS use.

Method

Participants

Participants were 234 college students active in club, intramural, or varsity athletics who consumed alcohol at least once in the preceding 30 days. Of the 329 original participants, 91 did not consume alcohol and were excluded. Four participants were excluded for not reporting gender, completing the negative urgency measure, or completing the PBS measures. Participants were recruited from a Midwestern university, a Northeastern women's college, and a small West Coast college. The majority of the participants were women (73.9%) and White (87.2%). The mean age was 20.26 ($SD = 1.90$) years.

Measures

Protective behavioral strategies. PBS were assessed with the Protective Behavioral Strategies Scale (PBSS; Martens et al., 2005; 2007), a 15-item measure in which participants are asked to indicate how often they engage in each PBS on a 6-point scale (1 = *never*, 6 = *always*). Scoring produces three subscales: stopping/limiting drinking (e.g., "stop drinking at a predetermined time"), manner of drinking (e.g., "avoid

drinking games"), and serious harm reduction (e.g., "use a designated driver"). Internal consistency in the present sample was .83, .73, and .46 for the stopping/limiting drinking, manner of drinking, and serious harm reduction subscales, respectively.

Negative urgency. Negative urgency was assessed via the negative urgency subscale from the UPPS Impulsive Behaviors Scale (Whiteside and Lynam, 2001). It is measured using 12 items on a 4-point scale (1 = *agree strongly*, 4 = *disagree strongly*), with higher scores indicating greater negative urgency. Internal consistency in the present study was .84.

Alcohol use. We created a composite alcohol use variable by standardizing and summing three measures: drinks per week, peak number of drinks in the past 30 days, and number of heavy drinking episodes in the preceding 2 weeks. Drinks per week were calculated via the Daily Drinking Questionnaire (Collins et al., 1985). Peak number of drinks and heavy drinking episodes were assessed via single-item measures. Internal consistency for this composite was .92.

Alcohol-related problems. Alcohol-related problems over the past 3 months were assessed with the Brief Young Adult Alcohol Consequences Questionnaire (BYAACQ; Kahler et al., 2005). The BYAACQ is a 24-item measure of alcohol-related consequences designed to be relevant to college students or other young adults (e.g., having a hangover, missed classes). The measure contains a yes/no response format (coded 1 = yes, 0 = no) for each item, with responses summed to form a total score. Internal consistency in the present sample was .91.

Procedures

Baseline data from the parent project examining an alcohol intervention for collegiate athletes was used for the current study (Martens et al., 2010). Participants were recruited from club, intramural, and varsity athletic teams via email invitations. Those students interested in enrolling in the study were transferred via an online link to a consent form and the baseline questionnaires. Participants received a \$20 gift card for completing the questionnaires.

Data analysis

Hierarchical multiple regression analyses were used to test for moderation. We examined each PBSS subscale in separate analyses and conducted separate tests with alcohol use and alcohol-related problems as dependent variables. PBSS subscales were analyzed separately because studies have shown differential effects among the subscales on alcohol-related outcomes (Martens et al., 2005, 2007). Alcohol use was included as a covariate in all analyses involving alcohol-related problems as the dependent variable, and gender was a covariate in all analyses. Gender, alcohol use

TABLE 1. Regression results for negative urgency and protective behavioral strategies predicting alcohol use and alcohol-related problems

