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First- and second-hand consequences of alcohol in college: Differential associations with later alcohol use

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Abstract

Introduction—College students are at increased risk of experiencing a variety of consequences as result of their own as well as others' alcohol consumption. The current study examined the differential associations between both first-hand consequences (resulting from one's own drinking) and second-hand consequences (resulting in victimization as a result of others' drinking) and subsequent alcohol consumption across the first year of college.

Method—First year students ($n = 253$) from a large northeastern U.S. university were randomly selected to participate and surveyed at the end of the first semester of college (time 1) and during the first semester of the second year of college (time 2).

Results—Results showed a significant, positive relationship between first-hand consequences and subsequent weekend drinking ($\beta = .16, p < .05$) and heavy episodic drinking ($\beta = .49, p < .01$), after controlling for individual and friend drinking. A negative association between second-hand consequences and later heavy episodic drinking was also observed ($\beta = -.16, p < .05$).

Discussion and Conclusions—The findings provided partial support for both a positive association hypothesis and a negative association hypothesis. The importance of personal alcohol consumption and peers' drinking in relation to first- and second-hand consequences are discussed.

Keywords

first-hand consequences; second-hand consequences; college alcohol use

INTRODUCTION AND BACKGROUND

Heavy episodic drinking continues to plague U.S. college campuses with 37% of students reporting engaging in this behavior within the past two weeks (Borsari et al., 2007; Johnston et al., 2010; NIAAA, 2007). As a result, many students report experiencing a variety of alcohol-related academic, legal, physical, sexual, and social consequences (Dowdall, 2009; Leinfelt & Thompson, 2004; Perkins, 2002). In addition to consequences experienced by individuals as a direct result of drinking (first-hand consequences), students also experience consequences as a result of others' drinking (second-hand consequences). Over 75% of college students experience a second-hand consequence during the academic year which may consist of having property damaged, receiving verbal and physical assaults, getting into arguments with intoxicated individuals, and having sleep disrupted (Jackson et al., 2005;

Wechsler et al., 2002). Not surprisingly, research has shown that students who engage in heavier drinking practices are more likely to experience second-hand consequences (Langley et al., 2003). However, other studies reveal that students are likely to experience second-hand consequences if they are on campuses where high risk drinking is prevalent whether or not they themselves consume alcohol (Wechsler et al., 2002).

To date, some research has addressed the prevalence of second-hand consequences, yet little is known about their association with subsequent drinking. The limited number of studies that have examined the relationship between first-hand consequences and subsequent drinking found they were significantly related to higher rates of subsequent drinking and consequences (Mallett et al., 2006; Mallett et al., 2011a). However, it is not clear whether first-hand and second-hand consequences function differently in their association with subsequent drinking. Considering widely used interventions (e.g., BASICS: Dimeff et al., 1999) utilize consequences as a motivation to not engage in risky drinking behavior, it is important to have a thorough understanding of the relationship between alcohol-related consequences and subsequent drinking and problems.

Negative Association Hypothesis

Most researchers, administrators, and healthcare providers deem consequences as a problematic outcome resulting from excessive alcohol consumption. In contrast, many college drinkers don't necessarily find the most common consequences (e.g. hangover, blackout) to be highly aversive (Mallett et al., 2008). However, when students have less favorable attitudes toward consequences, they tend to be less willing to experience them, and subsequently report fewer consequences relative to individuals with neutral or more favorable attitudes (Mallett et al., 2011b). First-hand and second-hand consequences may function differently in their relationship with subsequent alcohol use. For instance, it is plausible that individuals who experience second-hand consequences may find the experience aversive and subsequently, reduce their alcohol consumption. Little is known about how experiencing second-hand consequences is associated with subsequent alcohol consumption over a high-risk drinking period such as the first year of college.

Positive Association Hypothesis

Studies examining predictors of alcohol consumption among college-aged individuals have found the majority of students drink for social and celebratory motives (Neighbors et al., 2007). These social settings can be highly reinforcing and have the potential to influence how individuals perceive "negative" consequences. Further, research has shown students' alcohol consumption increases significantly during the first semester of college as do their reports of experiencing consequences (O'Malley & Johnston, 2002; Schulenberg & Maggs, 2002). Considering students continue to engage in excessive drinking after experiencing negative outcomes demonstrates consequences alone are not a deterrent for drinking and students do not feel alcohol is solely responsible for experiencing consequences. The same may be observed with second-hand consequences, particularly if peers perpetrate them. This normative component of observing peers behaving poorly as a result of heavy drinking may enhance the acceptability of the behavior and result in a positive association with subsequent drinking despite being victimized. Further, individuals who perceive it is acceptable to their

peers to experience consequences that impact both themselves and others may be more likely to engage in excessive rather than reducing drinking in an attempt to avoid consequences.

