

Addressing Inconsistencies in the Social Norms Drinking Literature: Development of the Injunctive Norms Drinking and Abstaining Behaviors Questionnaire

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Background: Informed by inconsistent findings regarding the association between injunctive norms (IN) and drinking behaviors, the current study developed a new measure of IN, the Injunctive Norms Drinking and Abstaining Behaviors Questionnaire (IN-DABQ). This measure addressed several psychometric weaknesses of prior assessment of this construct, specifically, reliance on single-item measures, and assessment of a limited range of drinking behaviors. The new measure also assessed norms for reasons for abstaining from drinking as college students often have simultaneous motives to use and inhibit their drug use. A parallel measure of descriptive norms (DN), the Descriptive Norms Drinking and Abstaining Behaviors Questionnaire (DN-DABQ), was created to allow for a comparison of the relative predictive effects of descriptive and IN in relation to different drinking outcomes.

Methods: A college sample ($N = 254$, female = 50.42%) was recruited using Amazon's Mechanical Turk. Participants completed an online survey assessing demographic characteristics, social norms for 3 referents, weekly alcohol use, and alcohol-related consequences.

Results: Exploratory factor analyses indicated 2 factors for the DN-DABQ and 3 factors for the IN-DABQ. The IN Drinking Behaviors factor consistently predicted weekly consumption and alcohol-related consequences across 3 reference groups (typical college student at your school, friends, and closest friends).

Conclusions: These findings suggest that prior inconsistencies in the relationship between IN and drinking behaviors are likely a function of poor measurement of this construct. Implications for normative feedback interventions are discussed.

Key Words: Injunctive Norms, Descriptive Norms, Attitudes, College Drinking.

SOCIAL NORMS ARE considered important in the etiology of college drinking and are modifiable targets for intervention (Perkins, 2002). Although evidence highlights the role of both descriptive norms (DN) (perceptions of how much peers engage in drinking behaviors) and injunctive norms (IN) (perceptions of peer approval of drinking behaviors) in college student drinking behaviors (Borsari and Carey, 2001; Larimer et al., 2004), social norms interventions predominantly target DN (Lewis and Neighbors, 2006). Researchers have excluded IN from normative feedback interventions in part because of inconsistent support for the link between IN and alcohol use (Neighbors et al., 2008). We propose that these inconsistent findings may stem from weak measurement of IN, specifically, reliance on single-item measures, and assessment of a limited range of

drinking behaviors. The goal of the current study was to address these measurement issues by developing a new measure of IN that assessed the perceived approval of drinking behaviors ranging from abstinence to alcohol-related consequences.

Measurement of Injunctive Norms

Perceived Peer Approval of Drinking Behaviors. IN have been widely assessed using single-item measures in the college student drinking literature (Hustad et al., 2014; Mallett et al., 2009; Pearson and Hustad, 2014; Turrissi et al., 2007). While single-item measures are parsimonious to administer, issues concerning their reliability and validity have been well noted (e.g., Diamantopoulos et al., 2012). Furthermore, the domain of IN may be factorially complex (Lewis et al., 2010), and single items provide limited coverage of this potentially complex construct, which may further contribute to weak or inconsistent effects.

Lewis and colleagues (2010) recently noted that measures of IN often ask individuals to rate the perceived acceptability of hazardous drinking behaviors (e.g., driving drunk, drinking enough alcohol to pass out) and hence represent a limited range of drinking behavior. In contrast, measures of DN predominantly assess perceptions of weekly consumption

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(see Baer et al., 1991; Neighbors et al., 2007). Because measures of IN often focus on perceptions of high risk drinking behaviors, while DN measures often focus on perceptions of daily consumption, it is difficult to disentangle whether inconsistent relations between IN and drinking reflect IN being an unimportant normative influence or instead reflect that assessment emphasizes severe drinking behaviors.

In this study, we develop a new measure of IN to address shortcomings of prior measures (e.g., reliance on single item and limited range of drinking behaviors). Further, we included parallel items in our assessment of DN to facilitate comparison of each type of norm.

Perceived Peer Approval of Abstinence from Drinking. College students often have simultaneous motives to use and inhibit their drug use (Anderson et al., 2013). Recent work in the social norms literature has begun to explore the relationship between motivations to limit or refrain from drinking and alcohol use. For instance, college student perceptions of their fellow students' use of protective behavioral strategies have been found to be associated with their personal use of protective behavioral strategies (Lewis et al., 2009). Further, college student perceptions of peer approval of protective behavioral strategies have been associated with lower levels of alcohol use (DeMartini et al., 2011). One study to date has assessed whether perceptions of peer abstinence from alcohol use are associated with drinking (Litt and Lewis, 2015). Using a college sample, Litt and Lewis (2015) demonstrated that higher perceptions of peer abstinence from alcohol use were related to lower levels of alcohol involvement. Although this study found a relation between abstinence norms and alcohol use, perceived reasons for abstaining from drinking were not assessed. This emerging literature suggests that perceptions of protective behavioral strategies and abstinence guide and constrain behavior much like other social norms (Cialdini and Trost, 1998), and accordingly, we included perceptions of various reasons for abstaining from drinking in our measure. The perception that various reasons for abstaining from drinking are frequently used and acceptable should be associated with lower levels of alcohol use.

Summary of the Current Study

Recent work has begun to recognize the importance of improving measurement of IN (Krieger et al., 2016; Lewis et al., 2010). Krieger and colleagues (2016) developed the Drink-Based Measure of IN, which asks respondents to list the maximum number of drinks the typical university student would consider acceptable each day of the week. The measure also asks respondents to rate the maximum frequency and quantity the typical university student would find acceptable during a single drinking occasion. The authors demonstrated unique associations between drink-based IN and drinking frequency and typical drinks per occasion. However, drink-based IN were not consistently associated

with weekly consumption. We view this study as making important advancement by broadening the assessment of IN and covering the same content for DN and IN.