Predictor	<i>b</i>	<i>SE</i>	β	<i>t</i>
Alcohol use				
Stopping/limiting drinking				
Gender	-2.64	0.38	-.41	-6.96**
SLD	-0.09	0.02	-.25	-4.17**
Negative urgency	0.03	0.02	.06	1.10
Negative Urgency $\times$ SLD	0.00	0.00	-.06	-0.96
Manner of drinking				
Gender	-2.63	0.36	-.41	-7.38**
MOD	-0.20	0.03	-.35	-6.22**
Negative urgency	0.01	0.02	.03	0.48
Negative Urgency $\times$ MOD	0.00	0.01	-.02	-0.39
Serious harm reduction				
Gender	-2.92	0.37	-.45	-7.98**
SHR	-0.16	0.06	-.15	-2.68**
Negative urgency	0.03	0.02	.08	1.47
Negative Urgency $\times$ SHR	-0.02	0.01	-.15	-2.65**
Alcohol-related problems				
Stopping/limiting drinking				
Gender	-0.42	0.68	-.04	-0.61
Alcohol use	0.89	0.11	.50	8.15**
SLD	-0.11	0.04	-.16	-2.81**
Negative urgency	0.13	0.04	.18	3.42**
Negative Urgency $\times$ SLD	-0.01	0.01	-.09	-1.67
Manner of drinking				
Gender	-0.63	0.66	-.06	-0.97
Alcohol use	0.78	0.11	.44	7.06**
MOD	-0.25	0.06	-.25	-4.42**
Negative urgency	0.11	0.04	.14	2.79**
Negative Urgency $\times$ MOD	-0.02	0.01	-.11	-2.23*
Serious harm reduction				
Gender	-0.63	0.69	-.06	-0.91
Alcohol use	0.95	0.11	.54	8.65**
SHR	-0.10	0.10	-.05	-1.00
Negative urgency	0.14	0.04	.19	3.70**
Negative Urgency $\times$ SHR	0.00	0.01	.01	0.20

Notes: Results represent the final step of the regression equation. SLD = stopping/limiting drinking; MOD = manner of drinking; SHR = serious harm reduction.

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

(if applicable), and main effects for negative urgency and the PBSS subscale in question were entered on Step 1, followed by the interaction term on Step 2. A significant interaction effect was followed by simple slopes analysis at high (i.e., 1 *SD* above the mean) and low (i.e., 1 *SD* below the mean) values of the moderator variable (Aiken and West, 1991). All continuous predictor variables were mean centered.

Results

Participants reported consuming an average of 9.89 drinks per week ($SD = 10.43$). Almost half of the participants (49.60%) reported at least one heavy drinking episode in the past 2 weeks. Average peak number of drinks over the past 30 days was 7.41 ($SD = 5.34$), and average number of problems was 5.77 ($SD = 5.04$). Negative urgency was significantly ($p < .01$) correlated with alcohol problems ($r = .25$) but not alcohol use ($r = .10$). Stopping/limiting drinking, manner of drinking, and serious harm reduction were significantly ($p < .01$) correlated with alcohol use ($r = -.37, -.44,$

and $-.24$, respectively) and problems ($r = -.37, -.48$, and $-.20$, respectively). Negative urgency was also significantly ($p < .05$) correlated with stopping/limiting drinking and manner of drinking but not serious harm reduction ($-.13, -.20$, and $-.07$, respectively).

Moderation tests

Alcohol use. On Step 1 of each regression analysis, main effects were found for gender ($\beta = -.41 - .46, p < .001$), stopping/limiting drinking ($\beta = -.24, p < .001$), manner of drinking ($\beta = -.35, p < .001$), and serious harm reduction ($\beta = -.17, p < .01$) but not for negative urgency. On Step 2 there was no significant interaction between negative urgency and stopping/limiting drinking or negative urgency and manner of drinking; however, there was a significant interaction between negative urgency and serious harm reduction, $\Delta F(1, 224) = 7.03, p < .01, \Delta R^2 = .02$ (Table 1). At low values of serious harm reduction, negative urgency was a significant predictor of alcohol use ($\beta = .25, p < .01$); at high values,

FIGURE 1. Interactions between negative urgency and serious harm reduction (SHR) and manner of drinking (MOD) subscales of the Protective Behavioral Strategies Scale in relation to alcohol consumption and alcohol-related problems. Values represent standardized β weights.

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

negative urgency was not associated with alcohol use ($\beta = -.09$, $p = .31$) (Figure 1).

Alcohol-related problems. On Step 1 of the regression analyses, main effects were found for alcohol use ($\beta = .44 - .53$, $p < .001$), negative urgency ($\beta = .16 - .19$, $p < .01$), stopping/limiting drinking ($\beta = -.14$, $p < .02$), and manner of drinking ($\beta = -.24$, $p < .001$) but not for gender or serious harm reduction. On Step 2 there were no significant interactions between negative urgency and stopping/limiting drinking or negative urgency and serious harm reduction; however, there was a significant interaction between negative urgency and manner of drinking, $\Delta F(1, 220) = 4.98$, $p < .05$, $\Delta R^2 = .01$ (Table 1). At low levels of manner of drinking, negative urgency was a significant predictor of alcohol-related problems ($\beta = .28$, $p < .001$); at high levels, negative urgency was not associated with alcohol-related problems ($\beta = .01$, $p = .91$; see Figure 1).

