Psychology of Addictive Behaviors

Dynamic Characteristics of Groups and Individuals That Amplify Adherence to Perceived Drinking Norms in College Club Sport Teams: A Longitudinal Multilevel Investigation

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CITATION
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Social norms positively predict college students’ alcohol use, but it is critical to explore heterogeneity in these patterns to identify which students are most susceptible to normative influences. The current study explored the nature of drinking norms within college student peer sport clubs. We examined the association between self-reported alcohol use (i.e., number of drinks in a typical week) and perceived descriptive/injunctive norms as an indicator of norm adherence and then tested moderating effects of social constructs related to the group: Social identification with one’s team, along with social network-derived indices of indegree centrality and network density. We sampled members of 35 intact college club sport teams at 3 timepoints across the school year (N = 1,054; 61% female). Multilevel modeling was employed to estimate moderating effects at within-person, between-person, and between-groups levels. Initial analyses revealed that perceived group norms predicted self-reported alcohol use, and that teams approached consensus on the groups’ drinking norms over time. Several significant time-varying moderation patterns were uncovered. At timepoints when students identified more strongly with their team (relative to person-mean levels), they more readily adhered to perceived descriptive and injunctive team drinking norms. Students also adhered more closely to these perceived team drinking norms at timepoints when students were nominated as having relatively lower indegree centrality. Cross-level interactions revealed that neither network density nor team sex moderated these associations. Taken together, the current findings advance our understanding of group processes that may produce more salient social influences on students’ alcohol use behaviors within proximal peer groups.

Keywords: alcohol, peer influence, social identity, social network analysis, athletes

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Emerging adults belong to a wide spectrum of social groups that can shape individuals’ lives in myriad ways. As it pertains to alcohol use, the influence of peer groups is intuitively evident in the shape of direct pressures and persuasion where other group members deliberately act in ways to prompt others to align with the group (i.e., active social influences; Graham, Marks, & Hansen, 1991). There is nevertheless evidence that social influences from groups are perhaps more commonly indirect and passive, whereby members’ shape their drinking behaviors in response to what they believe is expected in order to be a member of the group (Borsari & Carey, 2001). Individuals are highly sensitive to the attitudes and actions of others within their social groups, and these perceptions produce normative social pressures that may persist even in the absence of any intent by group members to shape the behaviors of others (Hogg & Reid, 2006; Latané, 1981; Rimal & Lapinski, 2015).

Social norms are a salient form of peer influence, and entail implicit and explicit patterns of behavior that are expected of individual members of social groups or categories (Cialdini, Reno, & Kallgren, 1990). There is consensus among alcohol researchers...
that social norms (i.e., perceptions of others’ alcohol-related attitudes and behaviors) are among the most robust predictors of college students’ alcohol use (Krieger et al., 2016; Neighbors, Lee, Lewis, Fossos, & Larimer, 2007). Although other sources of social influence remain important, college students are in a developmental stage involving particularly high sensitivity to peer influence (Burnett, Sebastian, Cohen Kadosh, & Blakemore, 2011).

Despite many theoretical frameworks describing individuals’ motivations to conform to norms, there is less evidence regarding factors that produce heterogeneity in normative influence. In other words, some individuals are more strongly influenced by drinking norms than others and a critical gap in this literature is that we know little about the psychosocial processes within groups that may amplify adherence to group drinking norms. The primary goal of this study was thus to test individual- and group-level factors that are theoretically posited to amplify or diminish students’ adherence to perceived group drinking norms.

Social Norms and College Student Alcohol Use

Several theoretical frameworks guide understanding of how, and why, small group social norms guide behavior. The focus theory of normative conduct is a particularly influential approach that outlines how norms influence behavior and distinguishes between injunctive and descriptive norms. Whereas injunctive norms involve perceptions of what others approve or disapprove of (what one “ought to do”), descriptive norms involve perceptions of what others actually do (Cialdini & Goldstein, 2004). There is evidence that both injunctive and descriptive norms relate to students’ alcohol use behaviors (e.g., Krieger et al., 2016); however, motivational processes are theorized to differ between the two sources of normative influence (Cialdini et al., 1990). Cialdini and colleagues (1990) suggest that individuals are motivated to adhere to injunctive norms to gain social acceptance from peers, while individuals are motivated to adhere to descriptive norms because they believe that peers’ behavior may be the correct way to behave.

We nevertheless note that motives to adhere to group norms are not mutually exclusive in that individuals may be influenced by both descriptive and injunctive norms. In a study testing injunctive and descriptive norms as competing models, Lac and Donaldson (2018) highlighted the importance of the normative referent group. This study found that descriptive norms were relatively stronger predictors of students’ alcohol use when assessed relative to a typical university student. Meanwhile, injunctive norms were comparatively strong predictors of alcohol use when derived from one’s more proximal peer groups—and this effect was mediated through attitudes toward alcohol use. It is thus plausible that injunctive norms regarding what behaviors are accepted by peers increase in salience within smaller groups because they more powerfully shape one’s own attitudes about what is appropriate.

Norm Adherence Within Small, Proximal Peer Groups

To optimize understanding of normative influence, it is critical to consider factors that explain the salience of a norm. Small group research holds promise, then, in relation to theory regarding how strength of normative influence varies depending on the nature of the referent group as well as one’s social standing within that group. Lewis and Neighbors (2006) reviewed studies that used normative feedback interventions with college students and noted that personalized normative feedback may be more effective when norms are based on more proximal referent groups like clubs, teams, or Greek life groups (e.g., fraternities). Furthermore, correlational studies demonstrate that, whereas students do align their behaviors with the norms of distal referents (e.g., campus-wide norms), students’ drinking behaviors are particularly shaped by the norms for proximal referent groups, such as student clubs (Hummer & Davison, 2016; LaBrie, Hummer, Neighbors, & Pedersen, 2008).

These findings align with tenets of both social comparison theory (Festinger, 1954) and social impact theory (Latané, 1981), which posit that proximal referent groups may exert greater normative influence on beliefs and behavior relative to distal referent groups. Small groups are distinct from other peer affiliations because they entail rich group processes (e.g., collective identity) and a dense social structure with close member interactions that may generate particularly powerful peer influences (Eys & Evans, 2018; Kim & Wiesenberg, 2017). Even at a more practical level, individuals may also feel stronger pressure to adhere to small group norms because close interactions among members make norm adherence (or deviance) highly visible. Because small groups tend to entail features like shared identity, group structure, and frequent social interaction among members there is both theoretical and empirical support for the value of studying proximal peer groups as normative referents. However, groups may vary in the extent that members experience these small group characteristics, which is anticipated to have implications for how closely members adhere to perceived group drinking norms.

