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Associations of descriptive and reflective injunctive norms with risky college drinking

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Abstract

The current study describes the relative predictive power of descriptive norms (i.e., how much the target student believes referents “drink until they get drunk”) and reflective injunctive norms (i.e., target student’s perception of referents’ approval of the target student drinking until drunk) across various reference groups. The aim of this study was to gain further insight into which types of norms and reference groups are most highly concurrently correlated with risky drinking. It was hypothesized that both reflective injunctive and descriptive norms would be significantly positively correlated with risky drinking outcomes, and that more proximal reference group norms would be more highly predictive than more distal reference group norms. Participants ($N = 837$) were college students on the US west coast who completed questionnaires in the context of a longitudinal parent study. Cross-sectional, zero-inflated negative binomial regressions were used to test the relative strengths of correlations between descriptive and reflective injunctive norms (i.e., for typical college students, closest friend, person whose opinion they value most and closest family member) and risky drinking (i.e., peak alcohol quantity, frequency of heavy drinking episodes, and alcohol-related problems). Findings showed that descriptive and reflective injunctive norms were most consistently, strongly and positively correlated with risky drinking when they involved referents who were closer to the target college drinkers (i.e., closest friend and person whose opinion you value the most). Norms for typical college students were less consistent correlates of risky drinking. These findings may contribute to the knowledge base for enhancing normative re-education and personalized normative feedback interventions to include more personally salient and powerful normative information.

Keywords

College drinking; descriptive norms; reflective injunctive norms; risky drinking; alcohol use

The negative consequences associated with the consistently high rates of heavy-episodic drinking (i.e., 4 drinks for women and 5 drinks for men; Dawson, Grant, Stinson, & Chou, 2004; Nelson, Xuan, Lee, Weitzman, & Wechsler, 2009) among college students are well-documented. Heavy-episodic drinking affects both college drinkers (e.g., accidents and falls resulting in injury; risky sex; unwanted sexual advances, rape and sexual assault;

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driving while intoxicated; problems with authorities; Abbey, 2002; Hingson, Heeren, Zakocs, Kopstein, & Wechsler, 2002) and their communities (e.g., sleep disruption; property damage; verbal, physical or sexual violence; Langley, Kypri, & Stephenson, 2003; Wechsler & Nelson, 2008). The pressing severity of the problem has led researchers to explore correlates and predictors of heavy-episodic drinking among college students—including family history, demographics, personality factors, drinking motives, expectancies, attitudes, peer influences, drinking onset, and perhaps most prolifically, perceived norms—to better understand how to effectively intervene (Baer, 2002; Borsari, Murphy, & Barnett, 2007).

Dozens of studies have shown strong associations between norms and college drinking (for reviews, see Borsari & Carey, 2003; Borsari & Carey, 2001). Most of these studies have evaluated the importance of *descriptive norms*, or the target student's beliefs about how much other reference groups drink, and have collectively shown that college students consistently overestimate referents' drinking (Borsari & Carey, 2003). Descriptive norms have been shown to be positively associated with alcohol outcomes (e.g., Baer, Stacy, & Larimer, 1991; Larimer et al., 2009; Larimer et al., 2011; Larimer, Turner, Mallett, & Geisner, 2004; Perkins, 2007; Perkins, Haines, & Rice, 2005).

Injunctive norms, or how much the target student believes referents approve or disapprove of drinking in general, have been researched to a lesser extent, but studies have shown similar outcomes. Specifically, college students perceive reference groups to approve of drinking more than is actually the case (Borsari & Carey, 2003; DeMartini, Carey, Lao, & Luciano, 2011; LaBrie, Napper, & Ghaidarov, 2012). On the other hand, the association between injunctive norms and drinking outcomes is more complex. Studies have shown that self-other discrepancies (i.e., the perceived difference between the target's and referents' behaviors and attitudes) created by injunctive norms are larger than for descriptive norms (Borsari & Carey, 2003). The association of injunctive norms with drinking outcomes varies by reference group: the closer the referents, the greater the positive association between perceived referent approval of drinking and the target student's drinking and alcohol-related problems (LaBrie, Hummer, Neighbors, & Larimer, 2010; Neighbors et al., 2008).