Discussion

The purpose of this study was to determine whether PBS moderated the relationship between negative urgency and alcohol use and related problems. The relationship between negative urgency and alcohol use was moderated by the serious harm reduction subscale of the PBSS but not the stopping/limiting drinking or manner of drinking subscales. The relationship between negative urgency and alcohol-related problems was moderated by the manner of drinking subscale but not the serious harm reduction or stopping/limiting drinking subscales. Implications of these findings for researchers and clinicians are addressed below.

The most important finding from this study was that PBS served as a protective factor against the risk factor of negative urgency, but the specific type of strategy mattered. These findings are somewhat consistent with research examining the direct effects of different types of PBS on alcohol-related outcomes. Studies have shown that when controlling for the effects of the other PBSS subscales and other covariates, the manner of drinking subscale was a unique predictor of both alcohol use and alcohol-related problems, and the serious harm reduction subscale was a unique predictor of alcohol-related problems (Martens et al., 2005, 2007). In contrast, the relationship between stopping/limiting drinking and alcohol-related outcomes dissipated when the effects of the other PBSS subscales were controlled for. In the present study, manner of drinking and serious harm reduction similarly moderated the relationship between negative urgency and alcohol-related outcomes, but stopping/limiting drinking did not. The manner of drinking subscale encompasses strategies designed to avoid excessive, rapid consumption of alcohol when choosing to drink, whereas the serious harm reduction subscale encompasses strategies designed specifically to avoid significant negative harms. This study contributes to the existing body of literature by suggesting that using these types of strategies may be most beneficial in terms of protecting one from negative alcohol-related outcomes, as opposed to the strategies assessed on the stopping/limiting drinking subscale. Many of the strategies on the stopping/limiting drinking subscale involve planning one's evening in advance, which may not be effective at either directly reducing alcohol use/problems or lessening the negative impact of other risk factors like negative urgency.

One interesting finding from the study was that serious harm reduction moderated the relationship between negative urgency and alcohol use (but not problems), and that manner of drinking moderated the relationship between negative urgency and alcohol-related problems (but not use). This pattern differs from prior studies examining the direct effects of the subscales, which have found serious harm reduction to have a unique relationship with problems and manner of drinking to have a strong unique relationship with use. The findings regarding manner of drinking are relatively straightforward to explain: They indicate that students high in negative urgency who also used PBS designed to limit rapid alcohol consumption were less likely to experience alcohol-related problems than high-negative-urgency individuals who generally did not use such strategies. However, given the focus of the serious harm reduction subscale on avoiding significant alcohol-related problems, the rationale for its moderating effects on the negative urgency–alcohol use relationship is less apparent. One possibility is that low serious harm reduction scores serve as a type of marker for being susceptible to the effects of negative urgency, which could manifest itself in a number of ways (including excessive alcohol use). If so, however, it is surprising that serious harm reduction did not moderate the relationship between negative urgency and alcohol-related problems. Additional research is necessary to explain this somewhat unexpected finding.

There are limitations to this study. First, the sample comprised student athletes (recreational and collegiate), limiting the generalizability of findings. It should be noted, however, that student athletes have been identified as an at-risk population in that they report higher levels alcohol consumption than their nonathlete peers (Leichliter et al., 1998; Nelson and Wechsler, 2001; Wechsler et al., 1997). Another limitation is that the data were cross-sectional, making the direction of the observed relationships undetermined. Furthermore, women were overrepresented in this sample, potentially limiting the generalizability of these findings. Future research should look toward replicating these findings using a more inclusive sample, equal numbers of men and women, and with longitudinal designs. Last, internal consistency of the serious harm reduction subscale was low, although the value is similar to that found in prior studies and is not surprising given the subscale comprises only three items.

Despite these limitations, the results of the current investigation provided important information regarding the protective role of PBS. As such, it is one of the first studies that examined PBS as moderating variable of the relationship between known risk factors and alcohol outcomes. Future research should focus on replicating these findings for other known risk factors for alcohol use and alcohol-related problems.

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