

Short-Term Longitudinal Peer Influence Processes Associated with Binge Drinking Among First Year College Students

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This study examined the influence of peer selection and socialization effects on binge drinking (BD) behaviors during the transition to college. Participants included 196 first-year college students (72.9% female) from a large Southeastern public university who reported BD pre-college (Time 1) and three months post-matriculation (Time 2). At Time 2, participants identified their closest new college friend whose data was linked to the participant. We hypothesized that matriculating college students would select peers with similar pre-college BD and that peers' pre-college BD would predict post-matriculation BD. Results from regression analyses suggested that first-year students chose friends with similar pre-college BD and maintain their BD commensurately with their new best friend's prior BD. Given support for peer influence, implications regarding prevention strategies and future research are discussed.

A Prospective Study of Peer Influence Processes Associated with Binge Drinking Among First- Year College Students

Emerging adulthood is a distinct developmental period between adolescence and young adulthood (ages 18-25; Arnett, 2000) that has been associated with increases in and maintenance of health risk behaviors (White et al., 2006; White, Fleming, Kim, Catalano, & McMorris, 2008). Binge drinking, defined as consumption of five or more drinks over a short period of time (two hours), has been the focus of much attention in this area. Up to 25.5% of high school seniors reported engaging in binge drinking within a 30-day period (Eaton et al., 2010). Further, approximately two out of five (44.4%) college students can be categorized as binge drinkers (Johnston, O'Malley, Bachman, & Schulenberg, 2011). Binge drinking during early emerging adulthood is associated with later alcohol dependency and other mental health prob-

lems (Chassin, Pitts, & Probst, 2002; Viner & Taylor, 2007). The purpose of the present study is to examine potential mechanisms through which college students develop relationships with binge drinking peers.

Many emerging adults transition into college during this developmental period. This transition is associated with increases in binge drinking behaviors as well as the formation of new social networks (Schulenberg & Maggs, 2002). As such, peer influence is particularly salient when considering the rise in binge drinking rates among first year college students. While research on peer influence and alcohol use behaviors among emerging adults has been growing (Pandina, Johnson, & White, 2010), research on the effects of the college transition on alcohol-related behaviors has been relatively limited. Researchers have investigated peer influence mechanisms from multiple theoretical perspectives to help explain the increase in binge drinking rates during the college transition. Two well-studied areas include alcohol expectancies and perceptions of social norms. Alcohol expectancies, or the belief that alcohol use will lead to positive or negative outcomes (e.g., increased comfort in social situations) have been shown to predict levels of drinking (Chen, Grube, & Madden, 1994), mediate patterns of drinking (Darkes, Green-

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baum, & Goldman, 2004), and alter binge drinking rates (Labbe & Maisto, 2011). Relatedly, Neighbors et al. (2007) found that among first-year-undergraduate college students, perceived social norms of alcohol use predicted higher alcohol consumption, even above alcohol expectancies. Another study found that perceived social norms also predict severity of drinking behaviors (Lewis & Neighbors, 2004).

As is evident, college students' perceptions of the social facilitative effects of drinking and general peer use patterns influence drinking behavior. However, the manner in which college students' perceptions of peer alcohol use and associated behaviors affect the development of binge drinking peer groups has received less attention in the research literature. One potential way to categorize friendship formation is to examine the role of selection and socialization effects. Selection effects refer to individuals' choice of friends whom they perceive to be similar to themselves in attitudes and beliefs (Kandel, 1978). Socialization effects refer to the processes wherein individuals implicitly and explicitly influence each other to engage in similar behaviors (Kandel, 1978; Prinstein & Dodge, 2008). This influence may serve to increase or maintain a maladaptive behavior, such as binge drinking. These processes, examined together, may help explain how first year college students befriend individuals whom they perceive to have similar binge drinking behaviors, and how these new friendships are associated with the maintenance or increase in each individual's binge drinking (White et al., 2008).

Previous studies yield support for peer influence on alcohol use behaviors during the college transition. Leibsohn (1994) found that first year students reported befriending college peers with similar drinking habits as themselves. Read, Wood, and Capone (2005) suggested that adolescents' perceptions of their friends' drinking behaviors and attitudes were associated with increases in their own drinking during the first year of college. White et al. (2008) found that adolescents who drank heavily in high school were more likely to perceive that their new (post-high school) friends possessed pro-alcohol values which predicted increases in adolescents' own drinking behavior. Thus, some studies have suggested that both selection and socialization effects may be relevant for understand-

ing alcohol use among first year college students.