Reflective injunctive norms are a more personally referenced version of injunctive norms and were originally introduced as "subjective norms" in the theory of reasoned action (Ajzen & Fishbein, 1980) and, later, in the theory of planned behavior (Ajzen, 1991). Reflective injunctive norms represent the extent to which the target believes referents approve of the target's own drinking (Ajzen, 2002). As applied in the theory of planned behavior, reflective injunctive norms have been shown to evince a positive association with intent to engage in risky drinking, and in some studies, an indirect effect on risky drinking via intent (Collins & Carey, 2007; Collins, Witkiewitz, & Larimer, 2011; Huchting, Lac, & LaBrie, 2008; Johnston & White, 2003).

Current Study Aim and Hypotheses

The aim of this study was to assess the relative predictive power of parallel descriptive and reflective injunctive norms across various peer groups and thereby gain further insight into which types of norms and reference groups are most highly concurrently correlated with

risky drinking. It was hypothesized that both reflective injunctive and descriptive norms would be significantly positively correlated with risky drinking outcomes (i.e., peak drinking quantity, heavy drinking episode [HDE] frequency, and alcohol-related problems), and that more proximal reference group norms would be more highly predictive than more distal reference group norms.

Methods

Participants

Participants were 837 (63.9% female, 0.1% transgender) college students at two, four-year universities on the US west coast who participated in a longitudinal parent study (response rate = 70%; Collins et al., 2011). Please see Table 1 for sample description.

Measures

The *Personal Information Questionnaire* assessed participants' age, gender, year in college, race/ethnicity, and membership in an on-campus Greek organization. This measure was used to describe the baseline sample.

The *Reflective Injunctive Norms Questionnaire* was made up of indicators from the *Subjective Norms Questionnaire*, a measure based on suggestions by Ajzen (2002a), and modified from a previous study (Collins & Carey, 2007). Participants rated how much various referents would approve or disapprove of their "drinking until you get drunk" in the next 30 days, where 1= highly disapprove and 5 = highly approve. Target groups included "an average college student at your university," "your closest friend," "your closest family member," and "the person whose opinion you value most." The question stem was rephrased to assess *descriptive norms* for each of the reference groups (e.g., "Will an average college student at your university drink until they get drunk at least once in the next 30 days?"). Participants could agree or disagree with these statements (1=strongly disagree to 5=strongly agree). Items for descriptive ($\alpha = .96$) and reflective injunctive ($\alpha = .96$) norms showed good internal consistency.

The *Frequency-Quantity (F-Q) Questionnaire* (adapted from Borsari & Carey, 2000; Collins, Carey, & Sliwinski, 2002; Dimeff, Baer, Kivlahan, & Marlatt, 1999) includes open-ended items assessing participants' self-aggregated alcohol frequency and quantity of alcohol consumption in the past 30 days.

The *Timeline Followback* questionnaire (TLFB; Sobell & Sobell, 1992) was used to aggregate HDE frequency in the past 30 days. The TLFB is a set of monthly calendars that allows for a retrospective evaluation of drinking for each day of the previous month.

Alcohol-related problems were assessed using the *Rutgers Alcohol Problems Index* (RAPI; White & Labouvie, 1989), which asks participants how often (0=never to 4=more than 10 times) they experienced 23 drinking-related consequences over the previous 30 days. The overall score showed acceptable internal consistency ($\alpha = .94$).

Procedure

Potential participants for the current study were emailed invitations. Invitations included the study URL and a randomly generated personal identification number (PIN) with which participants logged into the secure study website. Participants provided informed consent and completed the baseline assessment, which included the measures noted above and took approximately 45 minutes. They were paid \$20 for their time.