The current study sought to continue to advance the assessment of IN by developing a new measure that assessed a wide range of drinking behaviors from abstaining from drinking to alcohol-related consequences. Furthermore, we included the same range of behaviors for the assessment of DN to facilitate comparison of the predictive utility each type of norm. This approach allowed us to shed light on whether including a broader range of drinking behaviors than prior measures of IN, including the Drink-Based Measure of IN, led to more consistent associations between IN and drinking behaviors.

MATERIALS AND METHODS

Participants

The college student sample was recruited using Amazon's Mechanical Turk (MTurk). MTurk is an online labor market that connects researchers (called requesters) to subjects (called workers), who complete tasks for small amounts of money. Participants were compensated 1 dollar for their participation, which is comparable to other studies of a similar length (Shapiro et al., 2013). Work assessing the quality of data from MTurk has shown that data quality is not affected by workers' compensation and length of task (Buhrmester et al., 2011). Additionally, MTurk samples have been shown to be at least as representative as the U.S. population when compared to traditional subject pools (Paolacci et al., 2010). One concern with data collected from MTurk, or any web-based experiment for that matter, is that subjects tend to be less attentive than in supervised experiments (Oppenheimer et al., 2009). Thus, in addition to questionnaires about demographics, drinking behaviors and consequences, and social norms, an inconsistency scale was embedded into the survey to identify any individuals who may not have been paying attention.

The current study restricted the sample to individuals residing in the United States, and workers needed to have a satisfaction rating of at least 90% on their previous tasks to be eligible to participate. In addition, all individuals were required to take a 3-item pretest, which asked questions regarding age, sex, and educational status. Participants between the ages of 18 and 22 and who were currently enrolled in either a 2- or 4-year college met eligibility for the current study ($N = 254$). Sample characteristics can be found in Table 1.

Measures

Alcohol Consumption. Weekly alcohol consumption was assessed using the Daily Drinking Questionnaire (DDQ; Collins et al., 1985). Individuals reported the number of drinks they typically consume for each day of the week, and responses were summed to form a weekly alcohol consumption variable. The DDQ has shown strong convergent validity and test-retest reliability (Marlatt et al., 1998; Neighbors et al., 2006). The DDQ had strong internal consistency ($\alpha = 0.86$).

Alcohol-Related Consequences. Alcohol-related consequences were assessed using the Brief Young Adult Alcohol Consequences Questionnaire (BYAACQ; Kahler et al., 2005). The BYAACQ includes 24 items with dichotomous responses (0 = no, 1 = yes) that assess a range of alcohol-related consequences experienced in the past year. Items were summed to form a scale score. The internal consistency for the BYAACQ was strong ($\alpha = 0.93$).

Table 1. Sample Characteristics

	College student (N = 235)
Gender (%)	
Male	49.58
Female	50.42
Age (%)	
18	3.78
19	13.87
20	21.01
21	31.93
22	29.41
Race (%)	
Black	9.01
Asian	7.3
White	73.82
Hispanic	7.73
Other	2.15
Not reported	2.1
Fraternity/Sorority member (%)	20.80%
Club/Varsity athlete (%)	21.89%
Parental education (M)	Some college
Living arrangement (%)	
On campus	31.76
Off campus/with parents	14.59
Off campus/not with parents	49.79
Sorority or fraternity house	3.86
Work status (%)	
Full time	9.01
Part time	62.23
Military	0.43
Not working	28.33

Sample characteristics are for the college students included in the factor analyses and path models.

Drinking and Abstaining Behaviors Questionnaire. The Descriptive Norms Drinking and Abstaining Behaviors Questionnaire (DN-DABQ) and Injunctive Norms DABQ (IN-DABQ) were constructed such that item content reflected a range of drinking behaviors ranging from reasons for abstaining from drinking to alcohol-related consequences. For the drinking behaviors and consequences items, content ranged from less severe drinking behaviors (e.g., only have 1 or 2 drinks, drink occasionally) to more hazardous drinking behaviors (e.g., black out from drinking, drive after drinking). The content of the 8 drinking behaviors and consequences items were adapted from previous measures of social norms (Baer, 1994; Larimer et al., 2004; Lewis et al., 2010; Merrill et al., 2013b). Consequences were chosen that were both relatively severe, yet also moderately frequent in their occurrence (Kahler et al., 2005). Items pertaining to reasons for abstaining from drinking were adapted from the Reasons for Abstaining and Limiting Drinking measure (Epler et al., 2009). Examples of the 7 items that were used to assess reasons for limiting drinking were “How many times during a typical week do your friends not drink because of health concerns” and “How many times during a typical week do your friends not drink alcohol because drinking would interfere with their abilities to carry out their responsibilities.”

For the DN-DABQ, participants were instructed to select the number of times a particular reference group engaged in each drinking behavior and reason for abstaining from drinking over the course of a typical week (e.g., How many times during a typical week do your friends have a hangover after drinking?). For the IN-DABQ, participants rated how much they perceived a particular reference group approved of the same drinking behavior and reasons for abstaining from drinking on a scale from 1 (strongly disapprove) to 7 (strongly approve) (e.g., How do most of your friends feel about having a hangover after drinking?).

Participants completed the DN-DABQ and the IN-DABQ for 3 commonly assessed reference groups: (i) typical college student, (ii) friends, and (iii) closest friends. Reference group has repeatedly been noted as an important issue when assessing social norms (Borsari and Carey, 2003; LaBrie et al., 2010; Neighbors et al., 2008). Considering the mixed evidence for the importance of reference group in relation to IN (LaBrie et al., 2010; Neighbors et al., 2008), we were interested in whether addressing psychometric weaknesses of IN measures impacted the association of this norm with alcohol use across referents.

