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Tapping into Motivations for Drinking among Youth: Normative Beliefs about Alcohol Use among Underage Drinkers in the United States

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Abstract

Social norms affect human behavior, and underage drinking is no exception. Using the theory of normative social behavior (TNSB), this paper tested the proposition that the association between perceptions about the prevalence of drinking (descriptive norms) and underage drinking is strengthened when perceived pressures to conform (injunctive norms) and beliefs about the benefits of drinking (outcome expectations) are high. This proposition was tested on a nationally representative sample of underage drinkers, ages 13–20, ($N = 1,031$) in relation to their alcohol consumption, expanding on research with college-age youth. On average, males and females reported drinking 23 and 18 drinks per month, respectively. The main effect of descriptive norms ($\beta = .10, p < .01$) on alcohol consumption was modified by interactions with injunctive norms ($\beta = .11, p < .01$), benefit to self ($\beta = .12, p < .001$), and benefit to others ($\beta = .10, p < .01$). Underage drinkers are most vulnerable to excessive drinking if they believe that most others drink, that they themselves are expected to drink, and that drinking confers several benefits. Norms-based interventions to reduce youth alcohol use need to focus on changing not only descriptive norms, but also injunctive norms and outcome expectations.

Alcohol is the most popular drug among U.S. youth (Johnston, O'Malley, Bachman, & Schulenberg, 2011). Globally, alcohol use is the most important risk factor in productive life lost among those ages 15–29 (WHO, 2015). Among youth ages 15–19, the proportion of deaths attributable to alcohol use ranges from roughly 2% to 20% by WHO Region (WHO, 2014). In the U.S. alone, alcohol use is responsible every year for approximately 4,700 deaths among people under 21 years of age (CDC, 2012).

Research has shown that the younger the age at which youth begin drinking, the more likely they are to experience alcohol-related problems later in life, including becoming alcohol dependent, being in a physical fight or motor vehicle crash, and suffering from other unintentional injuries (Grant & Dawson, 1997; Hingson et al., 2009). Because youth drinking often occurs in social contexts (LaBrie, Hummer, & Pedersen, 2007; Real & Rimal, 2007), it is important to understand the social norms that drive alcohol consumption among this group.

The idea that social norms affect human behavior (Asch, 1951; Cialdini, Reno, & Kallgren, 1990; Lapinski & Rimal, 2005) has been the basis of much scholarship in recent years (Borsari & Carey, 2001; Mollen, Rimal, & Lapinski, 2010; Yanovitzky & Rimal, 2006). This work makes a clear distinction between *descriptive norms*, which refer to the perceived prevalence of a behavior, and *injunctive norms*, which refer to the pressures that people perceive to conform to others' expectations (Cialdini et al., 1990).

Given that many drinkers hold exaggerated perceptions about descriptive norms pertaining to alcohol consumption (Haines, 1996; Haines, Barker & Rice, 2003; Perkins & Berkowitz, 1986; Perkins, 2002; Perkins, Haines & Rice, 2005; Perkins, 2014), recent interventions have sought to correct these misperceptions to reduce drinking among middle, high school and college age populations (Berkowitz, 2004; DeJong, 2010; Hansen & Graham, 1991; LaBrie, Hummer, Grant, & Lac, 2010; Lewis & Neighbors, 2006; Miller & Prentice, 2016). The literature on the effectiveness of such norms-based interventions has been mixed (Rimal, 2008). For example, DeJong and colleagues conducted two studies of college-based social norms marketing campaigns designed to reduce alcohol consumption by providing accurate information about student drinking and thereby correct misperceptions of campus norms. Their first study found that these campaigns were effective (DeJong et al., 2006), but a replication study failed to find a positive effect (DeJong et al., 2009). Scribner et al. (2011) reanalyzed the combined data from the two studies, taking into account the density of on-premise alcohol outlets near each campus. The investigators found that the social norms marketing campaigns did make a difference at institutions located in communities with relatively low outlet density, but failed to have an effect in communities with relatively high density.

