

# If You're High Status and You Know It: Teasing Apart the Within- and Between-Person Effects of Peer- and Self-Reported Status in the Drinking Group on Alcohol-Related Outcomes

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In this longitudinal study, we disentangled within- and between-persons effects in the relationship between university students' status in their drinking group and alcohol-related behavior. We further examined the role of self-perceived and peer-reported status, with the hypothesis that only when students' peers reported them as of a higher status, and they were aware of their high status (via self-report), would they experience increased heavy episodic drinking (HED). University students ( $N = 118$ ;  $M_{\text{age}} = 19.40$ ,  $SD = 1.49$ ; 60.2% women) were recruited in their natural drinking groups ( $N = 27$ ). All group members completed surveys at 3 time points during the school year, each 2 months apart. We fitted a taxonomy of multilevel growth curve models predicting students' self-reported HED and the extent to which they encouraged other group members to consume alcohol (peer-reported). Between-persons results demonstrated that students who reported higher status compared to their group members experienced more HED on average and students who were peer-reported as of a higher status relative to their group members played a more salient role in encouraging others to drink. Notably, and consistent with hypotheses, a within-person interaction revealed that at time points when students were higher in peer-reported status relative to their average, and they were aware of their increase in status (via self-reports), they also engaged in more HED. Results emphasize the importance of considering within-person effects and highlight the need for university alcohol-prevention programming to focus on students' status-related motives and concerns.

*Keywords:* peers, peer groups, drinking groups, status

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Heavy alcohol consumption among students remains a significant public health concern on university campuses. Emerging adulthood is the peak time for heavy drinking in the life span (Arnett, 2005; Substance Abuse and Mental Health Services Administration [SAMHSA], 2014), and university students tend to engage in higher rates of heavy episodic drinking (HED), with

women consuming four-plus and men five-plus drinks on the same occasion (SAMHSA, 2016; Wechsler & Nelson, 2001) than do their nonuniversity attending peers (SAMHSA, 2016). In a related vein, university students experience a variety of different drinking-related consequences, including decreased academic performance, injury, violence, and even death (Hingson, Heeren, Winter, & Wechsler, 2005; Hingson & Zha, 2009). Thus, it is crucial to identify predictors of risky drinking patterns among university students.

A robust literature has indicated that peers play a significant role in HED among university students (e.g., Borsari & Carey, 2001). For example, perceptions of how much one's friends or the average university student drinks or approves of drinking predicts students' own patterns of alcohol consumption (e.g., LaBrie, Hummer, Grant, & Lac, 2010; Lewis & Neighbors, 2004; Neighbors, Lee, Lewis, Fossos, & Larimer, 2007; Read, Wood, Davidoff, McLacken, & Campbell, 2009; Rimal & Real, 2005). Past research has found that university students engage in HED most often within peer groups (Lange, Devos-Comby, Moore, Daniel, & Homer, 2011). However, little is known about the dynamics of the

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groups with whom university students drink. Recent research has demonstrated the existence of status hierarchies within university students' drinking groups (Dumas, Graham, Maxwell-Smith, & Wells, 2015). By relying on a measure that asks participants to rank group members on key elements of status, including resource control, popularity, and leadership (Adler, Kless, & Adler, 1992; Hawley, 1999; Hogg, 2005; Lease, Musgrove, & Axelrod, 2002; Xie, Cairns, & Cairns, 1999), researchers have found that members who occupy higher status positions within the group hierarchy have an increased risk for HED and related consequences (Dumas, Graham, Bernards, & Wells, 2014; Dumas et al., 2015; Dumas, Maxwell-Smith, Davis, & Bell, 2018). These higher status drinking-group members also seem to play a more salient role in encouraging other members to consume alcohol (Dumas, Wells, Flynn, Lange, & Graham, 2014).

However, the studies on status in the drinking group have been cross-sectional. By leveraging longitudinal designs, we addressed *between-persons* differences in the relation between status and drinking, which has been done in previous cross-sectional research (Dumas, Graham, et al., 2014; Dumas et al., 2015, 2017; Graham, Bernards, Abbey, Dumas, & Wells, 2014), as well as addressed *within-person* differences, which examines variation in drinking-related behavior based on deviations from one's own mean status. In other words, we assessed *which* students are most at risk and *when* they are most at risk for alcohol-related behavior. For example, it may be that when students are given higher status than their typical level in the group, they experience heightened drinking and influence over others' alcohol consumption.

Further, extant research has not teased apart the relative effects of self-reported versus peer-reported status on university students' drinking behavior. This is important because researchers studying popularity in adolescence have proposed that higher social standing should predict behavior only when youth are aware of their more powerful positions (Mayeux & Cillessen, 2008; Teunissen et al., 2012), although this proposition has not been examined in emerging adulthood or small, intact drinking groups. As such, our main research goals were to gain a more nuanced understanding of the association between status and drinking-related behaviors in university student drinking groups and, ultimately, identify members most at risk for HED and who encourage their peers to drink.

### Alcohol Consumption and University Life

Universities are contexts associated with heightened drinking. Research has demonstrated that among those who attend 4-year universities, drinking rates increase substantially from high school to university and then subside after graduation (e.g., Crosnoe, Kendig, & Benner, 2017; Sher, Bartholow, & Nanda, 2001); similar spikes and declines in risky drinking have not been seen in those who do not attend university (Bingham, Shope, & Tang, 2005; Lanza & Collins, 2006). Researchers have identified several characteristics of the university context—including lack of parental supervision, increased freedom, self-focus, and increased peer presence—that contribute to its drinking culture (Arnett, 2005), with students who live on campus experiencing more heavy drinking than do those who live off campus (Gfroerer, Greenblatt, & Wright, 1997; White et al., 2006). Additionally, social events, activities, and groups that center on alcohol consumption, including drinking nights and spring break trips (e.g., Lee, Maggs, & Rankin, 2006), and fraternities and sororities (e.g., Larimer,

Turner, Mallett, & Geisner, 2004; Read et al., 2009; Sher et al., 2001), contribute to the normative nature of drinking on campus.