Internal Consistency Items. Recent work has highlighted the utility of identifying unreliable reporting in online surveys (Wardell et al., 2014). Accordingly, a 5-item internal consistency scale was developed for the current study to identify any unreliability in reporting. All questions on this scale were structured such that they should be answered with a zero. If participants entered a nonzero response to more than 2 of these items, then they were removed from subsequent analyses. This resulted in 19 participants being removed.

RESULTS

Factor Structure of Norms Measures

Exploratory factor analysis (EFA) was used to assess the factor structure of the DN-DABQ and IN-DABQ using the PROC FACTOR procedure in SAS 9.3 (SAS Institute Inc., 2011). Based on the recommendations of Tabachnick and Fidell (2013), we started analysis with principal component analysis (PCA) to determine the number of factors to extract. Using the eigenvalues from PCA, the Kaiser–Guttman rule, scree test, and parallel analysis (O’Connor, 2000), we determined the number of factors to extract for both the DN-DABQ and IN-DABQ across the 3 reference groups. Next, based on the results of the PCA, the factor solutions were evaluated using principal factor analysis (PFA) for cross-loadings, strength of factor loadings, and interpretability.

Descriptive Norms. Separate EFAs were conducted for the DN-DABQ for the 3 reference groups (typical college student, friends, closest friends). Given the large number of EFAs and similarity in the factor pattern, the results of the EFA for the reference group friends are presented, and then these results are generalized to the other referents, noting differences. Eigenvalues from PCA and randomly generated eigenvalues from the parallel analysis can be seen in Table 2.

Table 2. First 5 Eigenvalues from Principal Component Analysis and from the Parallel Analysis (Randomly Generated)

Eigenvalue	Descriptive norms			Injunctive norms			PA
	TS	F	CF	TS	F	CF	
1	6.96	5.28	5.08	4.92	4.36	5.01	1.45
2	2.03	3.98	4.11	2.93	3.37	2.84	1.35
3	1.24	1.08	1.20	1.46	1.55	1.54	1.27
4	0.81	0.93	0.84	0.81	0.85	0.82	1.20
5	0.63	0.64	0.58	0.72	0.68	0.75	1.14

TS, typical student; F, friend; CF, closest friend; PA, parallel analysis.

The Kaiser–Guttman rule, scree test, and parallel analysis all suggested a 2-factor solution for the DN-DABQ. Considering the agreement across these extraction criteria, a 2-factor solution was evaluated using PFA. PFA indicated that 2 items, “How many times during a typical week do your friends go out and only have 1 or 2 drinks” and “How many times during a typical week do your friends say something like ‘people who do not drink are less fun,’” had low loadings and commonality estimates, and these items were removed. The orthogonal solution contained a number of ambiguous factor loadings ($\lambda > 0.32$ for both factors), and so a promax rotation was used to better approximate simple structure. The final factor structure and interfactor correlations for the DN-DABQ are presented in Table 3.

The 2-factor solution of the DN-DABQ consisted of 1 factor indicated by 7 items referring to drinking behaviors and consequences. We labeled this factor the Drinking Behaviors factor. The other factor was indicated by 6 items that had content reflecting reasons for abstaining from drinking, and hence, this factor was labeled the Reasons for Abstaining from Drinking factor. This 2-factor structure for the DN-DABQ replicated across all reference groups (typical college student at your school, friends, and closest friends) with the exception of 1 item. The item “How many times during a typical week does a typical college student at your school drive after drinking?” for the referent “typical college student at your school” loaded onto the Reasons for Abstaining from Drinking factor. In subsequent analyses in the computation of composites, this item was included in DN Drinking Behaviors factor for conceptual clarity. This decision is consistent with prior studies that have included perceptions of drinking and driving in DN measures of drinking behaviors

and consequences, because drinking and driving is considered one of the most severe consequences of drinking (Lee et al., 2010; Merrill et al., 2013a).

Injunctive Norms. As with the DN-DABQ, we present the EFA results with respect to the friends reference group for the IN-DABQ and then generalize to the other referents given the similarity in the factor patterns. The Kaiser–Guttman rule, scree test, and parallel analysis all suggested a 3-factor solution for the IN-DABQ. Eigenvalues from PCA and randomly generated eigenvalues from the parallel analysis can be seen in Table 2. Based on the agreement of these extraction criteria, we evaluated a 3-factor solution for the IN-DABQ using PFA. Because a 2-factor solution was retained for the DN-DABQ, we also evaluated whether a 2-factor solution would be feasible for the IN-DABQ. Results of the 2-factor PFA suggested a large number of cross-loadings ($\lambda > 0.32$ for both factors) and high negative loadings ($\lambda < -0.32$), making this solution difficult to interpret. Therefore, the 3-factor solution was retained for the IN-DABQ. PFA of the 3-factor solution indicated that the 2 items that had low factor loadings and commonality estimates in the DN-DABQ also had low loadings and commonality estimates in the IN-DABQ, and these items were removed. The orthogonal solution contained a number of ambiguous factor loadings ($\lambda > 0.32$ for both factors), and a promax rotation was used to better approximate simple structure. The 3-factor solution with an oblique rotation yielded a better approximation of simple structure. The final factor structure and interfactor correlations for the IN-DABQ is presented in Table 4.