In an effort to strengthen the underlying theoretical perspective for norms-based interventions, Rimal and Real (2005) proposed the theory of normative social behavior (TNSB), which postulated a number of moderators (including perceived injunctive norms and outcome expectations) in the relationship between perceived descriptive norms and behavior. An extensive literature has found a positive correlation between young people's expectation of prosocial outcomes from drinking and both drinking frequency and quantity (LaBrie et al., 2007; Leigh & Stacy, 2004; Patrick & Maggs, 2011). In two studies with college students, the TNSB was able to predict between 60% (Rimal, 2008) and 63% of the variance in drinking intentions (Rimal & Real, 2005).

Although several other moderators (Jang & Rimal, 2012; Jang, Rimal, & Cho, 2011; Real & Rimal, 2007) have also been added to the model since the original formulation (Rimal & Real, 2005), in this paper we concentrate on two of those moderators, namely perceived

injunctive norms and outcome expectations, which continue to show strong associations with drinking behaviors and are the most amenable to intervention-driven change compared to other determinants (such as group and behavioral identity). Specifically, we test for a multiplicative effect of perceived descriptive norms and the other moderators based on the central tenet of social cognitive theory—that individuals' behaviors, environment barriers, and personal factors interact dynamically. Individuals observe others performing a behavior, assess potential outcomes, and make comparisons between themselves and the people they have observed (Bandura, 1986).

This paper extends the literature in three important ways. First, although normative beliefs regarding alcohol consumption have been the focus of many studies among young people, with a few exceptions (Hansen & Graham, 1991; Haines et al., 2003), they have been confined mostly to college students. In their study of incoming freshmen on registration day, Rimal and Real (2005) were surprised to find that normative beliefs about alcohol were already strongly entrenched in this population. As a result, they recommended that norms-based studies focus on youth before they enter college. This paper is based on data in which half the sample comprised pre-college youth. Second, to the best of our knowledge, tests of the TNSB have not yet been conducted with a nationally representative sample. The current study allows us to do so. Third, and related to the second point, prior studies have focused on single or multiple university environments, where it would be natural to expect clustering of attitudes and normative beliefs (Schulman & Levine, 2012). By conducting this study outside that context, we are able to provide a more stringent test of the TNSB.

Derived from the TNSB, the hypotheses we test in this paper are the following:

H1: We expect positive associations between alcohol consumption and (a) perceived descriptive norms, (b) perceived injunctive norms, (c) perceived benefits to oneself, and (d) perceived benefits to others.

H2: We expect the association between perceived descriptive norms and alcohol consumption to be strengthened when (a) perceived injunctive norms, (b) perceived benefits to self, or (c) perceived benefits to others is high rather than low.

Method

Data for this study come from a nationally representative survey conducted in 2012 with an online, pre-recruited Internet panel maintained by Knowledge Networks (Palo Alto, CA) (Knowledge Networks, 2012). The sample comprised 1,032 youth, ages 13–20, who had consumed at least one drink of alcohol in the past 30 days. The self-administered survey instrument was developed to assess brand-specific alcohol consumption among underage youth. In this study, the primary dependent variable was the total number of alcoholic beverages consumed over the past 30 days.

Sample

GfK Custom Research maintains a pre-recruited panel of approximately 50,000 adults (including older youth ages 18–20) who have agreed to join the panel (the Knowledge Panel®) and to be invited periodically to participate in Internet-based surveys (GfK Custom

Research, Palo Alto, CA). The company recruited households to its Knowledge Panel® sample through a combination of random digit dialing (RDD) and address-based sampling (ABS). To ensure adequate representation of panelists across race and ethnicity, telephone numbers from phone banks with higher concentrations of Blacks and Hispanics were oversampled. To ensure adequate participation across levels of socioeconomic status, individuals agreeing to participate in the panel without Internet access were given WebTV and Internet access and training for free.