Although university students drink for a variety of different reasons, which include to cope with life stress and to enhance mood (Cooper, Russell, Skinner, & Windle, 1992), the most prominent drinking motive is social (Kuntsche, Knibbe, Gmel, & Engels, 2006; LaBrie, Hummer, & Pedersen, 2007). Heavy drinking can function as a bonding activity among peers (Demant & Järvinen, 2011). Studies have found that university students identify social camaraderie as a major reason for drinking (LaBrie et al., 2007). Research has also suggested that heavy drinking is associated with several social status-related constructs in emerging adulthood, including greater peer acceptance (Maggs, 1997) and appearing sociable, tough, and “cool” to others (Demant & Järvinen, 2011). As a result, students may use heavy alcohol consumption to maintain their social standing, particularly in peer groups with whom they drink.

### Peer Status and Alcohol Use

Several theories support the link between status and heavy alcohol consumption. For example, the *popularity-socialization hypothesis* suggests that popular youth are most attuned to the prevailing norms of the larger peer culture and are particularly susceptible to norms concerning normative mild-to-moderate risk behaviors, such as HED. Further, the popularity-socialization hypothesis suggests that popular youth play a key role in socializing these behaviors within their own peer groups (Laursen, Hafen, Kerr, & Stattin, 2012). In addition, the *social identity perspective* (Hogg, 2005) posits that, within a peer group, higher status members behave most in line with group norms (e.g., drinking norms) and, because of this, are imbued with increased group influence (Borsari & Carey, 2001).

In line with theory, prior empirical research has demonstrated that emerging adults who self-report as having higher status in their drinking groups, in turn, engage in more frequent episodes of HED, act more in line with peer norms for alcohol use, and experience more negative consequences of drinking compared to their lower status counterparts (Dumas, Graham, et al., 2014; Dumas et al., 2015, 2017). Further, in a study examining emerging adult drinking groups attending drinking establishments (i.e., bars), members who were reported by their peers as occupying higher status in their group consumed more alcohol and were more intoxicated at the end of the night (via breathalyzer) compared with their lower status peers (Dumas, Wells, et al., 2014). Finally, higher status group members also played a central role in influencing other group members to consume alcohol that night, consistent with the popularity-socialization hypothesis. Thus, associations with status and drinking-related behavior have been demonstrated using both self-report and peer-nomination techniques.

### Peer- Versus Self-Reported Status

Some researchers have favored the use of peer-reported techniques when measuring social constructs like status because they are argued to provide a more objective measure than does self-report (Reitz, Motti-Stefanidi, & Asendorpf, 2016). On the other hand, other researchers have suggested that self-perceived status may be particularly important to study when trying to understand the peer influence process (Teunissen et al., 2012). For instance, Mayeux and Cillessen (2008) proposed that only when individuals recognize their social

power and its benefits will they be more likely to engage in behaviors that maintain their favorable social position. Although Mayeux and Cillessen's focus was on adolescents' peer-nominated popularity across their school grade, it is possible that these processes also apply to emerging adults' status within their intact peer groups. Prior research has demonstrated that emerging adults who perceive themselves as of a higher status act more in line with peer group drinking norms than do lower status individuals (Dumas et al., 2018). Further, according to the social identity perspective (Hogg, 2005), behavioral alignment with group norms affords higher status group members benefits, such as increased maintenance of their favorable social standing among peers. Therefore, it is possible that when individuals have high-status positions in their drinking groups (measured via peer nomination) and greater awareness of their high status (measured via self-report), they will engage in the heaviest drinking, potentially to maintain their favorable social positions. However, no research to date has examined this proposition.

### The Present Study

We conducted a longitudinal study on university students' drinking groups, with a focus on peer-reported and self-reported status as predictors of students' drinking-related behavior. We first examined average between-persons differences in group members' *typical* status as a predictor of systematic changes in their drinking-related behavior over time. We then examined within-person effects, or how students' drinking-related behavior changes as a function of time-specific changes in their *typical* status. Past research on this topic has not examined within-person effects; however, this approach is arguably a better reflection of developmental processes because it assesses the extent to which individuals deviate from their own average over time. Also, within-person effects carry stronger internal validity because they treat each individual as his or her own control, thus adjusting for all observed and unobserved between-persons time-invariant confounds.

We hypothesized that university students with higher self-reported status relative to their drinking-group members' would engage in more HED (Hypothesis 1 [H1]) and encourage others to consume more alcohol (H2) compared to their lower status counterparts (between-persons effects). We also hypothesized that the effects of average self-reported status would be especially pronounced in participants who possessed higher peer-reported status (between-persons interaction effect; H3). Similar hypotheses were proposed for within-person effects: We proposed that at time points when participants reported higher self-reported status relative to their own average, they would also report increases in their HED (H4) and encouragement of others' alcohol use (H5) at the same time point. Finally, we predicted a similar interaction of self-reported and peer-reported status in predicting HED (within-person interaction effect; H6).

## Method

### Participants and Recruitment

This study was approved by the lead author's Institutional Review Board prior to participant recruitment. All participants provided informed consent prior to taking part in the study.