Data Analysis Plan

Three regression models were conducted in Stata 11.2 (StataCorp, 2009) to determine the relative contributions of reflective injunctive and descriptive norms in the prediction of risky drinking outcomes (i.e., alcohol quantity during the heaviest drinking occasion in the past 30 days [peak alcohol quantity], HDE, and alcohol-related problems). Because drinking outcome variables were overdispersed, positively skewed count/integer responses and evinced a preponderance of zeros, zero-inflated negative binomial (ZINB) models were used (Cameron & Trivedi, 1998). ZINB is a subset of generalized linear models for count outcomes that are positively skewed and have more zero responses than would be expected given the distribution. ZINB models two processes: the zero-inflated portion of the model, which is a Bernoulli trial to determine the probability that an observation is consistently zero, and a negative binomial portion of the model, which determines the association if the observation is a feasible count response predicted by the negative binomial distribution (Hardin & Hilbe, 2007).

Results

Descriptive statistics for the predictors and outcomes are presented in Table 2, and zero-order correlations are listed in Table 3.

Zero-inflated Negative Binomial Model Outcomes

Peak alcohol quantity—The omnibus model was significant, $\chi^2(8, N = 831) = 87.51, p < .001$, Vuong $z = 7.68, p < .001$, Nagelkerke pseudo $R^2 = .30$. The negative binomial portion of the model indicated that descriptive norms for a typical college student inversely predicted peak alcohol quantity, whereas descriptive norms for a respondent's closest friend positively predicted peak alcohol quantity. Reflective injunctive norms for one's closest friend were positively associated with peak alcohol quantity (see Table 4 for model parameters). The zero-inflated portion of the model indicated that both descriptive and reflective injunctive norms for one's closest friend inversely predicted zero inflation. Therefore, the greater the agreement that one's closest friend would drink until drunk and approve of the respondent drinking until drunk, the lower the likelihood the student belonged to the "consistent zero," or abstinent part of the distribution. Additionally, the greater the perceived approval by the person whose opinion they valued the most, the less likely respondents were to belong to the consistent zero group (Table 4).

Heavy Drinking Episodes (HDE)—The omnibus model was significant, $\chi^2(8, N = 831) = 53.57, p < .001$, Vuong $z = 4.42, p < .001$, Nagelkerke pseudo $R^2 = .30$. The negative binomial portion of the model indicated that descriptive norms for a typical college student

inversely predicted HDE, whereas descriptive norms for a respondent's closest friend positively predicted HDE. Regarding reflective injunctive norms, similar relationships existed for norms regarding typical students and one's closest friend (Table 4). The zero-inflated portion of the model indicated that both descriptive and reflective injunctive norms for one's closest friend inversely predicted zero inflation (Table 4).

Alcohol-related problems—The omnibus model was significant, $\chi^2(8, N = 797) = 16.45, p = .04$, Vuong $z = 4.01, p < .001$, Nagelkerke pseudo $R^2 = .20$. None of the negative binomial results were significant for predicting alcohol-related problems (Table 4). The zero-inflated portion of the model indicated that descriptive norms for one's closest friend and the person whose opinion the respondent valued most inversely predicted zero inflation (Table 4).

Discussion

The aims of this study were to test the relative predictive power of parallel descriptive and reflective injunctive norms across various peer groups. It was hypothesized that both reflective injunctive and descriptive norms would be associated with risky drinking outcomes (i.e., peak drinking quantity, HDE frequency and alcohol-related problems), and that more proximal referents would be more highly predictive than more distal referents.

Summary of Current Findings

Findings largely corresponded to hypotheses. Zero-order correlations showed that both descriptive and reflective injunctive norms regarding closer referents (in descending level of association: closest friend, person whose opinion you value most, and closest family member) showed stronger positive correlations with risky drinking and related problems than norms regarding typical college students.