Social Identification

A predominant social psychology perspective pertaining to how groups shape individuals’ behavior relates to the extent that one identifies and self-categorizes with the normative referent group (i.e., social identity approach; Hogg & Turner, 1987; Turner, Oakes, Haslam, & McGarty, 1994). Social identification is the meaning and significance that an individual places on their membership to a group (Postmes, Haslam, & Jans, 2013). Although groups based on even trivial characteristics of members produce social identities, individuals’ adherence to group norms may be linked to the strength of their identity. When individuals view their group identity as a salient part of their sense of self, they are more likely to internalize group norms to uphold the characteristics of a prototypical group member (Hogg, 2016; Jetten, Spears, & Manstead, 1997). The extent that one’s social identification strength influences behavior is thought to be especially pronounced within smaller and more proximal groups that generate powerful peer influences, such as student clubs (Hogg & Reid, 2006; Kim & Wiesenberg, 2017).

In line with this theoretical perspective, there is evidence that social identification strength may play a key role in adherence to perceived drinking norms. When examining the relative strength of normative influence from different referent groups including same-sex, same-race, and same-Greek-status students, researchers reported that students with strong identities within a given referent group aligned more closely with perceived descriptive norms (i.e., drinking norms and behaviors had a stronger association; Neighbors et al., 2010). In a similar study, researchers found that the
individuals with lower indegree centrality may be particularly motivated to adhere to the group’s norms as an attempt to gain approval and demonstrate commitment to the group (Cialdini & Goldstein, 2004; Deutsch & Gerard, 1955).

Alongside an individual’s position within a group, conformity to group norms may depend upon the group’s network structure as a whole. Network density is a sociometric index of the proportion of ties that exist among members. Network density is high in groups where a relatively higher proportion of individuals are bound together through social ties, while groups with few social connections between members have low density scores. It is a measure of how “tight knit” a group’s members are. While network density is typically considered to be a positive group attribute in relation to interpersonal attractions to the group, it is plausible that more densely connected groups may feature stronger pressures for members to conform to group norms. Indeed, network scientists have posited that network density may amplify the extent that social norms influence individuals’ behavior as a complex contagion (Davis, Heiman, & Menczer, 2015). As such, when groups feature more social connections between members, each of those connections produces additional paths or vectors through which one members’ behaviors link to other members.

**Group Network Structure**

Another promising avenue for considering normative adherence relates to the social network structure of a group (Knox et al., 2019). Social connections between members of small groups naturally produce a network structure that governs members’ behaviors, especially as it pertains to the position of individual members (Forsyth, 2019). Network structures can be challenging to observe because they tend to be latent and dynamic. Instead, network researchers estimate the discernable units of this structure—ties between each individual member of a group—and combine the ties to construct a social network (e.g., DiGuiseppi et al., 2018). Researchers interested in peer influence commonly construct networks using sociometric nominations regarding the frequency or quality of members’ interactions with one another to represent ties and use these networks to produce constructs reflecting the individuals’ position in the group (e.g., centrality) or the group’s network as a whole (e.g., density).

**Indegree centrality** is an important indicator of an individual’s position within their group and is calculated using the volume of incoming nominations from peers as well as the strength of those ties (Borgatti, 2013). Because indegree centrality reflects a contextual feature derived from the input of several members and is not an inherently psychological phenomena—we must make theoretical predictions regarding how an individual will “experience” their centrality. In networks comprising positive affiliative social ties like friendship or time spent together, indegree centrality is often interpreted as an indicator of sociometric popularity (Felmlee, McMillan, Inara Rodis, & Osgood, 2018). It follows that those with greater indegree centrality would be highly accepted and well-liked by fellow group members, relative to those with low indegree centrality. Though it has yet to be tested, there is strong rationale for examining how indegree centrality relates to adherence to perceived group drinking norms.

We anticipate that individuals may be motivated to adhere to group norms as an avenue to fulfill innate desires for affiliation, belongingness, and acceptance among peers (Baumeister & Leary, 1995). It is likely that individuals experience pressures to pursue greater centrality in their groups, seeing as attaining peer approval and popularity within one’s group is a central motivating factor for conforming to the group’s norms (Nail, MacDonald, & Levy, 2000). We recognize that groups may feature competing pressures related to social structure (e.g., members with higher centrality may feel pressure to be prototypical; Hogg, 2016). Nevertheless, individuals with lower indegree centrality may be particularly motivated to adhere to the group’s norms as an attempt to gain approval and demonstrate commitment to the group (Cialdini & Goldstein, 2004; Deutsch & Gerard, 1955).

The Current Study

Existing theory and empirical studies support the value of studying the role of small group processes in shaping norms and have produced compelling theoretical arguments regarding how social identities and group structure may predict members’ adherence to group norms. However, the extent that these group processes moderate associations between norms and behavior has yet to be tested in naturalistic peer groups. It is perhaps not surprising that there is a limited evidence base, primarily because of challenges associated with sampling enough intact and naturally occurring groups to estimate such effects at within- and between-groups levels. The purpose of the current study was therefore to fill this knowledge gap by examining variability in the extent that students adhere to perceived group drinking norms within intact student clubs.

Student club sport teams represented a valuable group context for these research questions because these groups remain intact throughout the school year and are readily accessible given the popularity of extracurricular sport organizations. In addition to sport-playing students being a relatively high-risk subgroup for alcohol use (Terri, Mallett, Mastroleo, & Larimer, 2006), sport teams are ideal proximal peer groups for studying processes such as conformity because of shared tasks and identities (Graupen- sperger et al., 2018).

We adopted a longitudinal approach to examine associations between perceived group drinking norms and students’ own alcohol use (i.e., number of drinks in typical week) at three timepoints across a single school year. Using a multilevel design (i.e., responses nested within people who are nested within groups) enabled us to examine time-varying moderation effects on the norms-behavior association. We specifically focused on associations at the between-person level to examine who is generally more likely to adhere to group drinking norms, as well as the within-person level to examine when individuals are more likely to adhere to group drinking norms relative to aggregated person-mean levels.
Aligned with the vast extant literature in this domain, we anticipated that students’ self-reported alcohol use would be predicted by perceptions of the descriptive and injunctive norms within their sport teams. However, the primary focus of the current study was to examine interaction effects regarding the extent that the norms–behavior association was moderated by components of the group environment. We specifically examined the role of: (a) social identification strength, (b) indegree centrality, and (c) group-level network density. We formulated hypotheses that aligned with group dynamics theory and empirical findings:

**Hypothesis 1:** The association between perceived norms and alcohol use will be stronger for students who identify more strongly with their sport team at both the within- and between-person levels.

**Hypothesis 2:** The association between perceived norms and alcohol use will be stronger for those with less indegree centrality (relative to teammates), at both the within- and between-person levels.

**Hypothesis 3:** The association between perceived norms and alcohol use will be stronger for students’ who belong to relatively more tight-knit clubs (i.e., network density).

Although it was unclear whether adherence to group drinking norms would vary between groups of men and groups of women, we anticipated that the association between perceived norms and alcohol use may vary as a function of team sex (see Graupensperger et al., 2018).