Despite significant advances in this area, much of the research on peer socialization and selection effects is hampered by a number of methodological limitations. First, most prior studies examine selection effects by measuring newly formed friendships within a context of familiar peers (i.e., among already-acquainted grademates; White et al., 2008). Such examinations of selection effects are confounded by adolescents' prior knowledge of their peers' reputations. A more rigorous examination of selection effects involves assessing newly formed dyadic friendships among unfamiliar peers (e.g., during college transition). Second, past work has suggested that college students provide poor estimates of their peers' drinking behavior (Borsari & Carey, 2006; Neighbors et al., 2007; Prinstein & Wang, 2005), thereby limiting conclusions that can be reached. Finally, past studies have often been cross sectional and thus causal inferences cannot be drawn (Leibsohn, 1994).

To address limitations of prior research, the current study examined peer socialization and selection effects using first-year college students' peer nominations of new college friends and these friends' own reported behaviors of prior drinking experiences. Thus, actual drinking behaviors, rather than estimations, of each person in a dyadic friendship were compared. This study also employed a prospective design to more accurately characterize friendship formation and binge drinking over a short, ecologically valid time frame. We hypothesized that: 1) matriculating college students would choose friends with similar levels of pre-college binge drinking (selection effects); and 2) students' binge drinking post-matriculation at Time 2 (T2) would be predicted by their new best friends' Time 1 (T1) binge drinking behavior over and above prior binge drinking experiences (socialization effects). Finally, given that males have been shown to binge drink more frequently than females (Borsari & Carey, 2001), we hypothesized that gender would moderate both selection and socialization effects. Specifically, males will be more likely than females to choose peers with similar rates of prior binge drinking experience, and males will be more likely than females to be influenced by their new best friends' binge drinking behaviors post-matriculation.

Method

Participants

Participants included 196 first-year students (72.9% female) at a large Southeastern university in the United States. The ethnic distribution of this sample was 80.6% White, 6.8% Black, 5.2% Asian, 4.7% Latino/a, and 2.6% other/mixed race and matched that of the university population. Females were overrepresented in this sample compared to the overall gender distribution from the university population (see below).

Measures

Binge drinking. Questions regarding binge drinking were created for the present study and mirrored well-established alcohol use measures included in the National Longitudinal Study of Adolescent Health (Add Health; Harris et al., 2009). At T1 before starting college in the fall, students were asked, “In the last six months, how often did you have five or more alcohol drinks on a single occasion (within a few hours)?” Responses were recorded using a Likert-type scale (i.e., 1 = 0 times, 2 = 1-2 times, 3 = 3-9 times, 4 = 10-19 times, and 5 = 20 or more times). At T2, participants reported the frequency of their binge drinking in the past three months using the same scale.

Best friend’s alcohol use. At T2, participants were asked to rank order an unlimited number of friends in college (using first and last names) and indicate whether each listed friend was a “new” friend (also a first-year student) since starting college. The name and data of the new best friend (highest-ranked new friend) who was also a part of this research study was linked to the participant via each person’s university identification number. Names of the participants and new best friends were matched (twice for accuracy) using official university records of first year students’ names and identification numbers. Friends’ responses to the same T1 question served as an independent report of college friends’ pre-college binge drinking.

Procedure

Incoming first-year students were told that they could voluntarily participate in a research study designed to understand the health behaviors of incom-

ing first year students. They were assured that all of their information would be kept strictly confidential. Trained research assistants distributed a survey to incoming first-year students during the first day of summer orientation sessions (T1). Students provided only their unique university identification number rather than their name, and returned their form in a sealed, confidential folder to facilitate honest responding. The paper and pencil survey took 10-15 minutes to complete, and students were allowed to complete these forms in the privacy of their dorms overnight. Additional measures were administered three months after the start of the school year (T2) using a secure online survey. Three months was chosen in order to provide adequate time for students to select new peers and establish drinking behaviors. All who completed the T1 assessment were eligible to participate in the T2 measurement. Of the 4,000 incoming first year students, 25% ($n = 1,000$) were under 18 and ineligible to participate in the study. Of the remaining 3,000 eligible students, 52% ($n = 1,574$ [65% female]) returned their T1 surveys. The gender, ethnic distribution, and geographic origin of this T1 sample did not differ significantly from the total population of the full first year class. Of all T1 participants, 53.2% ($n = 837$) completed the T2 survey.

Students with data at T1 and T2 had to meet two criteria to be included in final analyses.