Table 3. Standardized Pattern (Structure) Coefficients for the Descriptive Norms Drinking and Abstaining Behaviors Questionnaire

Item	Typical student			Friends			Closest friends		
	F1	F2	h^2	F1	F2	h^2	F1	F2	h^2
Drink alcohol	0.00 (0.43)	0.83 (0.84)	0.70	−0.10 (−0.01)	0.73 (0.72)	0.53	0.11 (−0.09)	0.78 (0.78)	0.62
Get drunk	0.07 (0.50)	0.84 (0.87)	0.77	0.04 (0.06)	0.87 (0.86)	0.74	0.06 (−0.03)	0.86 (0.86)	0.75
Have sexual relations when drinking	0.01 (0.45)	0.83 (0.86)	0.70	0.05 (0.18)	0.75 (0.76)	0.55	0.01 (0.05)	0.77 (0.80)	0.60
Get drunk on a weeknight	0.08 (0.38)	0.91 (0.87)	0.77	0.01 (0.09)	0.79 (0.79)	0.62	0.00 (0.02)	0.80 (0.80)	0.64
Have a hangover after drinking	0.02 (0.43)	0.85 (0.76)	0.74	0.09 (0.18)	0.75 (0.76)	0.58	0.03 (0.07)	0.80 (0.71)	0.64
Black out from drinking	0.07 (0.43)	0.72 (0.84)	0.58	0.09 (0.04)	0.75 (0.74)	0.59	0.06 (0.03)	0.71 (0.78)	0.51
Drive after drinking	0.57 (0.66)	0.18 (0.47)	0.47	0.08 (0.15)	0.53 (0.54)	0.30	0.12 (0.13)	0.36 (0.36)	0.15
Decide not to drink alcohol in social situations	0.66 (0.75)	0.17 (0.50)	0.58	0.75 (0.76)	0.07 (0.16)	0.58	0.79 (0.79)	0.09 (−0.07)	0.62
Not drink because of health concerns	0.70 (0.68)	0.04 (0.31)	0.46	0.81 (0.81)	0.02 (0.12)	0.66	0.87 (0.87)	0.02 (0.04)	0.76
Not drink alcohol because they believe drinking is morally wrong	0.61 (0.62)	0.02 (0.33)	0.39	0.90 (0.89)	0.09 (0.02)	0.80	0.65 (0.64)	−0.06 (−0.05)	0.42
Not drink alcohol out of fear they will lose control	0.75 (0.67)	0.16 (0.22)	0.47	0.89 (0.89)	0.04 (0.07)	0.79	0.86 (0.86)	0.02 (0.04)	0.74
Not drink alcohol out of fear of embarrassment	0.66 (0.69)	0.06 (0.39)	0.47	0.89 (0.89)	0.05 (0.16)	0.80	0.85 (0.85)	0.10 (0.12)	0.74
Not drink alcohol because drinking would interfere with their responsibilities	0.50 (0.61)	0.22 (0.47)	0.40	0.66 (0.66)	0.03 (0.11)	0.44	0.72 (0.72)	0.05 (0.07)	0.53
% Variance explained	5.35	4.29		4.12	3.96		3.90	3.82	
Interfactor correlations	–	–		–	–		–	–	
	0.51	–		0.12	–		0.02	–	

Pattern coefficients ≥ 0.32 are bolded. h^2 = final commonality estimate.

Table 4. Standardized Pattern (Structure) Coefficients for the Injunctive Norms Drinking and Abstaining Behaviors Questionnaire

Item	Typical student				Friends				Closest friends			
	F1	F2	F3	h^2	F1	F2	F3	h^2	F1	F2	F3	h^2
Drink alcohol	0.06 (0.08)	0.75 (0.68)	-0.24 (-0.06)	0.52	0.07 (0.13)	0.68 (0.66)	-0.13 (-0.02)	0.46	0.20 (0.11)	0.70 (0.64)	-0.10 (-0.03)	0.48
Get drunk	0.03 (-0.13)	0.75 (0.77)	0.05 (0.27)	0.60	-0.05 (-0.07)	0.80 (0.82)	0.09 (0.28)	0.68	-0.09 (-0.24)	0.85 (0.86)	-0.01 (0.23)	0.71
Have sexual relations when drinking	-0.02 (-0.18)	0.55 (0.61)	0.23 (0.39)	0.43	-0.12 (-0.22)	0.60 (0.66)	0.27 (0.44)	0.54	-0.11 (-0.31)	0.64 (0.70)	0.17 (0.37)	0.54
Get drunk on a weeknight	0.01 (-0.22)	0.56 (0.66)	0.37 (0.53)	0.57	0.01 (-0.12)	0.61 (0.68)	0.34 (0.47)	0.58	-0.06 (-0.30)	0.65 (0.71)	0.24 (0.42)	0.45
Have a hangover after drinking	0.09 (-0.13)	-0.03 (0.11)	0.54 (0.50)	0.25	0.05 (-0.16)	0.10 (0.21)	0.52 (0.52)	0.29	0.07 (-0.26)	0.11 (0.25)	0.66 (0.65)	0.43
Black out from drinking	-0.09 (-0.37)	0.12 (0.30)	0.64 (0.71)	0.52	-0.03 (-0.28)	0.18 (0.31)	0.64 (0.68)	0.50	-0.04 (-0.38)	0.13 (0.29)	0.68 (0.72)	0.53
Drive after drinking	-0.04 (-0.30)	0.01 (0.19)	0.62 (0.64)	0.41	0.12 (-0.15)	0.01 (0.15)	0.68 (0.63)	0.41	0.07 (-0.24)	-0.02 (0.12)	0.64 (0.60)	0.38
Decide not to drink alcohol in social situations	0.83 (0.80)	-0.08 (-0.14)	0.09 (-0.28)	0.66	0.73 (0.69)	-0.07 (-0.04)	0.09 (-0.22)	0.49	0.73 (0.73)	-0.03 (-0.16)	0.01 (-0.35)	0.54
Not drink because of health concerns	0.61 (0.66)	0.21 (0.09)	-0.19 (-0.39)	0.50	0.60 (0.68)	0.27 (0.24)	-0.20 (-0.38)	0.55	0.61 (0.70)	0.11 (-0.06)	-0.24 (-0.51)	0.54
Not drink alcohol because they believe drinking is morally wrong	0.72 (0.71)	-0.14 (-0.20)	0.07 (-0.28)	0.52	0.72 (0.66)	-0.21 (-0.17)	0.13 (-0.20)	0.49	0.68 (0.60)	-0.20 (-0.27)	0.25 (-0.12)	0.43
Not drink alcohol out of fear they will lose control	0.82 (0.81)	0.01 (-0.07)	0.03 (-0.32)	0.66	0.76 (0.75)	0.02 (0.04)	0.03 (-0.28)	0.57	0.75 (0.75)	0.02 (-0.11)	0.00 (-0.35)	0.56
Not drink alcohol out of fear of embarrassment	0.82 (0.81)	-0.11 (-0.19)	0.05 (-0.33)	0.67	0.74 (0.69)	-0.11 (-0.07)	0.14 (-0.18)	0.49	0.77 (0.75)	-0.07 (-0.19)	0.07 (-0.31)	0.57
Not drink alcohol because drinking would interfere with their responsibilities	0.69 (0.72)	0.18 (0.07)	-0.12 (-0.36)	0.55	0.53 (0.68)	0.28 (0.22)	-0.34 (-0.49)	0.59	0.56 (0.68)	0.22 (0.04)	-0.32 (-0.54)	0.57
% Variance explained	3.77	2.12	2.31		3.09	2.30	2.22		3.49	2.46	2.58	
Factor correlations	-	-	-	-	-	-	-	-	-	-	-	-
	-0.11	-	-	-	0.02	-	-	-	-0.18	-	-	-
	-0.42	0.28	-	-	-0.40	0.21	-	-	-0.48	0.23	-	-

