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Resistance to peer influence moderates the relationship between perceived (but not actual) peer norms and binge drinking in a college student social network

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Abstract

Introduction: Adolescent and young adult binge drinking is strongly associated with perceived social norms and the drinking behavior that occurs within peer networks. The extent to which an individual is influenced by the behavior of others may depend upon that individual's resistance to peer influence (RPI).

Methods: Students in their first semester of college (N = 1323; 54.7% female, 57% White, 15.1% Hispanic) reported on their own binge drinking, and the perceived binge drinking of up to 10 important peers in the first-year class. Using network autocorrelation models, we investigated cross-sectional relationships between participant's binge drinking frequency and the perceived and actual binge drinking frequency of important peers. We then tested the moderating role of RPI, expecting that greater RPI would weaken the relationship between perceived and actual peer binge drinking on participant binge drinking.

Results: Perceived and actual peer binge drinking were statistically significant predictors of participant binge drinking frequency in the past month, after controlling for covariates. RPI significantly moderated the association between perceptions of peer binge drinking and participant's own binge drinking; this association was weaker among participants with higher RPI compared to those with lower RPI. RPI did not interact with the actual binge drinking behavior of network peers.

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Contributors

Graham DiGuseppi designed the study and wrote the first and successive drafts of the manuscript. Matthew K. Meisel conducted the statistical analyses and assisted with the literature review. Sara G. Balestrieri conducted literature searches and provided feedback on successive drafts. Miles Q. Ott assisted with statistical analysis. Melissa J. Cox and Melissa A. Clark reviewed and edited successive drafts. Nancy P. Barnett contributed to study design and analysis and edited versions of the manuscript. All authors contributed to and have approved the final manuscript.

Conflict of interest

None.

Conclusions: RPI may function to protect individuals from the effect of their perceptions about the binge drinking of peers, but not from the effect of the actual binge drinking of peers.

Keywords

College; Alcohol; Binge drinking; Social norms; Resistance to peer influence

1. Introduction

Excessive alcohol use is a significant public health problem on college campuses linked to a variety of negative consequences, including decreased academic performance (Thombs et al., 2009; Wechsler & Dowdall, 1998), problems with health and social relationships, increased risk of assault (Hingson, Heeren, Winter, & Wechsler, 2005), injury and death due to overdose, motor-vehicle crashes and other accidents (Hingson, Zha, & Weitzman, 2009). Alcohol-related consequences are most often associated with binge drinking, defined as consuming 4 or more drinks per drinking occasion for females, and 5 or more drinks per drinking occasion for males (National Institute on Alcohol Abuse and Alcoholism, 2015). National surveys report a consistently high prevalence of binge drinking among college students (Dawson, Grant, Stinson, & Chou, 2004). In 2015, approximately 38% of full-time college students reported binge drinking in the past 30 days (Substance Abuse and Mental Health Services Administration, 2016).

The transition from high school to college is a particularly high-risk period for heavy drinking which tends to occur early in the semester, and episodically on weekends, holidays, and school breaks (Del Boca, Darkes, Greenbaum, & Goldman, 2004; Fromme, Corbin, & Kruse, 2008; Tremblay et al., 2010). Problematic drinking that develops around this time can disrupt the transition to college life, and may persist throughout college (Schulenberg & Maggs, 2002). Research has identified a number of important predictors of alcohol use during the first year of college. Among the most robust of these are perceived norms (i.e., the perception of peer drinking behavior), which strongly and consistently predict an individual's binge drinking behavior (Borsari, Murphy, & Barnett, 2007; Neighbors, Lee, Lewis, Fossos, & Larimer, 2007; Robinson, Jones, Christiansen, & Field, 2015).

There is a large body of research investigating processes through which peers influence college student alcohol use. In a review of the literature, Borsari and Carey (2001) propose that peer influence can occur in two principal ways: directly, through offers to drink, and indirectly through social modeling and perceived norms. Perceived norms are further divided into two types: perceptions about the quantity and frequency of other's drinking (descriptive norms), and perceptions about other's approval of drinking (injunctive norms) (Borsari & Carey, 2003; Cialdini, Kallgren, & Reno, 1991). College students reliably overestimate the drinking of their peers (descriptive norms), and these misperceptions are a consistent predictor of individual student drinking patterns (Perkins, Haines, & Rice, 2005). Thus, the misperception of drinking norms is an opportune target for interventions, to the extent that it can be modified through providing normative education or feedback; indeed, delivering such feedback to students is one of the most effective individual-level interventions used to reduce problematic drinking (Carey, Scott-Sheldon, Carey, & DeMartini, 2007).

