Perceived Approval of Friends and Parents as Mediators of the Relationship Between Self-Determination and Drinking*

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ABSTRACT. Objective: Within the context of self-determination theory, individuals vary in the extent to which they are oriented toward autonomy and control. Previous research on the relationship between motivational orientations and drinking behavior among college students has suggested that students who are more autonomously oriented consume less alcohol whereas those who are more control oriented consume more alcohol. This research evaluated the extent to which these relationships are mediated by the perceived approval of friends and parents, both of which are important sources of potential influence on the behavior of college students. **Method:** First-year students ($N = 818$, 58% female) who reported one or more heavy drinking episodes in the previous month completed online assessments of their drinking behavior, autonomous and controlled orientations, and perceptions of

the approval of drinking (injunctive norms) by important others (friends and parents). **Results:** The results suggested that controlled orientation was associated with greater alcohol use and that this association was mediated by perceptions of friends being more approving of problematic drinking. In contrast, autonomous orientation was associated with less alcohol use and this association was mediated by perceptions of friends being less supportive of problematic drinking. No support was found for perceptions of parents' approval as a mediator of the associations between either orientation and drinking. **Conclusions:** The findings highlight the importance of perceptions of friends' approval or disapproval of problematic drinking in understanding the relationship between self-determination and heavy drinking among college students. (*J. Stud. Alcohol Drugs* 70: 92-100, 2009)

ALCOHOL USE ON COLLEGE CAMPUSES is both prevalent and harmful. According to a recent national survey, almost 82% of full-time college students reported having used alcohol within the past year (Johnston et al., 2007). Although most college students drink occasionally, a substantial portion of them report drinking to excess. Johnston and colleagues (2007) found that 40% of college students reported consuming five or more drinks in a row in the past 2 weeks, relative to 35% of their noncollege bound peers. This is particularly concerning given the range of negative outcomes associated with heavy-episodic drinking, which includes physical injuries, sexual assaults, legal problems, dependence issues, and death (Hingson et al., 2005; Hingson et al., 2002; Knight et al., 2002; Perkins, 2002b).

Self-determination theory and alcohol use

To minimize harmful drinking and related consequences among college students, it is important to understand what

motivates the initiation and maintenance of drinking behavior in this population. Self-determination theory (Deci and Ryan, 1985, 1987, 2002) uses a general motivational framework to explain both the initiation and regulation of behavior and has been studied in relation to a number of risk behaviors, including eating disorders (e.g., Bergstrom et al., 2004; Patrick et al., 2004; Pelletier et al., 2004), risky sexual behavior (e.g., Lewis et al., 2006; Turner et al., 1993), gambling (e.g., Chantal et al., 1995; Mageau et al., 2005; Neighbors and Larimer, 2004), and alcohol use (Knee and Neighbors, 2002; Neighbors et al., 2003, 2004a, 2006; Rockafellow and Saules, 2006). Motivation, in the context of self-determination theory, has been defined as an attempt to satisfy the basic psychological needs for relatedness, autonomy, and competence. Relatedness refers to connection with others; autonomy describes a perspective that one's actions come from oneself; and competence indicates personal ability to influence or cause desired outcomes. When these needs are met, an individual is likely to develop a more autonomous orientation associated with regulating behavior based on intrinsic motivations and core values (Deci and Ryan, 1985, 2002). Conversely, a primarily controlled orientation results when these basic needs have not been met, and is associated with behavior that is more extrinsically regulated with greater sensitivity to the expectations of others (Deci and Ryan, 1985, 2002).

According to self-determination theory (Deci and Ryan, 1987), individuals with a higher controlled orientation per-

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ceive contexts as controlling their behavior and pressuring them toward particular outcomes. In contrast, individuals with a higher autonomy orientation experience themselves as initiators of their own behavior and as regulating their behavior through choice, rather than as a function of external pressure (Deci and Ryan, 1987). A number of studies suggest that a controlled orientation is associated with greater sensitivity and reactivity to social pressures and is positively associated with greater public self-consciousness (viewing oneself as a social object; Deci and Ryan, 1985). Prior research also suggests that individuals who are higher on controlled orientation tend to engage in impression management strategies to enhance self-image (Lewis and Neighbors, 2005).