Using its established panel, GfK recruited older youth ages 18–20 via email to participate in the Internet survey. GfK also recruited youth ages 13–17 to participate by identifying existing adult panelists who reported having age-eligible children in the household. Children whose parents consented to their participation in the study were added to the sample. These potential subjects were sent an email invitation which did not indicate the survey was related to alcohol consumption. All youth who agreed to participate were emailed a link to a secure web site, where a screening questionnaire was administered to determine if the respondent consumed alcohol in the past 30 days and was thus eligible for the survey.

Respondents who had consumed at least one drink of alcohol in the past 30 days were provided with an online consent form, which described the details of the study, the risks and benefits of participation, and the procedures in place to protect the confidentiality of responses. Respondents were informed that if they felt uncomfortable at any point while taking the survey, they could save their answers, discontinue taking it, and return to it “when you feel most comfortable or have any desired privacy.”

For the 18–20 year olds, the overall response rate was 43.3%, and for the 13–17 year olds, the overall response rate was 44.4%. These estimates were calculated by multiplying the parent completion rate (for the younger youth) by the screening completion rates by the survey completion rates.

The study procedure was approved by the Institutional Review Board for the XXX University Medical Center (*masked for blind review*).

Weighting Procedures

GfK applied statistical weighting adjustments to account for selection deviations and to render the sample representative of the underlying population (DiSogra, 2009). These weights accounted for the different selection probabilities associated with the RDD- and ABS-based samples, the oversampling of minority communities, non-response to panel recruitment, and panel attrition. Post-stratification adjustments were based on demographic distributions from the Current Population Survey (CPS) conducted by the U.S. Bureau of the Census. The post-stratification weights adjusted for gender, age, race/ethnicity, census region, household income, home ownership status, metropolitan area, and household size.

Control Variables

To test our hypotheses, we controlled for known predictors of alcohol consumption, which included gender (Babor et al., 2010); grade (Johnston, O’Malley, Bachman, & Schulenberg,

2006); parental drinking and age of first drink (Yu, 2003); race, geographical region, urban/rural location, and family income (SAMHSA, 2010).

Measures

The key question items were taken from Rimal and Real (2005). The respondents indicated their level of agreement with a series of statements using a 5-point Likert scale, ranging from strongly disagree (coded as 1) to strongly agree (coded as 5), unless otherwise stated below.

Perceived Descriptive Norms—Participants' perceptions regarding the prevalence of alcohol consumption were measured using three statements: (1) "Most of my close friends regularly drink alcohol," (2) "Most people in my school or neighborhood regularly drink alcohol," and (3) "Most people my age regularly drink alcohol." The *descriptive norms* variable was then calculated as the average of the three responses ($\alpha = .80$; $M = 3.29$, $SD = .90$).

Perceived Injunctive Norms—Perceptions of others' expectations regarding alcohol consumption were also measured using three statements: "Most of my (close friends/people in my school or neighborhood/people my age) expect me to drink alcohol," with each question asking about one of the three referent groups. Higher scores indicate greater perceived expectations from others for the respondent to drink alcohol. The *injunctive norms* variable was calculated as the average of the three responses ($\alpha = .88$; $M = 2.55$, $SD = .98$).

Perceived Outcome Expectations—Outcome expectations were operationalized as perceived benefits expected to result from drinking alcohol. Three statements—"Drinking alcohol is fun," "Drinking alcohol helps me gain friendships," and "Drinking alcohol helps me talk to others"—measured perceived benefits to self. Three similar statements—"Most of my close friends think drinking alcohol is fun," "Most of my close friends think drinking alcohol helps them gain friendships," and "Most of my close friends think that drinking alcohol helps them talk to others"—measured perceived benefit to close friends. *Benefits to self* and *benefits to others* were calculated as the average of their component three responses (self: $\alpha = .81$; $M = 2.83$, $SD = .92$; others: $\alpha = .86$; $M = 2.96$, $SD = .96$). It should be noted that the respondents perceived the benefits experienced by others to be significantly greater than the benefits they themselves experienced [$M = .13$, $SD = .71$; $t(1016) = 5.79$, $p < .001$].