Less research has been conducted on the influence of the actual drinking behavior of peers, primarily because measurement of actual peer drinking requires the direct report from the peers themselves. Social network methods, which often involve collecting information from a complete network of peers, have been used to study the relationship between peer behavior and substance use among adolescents (Ennett et al., 2006; Mundt, 2011), but have less often been used to investigate peer influences among college students (Barnett et al., 2014; Meisel, Clifton, MacKillop, & Goodie, 2015). For example, using social network methods, Barnett et al. (2014) found that the actual drinking quantity of peers in a college dormitory network was significantly correlated with the drinking quantity of participants even after controlling for other key correlates. Of note, several studies among adolescents and young adults have found that the perception of peer alcohol use is a better predictor of drinking than peers' actual use (Bauman & Fisher, 1986; Deutsch, Chernyavskiy, Steinley, & Slutske, 2015; Kenney, Ott, Meisel, & Barnett, 2017).

Given the strong relationship between peer drinking and college student drinking behavior, investigating resistance to peer influence (RPI) is a worthy area of research. RPI is conceptualized as an individual's tendency to resist peer pressure (e.g., pressure to behave in socially undesirable ways) (Steinberg & Monahan, 2007). In prior studies, RPI typically has been measured by presenting hypothetical social scenarios, and observing responses to peer pressure via self-report questionnaires or in a laboratory setting (Allen, Porter, & McFarland, 2006; Jackson et al., 2014; Santor, Messervey, & Kusumakar, 2000; Teunissen et al., 2012). Findings from this work indicate that individuals who are susceptible to peer influence are more likely to engage in a variety of risk-taking behaviors and to report negative psychosocial outcomes (Allen et al., 2006; Jackson et al., 2014; Santor et al., 2000; Teunissen et al., 2012). However, the majority of this work has been conducted with adolescents; it is currently unknown whether such relationships are evident among college students. RPI may be relatively fixed by emerging adulthood (Steinberg & Monahan, 2007), but even so, it likely plays an important role in determining whether individual college students will conform to perceived and/or actual behavior in heavy drinking peer networks.

1.1. The current study

The purpose of the current study was to investigate the association between actual and perceived peer drinking and participant drinking, and the possible moderating effect of resistance to peer influence. We utilized a sociocentric network approach, in which self-report data was obtained from all participating members of the first-year class at one university. We hypothesized that both perceived and actual binge drinking behavior among one's peers would be positively associated with individual binge drinking frequency, but that perceived behavior would be a stronger predictor. Assuming that individuals with greater RPI are less likely to conform to prevailing behavioral norms, we expected that greater RPI would weaken the effect of (perceived and actual) peer binge drinking on individual binge drinking frequency.

2. Methods

2.1. Participants

Participants were college students enrolled in their first semester at a mid-sized, private university in the northeastern U.S. Because we were interested in the experience of students living on-campus in first-year residences, first-year students living off-campus or in residence halls designated for upper-classmen ($n = 14$), and students enrolled in a dual-degree program with a neighboring college and residing at the other college in their first year ($n = 18$) were not eligible to participate. This left a total of 1660 eligible students, of whom 1342 (81%) consented and completed a web-based survey. Data obtained from the University indicate that eligible students who did not enroll or complete the survey ($n = 318$) were significantly more likely to be male ($\chi^2(1) = 7.91, p = 0.005$), non-Hispanic ($\chi^2(1) = 5.43, p = 0.02$), White ($\chi^2(1) = 5.13, p = 0.02$), and not receiving financial aid ($\chi^2(1) = 40.56, p < 0.001$) than eligible students who completed the survey. Nineteen individuals provided inconsistent data on the RPI scale and were removed from all analyses. Thus, the final sample consisted of 1323 (54.7% female, 44.0% male, 1.3% other) students. The average age was 18.65 ($SD = 0.51$). The racial composition of the sample was primarily White (56.0%), followed by Asian (23.4%), Multi-racial (10.0%), African American (7.1%), and other race (1.3%), with 2.2% of the sample not answering the racial identity question. 15.1% of the sample identified as Hispanic. 13.8% of the sample were intercollegiate athletes, and 13.7% lived on a substance-free floor in their dormitory.