Autonomous individuals are also influenced by others but typically in more autonomy-supportive and less reactive ways (Hodgins et al., 1996a; Hodgins et al., 1996b). Consequently individuals who are higher on autonomy approach relationships with an orientation toward growth and mutual support in fulfilling their own as well as others' basic psychological needs (Hodgins and Knee, 2002; Knee et al., 2002). Moreover, autonomy may be associated with less risk-related behaviors because autonomous individuals are focused on intrinsic values that are inconsistent with risk behaviors (Neighbors et al., 2007a) and because the influences that close others have on them tend to be more supportive of healthier behaviors (Hodgins et al., 1996a; Hodgins et al., 1996b). It is important to note that, although autonomy and controlled orientations may seem to be conceptually on opposite ends of the same spectrum, they have most often been found to either be uncorrelated (Deci and Ryan, 1985) or positively correlated (e.g., Knee and Neighbors, 2002; Knee et al., 2002). Thus, although an individual may be higher on one than the other, it is equally likely that an individual will be lower on both, representing a lack of motivation, or higher on both, indicating an individual who is motivated both by intrinsic interests and values, as well as by external contingencies and expectations.

Research examining the relationship between self-determination theory and alcohol use among college students has indicated that a controlled orientation is associated with greater alcohol consumption and drinking as a function of social pressure (Knee and Neighbors, 2002; Neighbors et al., 2003, 2004a, 2006; Rockafellow and Saules, 2006). For instance, in a study conducted by Knee and Neighbors (2002), a controlled orientation was found to be associated with drinking for extrinsic reasons, and with stronger perceptions of peer pressure, which in turn was related to heavier alcohol use. Similarly, Rockafellow and Saules (2006) found that among college student athletes, extrinsic motivation, which is consistent with a controlled orientation, was related to greater alcohol use than a more intrinsic motivation. Thus, given the evidence suggesting a positive association between a controlled orientation and drinking, and the potential role

of perceived social influence in this association, understanding the precise nature of this relationship seems important. Further, given the literature documenting the positive association between perceptions of normative approval and alcohol use among college students, it may be hypothesized that the relationship between self-determination and drinking may be mediated to some extent by the perceived approval of others.

Self-determination theory, injunctive norms, and alcohol use

A substantial body of research has suggested that perceptions of norms influence individual drinking behavior (Borsari and Carey, 2001, 2003; Larimer et al., 2004; Lo, 1995; Perkins, 2002a; Perkins and Berkowitz, 1986). Research has primarily focused on two types of norms: descriptive norms, which refer to beliefs about drinking behaviors that others actually engage in; and injunctive norms, which measure others' perceived approval of drinking behaviors (Borsari and Carey, 2001). Research on descriptive norms has consistently demonstrated that college students tend to overestimate the prevalence of drinking for a number of groups, including close friends and typical students, and that this in turn is associated with their own drinking (Baer et al., 1991; Borsari and Carey, 2003; Lewis and Neighbors, 2004; Thombs et al., 2005). Although the research on injunctive norms is far more limited, results indicate that students tend to overestimate typical students' approval of (Berkowitz and Perkins, 1986; Perkins and Berkowitz, 1986) and comfort with (Prentice and Miller, 1993) drinking behaviors, as well as close friends' approval of heavy drinking (Alva, 1998; Baer, 1994; Prentice and Miller, 1993). Research has also identified a positive relationship between perceptions of normative approval from one's peer group and individual alcohol use (Larimer et al., 2004; Perkins and Wechsler, 1996; Thombs et al., 1997; Wood et al., 1992). These findings have been noted for perceptions of approval being related to higher levels of drinking (Lo, 1995), as well as perceptions of disapproval being related to lower levels of drinking (Alva, 1998).