Participants were university students from a liberal arts college in southern Ontario, Canada. A total of 27 drinking groups were recruited for this study. A drinking group was defined for prospective participants as "a group of friends who go to social drinking events like parties and bars together and who usually meet up together to predrink before these events." Recruitment occurred via two routes. First, a booth was set up in front of the entrance of the campus pub during a student social event, which was supervised by the Tara M. Dumas and two undergraduate research assistants. Groups of three to eight students on route to the pub were stopped by a research assistant, who first asked whether they were a drinking group and if so, were given a brief description of the study and its requirements. All eligible drinking groups who attended the event together were stopped by research assistants and, in all cases, agreed to participate ( $n = 9$ ). In three other instances, a member of a drinking group passed the booth and then subsequently brought his or her full group back at a later point in the night to sign up. Two days later, all group members were sent a link to the first survey via e-mail.

An additional 15 drinking groups were recruited via posters around campus. In each case, one drinking-group member would contact the research team by e-mail, copying the e-mail to all drinking-group members (as requested). A member of the research team would then respond, requesting that each group member send an individual e-mail confirming group membership (definition provided previously). Once confirmation was received by each group member, links for the first survey were sent.

One hundred eighteen participants (27 groups) took part in the study ( $M_{\text{age}} = 19.40$ ,  $SD = 1.49$ ; 60.2% women). The 27 groups included five all-male, 10 all-female, and 12 mixed-sex groups.<sup>1</sup> Of these participants, 85% identified as White, 3.7% as Asian, 3.7% as East Indian, 1% as Hispanic, and 6.5% as other.

### Procedure

Participants completed three different online surveys throughout the school year, each two months apart (late November, January, and March). Each 30-min survey began with general demographics, followed by the measures discussed in the Measures section; higher scores on each scale represent higher levels of each variable. Participants were reimbursed with \$10 e-gift certificates for each survey completed.

### Measures

**Heavy episodic drinking (HED).** Participants were asked to report the number of days in the past 2 months that they consumed five or more drinks (for men; four or more drinks for women) on an occasion (i.e., in a row or within a couple hours of one another; SAMHSA, 2016). This question has been used extensively in the college drinking literature to measure heavy episodic drinking (Wechsler et al., 2002; Wechsler & Nelson, 2001). At all three

<sup>1</sup> In subsequent surveys, participants were given a list of their original drinking group members and asked whether anyone had left the group, and if so, who? Results demonstrated that only one person left her group between the first and second survey, due to a dispute with another group member. Further, for three groups, we were missing survey data from all group members at Wave 3; thus, we have no way of knowing whether these groups stayed intact.

time points, responses ranged from 0 to 30 days of HED in the past 2 months. Means (with standard deviations in parentheses) for the number of HED days were 6.42 (6.22) for Time 1; 6.26 (5.41) for Time 2; and 5.26 (5.61) for Time 3.

**Status.** Self-reported and peer-reported status were measured using the peer group status hierarchy task (Dumas, Wells, et al., 2014, 2015). This measure was developed in line with past research that has identified key elements reflecting status (Adler et al., 1992; Hawley, 1999; Hogg, 2005; Lease et al., 2002; Xie et al., 1999) and items were informed by Gavin and Furman's (1989) status hierarchy scale, which measures the existence of hierarchies within small groups.

Participants were instructed to first list their first name and last initial and to then list their drinking-group members' first names and last initials. Participants then ranked each group member on four different status-related dimensions: (a) who possesses the most popularity, (b) who makes the most group decisions, (c) who has opinions that are listened to the most by other group members, and (d) with whom it is most important to comply. For self-reported status, participants' rankings across the four dimensions were averaged, and for peer-reported status, participants' rankings from their peers were averaged. In both cases, scores were divided by the number of members in participants' drinking groups.

The ranking task requires participants to make concrete comparisons between themselves and their peer group members and visually place themselves and others within their peer group status hierarchy. This, arguably, yields a more valid response than if we were to simply ask who is of high status or if we asked participants to rate each members' status along a Likert scale.

In previous research on emerging adults, this scale has demonstrated good convergent validity, with moderate correlations with similar constructs (i.e., likability,  $r = .52, p < .01$ , and time spent with group,  $r = .27, p < .01$ ; Dumas et al., 2015). It also demonstrated good discriminant validity, with nonsignificant relations with theoretically unrelated constructs (social desirability,  $r = .03, p = .72$ , and narcissism,  $r = .11, p = .22$ ). Interitem correlations ranged from  $r = .69$  to  $r = .83$  ( $p < .01$ ). In the current study, Cronbach's alpha ranged from .77 to .86 for self-reported status and from .88 to .91 for peer-reported status. Times 1, 2, and 3 means and standard deviations were .63 (.18), .66 (.17), and .62 (.18), respectively, for self-reported status and .62 (.18), .60 (.18), and .61 (.18), respectively, for peer-reported status.

**Encouragement of drinking.** Participants were asked to nominate members of their drinking group who encourage other group members to drink, for example, by buying them drinks, teasing them, cheering them on, or telling them to drink. Consistent with the case in other research that has relied on peer nominations (e.g., Bot, Engels, Knibbe, & Meeus, 2007), proportion scores were calculated by dividing the number of nominations each individual received by the total number of possible nominations. Means (with standard deviations in parentheses) for encouragement of drinking were .31 (.36) for Time 1, .31 (.37) for Time 2, and .31 (.39) for Time 3.