By studying naturally occurring same-sex groups and collecting data from most or all team members, we could also pursue exploratory goals. One exploratory aim was to consider the emergent nature of norms and group-related behavior. Studying intact groups over the course of a school year presented the unique opportunity to examine the extent that groups come to a consensus on descriptive and injunctive drinking norms. Although perceptions of group drinking norms are an individual-level phenomenon, past research using large and diffuse referent groups has lacked the capacity to test whether consensus among group members emerges over time. Consensus emergence modeling specifically enabled us to test whether students’ perceptions of group drinking norms and self-reported alcohol use behaviors became more similar within groups across the school year.

**Method**

**Participants and Procedures**

We sampled 1,054 college students (61% female) from a large public university in the United States. Most participants identified as White (82%) and the sample comprised 28% freshmen, 23% sophomores, 26% juniors, 22% seniors, and 1% graduate students. Participants were nested within 35 intact sport teams (e.g., ultimate frisbee, lacrosse, soccer) that were same-sex and competed at the intercollegiate “club” level. Each team was formally organized by an established club sport department within the institution and was led primarily by student leaders. At the outset of the study, the average team size was 24.34 students (SD = 12.66), with members having reported an average team tenure of 1.73 seasons (SD = 0.69).

Approval was obtained from the authors’ institutional review board prior to recruitment. Researchers first presented an overview of the study to sport club student-leaders at an annual club sports meeting prior to the start of the school year. Upon following-up with club leaders who indicated interest in participation, researchers scheduled a time to meet with members of each participating team as a group. Researchers then met with teams before or after practices or team meetings to provide an overview of the study and invite students to participate. Data were collected at three timepoints with 3-month lags. Whereas Time 1 (T1) took place at the middle of the fall semester after teams had formed and commenced training (early to mid-October; weeks 6–8 in fall semester), and within 3–4 weeks of their team beginning training, Time 2 (T2) took place early in the spring (middle to late-January; weeks 2–4 in the spring semester), and Time 3 (T3) took place late in the spring semester (middle to late-April; weeks 13–15 in spring semester). Due to schedule conflicts and clubs’ availability, the specific date of survey completion for clubs varied by up to 3 weeks within a timepoint. Sampling all teams at similar timepoints across the school year nevertheless reduced the impact of seasonal factors (e.g., exams, spring break) as these would be largely shared among all participants. Participants used electronic tablets and smart phones to complete surveys. Participation was incentivized at each timepoint by the choice of either: (a) a $5 gift card or (b) credit toward the community service hours required of each student by the club sport organization.

Team rosters were obtained from the university’s club sport department prior to collecting data. Although these rosters may have limited accuracy, as some students sign up for sport clubs but do not actively participate, rough estimates of participation rates were calculated. Estimated participation rates ranged widely. At T1, participation rates ranged between 26.32% and 100% with an average of 73.88% participation across the 35 teams. At T2, between 25.64% and 100% of team rosters participated with an average of 65.24% participation. At T3, participation rates ranged between 23.60% and 100% with an average participation rate of 64.77%. Of all total rostered students, grand participation rates were 74.15% at T1, 59.31% at T2, and 57.06% at T3. We urge caution when interpreting these participation rates as they are likely underestimated, but note that from a descriptive standpoint, nearly all students who were present at the time of data collection volunteered to participate in the study.

**Measures**

**Alcohol use and perceived drinking norms.** We employed comparable rating scales to measure the three core constructs reflecting students’ self-reported alcohol use behavior, perceived descriptive norms, and perceived injunctive norms. Participants were first shown detailed descriptions of how much alcohol is considered to be one standard drink for various types of alcohol (e.g., wine, beer, liquor). Using the Daily Drinking Questionnaire (DDQ; Collins, Parks, & Marlatt, 1985), participants reported the typical number of drinks they had on each day of the week for the past 3 months. Responses across days of the week were aggregated into a typical weekly number of drinks variable. Perceptions of descriptive norms for participants’ respective club sport teams
were assessed using the Drinking Norms Rating Form (DNRF; Baer, Stacy, & Larimer, 1991). This normative assessment mirrors the structure of the DDQ items, but included a stem that directed participants to respond regarding their club: “During a typical week in the past 3 months, how many drinks do you estimate that a typical member of your club sport team had on each day of the week?” Krieger and colleagues (2016) demonstrated that injunctive norms should also be assessed on the same scale as other scales in an investigation used to reflect alcohol use. Following this recommendation, the items reflecting injunctive norms entailed the same drink-based scale as the DDQ and DNRF, followed by the prompt: “During a typical week in the past 3 months, how many drinks do you estimate that a typical member of your club sport team views as being acceptable on each day of the week?”

Social identification strength. The Social Identity Questionnaire for Sport (SIQS; Bruner & Benson, 2018) was used to assess participants’ identification with their club sport team. This nine-item scale specifically measures the strength of athletes’ social identities pertaining to their club membership and encompasses three subdomains. Scale validation research has demonstrated that this scale is appropriate for measuring social identification as a unidimensional construct—aggregating ingroup ties, ingroup affect, and cognitive centrality subdimensions (Bruner & Benson, 2018). Considering our general theoretical proposition that social identification strength would moderate key associations, we op-

Indegree centrality and group density. Peer nomination items, in which students indicated how often they spend time with each fellow teammate, were used to construct club-specific social networks, from which we computed: (a) individual member’s indegree centrality within their group, and (b) group-level network density. This social network-based approach aligns with educational psychology studies that construct classroom networks by asking students to identify affiliations with classmates (e.g., Serdiouk, Berry, & Gest, 2016). Surveys displayed a roster of all team members alongside Likert-type response options where participants indicated social ties with each teammate. The item specifically read: “I spend time with this teammate outside of club sport activities,” on a scale ranging from 0 (not at all) to 4 (all the time). Participants were instructed that leaving a blank response would score as ‘0’ for that club member. Networks were computed for clubs at each timepoint (i.e., 105 networks in total).

We computed indegree centrality as the total number and strength of incoming social connections, whereby each participants’ raw centrality score reflected the sum of all incoming nomination values from peers. Raw indegree centrality scores were standardized at the within-team level to control for varying team sizes, meaning that indegree centrality variables reflect centrality relative to one’s teammates at a given timepoint. Network density is a group-level variable that was calculated using the number and strength of actual ties within a network divided by the highest possible number and strength of potential ties. Students who were listed on club rosters, but who did not participate in the study, were removed from networks when computing density scores at each timepoint to avoid penalizing density scores for nonresponders (Žnidarič, Ferligoj, & Doreian, 2018). A detailed description of managing these social network analyses is also available in a previous study (Graupensperger, Panza, & Evans, 2020).