First, only students who selected a new best friend with T1 data (i.e., also a study participant with T1 data) were included to ensure actual reported behavior of the friend. In other words, participants had to be in a newly formed dyad, and both members of this dyad had to have T1 data. Second, to eliminate concerns of data duplication and resulting inflated associations, each participant was included as a best friend only once within the data set. In the T2 sample, 9.26% ($n = 20$) of the participants were doubly nominated as best friends. In such cases, one participant who had nominated the same best friend as another participant was excluded at random from study analyses. In total, 196 participants met all criteria necessary for inclusion. This procedure for examining newly formed friendships (e.g., including unlimited friend nominations, linking dyadic data, and ensuring that participants are only included once in

analyses) is consistent with that employed in previous research examining best friend relationships (Prinstein & Dodge, 2008). Affiliated University Institutional Review Board provided approval for this study.

Data Analysis

Descriptive analyses, including frequencies and bivariate correlations, were conducted first. Two separate hierarchical multiple regression analyses were used to examine primary hypotheses. In the first model testing selection effects, college friend's pre-college (T1) binge drinking was entered as the dependent variable. Participants' pre-college (T1) binge drinking and gender were entered as predictors on the initial step of the regression, with their interaction entered on the second step. To examine socialization effects, participants' post-matriculation (T2) binge drinking frequency was entered as the dependent variable. In order to show the unique effects of socialization, pre-college (T1) binge drinking was controlled in an initial step. The new friends' pre-college (T1) binge drinking and gender of the participant were entered in the next step. Finally, the interaction between new friends' pre-college (T1) binge drinking and gender of the participant were entered in the final step.

Results

Preliminary Results

Participants with T1 data only ($n = 701$) reported higher levels of binge drinking than participants who provided data at both T1 and T2 ($t(1548) = 2.93, p < .05$). More females than males completed the T2 follow-up ($\chi^2(1, 1558) = 7.83, p < .05$). At the T2 follow-up, students who did not list a best friend at all ($n = 109$) and students who did not list a best friend that also was in the study ($n = 512$) were ineligible for final analysis, but did not differ significantly from the overall T2 sample. However, participants who picked a best friend that was also in the original sample at T1 ($n = 216$) engaged in binge drinking less frequently than those who did not list a best friend in the original sample ($t(1,553) = 1.91, p < .05$). Females (72.9%) were more likely than males to list a best friend who also was in the study ($\chi^2(1,789) = 6.32, p < .05$) and were overrepresented in the follow-up study.

Bivariate Analyses

Bivariate correlations and descriptive statistics, including means and standard deviations, of all variables are presented in Tables 1 and 2. Figure 1 represents the frequency of binge drinking in the prior six months of the final sample. Males engaged in binge drinking more frequently than females at both T1 and T2. Previous binge drinking (T1) was positively associated with binge drinking behaviors at T2.

Selection Effects

Results from regression analyses showed a main effect of friends' binge drinking at T1 on the participants' pre-college binge drinking (T1). Consistent with selection effects, results suggested that higher levels of participants' pre-college binge drinking was significantly associated with higher levels of pre-college binge drinking (T1) of the participants' new best friend (see Table 3). There was no main effect of gender for participants' T1 pre-college binge drinking. Despite males reporting higher binge drinking rates than females (Table 1), gender did not moderate the relationship between participants' pre-college binge drinking and their new best friends' pre-college binge drinking.

Socialization Effects

Results from regression analyses suggested that pre-college binge drinking behaviors explained approximately half of the variance in binge drinking during the fall semester of college (see Table 3). Consistent with socialization effects, pre-college (T1) binge drinking of participants' new best friend predicted the participants' current binge drinking. Specifically, higher levels of binge drinking reported by the new best friend at T1 predicted higher levels of binge drinking of the participant at T2 over and above prior binge drinking behaviors of the participant. There was no main effect of gender, and gender did not moderate this association.

Discussion

A primary goal of this study was to examine the influence of peer selection and socialization effects on binge drinking among college students. To address limitations of prior research, this study assessed

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Table 1. Means and Standard Deviations for Primary Variables (N = 196)

| | Males | Females | t (df) |
|-------------------------|-------------|------------|---------------|
| Time 1 | | | |
| Binge Drinking | 2.22 (1.33) | 1.51 (.85) | -4.22** (178) |
| Friend's Binge Drinking | 1.96 (1.23) | 1.61 (.95) | -2.06* (179) |
| Time 2 | | | |
| Binge Drinking | 2.10 (1.20) | 1.51 (.87) | -3.69** (186) |