**Covariates.** Given that male university students, on average, tend to engage in more HED than do female students (e.g., Dumas, Wells, Tremblay, & Graham, 2013), gender was controlled in our analyses (0 = male and 1 = female). Other demographic covariates included age (grand-mean-centered) and ethnicity. Because the large majority of participants were White, ethnicity was di-

chotomized (0 = nonwhite and 1 = white). To ensure that we examined unique effects of status, rather than participants' quality of relationship with their drinking group, we controlled for within-group relationship quality (person- and grand-mean-centered). The 24-item Close Friendship Questionnaire (Zarbatany, Conley, & Pepper, 2004) was used, and items were revised so that they referred to one's drinking group rather than one's friend. Example items include "My group values me as a person" and "I like to do things with my group," rated on a 5-point scale from 1 (*Not at all true*) to 5 (*Extremely true*). Cronbach's alpha in the current study ranged from .97 to .98.

## Analytic Plan

To address our research questions, we fitted a taxonomy of multilevel growth curve models (Grimm, Ram, & Estabrook, 2016; Singer & Willett, 2003). All analyses were conducted in Mplus Version 7.4 (Muthén & Muthén, 1998–2012). In a series of unconditional models, we first examined the functional form of our dependent variables to establish plausible growth models for HED and encouragement of drinking. Linear growth functions best captured change in HED and encouragement of drinking over time. For both variables, we then tested whether growth in our two variables varied randomly between people by using a deviance test ( $-2$  log-likelihood ratio test). Specifically, we compared a model with a random intercept and fixed linear slope and a model with random intercept and linear slope. Significant reductions in  $-2$  log-likelihood indicated that the model with random intercept and slope fit the data better. To ensure our variables met requirements for a normal distribution, we assessed skewness and kurtosis for both HED and encouragement of drinking at each time point. Each variable over time fell in line with prior research on skewness and kurtosis ranges (e.g., 0–3 skewness and 0–8 kurtosis; Kline, 2005). Further, we utilized a robust maximum likelihood estimator (MLR) in Mplus, which aids in adjusting for potential nonnormality.

In subsequent models, we examined our hypotheses by testing systematic families of conditional growth models. We fit six models for both HED and encouragement of drinking. For each model, time was centered at the first observation (baseline) and scaled in months (2-month intervals). We first tested the need for a random slope (Model 1), added respective control variables (Model 2), tested the main effects of self-reported status (Model 3) and peer-reported status (Model 4) separately, assessed the main effects of self-reported and peer-reported status in the model simultaneously (Model 5), and finally allowed within-person peer-reported status to vary as a function of within-person self-reported status and allowed between-persons peer-reported status to vary as a function of between-persons self-reported status (Model 6). We also tested all possible interaction combinations across within- and between-persons status measures, including cross-level interactions (e.g., Within-Person Peer-Reported Status  $\times$  Between-Persons Peer-Reported Status). Results indicated no significant cross-level interactions or interactions with status and time; thus, these nonsignificant effects were removed for parsimony. Nested models were evaluated for model fit using significant reductions in  $-2$  log-likelihood (likelihood ratio test).

For both self- and peer-reported status, we disaggregated within-person (Level 1) and between-persons (Level 2) effects. This

allowed us to isolate the time-specific effects of status (within-person) from average effects of status (between-persons) on the outcome variables of interest. Thus, we could better assess whether status predicted more HED and more encouragement of others' drinking because a person is, in general, higher status (between-persons effect) and/or whether status predicts heavier drinking and more encouragement of others' drinking at specific times when a person is of a higher status than usual (within-person effect).

At Level 1, the main effect parameters represent the respective within-person effects between peer-reported and self-reported status with HED or encouragement of drinking. All Level 1 within-person parameters were person-mean-centered and were orthogonal to between-persons representations of the respective predictors at Level 2 (Curran & Bauer, 2011; Howard, 2015). Thus, for example, we could examine whether, at time points when individuals reported higher self-reported status than their *typical* level (i.e., individual average), they also reported higher rates of HED at the same time point. The stochastic part of the model allows the intercepts and slopes to vary randomly between participants. Random slopes were tested for both self-reported and peer-reported status. The absence of the stochastic part of the model (e.g., random slope variance) for within-person self-reported and peer-reported status constrained the within-person slopes to be identical across participants—an assumption that was tested and adjusted accordingly.

At Level 2, we tested the respective between-persons relations of self-reported and peer-reported status with the intercept and linear growth in both HED and encouragement of drinking. All Level 2 parameters were group-mean-centered and refer to average between-persons differences in participants' respective drinking groups. This allowed us to examine the extent to which average drinking related behaviors (e.g., HED and encouragement) varied over time as a function of reporting, for example, higher self-reported status than individuals within one's drinking group.

In preliminary analyses, we tested the extent to which there were meaningful "contextual" effects of our main predictors (self-reported and peer-reported status) at the level of peer drinking groups (Level 3). That is, we examined whether there was an effect of the peer group on individual levels of HED and encouragement of drinking. Subsequent models revealed no evidence of any contextual effects. Given we did not have any a priori between-groups hypotheses, we opted to not estimate a third level. Instead, we used a Huber-White sandwich estimator (Huber, 1967; White, 1982) in all models that adjusts the standard errors by group-level dependencies.

Missing data averaged 21% across the three waves. Specifically, attrition across the three waves included 9% at Time 1; 17.7% at Time 2; and 37% at Time 3. There is no way to know the true missing data mechanisms unless the outcome values for individuals with missing data are available (i.e., levels of HED). However, we used recommendations by Enders (2010) to examine various patterns of missingness. We believed that bias due to missing data was potentially due to missingness on various demographics variables. For example, when examining patterns of missing data for men and women, we found that men had more missing data than did women for HED,  $\chi^2(1) = 12.4, p < .001$  and women had more missing data than did men for peer status,  $\chi^2(1) = 5.97, p = .015$ . Including gender in our models thereby adjusted for any bias due to missing data for men and women. Because other

demographic variables were also associated with missing data, we included age, ethnicity, and group relationship quality as variables in our models to adjust for any potential bias due to missing data on these variables. Across all models, we used the maximum likelihood estimator (sometimes referred to as full information maximum likelihood [FIML]) in Mplus to address unplanned missingness. FIML uses all available data and has been shown to be superior to listwise deletion and comparable to multiple imputation methods (Enders, 2011; Enders & Bandalos, 2001).