Analyses

Preliminary analyses entailed calculating descriptive statistics across the study as well as separately at each timepoint. To reduce the influence of outliers, extreme values for number of weekly drinks, perceived descriptive norms, and perceived injunctive norms were recoded to 3 standard deviations above the mean at each timepoint (Tabachnick & Fidell, 2019). The data structure entailed several levels of clustering whereby multiple responses over time were nested in participants who were nested within intact groups. This necessitated the use of multilevel analytic approaches. Intraclass correlation coefficients (ICC) were computed as a descriptive step to estimate the extent that variance in study variables was attributed to the clustered structure of the data. We first estimated ICC values at each wave of responding, which estimates the percentage of total variability that is due to between-person and between-groups variability. The three-level structure also required parsing two ICC values when considering variability in all data: (a) variance attributed to the person-level (ICC_{lv2}), and (b) variance attributed to the group-level (ICC_{lv3}). We also conducted confirmatory factor analyses to assess psychometric properties of the social identity scale within our sample—using single-factor solution with correlated errors model proposed by Bruner and Benson (2018).

Consensus emergence. Addressing an exploratory goal of this research to examine the group-level properties of subjective norms and alcohol use, we conducted multilevel consensus emergence modeling (Lang, Bliese, & de Voogt, 2018). Consensus emergence refers to the extent that group members become more similar over time. Consensus emergence models are, in effect, null latent growth models including time and group membership functions. We fit a three-level model that included factors to control for baseline differences among group members at the first measurement occasion (e.g., baseline drinking). Models included an exponential variance function (i.e., \( \delta_1 \) coefficient) that identifies emergence (Pinheiro & Bates, 2000). Negative \( \delta_1 \) values signify a linear decrease in residual variance across measurement occasions and indicates that decreasing amounts of residual variance remain after accounting for group membership and time. Effect size for the \( \delta_1 \) coefficient was calculated as the percentage of reduction in the residual standard deviation at each measurement occasion (e.g., \( \delta_1 = -0.05: \) residual variance reduced by 5% with each occasion; see Lang et al., 2018).

Primary regressions. The primary analyses entailed fitting three-level models with participants’ number of weekly drinks as the outcome variable. Separate models were fit for descriptive norms (Model 1) and injunctive norms (Model 2) as predictors to understand how these unique forms of social influence relate to students’ alcohol use, and how other study variables may moderate these associations. The three-level modeling approach enabled us to examine both time-varying (i.e., within-person) and time-invariant (i.e., between-person) predictors of weekly drinks.
Models were evaluated hierarchically to identify main effects in Step 1 prior to probing interaction effects in Step 2 (Cohen, Cohen, West, & Aiken, 2003). Participants’ age and sex were entered as control variables. Perceived group drinking norms, social identification strength, and indegree centrality were all entered at both the within- (person-mean centered) and between-person (grand-mean centered) levels to estimate time-varying and time-invariant effects. Finally, group-level network density was entered as a Level 3 time-varying predictor. Decisions to center variables at either the person-mean or grand-mean levels were oriented around the approach best suited for interpreting effects relative to normative adherence (Brincks et al., 2017). At the within-person level (Level 1), variables were person-mean centered to examine time-varying associations and interactions. Between-person (Level 2) responses were aggregated across the timepoints and then grand-mean centered to examine time-invariant associations. Interaction terms examined the extent that social identification strength, indegree centrality, network density, and team sex moderated the associations between perceived group drinking norms and participants’ number of weekly drinks. To interpret interaction effects, simple slopes were estimated from parameter estimates at low (−1 SD) and high (+1 SD) levels of the moderator variables.

Multilevel modeling is flexible when managing missing responses, and provided opportunities to include even participants who only completed a survey at one timepoint as this information contributes to between-person and group-level parameters (Kwok et al., 2008). The outcome variable in the current study, number of weekly drinks, was a count variable that was skewed with many responses indicating zero drinks of alcohol. This distribution necessitated an initial test of zero-inflation as zero-inflated data require a special two-step procedure (Atkins et al., 2013). When using count regression, beta coefficients are exponentiated (eβ) to yield rate ratios that indicate the proportional change in the outcome with a one-unit increase in the predictor (Atkins et al., 2013).

Results

Of the total 1,054 participants, 737 participated at two or more waves (70%) and 492 participated in all three waves (47%).Broken into timepoint samples, 847 students participated at T1, 726 participated at T2, and 703 participated at T3. Descriptive statistics showing aggregated values across all three timepoints are displayed in Table 1. On average, participants reported 11.19 weekly drinks, which is similar to weekly drinks reported in studies examining college student-athletes (e.g., Dams-O’Connor, Martin, & Martens, 2007), but higher than studies with more general college student samples (e.g., Cail & LaBrie, 2010). Table 2 displays mean and ICC values for study variables at each timepoint. ICCs indicated that between 58 and 70% of the variance in study variables was attributable to between-person effects, and between 6 and 18% of variance was attributable to between-groups effects, highlighting the need to account for clustering. Vuong’s test (Vuong, 1989) indicated that the weekly drinks variable was not zero-inflated at any of the three timepoints (z-statistics ranged from −7.54 to −6.01; all p values <.001).

Multilevel zero-order correlations between study variables were computed separately at between- and within-group levels. There were moderate-to-strong correlations between weekly number of drinks, descriptive norms, and injunctive norms: rs ranged from .63 to .93 at the aggregated between-group level and from .22 to .72 at the within-group level (all ps < .05). Also of note, within-group correlations between social identification strength and indegree centrality ranged from .23 to .45 (all ps < .05). Full correlation matrices can be accessed within the online supplementary materials.

Multilevel alpha accounting for nesting within teams indicated that the social identity scale had high reliability at all timepoints, ranging from .95 to .97 at the between-groups level and from .90 to .92 at the within-group level. Confirmatory factor analysis also revealed that the factor structure of the social identity scale was consistent with prior theorizing and closely aligned with the single-factor structure reported during initial scale development (Bruner & Benson, 2018). Full results of confirmatory factor analysis at each timepoint are available in the online supplementary materials.

Consensus Emergence

Consensus emergence model results are provided in Table 3. The three significant χ² values between the null models (i.e., residual variance held constant) and models including the exponential variance function (δ₁ coefficient) signify that models allowing for change in the residual error variance fit better than models that assumed equal error variance. Table 4 results demonstrate that this pattern represents consensus emergence, with negative δ₁ coefficients for all models. In other words, decreases in residual variance over time indicate that group membership ac-