Pattern coefficients ≥ 0.32 are bolded. h^2 = final commonality estimate.

The first factor of the IN-DABQ was indicated by 6 items and was labeled the Reasons for Abstaining from Drinking factor. These were the same 6 items that defined the DN Reasons for Abstaining from Drinking factor. As seen in Table 4, the second factor consisted of items reflecting different drinking behaviors and behaviors that occur while drinking; thus, we labeled this factor the Drinking Behaviors factor. The third factor consisted of items with content pertaining to having a hangover after drinking, blacking out from drinking, and driving after drinking. This factor was labeled the Drinking Consequences factor. The Drinking Behaviors and Drinking Consequences factors found in the IN-DABQ are consistent with the 1 prior study assessing the factor structure of IN (Lewis et al., 2010), and with studies assessing college students' subjective evaluations of drinking consequences (Merrill et al., 2013a). The 3-factor solution for the IN-DABQ replicated across all reference groups.

Descriptives of Drinking Behaviors

The average weekly consumption in the current sample was 9.96 (SD = 10.16) with a range of 0 to 40.62 drinks. The majority of participants (82.05%) reported consuming alcohol at least once a week in a typical week. On average, participants in the current study experienced 7.33 (SD = 6.07) alcohol consequences within the past year with a range of 0 to 24.

Table 5 reports zero-order correlations between the individual items of the IN-DABQ and DN-DABQ and weekly

consumption and alcohol-related consequences for each referent. Correlations between the individual items making up the IN-DABQ Drinking Behaviors and Drinking Consequences Factors and the DN-DABQ Drinking Behaviors factor varied by reference group such that the correlations between the individual items and drinking outcomes were stronger for proximal, relative to distal, referents. Overall, items from the IN-DABQ Reasons for Abstaining from Drinking factor (items 8 to 13) were positively correlated with weekly consumption and alcohol consequences for the typical student referent, but negatively associated with weekly consumption and alcohol consequences for the friends and closest friends referents. The items from the DN-DABQ Reasons for Abstaining from Drinking factor (items 8 to 13) were not consistently related with weekly consumption or alcohol-related consequences.

Social Norms Predicting Drinking Outcomes

Hierarchical path analyses using observed variables were conducted in Mplus 7.3 (Muthen and Muthen, 1998–2014) using Robust Maximum Likelihood estimation (MLR). Hierarchical path models were conducted such that step 1 included covariates only (gender, age, Greek status, athlete status), and step 2 contained the factors from the DN-DABQ and IN-DABQ. Items forming the descriptive and IN factors were summed to form observed scale scores. Zero-order correlations between the drinking outcomes, observed scaled scores, and covariates can be seen in Table 6. Separate models were conducted for each reference group (typical

Table 5. Zero-Order Correlations of IN-DABQ and DN-DABQ Items and Drinking Outcomes

Item	Alcohol use		Consequences		Alcohol use		Consequences		Alcohol use		Consequences	
	DN TS	IN TS	DN TS	IN TS	DN F	IN F	DN F	IN F	DN CF	IN CF	DN CF	IN CF
1. Drink alcohol	0.07	0.08	0.04	-0.01	0.43	0.26	0.29	0.15	0.48	0.26	0.37	0.20
2. Get drunk	0.06	0.14	0.01	0.12	0.42	0.45	0.42	0.48	0.51	0.49	0.37	0.44
3. Have sexual relations when drinking	0.05	0.13	0.00	0.19	0.38	0.43	0.40	0.46	0.32	0.43	0.34	0.43
4. Get drunk on a weeknight	0.03	0.08	0.02	0.07	0.41	0.42	0.39	0.42	0.47	0.49	0.41	0.44
5. Have a hangover after drinking	0.07	-0.05	0.05	-0.03	0.30	0.08	0.40	0.16	0.43	0.11	0.43	0.15
6. Black out from drinking	0.13	-0.06	0.07	0.02	0.24	0.28	0.36	0.33	0.34	0.26	0.28	0.26
7. Drive after drinking	-0.03	-0.08	0.10	0.05	0.18	0.10	0.29	0.23	0.11	0.08	0.30	0.21
8. Decide not to drink alcohol in social situations	0.00	0.21	0.04	0.12	-0.11	0.02	-0.05	-0.06	-0.08	-0.15	-0.07	-0.19
9. Not drink because of health concerns	-0.02	0.14	0.02	0.03	-0.13	-0.05	-0.03	-0.12	-0.09	-0.10	-0.06	-0.20
10. Not drink alcohol because they believe drinking is morally wrong	-0.08	0.10	-0.09	0.03	-0.12	-0.18	-0.09	-0.17	-0.14	-0.19	-0.09	-0.20
11. Not drink alcohol out of fear they will lose control	-0.05	0.14	0.08	0.04	-0.09	-0.05	-0.07	-0.11	-0.07	-0.10	-0.06	-0.20
12. Not drink alcohol out of fear of embarrassment	-0.05	0.22	-0.02	0.10	-0.10	-0.10	-0.05	-0.16	-0.08	-0.10	0.00	-0.17
13. Not drink alcohol because drinking would interfere with their responsibilities	0.03	0.19	0.03	0.06	0.10	-0.07	-0.03	-0.15	0.02	-0.08	0.01	-0.20