Additional research supports greater influence of normative perceptions for groups that are more familiar and proximal to the individual (Borsari and Carey, 2001, 2003; Chawla et al., 2007; Lewis and Neighbors, 2004; Neighbors et al., 2007b). Specifically, institutional approval (Nagoshi, 1999; Wood et al., 1992) and typical college student approval are less influential to drinking behavior than the perceived approval of close friends (Baer et al., 1991; Thombs et al., 1997, 2005). Further, the perceived approval of close friends has a greater influence on drinking behavior than the perceived approval of parents (Chawla et al., 2007; Lo, 1995; Perkins, 1985). This may be the result of the increased influence of peers instead of parents among college students. Although parental approval has an impact on younger children's

alcohol use (Kandel and Andrews, 1987), this influence may decrease as more time is spent with peers (Csikszentmihalyi and Larson, 1984). Additionally, as students enter college, they may seek some autonomy from their parents, and fulfillment of their need for relatedness through peer relationships (Paul and Kelleher, 1995), and consuming alcohol is a specific, peer-accepted method of exercising independence outside of parental control (Maggs, 1997).

Based on these findings and those described in the previous section, we expected that perceptions of the approval of important others might account for the relationship between self-determination and drinking among college students. Specifically, we expected that a controlled orientation would be associated with heavier drinking as a function of the perceived expectations of others, especially peers. In particular, controlled orientation is likely to be associated with perceiving peers (perhaps accurately) as more supportive of risk-related behaviors (Neighbors et al., 2007a). In contrast, we expected that an autonomous orientation would be associated with more health promoting behaviors and thus lower rates of drinking, and with perceiving important others, especially peers (perhaps accurately), as less supportive of problematic drinking behavior.

Thus, the purpose of the present study was to evaluate the role of perceived injunctive norms for important others (friends and parents) as potential mediators of the relationships between a controlled orientation and alcohol use, and an autonomous orientation and alcohol use. Specifically, we predicted that a controlled orientation would be positively associated with drinking behavior, and that this relationship would be mediated by the perceived approval of important others, especially friends. In particular, we expected that a controlled orientation would be associated with perceiving friends as more approving of drinking and that this in turn would be associated with heavier drinking. We also predicted that an autonomous orientation would be negatively associated with drinking behavior, and that this relationship would also be mediated by the approval of important others, particularly friends. Specifically, we expected that autonomy would be associated with perceptions of less approval and that this in turn would be associated with lower rates of drinking.

Method

Participants

Participants included 818 (57.6% women) first-year college students who completed screening and baseline assessments as part of a larger social norms intervention study. The mean (SD) age of participants was 18.14 (0.46) years. Ethnicity of the sample was 65.2% white, 24.3% Asian, and 10.5% were classified as other. Participants were compensated \$10 for completing the screening assessment and \$25 for completing the baseline assessment.

Procedure

First-year students ($N = 4,103$) enrolled at a large public northwestern university were invited to participate in a web-based screening survey as part of a larger social norms intervention study. Participants were mailed and emailed an invitation that included a description of the research study, the URL for the survey Web site, and their personalized identification number to use for logging onto the survey. Of those invited, 2,095 (51.1% recruitment rate) completed the screening survey. Students meeting the inclusion criteria of heavy drinking in the previous month (i.e., consuming five or more drinks for men [four or more for women] on at least one occasion) were invited to participate in the larger study and were linked to the baseline survey. Participants had the option of completing the baseline survey immediately following the screening survey or within 2 weeks of completing the screening survey. Students were contacted by mail, email, and phone to remind them to complete the assessments. Of those meeting criteria for the baseline assessment, 818 (91.3% recruitment rate) completed the baseline survey and were included in analyses for the present article. Recruitment rates for the study are comparable to similar studies in this population (e.g., McCabe et al., 2002; Marlatt et al., 1998). The combined screening and baseline assessments took approximately 50 minutes to complete. All aspects of the study were reviewed and approved by the university institutional review board.