Alcohol Consumption—Total alcohol consumption in the past 30 days, the dependent variable, was calculated from two questions: (1) "During the past 30 days, on how many days did you have at least one drink of alcohol?" and (2) "During the past 30 days, on the days when you drank, about how many drinks did you have on average?" We provided participants with a definition of a drink for various forms of alcohol (e.g., 12-ounce can or bottle of beer, 5-ounce glass of wine or champagne, 1.5 ounces of liquor, etc.) Because some respondents reported extreme values, this variable was truncated at 20 drinks per day, a process known as Winsorization (Dixon & Yueon, 1974). Average alcohol consumption was

20.27 drinks ($SD = 33.73$), with men ($M = 23.07$, $SD = 37.42$) drinking significantly more than women ($M = 18.29$, $SD = 30.75$; $t(943) = 2.15$, $p < .05$).

Statistical Analyses

The study hypotheses were tested through multivariate regression models in which alcohol consumption was the dependent variable. Control variables were gender, age, grade, age of first drink, White/non-White, geographical region (dummy variable with the southern US as the reference), rural dwelling, and parental drinking. To test H1, the independent variables were perceived descriptive norms, perceived injunctive norms, perceived benefits to self, and perceived benefits to others. To test H2, the independent variables were each of three interaction terms: perceived descriptive norms x perceived injunctive norms, perceived descriptive norms x perceived benefits to self, and perceived descriptive norms x perceived benefits to others. Following recommendations by Aiken and West (1991), interaction terms were computed by first centering and standardizing the constituent variables.

Results

Preliminary Analyses

A description of the sample ($N = 1,031$), which comprised 58.5 percent female respondents, is shown in Table 1. Compared to males, females perceived higher rates of consumption among their peers, while males perceived greater personal benefits from consuming alcohol. Overall, males reported drinking about 5 drinks per month more than females (23 versus 18 drinks, respectively). This estimate is slightly lower than that found from the National Survey on Drug Use and Health (NSDUH), in which youth, ages 12–20, who drank reported an average of 6 drinking days per month and consuming 5 drinks per occasion (DHHS, 2007).

Table 2 shows the Pearson correlations among the study variables. Of particular interest, perceived descriptive norms ($r = .18$, $p < .001$), perceived injunctive norms ($r = .13$, $p < .001$), perceived benefits to self ($r = .20$, $p < .001$), and perceived benefits to others ($r = .12$, $p < .001$) were all significantly associated with alcohol consumption. Furthermore, males, older respondents, and those who started drinking at an earlier age drank more alcohol than did females, younger respondents, and those who started drinking at an older age, respectively.

Hypotheses H1a – H1d

Our first set of hypotheses predicted a main effect for perceived descriptive norms, perceived injunctive norms, perceived benefits to self, and perceived benefits to others. Results of regression equations used to test this hypothesis are shown in Table 3. In the multivariate model, the significant control variables were gender (males consumed more alcohol than females: $\beta = -.10$, $p < .01$), age ($\beta = .28$, $p < .001$), and age of first drink ($\beta = -.14$, $p < .001$). Respondents' race/ethnicity, geographic region, urban versus rural residence, and parental heavy drinking were not associated with alcohol consumption.

The association between perceived descriptive norms and alcohol consumption was significant ($\beta = .10, p < .01$). The association between perceived injunctive norms and consumption was not significant in the regression model, even though the bivariate association was significant. Perceived benefit to self was associated with consumption ($\beta = .17, p < .001$), but perceived benefit to others was not. Hence, two of the four hypotheses pertaining to the main effects were supported, while the other two were not.

Hypotheses H2a – H2c

Our second set of hypotheses predicted interactions between perceived descriptive norms and (a) perceived injunctive norms, (b) perceived benefits to self, and (c) perceived benefits to others. As shown in Table 3, the interactions were added in the second block. Note that each model has only one interaction term, thereby avoiding multicollinearity due to adding in multiple interaction terms.