DN, descriptive norm; IN, injunctive norms; TS, typical student; F, friends; CF, closest friends; DABQ, Drinking and Abstaining Behaviors Questionnaire.

Correlations are bolded that are significant at $p < 0.05$. Correlations >0.10 are significant at the $p < 0.10$ level.

Table 6. Zero-Order Correlations

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1. DDQ	-																				
2. BYAACQ	0.65	-																			
3. Ddrinks	-0.02	0.05	-																		
4. Dlimit	-0.02	0.04	0.56	-																	
5. Idrinks	0.12	0.11	0.20	0.01	-																
6. Icon	-0.09	0.02	0.18	0.10	0.28	-															
7. Ilimit	0.24	0.10	-0.06	0.19	-0.10	0.31	-														
8. Ddrinkf	0.42	0.49	0.53	0.41	0.19	0.12	0.11	-													
9. Dlimitf	-0.07	0.01	0.46	0.71	0.00	0.14	0.03	0.36	-												
10. Idrinkf	0.48	0.48	0.10	0.05	0.43	0.01	0.31	0.47	-0.07	-											
11. Iconf	0.20	0.30	0.05	0.04	0.00	0.52	0.07	0.24	0.06	0.38	-										
12. Ilimitf	-0.06	-0.16	0.00	0.05	0.32	-0.10	0.36	0.15	0.05	-0.05	0.23	-									
13. Ddrinkcf	0.49	0.54	0.40	0.35	0.13	0.10	0.13	0.82	0.28	0.47	0.03	0.11	-								
14. Dlimitcf	-0.07	0.01	0.27	0.40	0.12	0.16	-0.01	0.24	0.62	0.40	0.35	-0.04	0.51	-							
15. Idrinkcf	0.50	0.18	0.09	0.05	0.37	0.02	0.32	0.40	-0.03	0.88	0.35	-0.04	0.29	0.05	-						
16. Iconcf	0.18	0.25	-0.02	0.03	-0.09	0.47	0.11	0.18	0.06	0.29	0.79	-0.24	0.29	0.05	0.31	-					
17. Ilimitcf	-0.12	-0.25	0.02	0.03	0.30	-0.09	0.27	-0.15	0.05	-0.10	-0.27	0.79	-0.23	0.13	-0.15	-0.36	-				
18. Age	0.15	0.14	0.17	0.01	0.17	0.12	-0.10	0.19	0.02	0.17	0.13	-0.08	0.19	-0.10	0.19	0.08	-0.06	-			
19. Gender	0.20	0.14	-0.10	0.00	-0.12	0.11	0.03	0.05	-0.01	0.05	0.21	-0.17	0.04	-0.07	0.05	0.19	-0.20	0.04	-		
20. Greek	0.13	0.16	0.04	0.12	-0.04	0.12	0.10	0.18	0.22	0.05	0.12	-0.08	0.19	0.17	0.01	0.14	-0.11	0.01	0.06	-	
21. Athlete	0.10	0.16	0.11	0.13	-0.20	0.06	0.09	0.14	0.14	-0.03	0.19	-0.12	0.08	0.05	0.00	0.19	-0.14	0.01	0.08	0.14	-
M	9.96	7.35	2.87	1.61	5.34	3.37	4.26	1.64	1.00	4.78	2.75	4.86	1.24	1.03	4.65	2.52	5.03	20.69	0.48	0.21	0.22
SD	10.16	6.08	2.09	J.76	1.07	1.27	1.22	1.27	1.10	1.27	1.20	1.06	1.05	1.11	1.32	1.19	1.09	1.14	0.50	0.41	0.42
Skew	1.30	0.64	2.52	2.77	-1.30	0.11	-0.21	1.11	2.55	-0.74	0.45	-0.09	0.94	1.93	-0.69	0.61	-0.19	-0.56	0.10	1.43	1.36
Kurtosis	1.24	-0.40	10.03	10.20	2.81	-0.61	0.20	1.77	10.11	0.35	-0.30	0.13	0.70	4.52	0.13	-0.40	0.05	-0.60	-2.01	0.06	-0.16

Ddrink, descriptive norms Drinking Behaviors factor; Dlimit, descriptive norms Reasons for Abstaining from Drinking factor; Idrink, injunctive norms Drinking Behaviors factor; Icon, injunctive norms High Severity factor; Ilimit, injunctive norms Reasons for Abstaining from Drinking factor; cf, closest friends referent; f, friends referent; ts, typical college student at your school; BYAACQ, Brief Young Adult Alcohol Consequences Questionnaire; DDQ, Daily Drinking Questionnaire.
 Correlations of $r > 0.13$ are significant at $p < 0.05$.
 Correlations in bold are significant at $p < 0.05$.

college student at your school, friends, closest friends) because prior work suggests that inconsistencies between IN and alcohol use may vary as a function of referent. Each model simultaneously predicted both alcohol consumption and alcohol-related consequences. All models included age, gender, Greek status, and athlete status as covariates. Greek status and club/varsity athlete status were included as covariates because both these groups have both been shown to have higher levels of drinking and drinking norms relative to students who do not participate in these activities (Carter and Kahnweiler, 2000; Turrisi et al., 2007).