Measures

Alcohol use. Alcohol use was assessed with an estimate of total number of drinks per week based on the Daily Drinking Questionnaire (Collins et al., 1985), which asks participants to estimate their average alcohol consumption for each day of a typical week over the past 30 days. The total number of drinks per week is a sum of drinks for each day of the week. It was used as the primary outcome measure based on its high test-retest reliability and high correlations with self-monitored drinking and alcohol-related problems, over and above other measures (e.g., binge drinking frequency, blood alcohol level), among college student samples (Borsari et al., 2001; Kivlahan et al., 1990). In the present sample, drinks per week was moderately to highly correlated with several indices of drinking ($r = .62, p < .001$ for frequency of drinking in the past 30 days, $r = .49, p < .001$ for number of drinks consumed on a typical occasion in the past 30 days, and $r = .64, p < .001$ for number of drinks consumed on a peak occasion in the past 30 days).

Self-determination. Self-determination was assessed using a revised version of the General Causality Orientation Scale (Deci and Ryan, 1985) that includes two subscales measuring a controlled orientation and an autonomous orientation. The scale consists of 17 scenarios, each followed by a controlled

response and an autonomous response, to which respondents rate how characteristic this type of response would be for them. For example, one of the scenarios is the following: "Your friend has a habit that annoys you to the point of making you angry. It is likely that you would...." The controlled orientation is then measured by the response, "point it out each time you notice it, that way maybe he (she) will stop doing it," and the autonomous orientation is measured by the response, "try to understand why your friend does it and why it is so upsetting for you." Participants rate each response on a scale from 1 (very unlikely) to 7 (very likely). Scores are computed by averaging ratings across all 17 scenarios, yielding a total score for autonomous orientation and a total score for controlled orientation for each individual. Internal consistency (Cronbach's α) in this study was .74 for the controlled orientation subscale and .86 for the autonomous orientation subscale.

Perceived injunctive norms. Perceived injunctive norms were measured using eight items that assessed the perceived approval of friends and parents, on a 7-point Likert scale ranging from 1 (strong disapproval) to 7 (strong approval; Baer, 1994). Items included, "How much do your friends approve of: " (1) "drinking alcohol every weekend"; (2) "drinking alcohol daily"; (3) "driving a car after drinking;" and (4) "drinking enough alcohol to pass out." These items were repeated for the approval of parents and average scores were calculated for each set of items, creating two total scores, with higher scores indicating greater approval of high-risk drinking. Coefficient α 's for the approval of friends and the approval of parents were .73 and .69, respectively.

Results

Descriptive information

Descriptive statistics for all variables are presented in Table 1, and zero-order correlations among variables are presented in Table 2. As expected, we found a significant positive relationship between having a more controlled orientation and typical drinks per week, and a significant negative relationship between an autonomous orientation and typical drinks per week. Having a controlled orientation was also positively correlated with the perceived approval

TABLE 1. Means and standard deviations for controlled orientation, autonomous orientation, perceived injunctive norms, and alcohol use ($N = 818$)

Variable	Mean (SD)
Controlled orientation	4.16 (0.67)
Autonomous orientation	5.51 (0.74)
Perceived injunctive norms for approval of friends	2.65 (0.98)
Perceived injunctive norms for approval of parents	1.43 (0.60)
Typical drinks per week	11.65 (10.81)

of friends, whereas having an autonomous orientation was negatively correlated with the perceived approval of friends. Interestingly, both controlled and autonomous orientations were negatively correlated with the perceived approval of parents. The perceived approval of both friends and parents were positively correlated with typical drinks per week.

Given the positive correlations between gender and the other variables, and based on previous research indicating that male students consume more alcohol, drink more frequently (e.g., Johnston et al., 2007; O'Malley and Johnston, 2002; Wechsler et al., 1995), report higher perceived norms (Lewis and Neighbors, 2004), and are more controlled than women (Lewis et al., 2006), gender was included as a covariate in evaluating the proposed mediation model.