The purpose of the current study is to examine both first-hand consequences (resulting from one's own drinking) and second-hand consequences (resulting in victimization as a result of others' drinking) and their differential associations with subsequent alcohol consumption across the first year of college using a longitudinal regression framework controlling for both previous personal and friends' alcohol consumption.

METHOD

Participants & Procedure

Participants for the current study came from a larger intervention trial aimed at reducing college alcohol use. In order to address the current research questions prospectively without contamination from the treatment conditions, participants for this study were taken from the control group ($n = 253$). Participants were randomly selected incoming freshmen at a relatively large, public northeastern U.S. university. Invitation letters containing a URL and Personal Identification Number for accessing the survey were sent to all potential participants. Recruitment methods yielded a 66% response rate, consistent with other studies using a similar web-based approach (Larimer et al., 2007; McCabe et al., 2005). The assessments for the current study were conducted at the end of the first semester of college (Time 1) and during the first semester of the second (Time 2) year. Assessments were approximately 10 months apart in order to capture drinking related behaviors across the entire first year of college. Participants received \$30 for completing each survey.

An 89% retention rate within the control condition was observed. The demographic characteristics of this subset were: 53% female; 88% White, Non-Hispanic, 4% Asian, 2% African American, 3% Hispanic, and 3% multi-racial or other. The mean age at the time of enrollment was 18.3 years ($SD = .45$), 98% intended to live in a residence hall upon college entrance, and 94% perceived their family to be of average or above average socio-economic status relative to their peers.

Measures

Individual alcohol use—Individual college student alcohol use was measured using three distinct constructs at Time 1 and Time 2. Typical weekend drinking was the sum of drinks participants indicated they consumed on a typical Friday and Saturday within the past 30 days using the Daily Drinking Questionnaire (DDQ; Collins et al., 1985). Peak blood alcohol content (peak BAC) was calculated using the maximum number of drinks consumed on an occasion within the past 30 days and the number of hours spent drinking on that occasion (Dimeff et al., 1999; Marlatt et al., 1998). BAC was calculated following established guidelines (Dimeff et al., 1999; Matthews & Miller, 1979). Heavy episodic drinking (HED) was how often in the past two weeks participants indicated that they consumed 4 or more drinks if female, or 5 or more drinks if male, in a given two hour period (NIAAA, 2007).

Friends' alcohol use—Perceived typical weekend drinking of one's closest friends was assessed at Time 1. Participants were asked how much their closest friends consume on a typical Friday and Saturday night within the past 30 days using the DDQ (Collins et al., 1985). Both nights were summed to create a single score.

First-hand consequences—Consequences experienced as a result of one's own alcohol use were measured at Time 1. A subset of 20 items pertaining to the experienced negative consequences of one's *own* alcohol use was adapted from the Young Adult Alcohol Problems Screening Test (YAAPST, Hurlbut & Sher, 1992). Participants responded about the frequency of occurrence in the past year of these consequences (0 = never, 9 = 40+) (e.g., “felt very sick to your stomach or thrown up after drinking”). The items were averaged to create a manifest composite score representing first-hand negative consequences (Abar et al., 2009).

Second-hand consequences—At time 1, three items pertaining to the experienced negative consequences specifically due to *others'* alcohol use were adapted from and used the same response scale as the YAAPST (Hurlbut & Sher, 1992). These items were: “had property damaged because of other's drinking”, “had study or sleep interrupted because of other's drinking”, and “had to 'baby-sit' or take care of another student who drank too much”. These items were averaged to create a manifest composite score representing second-hand consequences.

RESULTS

Preliminary Analyses

Descriptive statistics and bivariate correlations are presented in Table 1. Results indicated that weekend drinking (Paired $t_{219} = 4.27$, $p < .001$), HED (Paired $t_{208} = 3.41$, $p < .01$), and peak BAC (Paired $t_{208} = 2.92$, $p < .01$) significantly increased from Time 1 to Time 2. Bivariate correlations were nearly all positively and significantly correlated ($p < .05$), with the exception of associations between second-hand consequences and time 2 HED and peak BAC.