2.2. Procedures

Data were from the first wave of a longitudinal study examining social networks and health behaviors in a first-year college class. All study procedures were approved by the university's Institutional Review Board. Incoming students received postcards mailed to home and campus mailbox addresses and e-mails, and were engaged in person at campus events. Students could consent to participate online or in person. Those who were under 18 years of age provided their assent, and parental/guardian consent was requested using our online system or by mail. The study information explained that all students in the class would be included in the social network, and that participants would be asked to select their social network connections from the list of all students. Students who did not wish to participate could also "optout" of having their name displayed in the list by indicating this choice on the consent form. Forty-two students (2.5% of eligible) opted out of having their name displayed in the sociocentric network list. Six weeks into the semester, participants were emailed a link to a web-based survey. The survey was available for two weeks, and included a battery of measures assessing demographics, alcohol use, resistance to peer influence, and social network ties. Participants were compensated with a \$50 Amazon gift card for completing the survey.

2.3. Measures

2.3.1. Demographic characteristics—Age, birth sex, race, ethnicity, and membership on an intercollegiate athletic team were assessed. Students can request to live on a substance free floor; this information was provided by the university registrar.

2.3.2. Resistance to peer influence—Each item in the 10-item RPI scale (Steinberg & Monahan, 2007) describes two different types of people, separated by the conjunction “BUT” (e.g., “Some people go along with their friends just to keep their friends happy BUT Other people refuse to go along with what their friends want to do, even though they know it will make their friends unhappy”). Respondents are instructed to “decide which sort of person you are most like—the one described on the right or the one described on the left. Then decide if that is ‘sort of true’ or ‘really true’ for you, and mark that choice.” Responses for each item are scored from 1 to 4 and averaged, with higher scores reflecting greater RPI. The measure demonstrated good internal consistency in this sample ($\alpha = 0.73$).

2.3.3. Personal binge drinking frequency—For all survey questions querying alcohol use by self or others, participants were presented with standard drink images and text that defined one drink as 12 oz. beer, 5 oz. wine, or 1.5 oz. 80 proof liquor. The binge drinking question was phrased: “Considering all types of alcoholic beverages, how many times during the past 30 days did you have five or more drinks in one occasion?” Responses could range from 0 to 30 times. Here, we measured binge drinking as 5 or more drinks per drinking occasion (regardless of gender) so that all binge drinking measures would be consistent (see explanation below).

2.3.4. Perceived binge drinking frequency of important peers (perceived norms)—Participants were asked to identify up to 10 first-year students who had been important to them in the previous month, including “people you socialized with, studied with, or regularly had fun with” (adapted from the Important People Instrument; Longabaugh & Zywiak, 2002). For each important person entry, participants selected the peer from a dropdown list of students. Since some students opted out, there was an option “I cannot find this person on the list.” For each peer nominated (regardless of gender), participants were asked, “How many times in the past 30 days do you think this person had five or more drinks in one occasion?”¹ Response options ranged from 0 to 30 times. For each participant, we calculated the average perceived frequency of binge drinking of the peers the participant had selected as important. In calculating this statistic, we included only the perceptions of the binge drinking of other participants in the study (i.e., we excluded participant perceptions of the binge drinking of students who did not participate themselves), so the perceived and actual binge drinking frequencies (described below) would reflect the same participants.

2.3.5. Actual binge drinking frequency of important peers (actual norms)—To calculate this person-level variable, we averaged the number of binge drinking episodes in the past 30 days reported by the important peer participants nominated in the social network survey.

¹Since participants self-reported their own gender, we assessed the perceived binge drinking frequency of each nominated peer using a gender non-specific measure of binge drinking (5+ drinks in one occasion). This was done to reduce the number of items presented (and participant burden) during the network survey.