## Results

Correlations for raw variables can be found in the online supplemental materials.

### Preliminary Model Results

**HED.** Table 1 displays a taxonomy of six nested models for HED. Our initial models indicated significant variance across participants in HED, with 55% of the total variation at the between-persons level and 45% at the within-person level. In our unconditional growth model (see Table 1, Model 1), results suggest a decrease in HED over the three time points. Both linear and quadratic effects were tested using log-likelihood ratio tests, with results indicating that a linear growth model was sufficient fit to the data. Further, tests of nested models for a random slope indicated that allowing the slope to vary randomly improved model fit (see Table 1, Model 1).

**Encouragement of drinking.** Table 2 displays a taxonomy of six nested models for the encouragement of drinking. Approximately 27% of the variance was between-persons, with a notable 73% reflecting variation among participants. The unconditional growth model (see Table 2, Model 1) suggests a nonsignificant negative slope, indicating encouragement of drinking remained relatively stable over time. Finally, tests of nested models indicated a nonsignificant random slope variance and no change in model fit; thus, models for encouragement of drinking were estimated using fixed time (see Table 2, Model 1).

### Between-Persons Effects

**HED.** Consistent with H1, participants who reported higher average levels of self-reported status in their drinking group showed comparatively higher levels of HED than did their lower status group members (see Table 1, Model 3). In contrast, participants with higher peer-reported status, on average, did not engage in significantly more HED than did their lower status group members (see Table 1, Model 4). Based on the between-persons variation in self-reported status on HED, this relation corresponded to a standardized regression coefficient of  $\beta = .30$ . Adjusting for both levels of peer-reported and self-reported status, Model 5 results indicated that between-persons self-reported status was a robust predictor of HED (standardized regression coefficient of  $\beta = .30$ ). Inconsistent with H3, in our final model (see Table 1, Model 6), we did not find evidence of a significant interaction for between-persons peer-reported and self-reported status ( $p = .70$ ).

**Encouragement of drinking.** In line with H2, Model 3 (see Table 2) demonstrated that participants with higher average self-reported status relative to their group members showed compara-

Table 1  
 Multilevel Modeling Results for Heavy Episodic Drinking Among University Students

Variable	M1	M2	M3	M4	M5	M6
Fixed effects						
Intercept	6.81 (.58)*	16.3 (5.08)*	15.8 (4.48)*	16.6 (4.86)*	15.8 (4.56)*	14.7 (4.73)*
Linear slope	-.72 (.37)*	-.74 (.36)*	-.69 (.36)*	-.75 (.36)*	-.70 (.33)*	-.81 (.39)*
Gender		-1.71 (1.12)	-1.53 (1.05)	-1.80 (1.10)	-1.52 (1.05)	-2.14 (1.18)
Age		-.44 (.24)	-.43 (.22)*	-.45 (.23)	-.43 (.22)	-.36 (.23)
Race-ethnicity		-.15 (1.00)	.39 (.96)	.06 (.99)	.40 (.94)	.84 (1.04)
WP relationship quality		.97 (.50)	.97 (.49)*	.97 (.50)	.97 (.49)	.98 (.80)
BP relationship quality		1.66 (.80)*	.66 (.87)	1.40 (.80)	.66 (.87)	.81 (.93)
WP PR status				-1.45 (4.95)	-2.23 (4.94)	1.22 (5.21)
WP SR status			3.75 (2.56)		3.87 (2.65)	3.33 (2.67)
BP PR status				4.75 (2.78)	-.21 (3.04)	-1.69 (3.78)
BP SR status			12.1 (3.54)*		12.3 (4.05)*	14.0 (4.50)*
WP PR status × WP SR status						26.0 (13.0)*
BP PR status × BP SR status						7.17 (17.59)
Random effects						
WP (L1)	8.89 (2.30)*	14.0 (3.38)*	8.68 (2.14)*	9.08 (2.50)*	8.82 (2.31)*	8.55 (2.43)*
BP (L2)	27.9 (8.11)*	16.6 (3.61)*	24.4 (6.70)*	25.40 (6.73)*	24.0 (6.58)*	25.6 (7.39)*
Linear slope	5.70 (2.21)*	5.47 (2.18)*	5.55 (2.35)*	5.21 (2.05)*	5.32 (2.18)*	6.91 (2.24)*
Fit indices						
-2LL	1,011.26	1,000.21	988.72	999.64	988.48	846.79
AIC	1,055.26	1,024.21	1,044.72	1,055.64	1,048.48	910.79
BIC	1,140.38	1,124.82	1,153.06	1,163.98	1,164.56	1,018.65