Next, our multivariate analyses afforded the unique opportunity to differentiate between two aspects of risky drinking: the odds of typically engaging in nonrisky versus risky drinking as well as the extent of risky drinking. Regarding the former, we were able to note which types of norms predicted drinking outcomes for people who were likely never to drink, experience HDE or alcohol-related problems. Specifically, the norm for one's closest friend was the primary predictor among descriptive norms, such that greater belief one's closest friend would drink until they got drunk was associated with lower likelihood of being either abstinent or a lighter drinker. Greater conviction that both one's closest friend and person whose opinion one values most would drink until drunk was also associated with a lower likelihood of nonproblem drinking. Regarding reflective injunctive norms, we found that greater agreement that one's closest friend or person whose opinion one values most would approve of one drinking until drunk was associated with lower likelihood of being either abstinent or a light drinker.

Second, we examined the prediction of the extent of risky drinking by descriptive and injunctive norms. We found that descriptive and reflective injunctive norms for one's closest friend served as the most consistent, positive predictors of risky drinking outcomes, with reflective injunctive norms for the person whose opinion respondents value most being a

similarly consistent positive predictor. Unlike in the zero-order correlations, however, closest family member was never significantly associated with risky drinking outcomes, and neither descriptive nor reflective injunctive norms were associated with the extent of one's experience of alcohol-related problems. Finally, descriptive norms regarding a typical college student were inversely—not positively—associated with risky drinking outcomes in the multivariate models.

Findings in the Context of the Norms Literature

Our findings replicated and extended those of other recent studies of norms and their relative weight across various reference groups (Larimer et al., 2009; Larimer et al., 2011) and norm types (LaBrie et al., 2010; Neighbors, Lostutter, Fossos, Walker, & Larimer, 2007; Neighbors et al., 2008). Regarding the similarities between other studies and the current study, we noted that both descriptive and reflective injunctive norms using typical college students as the reference group were positively associated with risky drinking in zero-order correlations—although not as strongly positively correlated as closer reference groups. When examined in the context of other reflective injunctive and descriptive norms, however, norms for typical students were *inversely* associated with experience of HDE, and peak alcohol quantity. A similar pattern of findings has been found across a few studies whose authors have attributed it to a potential negative suppressor effect (cf. Neighbors et al., 2007; Neighbors et al., 2008). Although more studies are needed to further parse and confirm this finding, it may be concluded that norms regarding closer referents and *not* typical college students are more powerful and consistent predictors of risky drinking outcomes.

While it replicated findings from previous studies, the current study also expanded upon these findings to include new reference groups (e.g., “person whose opinion you value most,” “closest family member”), a target behavior that is more specific to HDE experienced by college students (i.e., “drinking until you got drunk”), and a different type of injunctive norm (i.e., reflective injunctive norms) also known as “subjective norms” in the theory of planned behavior (Ajzen, 1991). Although reflective norms have been explored in a couple of prior studies in the college drinking norms literature, this has only been done in the context of opposite-gender perceptions and has not been personally referenced (Hummer, LaBrie, Lac, Sessoms, & Cail, 2012; LaBrie, Cail, Hummer, Lac, & Neighbors, 2009). Because they capture people's perceptions of others' approval of their own behavior, the current findings suggest reflective injunctive norms may be personally relevant and affectively salient.

Limitations

Because we did not additionally assess injunctive norms, it is impossible to compare the relative contributions of the reference groups' approval of drinking until drunk in general (injunctive norms) versus approval of the target student's drinking until drunk (reflective injunctive norms). Future studies may include both types of injunctive norms to understand their relative predictive abilities.

The norms questionnaires did not ask participants to indicate exactly who certain referents were (e.g., whom participants had in mind when considering their “closest family member”

or “person whose opinion they valued most”). Nonetheless, we were able to address the research question: what types of norms are most predictive of risky drinking outcomes. Future studies may incorporate qualitative methods to describe these most salient referents in greater detail.

Finally, this study is a cross-sectional representation of the associations between college drinking and norms. To better understand how norms may affect college drinking trajectories, it will be important to replicate such findings in longitudinal studies. Despite these limitations, however, the current study was able to introduce new reference groups, a new target behavior and a different type of injunctive norm. In doing so, we were able to replicate and expand upon the existing college norms literature.