2.4. Data analysis

Bivariate correlations were used to examine the relationship between key variables. During preparatory data analysis, we found that 618 participants (47% of the sample) reported 0 binge drinking episodes in the past month. Despite this zero-inflated outcome variable, skewness and kurtosis were both in acceptable ranges (skewness = 0.09 and kurtosis = -0.09). Therefore, we opted to employ network autocorrelation models, which are commonly used to account for the correlation between participants' behaviors found in network data (Leenders, 2002). Two separate network autocorrelation models were conducted, one for perceived peer drinking (including the RPI \times perceived peer drinking interaction term), and one for actual peer drinking (including the RPI \times actual peer drinking interaction term). Likelihood ratio tests indicated that significant autocorrelation was present in both models (p s < 0.01). Models controlled for sex, athlete status, and substance free dorm residence. Confidence intervals were compared to determine if the slopes in the main effects models (perceived vs. actual peer binge drinking frequency) were significantly different from one another. Akaike information criteria (AIC) were calculated to compare the quality of fit for the main effects models. For interaction analyses, simple slopes were generated at 1 SD above and below the mean. Analyses were conducted in SPSS 24.0 and in R version 3.3.2 using the SNA package (Butts, 2010).

3. Results

Table 1 presents descriptive statistics and correlations. Frequency of participant binge drinking episodes was negatively associated with total RPI, but positively associated with the perceived and actual frequency of binge drinking of important peers in the past 30 days. The perceived and actual binge drinking frequencies of important peers were also significantly positively associated.

Consistent with our hypotheses, after controlling for covariates, the perception of important peers' frequency of binge drinking was positively associated with participant binge drinking frequency ($b = 1.59$, $SE = 0.07$, 95% CI [1.46, 1.73], $z = 23.57$, $p < 0.001$). Results are in Table 2. Similarly, important peers' actual frequency of binge drinking was positively associated with participant binge drinking frequency ($b = 1.80$, $SE = 0.06$, 95% CI [1.69, 1.91], $z = 31.52$, $p < 0.001$). However, the model with perceived peer drinking provided a better fit to the data (AIC = 5259.9) than the model with actual peer drinking (AIC = 5465.9), as evidenced by the lower AIC value.

As shown in Table 2, there was a significant interaction between total RPI score and the perceived frequency of binge drinking among important peers. As displayed in Fig. 1, examination of the simple slopes revealed that for individuals with high (+1SD) perceived frequency of peer binge drinking, those with high RPI had lower binge drinking than those with low RPI (right side of figure) ($b = -0.29$, $SE = 0.09$, $z = -3.44$, $p < 0.001$). For individuals with low (-1SD) perceived frequency of peer binge drinking, there was no difference in participant drinking between those with low and high RPI (left side of figure) ($b = -0.03$, $SE = 0.08$, $z = -0.34$, $p = 0.73$). Contrary to hypotheses, there was no significant interaction between total RPI score and actual frequency of important peers' binge drinking episodes (see Table 2).

4. Discussion

We investigated relationships between participants' perceptions of the binge drinking frequency of important peers, the actual binge drinking frequency of important peers, and participant binge drinking frequency within a network of first-year college students. As expected, participant's own binge drinking frequency was positively associated with both perceived and actual norms. This is consistent with a number of previous studies demonstrating the important relationship between perceived norms (Borsari et al., 2007; Robinson et al., 2015) and actual norms of important peers (Barnett et al., 2014; Laubarraco & Linden, 2014) on college students' own drinking behavior. Comparing the regression coefficients and confidence intervals in the two models, it would appear that actual norms were a stronger predictor of participant binge drinking frequency than perceived norms. However, the model of perceived norms better fit the data, which is consistent with previous research supporting that participant perceptions are a better predictor of an individual's drinking behavior (Bauman & Fisher, 1986; Deutsch et al., 2015; Iannotti & Bush, 1992).

The strength of the positive correlation between perceived and actual binge drinking of important peers in our study is worth noting (see Table 1), as it was stronger than what has been previously reported by Deutsch et al. (2015), who used a similar social network measurement approach. This may be due to differences between the two samples (college vs. high school students), or the manner in which peers' alcohol use was measured (average binge drinking frequency among nominated peers vs. the number of close friends who drank any alcohol in the past month).