Mediation model

Mediation analyses were conducted using a structural equation modeling framework with AMOS 16 (Arbuckle, 2006). An advantage of this approach is that it allows for testing mediation relationships simultaneously. The mediation model included autonomous orientation and controlled orientation as exogenous variables. Injunctive norms for friends and injunctive norms for parents were specified as mediating variables. Alcohol use was specified as the dependent variable. Gender was included as an exogenous covariate. Figure 1 presents the complete model with standardized parameter estimates. Model fit was evaluated using the comparative fit index (CFI), the normative fit index (NFI), and the root mean square error of approximation (RMSEA). Values close to 1 are considered indicators of good fit for the CFI and NFI (Bollen and Long, 1993). Values of .05 and .08 on the RMSEA are considered indicative of excellent and adequate fit, respectively (Browne and Cudeck, 1993). The

TABLE 2. Zero-order correlations between gender, controlled orientation, autonomous orientation, perceived injunctive norms, and alcohol use ($N = 818$)

Variable	1	2	3	4	5
1. Gender	—				
2. Controlled orientation	.09 [†]	—			
3. Autonomous orientation	-.19 [‡]	.22 [‡]	—		
4. Perceived injunctive norms for approval of friends	.18 [‡]	.13 [‡]	-.12 [‡]	—	
5. Perceived injunctive norms for approval of parents	.02	-.09 [†]	-.15 [‡]	.37 [‡]	—
6. Typical drinks per week	.20 [‡]	.10 [†]	-.14 [‡]	.39 [‡]	.20 [‡]

Note: Gender was coded as women = 0 and men = 1.

[†] $p < .01$; [‡] $p < .001$.

FIGURE 1. Mediation model evaluating injunctive norms for friends and parents as mediators of the relationship between self-determination (controlled and autonomous orientations) and alcohol use, with gender included as a covariate. Error terms were not included for the sake of clarity.
 $^{\S}p < .1$; $^*p < .05$; $^{\ddagger}p < .001$.

overall model fit was adequate ($\chi^2 = 11.84$, 2/818 df, $p < .01$; CFI = .977; NFI = .973; RMSEA = .078). Results indicated that all paths were statistically significant at $p < .001$ with the following exceptions: the path from controlled orientation to perceived approval of parents ($p = .08$), the path from perceived approval of parents to drinks per week ($p = .06$), and the path from gender to perceived approval of parents ($p = .97$). In addition, the association between gender and autonomous orientation was significant at $p < .05$.

Mediation was formally evaluated by testing indirect effects using the *ab* products method described by MacKinnon and colleagues (2002), where the standard error for indirect effects was estimated using Sobel's (1982) formula. Sobel's formula evaluates the difference between the effect of the predictor on the outcome with and without the mediator, divided by the standard error of this difference. According to a recent article by Fritz and MacKinnon (2007), given the sample size for the present study, this method provides adequate power to detect a mediated effect.

Four specific questions were considered in turn: (1) Does perceived approval of friends mediate the relationship between controlled orientation and drinking? (2) Does perceived approval of friends mediate the relationship between autonomous orientation and drinking? (3) Does perceived

approval of parents mediate the relationship between controlled orientation and drinking? And, (4) does perceived approval of parents mediate the relationship between autonomous orientation and drinking? With respect to the perceived approval of friends as a mediator, the relationship between controlled orientation and drinking was significantly associated with perceiving friends as more approving of problematic drinking, which was in turn associated with consuming more drinks per week. The test of the indirect path was significant providing support for mediation ($z = 3.90$, $p < .001$). In contrast, autonomous orientation was significantly associated with perceiving friends as less approving of problematic drinking, which in turn was associated with consuming fewer drinks per week ($z = 3.41$, $p < .001$). With respect to perceived approval of parents, neither the indirect path from controlled orientation to drinking ($z = 1.28$, $p = \text{NS}$), nor the indirect path from autonomous orientation to drinking ($z = 1.65$, $p = \text{NS}$), was statistically significant. Moreover, although autonomy was significantly associated with perceiving parents as less approving, controlled orientation was only marginally associated with perceiving parents as less approving, and perceived approval of parents was only marginally associated with number of drinks consumed per week. In sum, support was found for perceived approval of

friends as a mediator of the association between self-determination and drinking whereas no support was found for perceived approval of parents as a mediator.