Conclusion and Future Directions

This study indicated that descriptive and reflective injunctive norms are most highly, positively correlated with college drinking when they involve referents who are closer to the target college drinkers (i.e., closest friend and person whose opinion you value the most). These findings may contribute to the knowledge base for enhancing normative re-education and personalized normative feedback interventions to include more personally salient and powerful normative information.

Future studies should include assessment of both injunctive and reflective injunctive norms to better characterize the difference between these two aspects of social approval and to understand whether one may be more affectively salient than the other. In turn, future studies of personalized normative feedback may include feedback on closer referents to create more powerful interventions that inspire greater and potentially more lasting drinking behavior change for college students. This suggested direction is challenging, because it is much more difficult to gather information on specific referents to assess the normative discrepancy. On the other hand, future studies could explore feedback on reflective injunctive norms without relying on normative discrepancy. It is possible that simply making college drinkers aware of their normative beliefs could build discrepancy (e.g., self-other or ideal-current drinking) that could, in turn, influence drinking behavior.

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Table 1

Sociodemographic Sample Description (N = 837)

Variable	<i>M(SD)</i> / %
Age	20.15(1.39)
Race	67.3% White/European American
	12% Asian
	10% More than one race
	5% Other
	2.9% Black/African American
	2% Native Hawaiian/Pacific Islander
	0.8% American Indian/Alaskan Native
Ethnicity	12.5% Hispanic/Latino(a)
Class	28.3% Senior
	27.5% Junior
	27% Sophomore
	17.2% Freshman
Greek affiliation	25.4% Greek

Table 2

Descriptive Statistics for Predictors and Outcomes

Predictor variables	<i>M(SD)</i>
Descriptive norms	
Typical student	4.30(1.17)
Closest friend	3.46(1.59)
Closest family member	2.23(1.49)
Person whose opinion you value most	2.45(1.48)
Reflective injunctive norms	
Typical student	3.98(.96)
Closest friend	3.26(1.33)
Closest family member	2.18(1.15)
Person whose opinion you value most	2.47(1.21)
Outcome variables	
Heavy drinking episodes	2.76(4.25)
Peak alcohol quantity	4.84(4.67)
Alcohol-related problems	3.53(6.74)

Notes. Descriptive norms were single items measured on a 5-point Likert scale, where 1 = strongly disagree and 5 = strongly agree. Reflective injunctive norms were single items measured on a 5-point Likert scale, where 1 = highly disapprove and 5 = highly approve. Alcohol-related problems are represented by Rutgers' Alcohol Problem Index (RAPI) mean scores, which assume the same scale as individual RAPI items and thereby represent frequency of alcohol-related problem experience (0 = none to 4 = greater than 10 times).

Table 3Zero-order Correlations (Bivariate Spearman's ρ) Between Norms and Risky Drinking

Measures	Peak alcohol quantity	Heavy drinking episodes	Alcohol-related problems
Descriptive norms			
Typical student	.10	.12	.08
Your closest friend	.42	.44	.37
Your closest family member	.18	.21	.18
Person whose opinion you value most	.33	.35	.29
Reflective injunctive norms			
Typical student	.10	.12	.10
Your closest friend	.47	.47	.39
Your closest family member	.33	.31	.23
Person whose opinion you value most	.40	.39	.28

Notes. All correlations were significant at $p < .03$, even after a modified Bonferroni correction was applied (Jaccard & Wan, 1996).