Note. * $p < .05$; ** $p < .001$

Table 2. Bivariate Associations Among Primary Variables (N = 196)

| | T1 Binge Drinking | T1 Friend's Binge Drinking | T2 Binge Drinking |
|-------------------------------|----------------------|-------------------------------|----------------------|
| T1 Binge Drinking | -- | .28** | .70** |
| T1 Friend's Binge Drinking | .25 | -- | .34** |
| T2 Binge Drinking | .65** | .30* | -- |

Note. Correlations below the diagonal represent males, and values above the diagonal represent females. * $p < .05$; ** $p < .001$

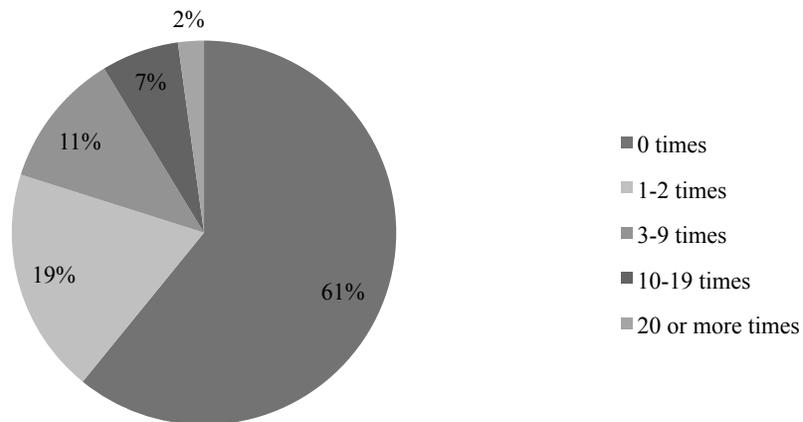
Table 3. Multiple Linear Regression Analysis Testing Selection Effects (1) and Socialization

| Predictor | | B | SE B | β | <i>p</i> | ΔR^2 |
|---|--|------|------|---------|----------|--------------|
| 1. Friend's Time 1 (T1) Behavior | | | | | | |
| Step 1 | Gender | -.16 | .18 | -.07 | .377 | .09** |
| | Participant Binge Drinking T1 | .27 | .07 | .27** | .001 | |
| Step 2 | Participant Binge Drinking T1 x Gender | .09 | .16 | .14 | .567 | .09 |
| 2. Participant Binge Drinking at Time 2 (T2) | | | | | | |
| Step 1 | Participant Binge Drinking T1 | .68 | .05 | .70** | <.000 | .50** |
| Step 2 | Gender | -.10 | .13 | -.05 | .417 | .02* |
| | Friend's Binge Drinking at T1 | .15 | .05 | .15* | .007 | |
| Step 3 | Friend's Binge Drinking T1 x Gender | .04 | .11 | .07 | .735 | .00 |

Effects (2) (*N* = 196)

Figure 1.

Binge Drinking at Time 1, *N* = 196



college students' binge drinking behaviors pre- and post-college matriculation and compared it to their new best friends' actual reports of binge drinking. It also employed a prospective, 3-month design. Similar to past work, results suggested that prior binge drinking was a strong predictor of future binge drinking behavior (White et al., 2008). Importantly, results are consistent with prior research (Leibsohn, 1994; Read et al., 2005; White et al., 2008) and provide evidence that both peer selection and socialization effects may account for some of the binge drinking behaviors reported by students during their college transition.

The college transition is typically characterized by numerous opportunities for substance use (Pandina et al., 2010). One pathway to college students' binge drinking may be through the selection of friends who have similar past binge drinking experiences as themselves. Our results also yield preliminary evidence to suggest that new college friends may influence the maintenance of binge drinking behavior. This finding is consistent with prior studies that have found that emerging adults are influenced by the behaviors of their friends (Allen, Porter, & McFarland, 2006; Cohen & Prinstein, 2006). While experimental alcohol use is considered to be normative during the first year of college, friendships that form around and facilitate binge drinking are concerning and deserve attention. Study results can be further interpreted through the lens of social learning theory (SLT). According to the SLT of alcohol, social reinforcement and modeling are central concepts for understanding binge drinking during the college transition (Borsari & Carey, 2006). The college transition provides an ideal social environment to facilitate alcohol use.