Discussion

The present study assessed the role of injunctive norms with regard to the perceived approval of friends and parents as mediators of the relationship between self-determination and alcohol use. This research makes several important contributions. First, the findings contribute to two bodies of literature that examine the relationship between alcohol use and self-determination, and alcohol use and social norms. As per our expectations, and consistent with prior research (Knee and Neighbors, 2002; Neighbors et al., 2003, 2004a, 2006; Rockafellow and Saules, 2006), our findings indicated a significant positive association between a controlled orientation and alcohol use and a significant negative association between an autonomous orientation and alcohol use. Furthermore, consistent with the literature on injunctive norms (Chawla et al., 2007; Lo, 1995; Neighbors et al., 2007b; Perkins, 1985), we found a strong positive association between the perceived approval of both friends and parents and alcohol use. Most importantly, the present study not only contributes to these two bodies of literature but also connects and extends them. Specifically, the results highlight the importance of considering the perceived approval of important others, particularly peers, in understanding the influence of motivational orientation on alcohol use. Additionally, these results indicate that feeling controlled is linked to alcohol consumption in a manner that is consistent with self-determination theory (Deci and Ryan, 1985, 1987), via the perceived social influence of important others.

These results also underscore the notion that being autonomous does not equate to a lack of consideration for the expectations that important others have for the self (Koestner and Losier, 1996), but, rather, the nature of relationships formed by more autonomous individuals tend to be more supportive of personal growth and healthier personal choices (Hodgins and Knee, 2002). As predicted, a significant positive association was found between having a controlled orientation and the perceived approval of friends, and a significant negative association was found between an autonomous orientation and the perceived approval of friends. This finding is supported by literature indicating that a controlled orientation is associated with a high need for social approval, and greater perceptions of and responsiveness to social expectations, compared with an autonomous orientation (Deci and Ryan, 1987). These results suggest that both controlled and autonomous individuals are influenced by important others but that they seek out different kinds of relationships, at least with respect to friends. Moreover controlled individuals may be more likely to select friends and contexts that they perceive as approving of problematic alcohol use, whereas

autonomous individuals may be more likely to associate with peers they perceive to be less approving of problematic drinking.

Interestingly, correlations revealed that both controlled and autonomous orientations were associated with perceiving parents as being less approving of drinking, although this relationship was only marginally significant for controlled orientation in the context of the mediation model. Although the present results cannot distinguish whether this perceived approval may be experienced differently, self-determination theory suggests that controlled individuals may experience perceived parental disapproval of drinking as a prohibitive admonition against problematic drinking, whereas more autonomous individuals may experience this as support for the individual's choices not to drink problematically. Thus, parenting that emphasizes submission to authority and living up to parental expectations may lead to the development of a more controlled orientation (Williams and Deci, 1998; Williams et al., 1998). It is also possible that more motivated students (either autonomously or controlled) experience their parents' disapproval of problematic drinking in a similar way, but additional research is needed to specifically evaluate this issue.

Overall, these findings indicate that observed differences in drinking between more controlled versus more autonomous students are likely the result of differences in how they perceive their peers. Specifically, more controlled students perceive (and probably have) friends who are more approving of problematic drinking and more autonomous students perceive (and probably have) friends who are less approving of problematic drinking. Further, the perceived approval of friends appears to be a stronger influence on the drinking of both controlled and autonomous college students, compared with the perceived approval of parents. This is consistent with the literature on injunctive norms (Chawla et al., 2007; Lo, 1995; Perkins, 1985) and may be attributed to the increased influence of peers over parents among college students (Csikszentmihalyi and Larson, 1984), and to a greater tendency among college students to seek fulfillment of their needs through peer relationships rather than parental relationships (Paul and Kelleher, 1995).