Note. M1 is an unconditional growth model with a random intercept and random slope. M2 added basic control covariates (M1 to M2;  $\Delta LR = 11.05$ ,  $\Delta df = 4$ ,  $p = .026$ ). M3 added orthogonal self-reported status measures (M2 to M3;  $\Delta LR = 11.49.3$ ,  $\Delta df = 2$ ,  $p = .0038$ ). M4 added orthogonal peer-reported status measures (M2 to M4;  $\Delta LR = .57$ ,  $\Delta df = 2$ ,  $p = .752$ ). M5 added both self- and peer-reported status (M4 to M5;  $\Delta LR = 11.73$ ,  $\Delta df = 2$ ,  $p = .003$ ). M6 added orthogonal interactions (M5 to M6;  $\Delta LR = 141.69$ ,  $\Delta df = 2$ ,  $p < .001$ ). Random intercepts and slopes were allowed to covary but are not shown for ease of reading. M = model; WP = within-person; BP = between-persons; PR = peer-reported; SR = self-reported; L = level; -2LL = -2 log-likelihood; AIC = Akaike information criteria; BIC = Bayesian information criteria; LR = Log-likelihood ratio test.  
 \*  $p < .05$ .

tively higher levels of encouragement of drinking than did their lower status peers. Similar results were found in Model 4 for peer-reported status. Based on the between-persons variation in self-reported and peer-reported status on encouragement of drinking, these effects corresponded to standardized regression coefficients of  $\beta = .28$  and  $\beta = .22$ , respectively. Adjusting for both levels of self-reported and peer-reported status, Model 5 results indicated that between-persons peer-reported status remained a robust predictor of encouragement of drinking over time (standardized regression coefficient of  $\beta = .19$ ). Contrary to H3, in our final model (Model 6), we did not find evidence of a significant interaction for between-persons peer-reported and self-reported status for encouragement of drinking.

### Within-Person Changes in Peer-Reported and Self-Reported Status

Inconsistent with H4 and H5, main effects models for the within-person effects of self-reported status on HED and encouragement of drinking revealed no significant associations. No main effects emerged for within-person peer-reported status either. However, in support of H6, we found a significant interaction at the within-person level between peer-reported and self-reported status on HED. Looking at Figure 1, one can see that at time points when individuals reported higher (+1 SD) self-reported status than their typical level and received higher (+1 SD) peer-reported

status than their typical level, individuals reported higher HED. To understand this interaction further, we probed simple slopes and regions of significance (Preacher, Curran, & Bauer, 2006). Results indicated a nonsignificant simple slope for low (-1 SD) peer-reported status, simple slope = .920 (2.65),  $z = .347$ ,  $p = .72$ , and a significant simple slope for high (+1 SD) peer-reported status, simple slope = 7.09 (3.43),  $z = 2.07$ ,  $p = .04$ . Results from the regions of significance test further confirmed that low peer-reported status did not predict HED, but a peer-reported status just .11 standard deviations above average was associated with more HED.

### Discussion

Previous cross-sectional research has suggested that emerging adults' position within their drinking group's status hierarchy is important for determining risky drinking outcomes (Dumas, Graham, et al., 2014; Dumas et al., 2015, 2018; Dumas, Wells, et al., 2014). We extended this research by conducting a longitudinal study that allowed us to tease apart within- and between-persons status in the drinking group and associations with university students' alcohol-related behavior over the school year. Thus, we were able to determine which group members were most at risk and when they were most at risk for experiencing problematic alcohol consumption and encouragement of others' drinking. We also extended past research by simultaneously examining self- and

Table 2  
Multilevel Modeling Results for Encouragement of Drinking Among University Students

Variable	M1	M2	M3	M4	M5	M6
Fixed effects						
Intercept	.51 (.02)*	1.04 (.76)	.95 (.81)	1.09 (.82)	1.03 (.84)	.38 (1.12)
Linear slope	-.02 (.02)	-.02 (.02)	-.01 (.02)	-.01 (.02)	-.01 (.02)	.03 (.03)
Gender		-.09 (.12)	-.06 (.04)	-.11 (.11)	-.09 (.12)	-.05 (.15)
Age		-.02 (.04)	-.02 (.11)	-.03 (.04)	-.03 (.04)	.01 (.06)
Race-ethnicity		.02 (.11)	.04 (.09)	.03 (.10)	.05 (.10)	.02 (.14)
WP relationship quality		.10 (.09)	.11 (.09)	.11 (.08)	.10 (.11)	.09 (.08)
BP relationship quality		.16 (.08)*	.05 (.40)	.09 (.08)	.04 (.08)	.08 (.11)
WP PR status				.02 (.44)	-.01 (.46)	-.20 (.65)
WP SR status			.18 (.47)		.17 (.48)	.20 (.58)
BP PR status				1.19 (.29)*	.90 (.37)*	.93 (.44)*
BP SR status			1.29 (.40)*		.81 (.45)	1.15 (.50)*
WP PR status × WP SR status						-2.52 (2.73)
BP PR status × BP SR status						1.40 (2.23)
Random effects						
WP (L1)	.41 (.08)*	.41 (.08)*	.41 (.08)*	.41 (.08)*	.41 (.08)*	.54 (.11)*
BP (L2)	.15 (.02)*	.14 (.02)*	.11 (.03)*	.11 (.02)*	.10 (.03)*	.05 (.04)
Fit indices						
-2LL	189.67	185.39	174.53	171.75	167.95	87.86
AIC	229.67	223.39	226.53	223.75	223.95	147.86
BIC	307.04	326.25	327.14	324.36	332.29	248.98

Note. M1 is an unconditional growth model with a random intercept and random slope. M2 added basic control covariates (M1 to M2;  $\Delta LR = 4.28$ ,  $\Delta df = 4$ ,  $p = .369$ ). M3 added orthogonal self-reported status measures (M2 to M3;  $\Delta LR = 10.86$ ,  $\Delta df = 2$ ,  $p = .004$ ). M4 added orthogonal peer-reported status measures (M2 to M4;  $\Delta LR = 13.64$ ,  $\Delta df = 2$ ,  $p < .001$ ). M5 added both self- and peer-reported status (M4 to M5;  $\Delta LR = 17.44$ ,  $\Delta df = 2$ ,  $p < .001$ ). M6 added orthogonal interactions (M5 to M6;  $\Delta LR = 80.09$ ,  $\Delta df = 2$ ,  $p < .001$ ). Random intercepts and slopes were allowed to covary but are not shown for ease of reading. M = model; WP = within-person; BP = between-persons; PR = peer-reported; SR = self-reported; L = level; -2LL = -2 log-likelihood; AIC = Akaike information criteria; BIC = Bayesian information criteria; LR = Log-likelihood ratio test.