Table 1
Descriptive Statistics for Key Study Variables, Across All Timepoints

<table>
<thead>
<tr>
<th>Variable</th>
<th>Range</th>
<th>M (SD)</th>
<th>Median</th>
<th>% of responses equivalent to zero</th>
<th>ICC</th>
<th>Person (Level 2)</th>
<th>Group (Level 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drinks per week⁴</td>
<td>0–44</td>
<td>11.19 (9.43)</td>
<td>10</td>
<td>14.59%</td>
<td>.70</td>
<td>.14</td>
<td></td>
</tr>
<tr>
<td>Descriptive norms⁴</td>
<td>0–45</td>
<td>14.84 (9.18)</td>
<td>13</td>
<td>4.70%</td>
<td>.58</td>
<td>.18</td>
<td></td>
</tr>
<tr>
<td>Injunctive norms⁴</td>
<td>0–45</td>
<td>14.95 (9.78)</td>
<td>13</td>
<td>5.45%</td>
<td>.60</td>
<td>.18</td>
<td></td>
</tr>
<tr>
<td>Social identification</td>
<td>1–7</td>
<td>5.57 (1.06)</td>
<td>5.78</td>
<td>—</td>
<td>.63</td>
<td>.06</td>
<td></td>
</tr>
<tr>
<td>Indegree centrality⁵</td>
<td>0–88</td>
<td>22.65 (15.65)</td>
<td>20</td>
<td>5.96%</td>
<td>—</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Network density</td>
<td>0.34–2.06</td>
<td>1.09 (0.99)</td>
<td>0.42</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td></td>
</tr>
</tbody>
</table>

⁴To reduce the influence of outliers, extreme values were recoded to three standard deviations above the mean (Tabachnick & Fidell, 2019). ⁵Values shown here represent raw indegree centrality scores, which were transformed prior to analyses by standardizing values within-group. ICC = Intraclass correlation coefficient.
interaction terms in Step 2 significantly improved the model fit. In both the descriptive and injunctive norms models, adding the main effects of predictor variables on the number of weekly drinks (Step 1), and then estimated moderation of these associations (Step 2) values indicate that models allowing for change in the residual error variance 2) values indicate that models allowing for change in the residual error variance were used to estimate the models. Descriptive norms (Model 1). Table 5 displays the results for the descriptive norms model. Interpreting Step 1, within-person effects showed that when students perceived descriptive norms for their respective groups that were above their aggregated person-mean, they also reported greater-than-usual alcohol consumption. Descriptive norms also significantly predicted weekly drinks at the between-person level; students who perceived relatively higher levels of descriptive norms on average also engaged in greater alcohol use. Weekly number of drinks was positively predicted by within-person variability in students’ social identification strength as well as students’ indegree centrality at the between-person level. At the group level, neither network density nor team sex significantly predicted students’ number of weekly drinks. Moderating effects were the primary focus of this study, and results revealed significant interactions related to social identification and indegree centrality (see Figure 1). In support of our first hypothesis, social identification strength significantly moderated the association between descriptive norms and weekly drinks at both the within- and between-person levels. This finding indicates that the association between descriptive drinking norms and alcohol use was greater among students who reported relatively stronger social identification—relative to their own mean (within-person), and relative to other participants (between-person). In support of our second hypothesis, indegree centrality moderated the norms-behavior association at both the within- and between-person level. At timepoints when students were nominated as relatively less central (relative to person-mean centrality), they reported greater adherence to perceived descriptive norms. Finally, neither network density nor team sex significantly moderated the association between descriptive norms and alcohol use. Injunctive norms (Model 2). Perceived injunctive norms significantly predicted students’ number of weekly drinks at both the within- and between-person levels (see Table 6). This indicates that in addition to typical perceptions of injunctive norms predicting students’ typical alcohol use, students engaged in greater-than-usual alcohol use at timepoints when they perceived higher-than-usual injunctive norms. The main effects within the multilevel models are presented in Table 2. The consensus emergence models (Mod 2) add residual variance terms allowing residual variances to fit the data better than models that assume equal error variance. AIC = Akaike information criterion; BIC = Bayesian information criterion; LogLik = Log Likelihood.

### Table 2

<table>
<thead>
<tr>
<th>Variable</th>
<th>M (SD)</th>
<th>Group-level ICC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T1</td>
<td>T2</td>
</tr>
<tr>
<td>Drinks per week*</td>
<td>12.24</td>
<td>10.85 (9.98)</td>
</tr>
<tr>
<td>Descriptive norms*</td>
<td>15.77</td>
<td>14.26 (8.80)</td>
</tr>
<tr>
<td>Injunctive norms*</td>
<td>15.58</td>
<td>14.48 (9.52)</td>
</tr>
<tr>
<td>Social identification</td>
<td>5.63 (0.97)</td>
<td>5.51 (1.08)</td>
</tr>
<tr>
<td>Indegree centralityb</td>
<td>21.34 (16.35)</td>
<td>23.47 (15.47)</td>
</tr>
<tr>
<td>Network density</td>
<td>.92 (0.41)</td>
<td>1.18 (0.40)</td>
</tr>
</tbody>
</table>

Note. Sample size Time 1 (T1) = 847, Time 2 (T2) = 726, Time 3 (T3) = 703.
* To reduce the influence of outliers, extreme values were recoded to 3 standard deviations above the mean (Tabachnick & Fidell, 2019). Values shown here represent raw indegree centrality scores, which were transformed prior to analyses by standardizing values within-group.
model including injunctive norms were otherwise comparable to the main effects reported in the descriptive norms model.

Interaction terms were interpreted to examine hypothesized moderators on the association between perceived injunctive norms and number of weekly drinks. In partial support of our second hypothesis, students’ social identification strength significantly moderated this association at the within-person time-varying level (see Figure 2), but not at the between-person level. This indicates that students more readily adhered to perception of injunctive team drinking norms at timepoints in which they identified relatively more strongly with their team.

The interaction between injunctive norms and indegree centrality revealed that students who were nominated as less central, relative to teammates, more readily adhered to perceived injunctive group drinking norms. It was also revealed that at the within-person level, students adhered to perceived injunctive norms to a greater extent at timepoints when they were nominated as relatively less central. These findings are in support of our second hypothesis. Counter to our third hypothesis, network density did not amplify the extent that students adhered to perceived injunctive norms, nor did team sex.

Discussion

College students experience numerous social relationships that influence their health behaviors. The current study focused on social influences within small groups of students, which are thought to be salient sources of peer influence on alcohol use, even