Given the similarity in the path analyses across referents (see Table 7), results for the reference group friends are presented and these results are generalized to the other referents, noting differences. Gender and athletic status were significantly associated with weekly consumption such that being male and participating in a college athletic team were associated with higher levels of weekly consumption. These findings were consistent across referents for gender, and athletic status was significantly related to weekly consumption for

the typical student referent and marginally associated with weekly consumption for the closest friend referent. The DN Drinking Behaviors factor was consistently associated with both weekly consumption and alcohol-related consequences, and these findings were consistent for the closest friend referent. For the more distal referent group, typical students at your school, the DN Drinking Behaviors factor was not related to weekly consumption or to alcohol-related consequences. The DN Reasons for Abstaining from Drinking factor was significantly negatively associated with weekly consumption; higher perceptions of friends using various reasons for abstaining from drinking were associated with lower weekly alcohol consumption. This finding differed for the closest friend and typical student referents such that the DN Reasons for Abstaining from Drinking factor was not related with weekly consumption for either of these referents.

The IN Drinking Behaviors factor was consistently associated with weekly consumption and alcohol-related consequences, and these findings were consistent across referents. The injunctive Drinking Consequences factor was unrelated

Table 7. Path Analyses of Social Norms Predicting Drinking Outcomes

Variable	Weekly consumption				Alcohol consequences			
	β	<i>B</i>	SE (<i>B</i>)	<i>p</i> -Value	β	<i>B</i>	SE (<i>B</i>)	<i>p</i> -Value
<i>Closest friends</i>								
	Step 1 ($R^2 = 0.09$)				Step 1 ($R^2 = 0.06$)			
Gender	0.19	3.91	1.09	<0.001	0.08	1.02	0.72	0.16
Age	0.02	0.17	0.48	0.72	0.03	0.13	0.34	0.71
Greek	0.08	1.90	1.35	0.16	0.05	0.72	0.96	0.45
Athlete	0.10	2.39	1.22	0.05	0.09	1.37	0.88	0.12
	Step 2 ($R^2 = 0.40$)				Step 2 ($R^2 = 0.34$)			
Ddrink	0.34	3.39	0.79	<0.001	0.31	1.83	0.41	<0.001
Dlimit	-0.06	-0.52	0.65	0.42	0.00	0.01	0.34	0.98
Idrink	0.35	2.67	0.49	<0.001	0.29	1.31	0.31	<0.001
Icon	-0.09	-0.73	0.55	0.18	-0.02	-0.08	0.40	0.84
Ilimit	0.05	0.43	0.55	0.43	-0.10	-0.54	0.49	0.27
<i>Friends</i>								
	Step 1 ($R^2 = 0.09$)				Step 1 ($R^2 = 0.06$)			
Gender	0.19	3.81	0.13	0.001	0.08	1.02	0.73	0.16
Age	0.04	0.39	0.45	0.39	0.03	0.18	0.32	0.58
Greek	0.09	2.27	1.38	0.10	0.06	0.88	0.97	0.37
Athlete	0.12	2.98	1.19	0.01	0.12	1.68	0.93	0.07
	Step 2 ($R^2 = 0.38$)				Step 2 ($R^2 = 0.33$)			
Ddrink	0.30	2.48	0.71	<0.001	0.27	1.33	0.34	<0.001
Dlimit	-0.16	-1.56	0.70	0.03	-0.11	-0.66	0.43	0.13
Idrink	0.36	2.83	0.51	<0.001	0.31	1.49	0.36	<0.001
Icon	-0.07	-0.59	0.54	0.27	0.05	0.23	0.35	0.51
Ilimit	0.04	0.43	0.55	0.44	-0.04	-0.24	0.48	0.62
<i>Typical student at your school</i>								
	Step 1 ($R^2 = 0.09$)				Step 1 ($R^2 = 0.06$)			
Gender	0.23	4.62	1.37	0.001	0.13	1.64	0.84	0.05
Age	0.15	1.35	0.55	0.02	0.13	0.70	0.36	0.05
Greek	0.11	2.70	1.50	0.07	0.09	1.36	1.08	0.21
Athlete	0.13	3.10	1.46	0.03	0.15	2.20	1.00	0.03
	Step 2 ($R^2 = 0.20$)				Step 2 ($R^2 = 0.09$)			
Ddrink	-0.02	-0.10	0.36	0.79	0.00	0.01	0.24	0.99
Dlimit	-0.08	-0.49	0.43	0.25	-0.07	-0.28	0.35	0.44
Idrink	0.24	2.26	0.57	<0.001	0.17	0.93	0.46	0.04
Icon	-0.17	-1.34	0.59	0.02	-0.08	-0.41	0.44	0.36
Ilimit	0.21	1.73	0.59	0.003	0.07	0.36	0.47	0.45

Ddrink, descriptive norms Drinking Behaviors factor; Dlimit, descriptive norms Reasons for Abstaining from Drinking factor; Idrink, injunctive norms Drinking Behaviors factor; Icon, injunctive norms High Severity factor; Ilimit, injunctive norms Reasons for Abstaining from Drinking factor.

to weekly consumption and alcohol-related consequences, and these results were consistent across referents as well. The IN Reasons for Abstaining from Drinking factor was unrelated to consumption and consequences. While this finding replicated for the closest friend referent, the IN Reasons for Abstaining from Drinking factor was significantly associated with weekly consumption for the typical college student at your school referent, such that higher perceptions of the typical person or typical student approving of using various reasons for abstaining from drinking were related to higher levels of weekly consumption.

DISCUSSION

Inconsistent findings relating IN to college student drinking outcome variables has led some to conclude that IN may be a more complex, or less important, social normative influence than DN (Eisenberg et al., 2014; Neighbors et al., 2008). The current study considered whether inconsistent findings regarding IN may be a function of poor measurement of this construct by creating a new measure of IN (the IN-DABQ). Additionally, we created a parallel measure of DN (the DN-DABQ) to allow for a comparison of the effects of the 2 norms types in relation to different drinking outcomes.