Multiple regression models

A series of three multiple regression models were performed in Mplus 6.0 (Muthén & Muthén, 1998–2007) using a full information maximum likelihood estimator robust to non-normality to account for missing data over time. Time 1 friend alcohol use was included in each model as a covariate, as were the auto-regressive paths from individual alcohol measures at time 1 to alcohol measures at time 2 (e.g., time 1 HED $\rightarrow$ time 2 HED).

In regard to typical weekend drinking, results indicated that high levels of previous weekend drinking were strongly predictive of high levels of later weekend drinking (see table 2). In addition, greater experienced first-hand consequences were also associated with greater weekend drinking at follow-up, whereas second-hand consequences were not predictive in either direction. A similar pattern of results were seen when examining peak BAC, such that higher time 1 peak BAC predicted higher levels at follow-up, and the positive association

between first-hand consequences and later BAC approached significance ($p = .06$). Again, second-hand consequences were not predictive. Results examining heavy episodic drinking deviated from this pattern, such that earlier HED was not significantly associated with later HED, but both first-hand and second-hand consequences were. Higher first-hand consequences were associated with greater HED at time 2, whereas higher second-hand consequences were associated with lower follow-up HED.

DISCUSSION

The current study examined first- and second-hand alcohol consequences and their unique association with subsequent alcohol consumption across the first year of college using a longitudinal design. The findings provided partial support for both the positive association hypothesis and the negative association hypothesis. Bivariate correlations revealed positive relationships between both first- and second-hand consequences and subsequent drinking. However, after controlling for personal and friends' drinking, only first-hand consequences were consistently associated with greater alcohol consumption at follow-up, whereas second-hand consequences were inconsistently associated with lower drinking. With regard to the relationship of alcohol use between Time 1 and Time 2, results of the study indicated students who drank more at Time 1 were more likely to drink more at Time 2. This is consistent with research showing individuals tend to escalate their drinking behavior in college (O'Malley & Johnston, 2002; Schulenberg & Maggs, 2002).

The current findings have implications for students who choose to socialize in settings where alcohol consumption is taking place. While previous studies have indicated heavier drinkers are at an increased risk of experiencing second-hand consequences (Langley et al., 2003), only small to moderate correlations between an individual's own alcohol use and second-hand consequences were observed. This suggests second-hand consequences are not exclusive to heavy drinkers and that students who engage in light or moderate drinking also experience them, however to a lesser extent. Choosing not to drink, or drinking light amounts of alcohol may not prevent individuals from experiencing second-hand consequences when in a setting where others are drinking (e.g., college). Students who are affiliated with peer groups that integrate alcohol consumption into social activities may be at an increased risk of falling into these higher risk patterns. This highlights the importance of selecting peers who support and engage in lower risk alcohol behaviors; a process which can be influenced by parents, another important normative influence (Abar & Turrissi, 2008).

Finding that, even after accounting for early drinking, peer influences, and first-hand consequences of alcohol use, more frequent experiences of second-hand consequences were associated with lower levels of later heavy episodic, or binge, drinking was mildly supportive of the negative association hypothesis. It is possible that having experienced frequent consequences of other's alcohol use influences an individual's attitudes regarding the risks associated with heavy episodic drinking, which in turn, influences later binge frequency (Mallett et al., 2011b). Future studies should explore this possibility by longitudinally examining potential mechanisms of influence associated with both first- and second-hand consequences, with the goal of better understanding potential targets for college-based intervention.

The consistent relationship between first-hand consequences and subsequent drinking even after controlling for personal and friends' drinking was supportive of the positive association hypothesis, such that "negative" consequences of one's alcohol use tend to be conflated with the positive social experience of use. This supposition is reasonable when viewed in the context of previous work on perceptions of consequences. Research has shown students do not find some of the most prevalent consequences aversive (Mallett et al., 2008), nor do they feel the need to curb their drinking in order to prevent repeatedly experiencing consequences they have previously endorsed (Mallett et al., 2006). Future work should seek to include perceptions of experienced consequences in predictive models in order to more clearly delineate reasons for the observed unique associations between negative consequences and later drinking.