Table 5

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Step 1: AIC = 14,291.5; $-2LL = 14,265.6$</th>
<th>Step 2: AIC = 14,265.7; $-2LL = 14,227.6$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\hat{b}$</td>
<td>95% CI</td>
</tr>
<tr>
<td>Level-1 (Within-person time-varying)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AgGMC</td>
<td>1.10</td>
<td>[1.05, 1.14]</td>
</tr>
<tr>
<td>Descriptive normSPMC</td>
<td>1.07</td>
<td>[1.02, 1.12]</td>
</tr>
<tr>
<td>Social identityGMC</td>
<td>1.07</td>
<td>[1.02, 1.12]</td>
</tr>
<tr>
<td>Indegree centralityGMC</td>
<td>1.07</td>
<td>[1.02, 1.12]</td>
</tr>
<tr>
<td>Level-2 (Between-person time-invariant)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Descriptive normGMC</td>
<td>1.07</td>
<td>[1.02, 1.12]</td>
</tr>
<tr>
<td>Social identityGMC</td>
<td>1.07</td>
<td>[1.02, 1.12]</td>
</tr>
<tr>
<td>Indegree centralityGMC</td>
<td>1.07</td>
<td>[1.02, 1.12]</td>
</tr>
<tr>
<td>Level-3 variables (Group-level)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex (Men = 0, Women = 1)</td>
<td>0.97</td>
<td>[0.93, 1.01]</td>
</tr>
<tr>
<td>Network density (Time-Varying)</td>
<td>0.97</td>
<td>[0.93, 1.01]</td>
</tr>
<tr>
<td>Level-1 interactions (Within-person time-varying moderation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Descriptive normSPMC × Social identityGMC</td>
<td>1.07</td>
<td>[1.02, 1.12]</td>
</tr>
<tr>
<td>Descriptive normSPMC × Indegree centralityGMC</td>
<td>1.07</td>
<td>[1.02, 1.12]</td>
</tr>
<tr>
<td>Level-2 interactions (Between-person time-invariant moderation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Descriptive normGMC × Social identityGMC</td>
<td>1.06</td>
<td>[1.02, 1.10]</td>
</tr>
<tr>
<td>Descriptive normGMC × Indegree centralityGMC</td>
<td>1.06</td>
<td>[1.02, 1.10]</td>
</tr>
<tr>
<td>Cross-level interactions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Descriptive normGMC × Network density</td>
<td>1.06</td>
<td>[1.02, 1.10]</td>
</tr>
<tr>
<td>Descriptive normGMC × Sex</td>
<td>1.06</td>
<td>[1.02, 1.10]</td>
</tr>
</tbody>
</table>

Note. $\hat{b}$ = exponentiated beta, which represents proportional change for each unit increase in the predictor (e.g., an $\hat{b}$ of 1.03 = 3% increase for each unit change in the predictor). GMC indicates that variable was grand-mean-centered. PMC indicates that variable was person-mean-centered.

$^*$Indegree centrality was standardized within each club (i.e., scores are relative to fellow club members). Step 2 was significantly better fit to the data: $\chi^2 = 37.83$, $p < .001$. 

$^{	ext{Note}}$ Time ($b_i$) represents the exponential variance function weight for time, showing the direction and extent of change in residual variance from previous timepoints [e.g., For weekly drinks, a decrease in residual variance from 41.07 at baseline to 41.07 $\times \exp(-0.11 \times 2) = 26.45$ at Time 2].

$^*$ $p < .05$. $^{**} p < .01$. $^{***} p < .001$. 

Table 4

Three-Level Consensus Emergence Models

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Weekly drinks</th>
<th>Descriptive norms</th>
<th>Injunctive norms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept, $\gamma_{000}$</td>
<td>12.03***</td>
<td>15.07***</td>
<td>15.02***</td>
</tr>
<tr>
<td>TIME, $\gamma_{001}$</td>
<td>-0.63***</td>
<td>-0.43*</td>
<td>-0.17</td>
</tr>
<tr>
<td>Group intercept variance, $\sigma^2_{b00}$</td>
<td>17.13</td>
<td>25.95</td>
<td>23.49</td>
</tr>
<tr>
<td>Group variance for TIME, $\sigma^2_{b10}$</td>
<td>0.31</td>
<td>0.62</td>
<td>0.38</td>
</tr>
<tr>
<td>Person intercept variance, $\sigma^2_{n0}$</td>
<td>52.20</td>
<td>34.78</td>
<td>41.92</td>
</tr>
<tr>
<td>Residual variance, $\sigma^2_{e}$</td>
<td>41.07</td>
<td>45.92</td>
<td>55.59</td>
</tr>
<tr>
<td>TIME, $b_1$</td>
<td>-11***</td>
<td>-0.06*</td>
<td>-0.09**</td>
</tr>
</tbody>
</table>

Note. AIC = Akaike’s Information Criterion, $\chi^2$ = chi-square, $LL$ = log-likelihood, $-2LL$ = twice negative log likelihood. GMC indicates that variable was grand-mean-centered. PMC indicates that variable was person-mean-centered.

when the group is structured around task-focused activities like sport. The purpose of the current study was to examine aspects of the group environment within proximal groups that explain variability in the extent that students adhered to perceived descriptive and injunctive drinking norms for their sport team. We employed a longitudinal design to examine the extent that social identification strength, indegree centrality, and network density moderated the effects of perceived norms on students’ typical number of weekly drinks at both within- and between-person levels. Collectively, the findings revealed that small group alcohol use norms are an emergent and dynamic process, and that students’ perceptions of group drinking norms predicted alcohol use behaviors. We also identified several components of small group environments that may amplify the association between perceived norms and alcohol use.

Central to the effects described in this study were underlying findings that perceptions of descriptive and injunctive drinking norms for students’ sport team predicted alcohol use behavior. These effects extend existing literature in this domain by examining both within- and between-person effects of perceived norms on alcohol use.

Figure 1. Simple slopes visualizing significant interactions with descriptive norms. Figures demonstrate moderation by: (A) social identity (within-person), (B) social identity (between-person), (C) indegree centrality (within-person), and (D) indegree centrality (between-person). See the online article for the color version of this figure.
students’ alcohol use. In addition to a between-person effect of perceived norms on number of weekly drinks (aggregated across timepoints), the significant within-person effects indicated that students reported higher engagement in alcohol use at specific timepoints in which they perceived higher group drinking norms. This shows that the association between perceived norms and alcohol use may be dynamic; fluctuations in perceptions of peers’ drinking attitudes and behaviors over time relate to variability in students’ own alcohol use.

The associations between perceived drinking norms and students’ alcohol use were moderated, in partial support of our hypotheses. In line with social identity theorizing (e.g., Hogg, 2016), students who identified more strongly with their respective sport team more readily adhered to perceived descriptive and injunctive drinking norms. For both descriptive and injunctive norms, this interaction effect occurred at the time-varying within-person level such that adherence to perceived drinking norms was more pronounced at timepoints when students reported relatively stronger social identification. At the between-person level, social identification strength only moderated the norms–behavior association for descriptive (but not injunctive) norms (e.g., high vs. low social identity relative to the sample as a whole). These findings build upon evidence that normative influences are particularly strong when students form strong identities around memberships to proximal peer groups (Graupensperger et al., 2018; Neighbors et al., 2010; Reed et al., 2007). Within-person level moderation effects from this study were nevertheless novel, revealing that norm adherence increased at timepoints when individuals identified more strongly. These findings provide comparatively stronger evidence for this association by factoring out confounds related to between-subjects effects (e.g., inference errors; Curran & Bauer, 2011) and aligns with theorizing that group identities fluctuate and can impact the connections that individuals feel with their groups. Alongside the psychological and developmental benefits of group identities (Greenaway, Cruwys, Haslam, & Jetten, 2016), the current findings reveal a possibly pernicious effect: Strongly identifying with a social group may introduce stronger pressures to adhere to the norms of the group.