Table 4

Zero-inflated Negative Binomial Model Parameters

Predictors	Coefficients (<i>IRR/B</i>) ^a	SE	CI (95%)	z	p
Peak Alcohol Quantity					
Negative binomial process					
Descriptive norms					
Typical student	.88	.03	.83, .94	-4.25	<.001
Closest friend	1.09	.03	1.03, 1.15	2.97	.003
Closest family member	1.01	.02	.97, 1.05	.55	.58
Person whose opinion you respect the most	1.004	.02	.96, 1.05	.16	.87
Reflective injunctive norms					
Typical student	.94	.03	.87, 1.01	-1.78	.07
Closest friend	1.16	.04	1.08, 1.25	4.19	<.001
Closest family member	1.02	.03	.96, 1.08	.50	.62
Person whose opinion you respect the most	1.05	.03	.98, 1.12	1.36	.17
Zero-inflated process					
Descriptive norms					
Typical student	-.02	.10	-.21, .17	-.19	.85
Closest friend	-.29	.09	-.47, -.11	-3.15	.002
Closest family member	.07	.09	-.11, .25	.74	.46
Person whose opinion you respect the most	-.02	.11	-.24, .19	-.20	.85
Reflective injunctive norms					
Typical student	.13	.12	-.11, .37	1.06	.29
Closest friend	-.49	.13	-.74, -.25	-3.19	<.001
Closest family member	-.12	.15	-.42, .18	-.79	.43
Person whose opinion you respect the most	-.33	.16	-.64, -.02	-2.07	.04

Heavy Drinking Episodes

Negative binomial process					
Descriptive norms					
Typical student	.86	.06	.75, .98	-2.28	.02
Closest friend	1.20	.08	1.06, 1.36	2.91	.004

Predictors	Coefficients (IRR/B ^a)	SE	CI (95%)	z	p
Closest family member	1.04	.04	.97, 1.13	1.10	.27
Person whose opinion you respect the most	1.04	.05	.95, 1.14	.85	.40
Reflective injunctive norms					
Typical student	.81	.06	.70, .94	-2.81	.01
Closest friend	1.32	.10	1.14, 1.53	3.69	<.001
Closest family member	1.05	.06	.94, 1.18	.89	.38
Person whose opinion you respect the most	.98	.06	.87, 1.11	-.29	.77
Zero-inflated process					
Descriptive norms					
Typical student	.11	.14	-.17, .38	.75	.46
Closest friend	-.33	.14	-.60, -.06	-2.44	.02
Closest family member	.11	.13	-.15, .37	.82	.41
Person whose opinion you respect the most	-.17	.16	-.50, .15	-1.06	.29
Reflective injunctive norms					
Typical student	-.07	.19	-.45, .30	-.38	.71
Closest friend	-.61	.19	-.98, -.25	-3.27	.001
Closest family member	.02	.25	-.47, .51	.07	.94
Person whose opinion you respect the most	-.65	.27	-1.18, .11	-2.38	.02
RAPI Score					
Negative binomial process					
Descriptive norms					
Typical student	.87	.07	.74, 1.02	-1.74	.08
Closest friend	1.10	.09	.94, 1.29	1.20	.23
Closest family member	1.04	.05	.95, 1.15	.84	.40
Person whose opinion you respect the most	1.03	.06	.91, 1.16	.44	.66
Reflective injunctive norms					
Typical student	.88	.08	.74, 1.05	-1.38	.17
Closest friend	1.17	.10	.98, 1.39	1.76	.08
Closest family member	1.05	.07	.91, 1.2	.65	.52
Person whose opinion you respect the most	.94	.07	.80, 1.09	-.82	.41
Zero-inflated process					

Predictors	Coefficients (IRR/B) ^a	SE	CI (95%)	z	p
Descriptive norms					
Typical student	.17	.33	-.49, .82	.50	.62
Closest friend	-.59	.27	-1.12, -.05	-2.15	.03
Closest family member	.25	.23	-.20, .70	1.09	.28
Person whose opinion you respect the most	-2.26	1.05	-4.32, -.20	-2.15	.03
Reflective injunctive norms					
Typical student	-.24	.36	-.94, .46	-.68	.50
Closest friend	-.35	.32	-.98, .27	-1.11	.27
Closest family member	-.39	.37	-1.12, .34	-1.06	.29
Person whose opinion you respect the most	-.06	.37	-.79, .67	-.17	.87

Notes.

^aFor the negative binomial process, coefficients are represented as incident rate ratios (IRRs). For the zero-inflated process, raw coefficients (B) are presented.