Interactions with Injunctive Norms—There was a significant perceived descriptive norms x perceived injunctive norms interaction effect on alcohol consumption ($\beta = .11, p < .01$).

We could depict this interaction by modeling the relationship between perceived descriptive norms and alcohol consumption at two values of the moderator variable (in this case, perceived injunctive norms): namely, at one standard deviation above the mean and at one standard deviation below the mean (Aiken & West, 1991). Although this is the recommended procedure for depicting interactions in regression models, the disadvantage of this method is that it destroys the underlying metric of the dependent variable. Thus, this method is useful when the underlying metric is of little value (e.g., when outcomes are measured using Likert-type scales), but it is of less practical utility if there is value in retaining the underlying metric, as is the case here with alcohol consumption.

In this study, we wished to model the number of drinks that the different groups actually consumed, delineated according to their values on perceived descriptive norms, perceived injunctive norms, perceived benefits to self, and perceived benefits to others. Hence, we modeled the outcome using analysis of covariance (ANCOVA) tests, with the same control variables as in the regression analyses. In this case, the perceived descriptive norms variable was split into two subgroups, low versus high, depending on whether the standardized scores were negative or positive, respectively; scores of zero were included in the high subgroup. The same grouping was done for the perceived injunctive norms variable.

Actual consumption by the resulting four subgroups, controlling for the known predictors, is shown in Figure 1. When the perceived injunctive norms variable was low, there was virtually no difference in alcohol consumption between those with low versus high perceived descriptive norms (17.8 versus 18.4 drinks per month, respectively). When the perceived injunctive norms variable was high, however, those with high perceived descriptive norms drank significantly more (23.9 drinks) than those with low perceived descriptive norms (15.3 drinks).

Interactions with Perceived Benefits to Self—Similarly, the interaction between perceived descriptive norms and perceived benefits to self was also a significant predictor of alcohol consumption ($\beta = .12, p < .001$). When the perceived benefits variable was low, the relationship between perceived descriptive norms and behavior was not significant ($\beta = .00, n.s.$), but this relationship did become significant when perceived benefits was high ($\beta = .22, p < .001$). Hypothesis H2b was thus supported.

Following similar procedures as described above, we ran ANCOVA models with high versus low perceived descriptive norms and high versus low perceived benefits to self. As shown in Figure 1, when perceived descriptive norms and perceived benefits were both low, individuals were likely to drink, on average, 14.5 drinks per month; this figure almost doubled to 26.5 drinks per month when both perceived descriptive norms and perceived benefits were high.

Interactions with Perceived Benefits to Others—The interaction between perceived descriptive norms and perceived benefits to others was also a significant predictor of alcohol consumption ($\beta = .10, p < .01$). When perceived benefits to others was low, the relationship between perceived descriptive norms and total alcohol consumption was not significant ($\beta = .01, n.s.$), but this relationship did become significant when the perceived benefits variable was high ($\beta = .19, p < .001$). Hypothesis H2c was thus supported.

We ran ANCOVA models with high versus low perceived descriptive norms and high versus low perceived benefits to others. As shown in Figure 1, the lowest level of alcohol consumption (15.3 drinks per month) occurred among those who believed that most others did not drink but also said that others derived many benefits from drinking. Individuals were likely to drink the most alcohol (at 21.7 drinks per month) when they believed not only that most others drank a lot of alcohol, but also that most others derived many benefits from drinking.

Discussion

We found a significant main effect of perceived descriptive norms on alcohol consumption, signifying that those who believed that their peers drank a lot of alcohol were themselves more likely to have higher alcohol consumption, and vice versa, as has been reported elsewhere (Perkins, 2002; Perkins & Berkowitz, 1986). Those with low perceived descriptive norms reported drinking, on average, about 16 drinks per month, as compared to those with high perceived descriptive norms, who reported drinking about 21 drinks per month.