Interaction effects also revealed that aspects of groups’ network structure may influence adherence to perceived group drinking norms. Members who were less central to their group’s social network (at both within- and between-person levels) reported greater adherence to descriptive and injunctive norms. This provides evidence that perceptions of peers’ drinking behaviors and perceptions of what peers’ deem to be acceptable drinking behaviors are especially influential for those individuals with lower indegree centrality. Provided that the social connections within the current study comprised the strength and frequency of social interactions among teammates, we draw upon literature pertaining to popularity within networks to interpret these effects (Asher & McDonald, 2009). The finding that those lower in centrality are more susceptible to injunctive normative influence aligns with theorizing that individuals may conform to injunctive group norms in attempt to increase their popularity and attain peer approval (Cialdini & Goldstein, 2004).

Alongside indices of centrality within one’s network, network density was expected to moderate the effect of perceived group drinking norms on students’ own alcohol use. However, contrary to these expectations, adherence to team drinking norms did not differ as a function of network density. Social identity theorists as

### Table 6

Table **Multilevel Negative Binomial Regression Models Evaluating Alcohol Use as a Function of Injunctive Norms**

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Step 1: AIC = 14,381.3; ( -2LL = 14,355.2 )</th>
<th>Step 2: AIC = 14,353.8; ( -2LL = 14,215.6 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (GMC)</td>
<td>( \gamma_{100} ) ( 1.098 ) [1.046, 1.151]</td>
<td>( \gamma_{100} ) ( 1.099 ) [1.048, 1.152]</td>
</tr>
<tr>
<td>Injunctive norms (PMC)</td>
<td>( \gamma_{200} ) ( 1.021 ) [1.017, 1.026]</td>
<td>( \gamma_{200} ) ( 1.024 ) [1.010, 1.037]</td>
</tr>
<tr>
<td>Social identity (PMC)</td>
<td>( \gamma_{100} ) ( 1.061 ) [1.018, 1.107]</td>
<td>( \gamma_{100} ) ( 1.048 ) [1.005, 1.093]</td>
</tr>
<tr>
<td>Indegree centrality (PMC)</td>
<td>( \gamma_{400} ) ( 1.015 ) [0.968, 1.064]</td>
<td>( \gamma_{400} ) ( 1.023 ) [0.976, 1.073]</td>
</tr>
<tr>
<td>Level-2 interactions (Between-Person Time-Invariant)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Injunctive norms (GMC)</td>
<td>( \gamma_{310} ) ( 1.045 ) [1.038, 1.052]</td>
<td>( \gamma_{310} ) ( 1.041 ) [1.018, 1.063]</td>
</tr>
<tr>
<td>Social identity (GMC)</td>
<td>( \gamma_{300} ) ( 1.025 ) [0.960, 1.094]</td>
<td>( \gamma_{300} ) ( 1.028 ) [0.962, 1.097]</td>
</tr>
<tr>
<td>Indegree centrality (GMC)</td>
<td>( \gamma_{300} ) ( 1.275 ) [1.189, 1.368]</td>
<td>( \gamma_{300} ) ( 1.288 ) [1.201, 1.382]</td>
</tr>
<tr>
<td>Level-3 variables (Group-level)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex (Men = 0, Women = 1)</td>
<td>( \gamma_{001} ) ( 1.010 ) [0.761, 1.339]</td>
<td>( \gamma_{001} ) ( 1.019 ) [0.768, 1.152]</td>
</tr>
<tr>
<td>Network density (Time-Varying)</td>
<td>( \gamma_{022} ) ( 0.959 ) [0.862, 1.067]</td>
<td>( \gamma_{022} ) ( 0.955 ) [0.859, 1.062]</td>
</tr>
<tr>
<td>Level-1 interactions (Within-person time-varying moderation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Injunctive norms (PMC) × Social Identity (PMC)</td>
<td>( \gamma_{002} ) ( 1.025 ) [1.015, 1.035]</td>
<td>( \gamma_{002} ) ( 1.006 ) [0.999, 1.013]</td>
</tr>
<tr>
<td>Injunctive norms (PMC) × Indegree Centrality (PMC)</td>
<td>( \gamma_{000} ) ( 0.976 ) [0.963, 0.989]</td>
<td>( \gamma_{000} ) ( 0.989 ) [0.982, 0.996]</td>
</tr>
<tr>
<td>Level-2 interactions (Between-Person time-invariant moderation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Injunctive Norms (GMC) × Social Identity (GMC)</td>
<td>( \gamma_{002} ) ( 1.006 ) [0.999, 1.013]</td>
<td>( \gamma_{002} ) ( 1.006 ) [0.985, 1.009]</td>
</tr>
<tr>
<td>Injunctive Norms (GMC) × Indegree Centrality (GMC)</td>
<td>( \gamma_{000} ) ( 0.989 ) [0.982, 0.996]</td>
<td>( \gamma_{000} ) ( 0.997 ) [0.989, 1.016]</td>
</tr>
</tbody>
</table>

Note. * = exponentiated beta, which represents proportional change for each unit increase in the predictor (e.g., an * \( e \) of 1.03 = 3% increase for each unit change in the predictor). GMC indicates that variable was grand-mean-centered. PMC indicates that variable was person-mean-centered.

* Indegree centrality was standardized within each club (i.e., scores are relative to fellow club members). Step 2 was significantly better fit to the data: \( \chi^2 = 39.44, p < .001 \).
well as network theorists have posited that group norms may be
more salient within more dense social networks, but the current
findings failed to support this theorizing (Davis et al., 2015; Hogg,
2016). Of course, it is important to note that network density is a
group-level variable, and only 35 unique groups were sampled in
our study. Thus, our group-level effects were limited by having a
relatively small group-level sample size.

We also tested whether adherence to perceived group drinking
norms differed between men’s and women’s sport teams. Our
results however did not identify differences between men and
women in terms of adherence to group drinking norms. It may be
the case that perceived norms are equally influential for men and
women within the context of same-sex groups wherein membership
is voluntary. If this happens to be the case, then norms-based
interventions could be a promising harm-reduction strategy for
same-sex groups such as student sport teams and Greek life orga-
nizations. Nevertheless, we note that it may be prudent to
examine three-way interactions to determine whether the mod-
ering effects of social identification and indegree centrality on
norm adherence differs by sex. As an example, this recommen-
dation is made in light of evidence that women are more
sensitive to social exclusion, which is relevant given that con-

Figure 2. Simple slopes visualizing significant interactions with injunctive norms. Figures demonstrate
moderation by: (A) social identity (within-person), (B) indegree centrality (within-person), and (C) indegree
centrality (between-person). See the online article for the color version of this figure.
cerns about peer acceptance can motivate conformity to group norms (Benenson et al., 2013).