Findings from the present study have potentially important implications and provide direction for further research with regard to intervention strategies that incorporate information on social norms. Based on the relationship between perceived norms and drinking behavior, a number of intervention strategies have incorporated some form of normative education. This includes interventions that attempt to highlight the discrepancy between an individual's descriptive normative perceptions of other students' drinking and other students' actual drinking (e.g., Neighbors et al., 2004b). Given that these interventions have typically incorporated or focused on descriptive norms, rather than injunctive norms, the present study represents a distinctive contribution. These

results suggest that using injunctive norms for proximal reference groups, such as an individual's close friends, may be another promising approach for interventions. This is consistent with recent studies indicating that targeting injunctive norms for proximal groups may have a greater impact on behavior than targeting norms for the perceived approval of more distal groups such as typical college students (Chawla et al., 2007; Neighbors et al., 2007a,b). Thus, future research should consider evaluating the role of injunctive norms in brief preventative interventions aimed at reducing college student drinking.

The findings also indicate that individuals who are controlled may be attracted to contexts in which there is greater peer pressure and perceived approval for heavy drinking (e.g., fraternities). However, the same quality that may lead these individuals to drink may also increase their receptivity to social influences for positive change. Thus, interventions that target motivational style, by encouraging and supporting autonomy (e.g., motivational interviewing), while simultaneously addressing perceived norms, by incorporating peers, may be more effective than interventions that target each in isolation. This is consistent with the results of a recent study that compared a brief motivational intervention to a peer-enhanced intervention (included the presence of a supportive peer) and found that the peer-enhanced version was associated with reductions in alcohol use and problems that were three times greater than those associated with the motivational intervention alone (Tevyaw et al., 2007). Although this study did not assess the specific motivational orientation of participants, these findings lend support for the use of peers in interventions that attempt to support intrinsic motivation and reduce drinking among college students.

Finally, these results also overlap with the literature on drinking-related self-efficacy, or the ability to resist alcohol in certain situations. This literature suggests that the inability to refuse alcohol, which relates to a controlled orientation and greater susceptibility to social influence, is an important predictor of alcohol consumption (Oei and Morawska, 2004).

The findings of this study should be considered in the light of several limitations. First, the present findings are based on a cross-sectional design that prevents inferences regarding the causal direction of effects. Longitudinal research is needed to clarify the causal relationship between controlled versus autonomous orientation, perceived injunctive norms, and alcohol use and to draw unbiased conclusions regarding mediation. Further, the direction of the relationship between motivational orientation and the perceived approval of important others is unclear and requires further clarification. Specifically, future research should assess whether controlled and autonomous individuals are differentially exposed to heavier drinking contexts and have different tendencies with regard to associating with heavy drinking peers. A second limitation relates to the sample, which consisted primar-

ily of college freshmen. This limits the generalizability of findings to older students and other age groups. Furthermore, the response rate of 51.1%, although generally comparable to rates reported in other large studies of college drinking (e.g., Marlatt et al., 1998; McCabe et al., 2002), suggests a potential selection bias and necessitates caution in generalizing these results. Additionally, this sample was recruited for a larger intervention study that included only students who reported at least one heavy drinking episode in the previous month. Although this represents a large proportion of students (42.7% of the screening sample), it is unclear how findings might have differed without this inclusion criteria. Criteria for heavy drinking also vary greatly across studies, and differences in definition may further affect the comparability of findings (Jackson, 2008). Finally, all of the measures used in the study were self-report measures, although the use of self-report measures for alcohol use among college students has been shown to be relatively reliable and valid (Johnson and Mott, 2001; Johnston and O'Malley, 1985).

In conclusion, the present study supports using a motivational approach, in relation to a social norms approach, in understanding college student drinking. The findings also suggest important directions for norms-based interventions, including the use of injunctive norms, in addition to descriptive norms, and tailoring these interventions to the divergent needs and styles of controlled and autonomous individuals.

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