Our second aim was to examine whether RPI moderated the association between perceived and actual peer binge drinking and participants' own binge drinking frequency. Here, our hypotheses were partially supported. RPI weakened the effect of perceived peer binge drinking on participant binge drinking, but did not interact with actual norms. Thus, results suggest that beliefs about the normative behavior of important peers interact with one's tendency to conform (or not conform) to those perceived norms, whereby a higher ability to resist peer influence is a protective factor when perceived binge drinking among one's important peers is high.

We propose the following explanations for these findings. The well-established overestimation of peer drinking (Borsari & Carey, 2001; Borsari & Carey, 2003) is likely based on salient information derived from the social environment, or from widely held beliefs that excessive alcohol use is a normal part of the college experience (Osberg et al., 2010). Students who are better able to resist peer influence may not be as susceptible to this normative behavior (even if misperceived), and thus show a lower frequency of binge drinking. Conversely, students with lower levels of RPI may be more susceptible to what they perceive as frequent binge drinking among their peers, and in turn, engage in binge drinking more often, possibly to avoid negative feelings associated with non-conformity or to seek approval from peers (Cooper, 1994).

In contrast, RPI did not interact with actual binge drinking norms. This may be interpreted in light of the homophily principle, which suggests that similarity in behaviors and attributes among individuals with social ties comes about through selection and socialization mechanisms (Kandel, 1978). In the case of binge drinking homophily, selection processes would dictate that binge drinking students tend to affiliate with other binge drinking students. Thus, RPI may have been less relevant for students who self-selected into friendship groups with a high prevalence of actual binge drinking, perhaps because of demographic and personality factors that predispose such individuals to binge drink (Kahler, Read, Wood, & Palfai, 2003). An alternative view lies in the socialization mechanisms that occur in networks with a high prevalence of actual binge drinking. In such networks, social influences to binge drink may overpower students' RPI. Social pressures to drink may be intensified by what Borsari and Carey (2001) refer to as direct forms of peer influence (e.g., offers or invitations to drink), which may be more prevalent in peer groups in which this risky behavior actually occurs.

4.1. Limitations and future directions

The limitations of this study are worth noting. We measured social relationships, perceptions, and alcohol use behaviors cross-sectionally and therefore cannot infer causation. More longitudinal research with complete social networks is needed to better understand the dynamic relationships between the social selection and socialization processes responsible for binge drinking homophily. Secondly, demographic differences between students who enrolled and those who did not may have introduced some bias. Third, we assumed that the self-reported drinking measures in our study were accurate, but the single item used to measure participant binge drinking frequency may be less valid than other recall measures (e.g., the timeline follow-back). Finally, although network autocorrelation models allowed us to account for the correlation between participant behaviors in the network, these models are not equipped to model potentially skewed or zero-inflated distributions (Cliff, 1981). If this were not a social network study, a zero-inflated negative binomial model may have been more appropriate in order to account for the large proportion of the sample that reported no binge drinking within the assessment time frame.

Overall, the main effects of RPI in these models suggest that strengthening students' level of confidence in resisting peer influence may be a worthwhile intervention strategy; students who are more susceptible to peer influence (i.e., have lower levels of RPI) may benefit most from such interventions. Interventions may be enhanced by tailoring to individual differences in RPI, or by incorporating aspects of social skills training to resist negative peer pressure to drink alcohol at harmful levels.

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HIGHLIGHTS

- Perceived and actual binge drinking norms predicted college student binge drinking.
- Resistance to peer influence (RPI) interacted with perceived binge drinking norms.
- Students with greater perceived norms and RPI reported fewer binge drinking episodes.
- RPI may be an important target for college student drinking interventions.