In the context of SLT, peers serve as models for binge drinking and simultaneously provide social reinforcement. Binge drinking facilitates contact and acceptance among peers, provides pleasant shared experiences, and increases intimacy, closeness, and support among newly forming friendships (Borsari & Carey, 2006). Thus, individuals transitioning to college who have already experienced the positive social aspects associated with binge drinking may select peers with similar past experiences and mutually engage in binge drinking as a means to de-

velop a close friendship. Indeed, previous studies have shown that incoming college students appear to binge drink to make friends rather than to cope with negative affect (Reifman & Watson, 2003). As a friendship continues to develop, peers may maintain binge drinking behaviors as both members of the dyadic relationship experience similar positive reinforcement for binge drinking and drink as a means to maintain shared behaviors and beliefs.

Implications for Prevention

Results suggest that a tiered approach to alcohol prevention may be effective. Given that past drinking behaviors were associated with future binge drinking, interventions designed to address the health risks associated with binge drinking among incoming college students are indicated. Recent research suggests that psychoeducational alcohol prevention programs on college campuses hold promise in the short-term. In a randomized clinical trial that included 30 universities, the use of an online, internet-based alcohol misuse prevention program, referred to as "AlcoholEdu for College", was associated with a significant reduction in the frequency of past-30 day binge drinking in the fall semester upon course completion (Paschall, Antin, Ringwalt, & Saltz, 2011). However, these results did not persist into the spring semester, highlighting the potential need for booster sessions or other prevention approaches.

The results of the present study suggest that incorporating peer related factors into alcohol prevention programming may prove to be fruitful. Peers' drinking prior to college matriculation was found to predict binge-drinking behaviors during the first few months of college, above and beyond past drinking history. Thus, programs that promote physical health but also teach peer alcohol resistance skills during the first few weeks of college may help combat binge drinking on college campuses. Peer-led prevention programs or the use of well-respected peer actors in online materials may also help increase the salience of prevention programming.

For those students who do not respond to universal (or broad) prevention efforts, and form mutually supportive social relationships around binge drinking, selective or indicated prevention programming

may be warranted. A number of studies have found that peer-led interventions utilizing motivational interviewing techniques with college students have been successful in reducing alcohol use (Larimer, Crouce, Lee, & Kilmer, 2004; Tevyaw, Borsari, Colby, & Monti, 2007). Future development and work in the area of peer-led interventions appears warranted.

Limitations and Future Directions

Though the present study uniquely builds upon existing literature in the area of peer influences on college student drinking behavior, it also has a number of limitations. Data at both time points were collected from a small subset of incoming first year students, limiting generalizability. Efforts to enroll all incoming first year students for participation in future research in this area would be beneficial. Despite assurances of confidentiality, it is also possible that students under-reported their alcohol use given that they were under the legal drinking age.

Alternative explanations for the binge drinking behaviors in the current sample should also be considered. Drinking behavior was only measured between two friends in this sample. The influence of other peers, or non-interpersonal factors, was not assessed in this study. For example, students' Greek affiliation, a known influence on binge drinking (McCabe et al., 2005) was not assessed. Although the majority of students (> 75%) at the university where this study was conducted live on campus their first year, it is possible that students living on campus may drink more than students that live off campus or vice versa. Further, some studies have shown that for males, having a roommate who was a binge drinker in high school is related to increases in drinking behaviors in college (Duncan, Boisjoly, Kremer, Levy, & Eccles, 2005). Future research would benefit from examining these alternative explanations and other potential reasons that friendships may form other than around binge drinking behaviors.

Another important issue in this study was the attrition rate from T1 to T2. Students with the highest binge drinking rates at T1 were the least likely to complete the follow-up survey at T2. The final sample for analysis included mostly females and less frequent binge drinkers compared to the T1 sample.

Importantly, even among this small sample, peer influence mechanisms still accounted for a significant portion of the variance in binge drinking behaviors. Future research with more frequent binge drinkers might find stronger peer influence effects. Specifically, it would be useful to examine whether frequent binge drinkers are more strongly affected by peer influence than individuals without a history of binge drinking. It would also be important to study individuals who are abstainers to understand continuities and discontinuities in their college drinking behaviors (Hersh & Hussong, 2006). It is also important to note that the current study only included participants who made new best friendships over the course of the first three months of college. Thus, study participants may be higher in various types of socially facilitative personality traits, such as extroversion, compared to excluded individuals. Finally, this study used a single item to measure binge-drinking behaviors at both Time 1 and 2, which temper conclusions. Future research would benefit from using validated measures of binge drinking behaviors.

Conclusion

This study offers further evidence to suggest that peer influence processes are relevant for understanding binge drinking on college campuses. The current study improves upon prior research methodology by examining actual peer reports of substance use behaviors rather than estimations by the study participant. Results highlight the potential benefit of using developmental theories, methods, and ecologically valid time points to understand peer influence effects on college binge drinking.

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