Consistent with the Theory of Normative Social Behavior (Rimal & Real, 2005), we also found that the association between perceived descriptive norms and behavior is moderated by perceived injunctive norms. When youth perceive that many others drink alcohol, their perception that others expect them to drink appears to greatly enhance their own drinking. This finding—that perceived descriptive and injunctive norms have a multiplicative effect—has important implications for alcohol prevention, for it signifies that the most at-risk group comprises individuals who hold exaggerated perceptions about the prevalence of

consumption among their peers and also believe that they are expected to drink. For this group, normative restructuring strategies may need to focus not only on correcting misperceptions about the prevalence of drinking (as has been attempted by many interventions), but also to persuade individuals that injunctive norms to drink are not as strong as they think. An alternative to correcting misperceptions about the injunctive norms may be to diminish the salience of those expectations, for instance, by persuading individuals that such expectations need not be consequential, or that they have the capacity to resist such pressures (Larimer, Turner, Mallett & Geisner, 2004). Indeed, prior research has found that resistance efficacy is a strong deterrent to heavy alcohol consumption (Jang & Rimal, 2012; Rimal & Real, 2005), thus demonstrating the potency of interventions designed to enhance self-efficacy to resist peer pressure.

It is unsurprising that perceived benefits to self from drinking were associated with actual consumption. Of greater interest is the finding that perceived benefits significantly augmented the association between perceived descriptive norms and behaviors. As shown in Figure 1, if individuals did not believe that drinking confers many benefits, then not only did they drink less, but their perceptions of drinking prevalence had little bearing on their drinking. In contrast, if they did believe that alcohol conferred many benefits, then the influence of perceived descriptive norms on their own drinking was significant. A likely explanation for this finding is that youth who believe many of their peers drink and also believe that drinking confers many benefits face minimal internal resistance to comply. Indeed, when people believe that a popular behavior is beneficial, they will likely also believe that not engaging in that behavior will deprive them of benefits that others are deriving. Colloquially put, the fear of missing out propels one to act (Crone, van Duijvenvoorde, & Peper, 2016). This finding reinforces the need for alcohol prevention interventions to reduce the perceived benefits of drinking alcohol, or to temper those positive expectancies by emphasizing the potential monetary, social, academic, legal, or health-associated costs of alcohol use.

Also of interest is how the belief about benefits to others moderated the relationship between perceived descriptive norms and behavior. When people believed that others did not derive many benefits from drinking, then their perceptions of drinking prevalence was not correlated with their own drinking. In contrast, when they did believe that others were deriving many benefits, their perceptions of drinking prevalence were significantly associated with their own drinking.

The lowest level of consumption took place when people believed that others found drinking to be beneficial, but also thought that few others drank alcohol. In other words, if most others are thought not to drink, even though they benefit from drinking, then individuals are less likely to drink. Further research is needed to explore this effect. One possibility is that this subgroup was more likely to perceive higher costs to drinking, as well as greater benefits, but this variable was not measured in the present study.

Overall, the findings from this study better support the TNSB than previous studies. Further research is needed to compare methods involving different study populations (younger

adolescents vs. college students), sampling procedures (individual-level vs. cluster sampling), or varying operationalizations of the independent variables.

Limitations

The primary limitation of this study is its cross-sectional design, which prevents us from investigating whether perceived descriptive norms, perceived injunctive norms, perceived benefits to self, and perceived benefits to others are associated with later changes in drinking patterns. Research examining the temporal relationships between perceived norms and drinking have shown direct effects of perceived descriptive and injunctive norms on subsequent drinking behavior among youth (Elek, Miller-Day, & Hecht, 2006; Larimer et al., 2004). However, there is also evidence of a reciprocal relationship, with perceived descriptive and injunctive norms predicting subsequent drinking, and also concurrent drinking predicting subsequent perceived norms (Lewis, Litt & Neighbors, 2015; Neighbors, Dillard, Lewis, Bergstrom & Neil, 2006; Wardell & Read, 2013). Future research should also examine perceived benefits within a longitudinal context to better understand the dynamic interplay of these moderators.