\*  $p < .05$ .

peer-reported status as predictors of alcohol-related behavior. Results revealed important between-persons effects, with higher self-reported status predicting more HED and higher peer-reported status predicting more encouragement of others' drinking. Nota-

bly, a within-person interaction effect revealed that at times during the school year when university students experienced heightened self-reported and peer-reported status in their drinking groups relative to their norm, they also experienced increased HED. These

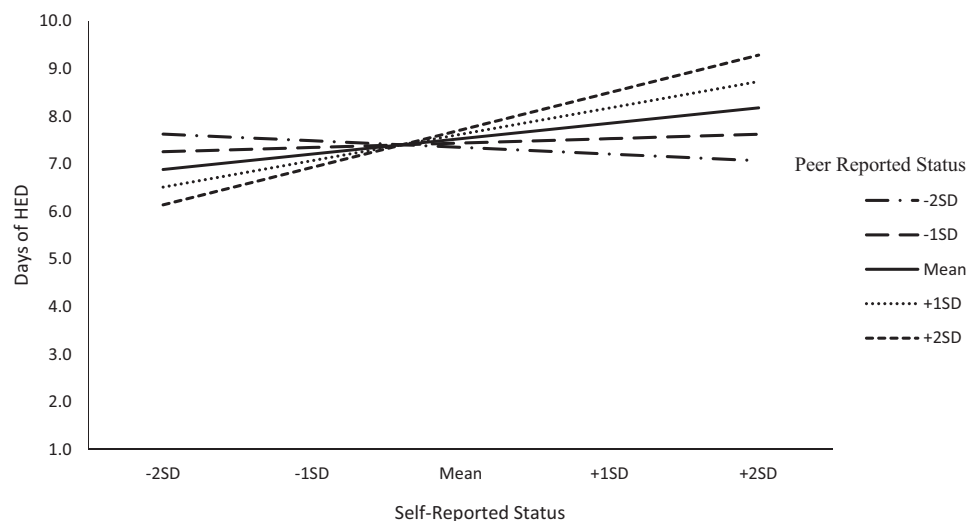


Figure 1. Interaction between within-person self-reported status and within-person peer-nominated status on heavy episodic drinking (HED). The x-axis refers to within-person self-reported status, and the plotted lines represent within-person peer-reported status.

results contribute to a more nuanced understanding of the relation between university students' social standing, drinking patterns, and related behaviors.

Consistent with H1, students who, on average, reported higher self-reported status than did their drinking-group members engaged in more HED. They also played a more salient role in encouraging other group members to consume alcohol (H2), though this relation became nonsignificant once peer-reported status was included in our model. These findings are consistent with past cross-sectional research (Dumas, Graham, et al., 2014; Dumas et al., 2015, 2018; Dumas, Wells, et al., 2014) and point to the usefulness of self-reported status as an indicator of university students at risk for problematic alcohol use. Furthermore, in line with past research (Dumas, Wells, et al., 2014), peer-reported status predicted encouragement of drinking; specifically, students who were of higher status according to peers were also more likely to be reported as individuals who encourage others to consume alcohol. Given that groups imbue higher status members with increased influence over group norms (social identity perceptives; Hogg, 2005), it follows that drinking-group members considered to be of a higher status by peers might play a greater role in influencing others to act in line with group drinking norms.

It is unclear, however, why peer-reported status did not predict HED, because it has in previous cross-sectional research (Dumas, Wells, et al., 2014), nor why the interaction between peer-reported and self-reported status did not predict outcome variables in our between-persons analyses. In terms of the interaction, the discrepancy in results compared to past research (Mayeux & Cillessen, 2008) may have occurred because of our differing populations (high school vs. university students) and differing measures of status (peer-nominated popularity across the grade vs. status within the drinking group). It may be that where university students perceive themselves to be in their drinking-group status hierarchy is what really matters when determining their alcohol-related behavior relative to others. Further, it is also possible that our results differ from others because past research has failed to tease apart between- and within-person variance when examining status and drinking-related behavior. In other research topics, between-persons associations that were established in previous research were found to be nonsignificant after plausibly disaggregating between- and within-person effects (e.g., Davis et al., 2016, for the relation between victimization and marijuana use). Likewise, significant effects of peer-reported status on HED occurred within rather than between individuals in the current study.

In line with H6, a within-person interaction demonstrated that at time points when both self-reported and peer-reported status was higher than usual, participants increased their HED. In other words, at time points when participants' status increased relative to their own average, and they were personally aware of their more powerful positions, they increased their heavy drinking behavior. Thus, it was not enough for students to perceive they had increased social power in their drinking group; this needed to be corroborated by their group members before it predicted drinking patterns. It is important to emphasize that these findings reflect time-specific deviations rather than overall time-invariant averages and may suggest that fluctuations in peer- and self-reported status are more meaningful than is average status over time. Thus, changes in university students' drinking may be particularly impacted by a combination of the motivation to uphold an increasingly positive

and powerful social standing (Demant & Järvinen, 2011) to enjoy certain unique benefits that having a higher peer-reported status may afford (e.g., more opportunities for and invitations to social drinking events; Wolburg, 2016). Future research is needed to explore the mechanisms behind these important relations.