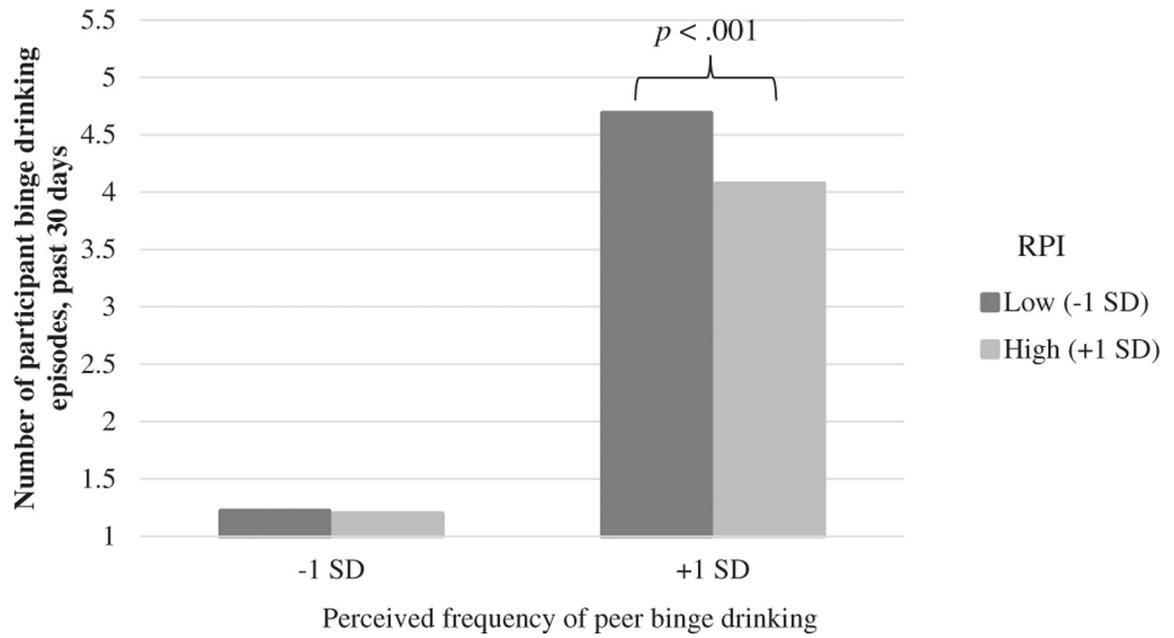


Fig. 1. Interaction Between Perceived Frequency of Peer Binge Drinking and Participant RPI on Participant Frequency of Binge Drinking (Previous 30 Days).

Table 1

Descriptive statistics and correlations between participant binge drinking episodes, resistance to peer influence (RPI), and the perceived and actual frequency of important peers' binge drinking episodes in the past 30 days.

Variable	Mean	SD	Frequency of participant binge drinking episodes	RPI total	Actual frequency of important peers' binge drinking episodes
Frequency of participant binge drinking episodes	1.76	2.76			
RPI total	29.37	4.11	-0.1115 ^{***}		
Actual frequency of important peers' binge drinking episodes	2.05	2.07	0.555 ^{***}	-0.079 ^{**}	
Perceived frequency of important peers' binge drinking episodes	2.47	2.85	0.645 ^{***}	-0.055	0.668 ^{***}

RPI = Resistance to peer influence.

^{**} $p < 0.01$.

^{***} $p < 0.001$.

Table 2

Resistance to peer influence interaction with perceived frequency of peer binge drinking (Model A) and actual frequency of peer binge drinking (Model B) predicting participant frequency of binge drinking.

Predictors	b	SE	z
Model A			
Sex ^a	-0.65	0.13	-5.17***
Athlete	0.25	0.19	1.31
Substance free dorm resident	-0.56	0.19	-2.90**
RPI total	-0.16	0.06	-2.71**
Perceived frequency of peer binge drinking	1.60	0.07	23.83***
RPI × perceived frequency of peer binge drinking	-0.13	0.06	-2.25*
Model B			
Sex ^a	-0.47	0.12	-4.06***
Athlete	0.19	0.15	1.26
Substance free dorm resident	-0.39	0.16	-2.37*
RPI total	-0.15	0.06	-2.36*
Actual frequency of peer binge drinking	1.78	0.06	31.12***
RPI × actual frequency of peer binge drinking	0.01	0.06	0.22

RPI = Resistance to peer influence.

^aBirth sex was coded 0 = male, 1 = female.

* $p < 0.05$; $p < 0.001$.

** $p < 0.01$.

*** $p < 0.001$.