The second limitation is that we relied on a retrospective measure of consumption, which likely suffers from recall biases that may result in an underestimation of alcohol consumed (Casswell, Huckle & Pledger, 2002). Also possible are response biases that could lead to artificially correlated measures (for example, to be consistent, those with lower perceptions of drinking benefits might report consuming less alcohol than is actually the case), which could strengthen the relationships we observed. This skepticism should be tempered, however, with prior findings from tests of the TNSB that have included experimental designs that manipulated descriptive norms (Lapinski, Rimal, DeVries, & Lee, 2007) and perceived benefits (Rimal, Lapinski, Cook, & Real, 2005) and obtained similar results.

Third, our measure of perceived injunctive norms used the phrase “others expect me to drink alcohol,” by which we meant that others think the respondent *should* drink alcohol. An anonymous reviewer pointed out, correctly, that the second interpretation of “expect” is also possible – that most others will think the respondent is likely to drink. We do not know what proportion of respondents adopted this second (unintended) meaning, which is more akin to the measure of perceived descriptive norms. The correlation between the two ($r = .45, p < .001$) suggests that, perhaps, this was an important confound. We suggest that future papers use the phrase “others think I should drink alcohol,” instead.

Finally, we note that our findings pertain only to drinkers, as non-drinkers were excluded from the sample, given the study’s focus on brand selection of underage youth who drink alcohol. This has two implications. First, the variance in our dependent variable was artificially constrained, a phenomenon that normally conspires to reduce the strengths of relationships. That we found support for the study hypotheses bolsters the viability of the underlying theoretical proposition. Second, the inferences we make in this study should be limited in scope to predicting the *amount* of drinking rather than delineating *whether* someone is a drinker or a nondrinker.

Conclusion

This paper tested and found support for the proposition that the influence of perceived descriptive norms on alcohol consumption is moderated by interactions with perceived injunctive norms and outcome expectations. Through a nationally representative survey, we found that the relationship between perceived prevalence of drinking and reported alcohol use was heightened if people also believed that they were under external pressure to drink and if drinking was perceived to be beneficial (for both oneself and others). Overall, then, our findings suggest that norms-based interventions need to expand beyond correcting misperceptions about the prevalence of alcohol consumption. They also need to correct possible misperceptions of injunctive norms and alter perceptions of the costs and benefits associated with drinking.

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Figure 1. Past 30-day total alcohol consumption, with interaction effects between descriptive norms and (a) injunctive norms (top panel), (b) perceived benefits to self (middle panel), and (c) perceived benefits to others (bottom panel).

Table 1

Descriptive Statistics (N = 1,031)

	Male (N=428) <i>M (SD) or %</i>	Female (N=603) <i>M (SD) or %</i>
Age	17.60 (1.89)	18.17 (1.81) ***
13–15	14.0%	9.0%
16–18	50.5%	41.0%
19–20	35.5%	49.9%
Grade		
Not in school	11.5%	15.8%
Elementary (grades 5–6)	0.9%	0.0%
Middle school (grades 7–8)	4.3%	2.2%
High school (grades 9–12)	47.7%	32.7%
College	35.5%	49.3%
Race		
White, non-Hispanic	57.0%	57.7%
Black	12.4%	12.1%
Hispanic	22.0%	19.9%
Other	8.6%	10.3%
Age at first drink		
8 or younger	3.4%	3.5%
9–10	3.9%	2.2%
11–12	8.9%	7.2%
13–14	22.8%	19.3%
15–16	30.5%	33.3%
17–18	25.7%	24.3%
19–20	4.8%	10.2%
Parental heavy drinking		
No drinking/no parent drinker	65.4%	64.3%
1–3 times/month	21.1%	18.7%
1–4 times/week	8.7%	11.8%
Nearly every day or more	4.8%	5.2%
Region		
Northeast	17.8%	16.7%
Midwest	28.5%	27.4%
South	30.1%	32.8%
West	23.6%	23.1%
Descriptive norms	3.20 (.89)	3.36 (.89) **
Injunctive norms	2.56 (.99)	2.53 (.96)
Benefits to self	2.93 (.92)	2.76 (.90) **
Benefits to others	2.98 (.94)	2.95 (.98)
Total alcohol consumption (past 30 days)	23.07 (37.42)	18.29 (30.75) *