Factor Structure of Social Norms

EFA suggested a multifactorial structure for both the IN-DABQ and the DN-DABQ. A 2-factor solution was found for DN and included a Drinking Behaviors factor with items pertaining to various drinking behaviors and consequences, and a Reasons for Abstaining from Drinking factor with items pertaining to multiple reasons for abstaining from drinking.

With respect to IN, the factor structure was consistent across referents and included a Drinking Behaviors factor, a Drinking Consequences factor, and a Reasons for Abstaining from Drinking factor. The different factor structures found for descriptive and IN support the notion that IN may be a more complex normative influence than IN (Lewis et al., 2010; Neighbors et al., 2008). The emergence of a Drinking Behaviors and a Drinking Consequence factor is consistent with the 1 prior study assessing the multifactorial structure of IN (Lewis et al., 2010) and suggests that measures of IN that do not account for the multifactor structure of this construct offer poor coverage of the domain of IN.

Social Norms and Drinking Behaviors

The variance accounted for by the hierarchical path models varied greatly as function of referent group. Relative to the typical student referent, the closest friends referent model accounted for 20% more variance in weekly consumption and 25% more variance in alcohol-related consequences. These findings are consistent with prior work demonstrating stronger relations between descriptive and IN and alcohol

uses for more proximal referents (Borsari and Carey, 2001; Neighbors et al., 2008). Despite the wide variability in variance accounted for across the 3 reference groups, the IN Drinking Behaviors factor was a consistent predictor of weekly consumption and alcohol-related consequences after accounting for the multifactorial structure of IN.

These results suggest that accounting for the factorial complexity of IN may diminish previous inconsistencies observed across studies. Additionally, prior work has argued that IN may be more relevant for more deleterious drinking outcomes (Clapp and McDonnell, 2000; Larimer et al., 2004; Wood et al., 2001). Results of the current study found that IN were associated not only with alcohol-related consequence, but also with weekly consumption. This discrepancy may indicate that prior relations between social norms and drinking outcomes were complicated by the differing item content in measures of descriptive and IN. Our creating parallel forms for assessing descriptive and IN provide much needed clarity on the comparative role of each norm in influencing drinking.

Perceptions of Reasons for Abstaining from Drinking

The current study also sought to extend prior work (Litt and Lewis, 2015) by testing how norms for abstaining from drinking relate to different drinking behaviors. When assessing the relation between the perceived frequency of Reasons for Abstaining from Drinking (a descriptive norm) and drinking outcomes, this norm was only related to weekly consumption for the friend referent. Results indicated that higher perceptions of friends' use of various reasons for abstaining from drinking were associated with lower levels of weekly consumption. Perceived approval of Reasons for Abstaining from Drinking (an injunctive norm) was related to weekly alcohol use for the typical college student at your school referent such that higher perceived approval was associated with high levels of weekly consumption. This association was surprising. As seen in Table 6, the injunctive Reasons for Abstaining from Drinking norm was positively related to weekly consumption for the typical college student at your school but negatively related to weekly consumption for the friend and closest friend referents. This suggests that the relation between perceptions of approval of abstaining from drinking may have differing relations to alcohol use behaviors across different referents.

Clinical Implications and Limitations

The consistent association between the IN Drinking Behaviors factor and weekly consumption and alcohol-related consequences has important implications for college student social norms intervention efforts. Researchers have repeatedly forwarded the idea that social norms interventions may be limited in their effectiveness because they fail to include IN (Blanton et al., 2008; Larimer, 2012; Prince et al., 2015; Schultz et al., 2007). Considering the consistent relation between IN and drinking outcomes in the current study, as

well as recent work demonstrating that IN are malleable (Prince and Carey, 2010), interventions may benefit from the inclusion of IN. Indeed, in a recent study comparing the efficacy of social norms interventions targeting DN, IN, and DN and IN together, stronger effects were observed for the social norms intervention targeting both norm types compared to the intervention only targeting DN (Prince et al., 2015). The inclusion of both descriptive and IN in norms-based interventions would better ground these interventions in a theoretical context (Cialdini, 2003; Schultz et al., 2007).

The current study should be considered within the context of its limitations. First, this study was cross-sectional, which limits the ability to establish direction of effects. The current student only considered 2 drinking outcomes (weekly consumption and alcohol-related consequences) and 3 reference groups (typical college student at your school, friends, closest friends). Studies of descriptive and injunctive social norms have been assessed in relation to a wide array of drinking outcomes (e.g., binge drinking, alcohol dependency) using a wide array of reference groups (e.g., norms keyed to same gender, fraternity/sorority members). Future work should look to determine whether IN keyed to other referents are consistently associated with other drinking outcomes. The 1 prior study assessing abstainer norms had a higher proportion of abstainers than the current study (Litt and Lewis, 2015). Future work using the IN-DABQ and DN-DABQ should use samples with higher proportions of abstainers to determine whether the Reasons for Abstaining from Drinking Factors are more relevant to drinking behaviors among college students who do not drink. Last, our measure of IN did not assess the perceived approval of the quantity and frequency of drinking each day of the week. Considering recent work showing the potential utility of assessing the perceived approval of drinking quantity and frequency (Krieger et al., 2016), future work should look to determine whether the Drink-Based Measure of IN accounts for additional variance in drinking outcomes above and beyond the IN-DABQ.

CONCLUSION

This was the first study to expand the item content of IN and document a multifactorial structure for both descriptive and IN. Accounting for the multifactorial structure of IN led to consistent relationships between IN and drinking outcomes across 3 referents. The consistency of associations between IN and alcohol outcomes suggests that inconsistencies in prior studies are likely to the result of poor measurement of this construct.

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CONFLICT OF INTEREST

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