As we investigated how students’ proximal peer groups can influence decisions to engage in alcohol use, a secondary aim was to explore the extent that members’ perceptions of group drinking norms approached consensus over time. Evidence for consensus emergence for both perceived group drinking norms and self-reported alcohol use behavior documents the process regarding how peer groups socialize members’ attitudes and behaviors (McCabe et al., 2005). Although each individual held unique normative perceptions, they demonstrated similarities with other team members that strengthened across the school year. Students’ alcohol use behaviors also became more similar within groups over time (i.e., consensus emergence). This evidence is particularly novel considering that it extends beyond mere selection effects (e.g., those with heavier drinking behavior initially selecting a club that engages in heavy alcohol use). Given that we sampled task-focused sport groups, where it is assumed that students join for the primary purpose of playing sport rather than for alcohol-specific reasons, this evidence for socialization effects on drinking is particularly compelling. More generally, these results also reveal the emergent nature of subjective norms within small groups.

Implications

When interpreting these findings regarding factors that may amplify or diminish adherence to group drinking norms, it is critical to emphasize that adherence to group norms is not necessarily a risky process. Adherence to norms can be protective at times. For example, if a student adheres to perceptions that drinking is not approved of by fellow group members, the student may indeed drink less than they otherwise would. There are accordingly applied implications, with normative perceptions being the target of interventions related to a spectrum of health risk behaviors. Interventions to shape perceptions of peer norms are an especially common strategy in approaches targeting college students, and if stakeholders are able to shift drinking norms downward, then increasing norm adherence would be constructive.

Social identification strength may amplify the extent that individuals adhere to the drinking norms of their peer groups. While this is desirable when perceived group drinking norms are low, this can also increase risky behavior when individuals hold perceptions that group members approve of and engage in heavy alcohol use. As such, the challenge in translating these findings into practice is identifying strategies to foster strong group identities, while also addressing pressures to adhere to health-risk norms such as heavy alcohol use. The content of a group’s identity can be modified through interventions (see Steffens et al., 2019), so it may be possible to promote constructive behaviors as part of a group’s identity from the early stages of group formation. That is, it may be possible to build the group’s identity around healthful behaviors that can then become ingrained within members’ sense of self concept. For example, therapists have been able to increase patients’ commitment to sobriety by gradually shaping individuals’ social identity from “user” to “in recovery” (e.g., Dingle et al., 2019).

Results showing that perceptions of descriptive and injunctive drinking norms for students’ club sport teams predicted students’ own alcohol use demonstrate the practical value in intervening within proximal groups (LaBrie, Hummer, Huchting, & Neigh-}

bors, 2009). Network analyses additionally showed that less central members who are on the periphery of a group’s network structure may be particularly motivated to adhere to perceived drinking norms, perhaps as a way of gaining social approval. As such, it is important for student groups to provide avenues for members to demonstrate commitment and gain approval from other members, which may alleviate pressures to adhere to group drinking norms. This may be particularly important for socializing new members into student groups, in which onboarding procedures can emphasize positive and healthy norms.

Limitations and Future Directions

Several limitations pertaining to study design warrant further discussion. As an initial point, we note that the excess number of responses indicating zero weekly drinks meant that effect sizes from this study cannot readily be compared with effect sizes from studies based on assumptions of normal distributions and with samples of only alcohol-using students. Specifically, effect sizes appear relatively small across the presented results because the sample contained a substantial number of abstainers, which deflates effect sizes for predictor variables such as perceived descriptive norms. For example, a nondrinking student who reported consuming zero drinks in a typical week may still report 10 or more drinks for the descriptive norms item—inflate the standard error. Nevertheless, the magnitude of the interaction effects found in the current study are similar to those reported by researchers who examined the moderating effect of identification strength with same-sex, same-race, and same-Greek status normative referents that also used count regression analyses (Neighbors et al., 2010). While we focused on adherence to group drinking norms in terms of number of drinks consumed across a typical week, additional studies are needed to examine these social influences on other alcohol-related behaviors such as heavy episodic drinking. It is also worth noting that, although we analyzed adherence to descriptive and injunctive norms in separate models, relatively high within-person correlations indicated that the two constructs may overlap. There is nevertheless theoretical and empirical evidence suggesting that descriptive and injunctive norms are distinct and not interchangeable (Cialdini & Goldstein, 2004; Lee, Geisner, Lewis, Neighbors, & Larimer, 2007), and future studies could examine whether some individuals are more strongly influenced by one or the other.

The multilevel models included between-person effects in order to disaggregate the within-person effects across timepoints. We note that the between-person effects should only be interpreted as the association between person-mean variables that are averaged across the three timepoints, while the major focus is placed on the within-person effects that entail participants’ deviations from their person-means (e.g., drank relatively more or less than usual). We were also unable to account for participants’ alcohol use behaviors prior to joining their respective club sport teams, which would be valuable for understanding the extent that students self-selected into sport clubs based on alcohol use preferences in addition to sport preferences. This future direction also aligns with longitudinal network studies examining alcohol-related peer selection and socialization (e.g., Osgood et al., 2013). These studies typically involve large networks such as entire schools, but examining selection and socialization in small peer groups would be an
important direction to build on the current findings regarding which students most closely adhere to peer group drinking norms.

While sport teams represent intact peer groups that provide researchers with a unique opportunity to examine social influences within a naturalistic setting—sport club settings—the resulting generalizability may be limited. A particular limitation involved our decision to study only same-sex teams. Nevertheless, students often engage in groups that are mixed-sex, so these results do not extend to such contexts that may entail more complex norms. This homogeneity within groups also meant that analyses involving sex were only relevant at the group level. Sport groups also entail unique characteristics that may not generalize to other student groups, such as pressures to perform well during competitions. As such, future studies would add to this literature by examining social influences within other student groups such as Greek organizations or other student clubs that might entail unique drinking norms and member composition. Despite these limitations, sport teams are an important setting in which to study group processes, especially considering that sport-playing college students tend to engage in heavy alcohol use (Turrisi et al., 2006).

Finally, the circumstances surrounding the team environment may also influence the effects reported. As it pertains to alcohol use among student-athletes, researchers have noted that alcohol use may be more prevalent during the off-season (Martens, Dams-O’Connor, & Duffy-Paiement, 2006), although these differences may be negligible (Dams-O’Connor et al., 2007). Because college club sport teams practice and train throughout the entire school year with competitions often scheduled sporadically, we were unable to control for when teams were nearing peak competitive seasons. Another point of consideration is that students’ sport-specific skill level may confound the associations reported in the current study. For example, students who are more skilled may become more central within respective social networks, while those with less skill may feel greater pressures to adhere to group drinking norms. Additional measures of sport-specific skill would thus improve the rigor of future studies in this domain.

Conclusion

The current study examined college students’ adherence to perceived group drinking norms within intact sport teams at three timepoints across the school year. We used novel methodological tools including social network analyses within a multilevel framework. Several novel findings revealed group processes that may amplify the extent that students adhere to perceived group drinking norms. The longitudinal design also revealed time-varying moderation, such that fluctuations in students’ perceptions of the group environment and dynamic aspects of the group structure explained variance in the extent that students adhered to perceived group drinking norms. Taken together, the findings from the current study make a novel contribution to our understanding of peer influences on college student alcohol use and hold practical implications for norms-based harm reduction strategies.

References


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