Finally, only between-persons and not within-person self- and peer-reported status emerged as a significant predictor of encouragement of others' drinking. This suggests that status measures in relation to encouragement of drinking are primarily a between-persons effect. Thus, individual variation in status may be less important than are between-persons differences when assessing encouragement of others' drinking. One reason for this could be that certain individuals may gain a reputation as the group members who encourage others to drink (Demant & Järvinen, 2011; Wolburg, 2016), and regardless of changes in behavior over the school year, they may be at a heightened likelihood of being reported by their peers as "the instigators," so to speak. Alternatively, it is possible that university students' encouragement behaviors are fairly stable over the school year. Future research is needed to test these claims.

The aforementioned research findings have important practical implications. First, our results corroborate previous research that has identified the beginning (first couple months) of the academic term (which begins in September in Canada) as a particularly heightened time for heavy episodic drinking (Tremblay et al., 2010), partly due to the elevated number of drinking-related events (e.g., frosh week, homecoming, Halloween) relative to the rest of the school year. Our results also demonstrated important between-persons differences in the association between self-reported status and drinking-related behavior. Thus, universities may benefit from incorporating a measure of self-reported status during substance use programming that occurs at the start of the academic year (e.g., frosh week interventions). This could help target high-risk students in order to employ strategies aimed at lowering their risk of experiencing negative drinking consequences during the first couple months of school and beyond. Extant interventions have used this targeting approach, inviting higher risk students in for one-to-one motivational interviewing (e.g., Borsari & Carey, 2000) or mindfulness interventions (Mermelstein & Garske, 2015). Considering that the self-reported status measure is brief (four items) and relatively easy to use (compared to peer reports), it may be a useful way to screen participants who are more likely to not only drink heavily themselves but play a salient role in encouraging their peers to drink.

Furthermore, our within-person findings identified *when* drinking-group members are most at risk for increases in heavy drinking (i.e., when they experience increases in their peer- and self-reported status). Thus, it may be useful for prevention and intervention programs to address the link between status and alcohol consumption, in addition to discussing ways in which students can maintain favorable social positions among their peers and remain socially active and integrated that do not involve risky drinking practices (e.g., joining clubs or sports teams; Holland & Andre, 1994). The link between high status and negative drinking consequences (e.g., injury, blackouts, unprotected sex; Dumas et al., 2018) can also be highlighted as a deterrent. Further, given that increases in social status can occur at any point during the academic year, it may be important for substance use interventions to include booster sessions to extend intervention effects to times



during which some students may feel status-related pressures to engage in HED (e.g., Braitman & Henson, 2016; Mason, Benotsch, Way, Kim, & Snipes, 2014). In a similar vein, it will be important for prevention and intervention programming that future research examine buffers of the within-person effects of status on heavy drinking.

Implications notwithstanding, there exist limitations of this study that should be addressed. We improved upon prior analysis on this topic by conducting a longitudinal study that enhanced internal validity (achieved through isolating within-person variance, which controls for all between-persons confounds). That being said, although our time effects were longitudinal, the effects of status were cross-sectional. Thus, we cannot claim causality or tease apart temporal precedence for the associations between status and alcohol-related behavior. Rather, future experimental research is needed on the topic. There exists extant experimental research suggesting that adolescents are more influenced by the alcohol-related attitudes of their higher rather than lower status schoolmates (Teunissen et al., 2012). However, no experimental research, to our knowledge, has attempted to manipulate young people's own status to examine outcomes on their drinking-related behavior. Further, given the clustered nature of our data, we calculated effective sample size. Values ranged, depending on the clustering value (range = 3–8) from  $n = 44$  to  $n = 78$ ; thus, we should note limited power to detect higher order effects such as interactions. Additionally, because of our low power, we refrained from examining more nuanced research questions, such as the difference in the relation between status and drinking for men and women or university students at differing points in their academic careers. That being said, we did control for demographic variables. Additionally, prior research has demonstrated little to no gender or age differences in the relation between status and drinking (or status and encouragement of drinking; Dumas, Graham, et al., 2014; Dumas et al., 2015, 2018; Dumas, Wells, et al., 2014). In any case, this research should be replicated with a larger sample size.

Finally, although we found notable stability in drinking groups over time, we conducted a short-term longitudinal study, over a period of 4 months. Thus, we did not capture the full variability in university drinking-group membership, particularly across academic years. It is important for future research to examine drinking-group membership over a longer period, with a focus on patterns of group composition change and termination across the university, reasons for why university drinking groups dissolve, and how this affects the predictive power of peer status on students' drinking patterns.

To conclude, during a time in life when problematic drinking and related risks are high (Arnett, 2005, SAMHSA, 2014, 2016), university students who view themselves as occupying a higher status in their drinking groups appear at particular risk of heavy alcohol consumption. Moreover, at times during the school year when students' status according to peers increases and they are aware of this increase in status, they also experience rises in problematic drinking (i.e., HED). Finally, students who are of a higher status according to peers play a key role in perpetuating group drinking norms by encouraging others in the group to consume alcohol. These findings highlight the notion that peer-group influence in emerging adulthood is not uniformly experienced or exerted by all group members (Hogg, 2005; Rimal &

Real, 2005). Rather, results emphasize the complex and dynamic nature of the drinking group and the importance of students' perceptions of their social status and stress the need for prevention efforts that address students' status-related motives and concerns.

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