Limitations & Future Directions

One limitation of the current study is the inability to fully take into account participants' alcohol consumption at the time of experiencing second-hand consequences. The present study used a longitudinal design where students were asked to retrospectively report past drinking behavior and experienced consequences at two different time points. In terms of alcohol consumption, our findings indicated there was a positive relationship between both Time 1 and Time 2 drinking. From the data it is clear that when controlling for individual and friend drinking, first-hand consequences, and sometimes second-hand consequences, account for unique variance in subsequent drinking. What is not clear is the role of individuals' personal alcohol consumption during the occasion in which the second-hand consequences were experienced. Preliminary evidence from the bivariate correlations observed in the current study imply that the relationship between individuals' use and second hand consequences is small to moderate in magnitude (r^2 s = .29). Future longitudinal research incorporating multiple measurements of individual use, friend use, and experienced consequences is needed to thoroughly understand this relationship. Emerging methods, such as dynamic structural equation modeling (Cziráky, 2004; McArdle, 2007), might be useful for establishing a more complete understanding of the contemporaneous and lead/lag associations among these constructs.

A second limitation is the stated uncertainty of the exact mechanisms by which consequences are related to subsequent drinking. The analyses controlled for drinking and peer influences, and yet the relationship consequences and subsequent drinking remained significant. The underlying cause of these relationships could be due to several different influences such as normative, negative affect, environmental, and so forth. Future research is needed to better understand the underlying causal mechanisms.

It is important to note the current study examined first- and second-hand consequences as a summed score rather than looking at individual consequences alone. Future studies with a larger sample size may benefit from examining individual consequences. For instance, experiencing a hangover and receiving a DUI violation may impact drinking differently. Further, examining specific consequences as well as the context in which they occurred may provide information about students' perceptions of these outcomes and their influence on future drinking. In addition, the data examined in the study were retrospective in nature. As

previously stated, future studies that utilize prospective, event-level approaches to examine drinking context, specific consequences, immediate impact on drinking behavior, and the perceptions of the consequences will provide useful information to better understand how drinking and consequences influence one another.

Finally, the study examined drinking and consequences that were limited to the first year of college. Due to the 1-year time frame utilized in the YAAPST measure, some of the consequences reported at Time 1 may have been experienced in the transitional period prior to college matriculation. While this is a critical and high-risk developmental period, results are limited in terms of generalizability to upperclassmen. Future studies would benefit from examining students as they progress into their sophomore, junior, and senior years in order to provide more information regarding the maturing out process, attrition and other more chronic outcomes associated with excessive alcohol use.

CONCLUSIONS

High-risk drinking and consequences continue to impact college students nationwide. More information about the role of consequences as a predictor of drinking behavior is needed in order to strengthen intervention and prevention efforts. The current study highlights consequences are not an effective deterrent in curbing dangerous drinking, but in fact, the opposite was often observed. Future studies are needed to examine additional unique predictors of first- and second-hand consequences (e.g. willingness, beliefs; Mallett et al., 2011b) in order to better understand their relationship with high-risk drinking.

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Table 1

Correlations, Means and (Standard Deviations)

	1.	2.	3.	4.	5.	6.	7.	8.	9.
<i>Time 1</i>									
1. Typical Weekend Drinking	6.19 (6.29)								
2. Heavy Episodic Drinking	.67***	.89 (1.42)							
3. Peak BAC	.77***	.71***	.09 (.10)						
4. Friend Typical Weekend Drinking	.78***	.53***	.62***	8.49 (5.71)					
5. First-hand Consequences	.68***	.63***	.63***	.58***	.73 (.66)				
6. Second-hand Consequences	.27***	.19**	.29***	.34***	.33***	1.39 (1.01)			
<i>Time 2</i>									
7. Typical Weekend Drinking	.78***	.59***	.69***	.64***	.63***	.22**	7.49 (6.83)		
8. Heavy Episodic Drinking	.51***	.49***	.64***	.42***	.59***	.10	.65***	1.25 (1.88)	
9. Peak BAC	.61***	.54***	.72***	.47***	.50***	.13	.76***	.67***	.11 (.11)

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

Table 2

Standardized Beta Weights across Drinking Outcomes

<i>Time 1 Predictors</i>	<i>Time 2 Drinking Outcomes</i>		
	Typical Weekend Drinking	Peak Bac	Heavy Episodic Drinking
Typical Weekend Drinking	.66***		
Peak BAC		.66***	
Heavy Episodic Drinking			.18
Friend Drinking	.01	.00	.05
First-hand consequences	.16 *	.13 [†]	.49 **
Second-hand consequences	.00	-.06	-.09 *

[†]
 $p = .06$,*
 $p < .05$,**
 $p < .001$