Note: Descriptive norms, injunctive norms, benefits to self, and benefits to others were coded on 5-point Likert scales. Statistical tests compare males and females.

*
 $p < .05$.

**
 $p < .01$.

 $p < .001$.

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Table 2
Pearson Correlations among Predictors of Past 30-Day Total Alcohol Consumption (N = 1,031)

	2	3	4	5	6	7	8	9	10	11	12	13
1. Female	.15***	.02	.08*	.01	.03	.03	.03	.09**	-.01	-.10**	-.02	-.07*
2. Age	1.00	.08**	.36***	-.06	-.00	.03	-.05	.20***	.08**	.09**	.09**	.24***
3. Grade		1.00	.10**	-.01	-.04	-.04	.08*	.13***	.03	.09**	.09**	-.01
4. Age at first drink			1.00	-.03	.02	-.08**	-.14***	-.03	-.08*	-.13***	-.09**	-.09**
5. White				1.00	-.10**	.15***	.05	.01	-.04	.13***	.09**	.03
6. Southern region					1.00	.07*	.00	-.01	-.03	-.03	-.04	.01
7. Rural						1.00	.04	-.00	-.03	.01	-.01	.08*
8. Parental heavy drinking							1.00	.10**	.10**	.13***	.10**	.04
9. Descriptive norms								1.00	.45***	.36***	.45***	.18***
10. Injunctive norms									1.00	.44***	.48***	.13***
11. Benefits to self										1.00	.71***	.20***
12. Benefits to others											1.00	.12***
13. Alcohol consumption (past 30 days)												1.00

Note : Due to missing values, some correlations were based on smaller sample sizes.

*
 $p < .05$

**
 $p < .01$

 $p < .001$.

Table 3**Past 30-Day Total Alcohol Consumption from Regression Equations**

	r^2	β_1	β_2	β_3	β_4
Block 1: Main effects					
Female	-.07*	-.11**	-.10**	-.11**	-.10**
Age	.24***	.28***	.28***	.29***	.29***
Grade	-.01	-.03	-.03	-.03	-.03
Age at first drink	-.09**	-.14***	-.14***	-.14***	-.14***
White	.03	-.02	-.01	-.02	-.02
Southern region	.01	-.01	-.01	-.01	-.01
Rural	.08*	.04	.03	.04	.03
Parental heavy drinking	.04	.01	.02	.01	.01
Descriptive norms (DN)	.18***	.10**	.11**	.11**	.10**
Injunctive norms (IN)	.13***	.03	.01	.03	.04
Benefits to self (BS)	.20***	.17***	.17***	.15**	.17***
Benefits to others (BO)	.12***	-.07	-.05	-.05	-.07
Block 2: Interactions ^c					
2A: DN x IN	.07*		.11**		
2B: DN x BS	.11***			.12***	
2C: DN x BO	.06				.10**
R-square		.136***	.148***	.151***	.146***

Notes:

^a Pearson correlation between predictor and alcohol consumption. All β s are standardized betas from regression equations; β_1 pertains to only variables in Block 1 included in the model; β_2 pertains to variables from Block 1 and Step 2A in the model; β_3 pertains to variables from Block 1 and Step 2B in the model; β_4 pertains to variables from Block 1 and Step 2C in the model.

^c Block 2 analyses included all variables from Block 1 and only one interaction term from Block 2.

* $p < .05$

** $p < .01$

$p < .001$

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