Fitting In and Standing Out: Increasing the Use of Alcohol Protective Behavioral Strategies with a Deviance Regulation Intervention

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Abstract

OBJECTIVE—Heavy alcohol use remains a consistent public health concern on college campuses. The current pilot study used Deviance Regulation Theory (DRT) to modify Protective Behavioral Strategies (PBS) among college student drinkers to reduce alcohol use and alcohol-related consequences.

METHODS—The sample was comprised of current college student drinkers (n = 76; 53.95% female) ranging in age from 18-24 (M = 19.29, SD = 1.42). Participants were randomly assigned to receive a positive or negative framed message. They then reported on use of alcohol protective behavioral strategies (via the Protective Behavioral Strategies Scale), alcohol consumption (via the Modified Daily Drinking Questionnaire), and alcohol-related consequences (via the Young Adults Alcohol Consequences Questionnaire) each week for six weeks.

RESULTS AND CONCLUSIONS—Among drinkers with low PBS use norms, a positively, versus a negatively, framed message resulted in increased PBS use and consequently less alcohol consumption and fewer alcohol-related consequences. Among drinkers with high PBS use norms, a negatively, versus positively, framed message resulted in increased PBS use and consequently lower alcohol consumption and fewer alcohol-related consequences. However, these effects were only relevant among those who strongly believed the DRT frame. Findings suggest assigning drinkers to frames based on perceived PBS use norms and increasing belief in the frame may be one approach to increasing responsible drinking patterns among college students. Furthermore, the current data suggests important boundary conditions for norm-based interventions.

PUBLIC HEALTH RELEVANCE—This study of college student drinkers who received either a positive or negative framed message about reducing their drinking found that a Deviance Regulation intervention might be effective at increasing responsible alcohol use, but only among students with a high acceptance of the intervention materials.
Keywords
Protective behavioral strategies; Deviance Regulation Theory; college students

Introduction
College student alcohol use remains a significant public health issue (Substance Abuse and Mental Health Services Administration, 2013). College students consume alcohol at higher rates than their non-college peers (Slutske, 2005). Though most college students “mature out” of heavy alcohol use by graduation (Ham & Hope, 2003), the consequences resulting from frequent acute intoxication can be severe. For example, college student drinking consequences range from relatively minor problems such as missing class and decreased grades to far more severe problems such as driving under the influence, personal injury, sexual assault, and even death (Hingson, Heeren, Winter, & Wechsler, 2005; Wechsler, Moeykens, Davenport, & Castillo, 1995). In addition, college student alcohol use has a number of adverse effects on non-drinking students and the college student body at large (Wechsler et al., 1995). With 40.1% of college students endorsing at least one heavy-episodic drinking occasion in the past month (Substance Abuse and Mental Health Services Administration, 2013), the need for brief, easily accessible, and broadly dispensable interventions is needed. The current study examines such an intervention among current college student drinkers.

Drinking Norms and Norm Based Drinking Interventions
A large body of literature has examined the associations between social norms and drinking among college students (Borsari & Carey, 2003; Lewis & Neighbors, 2006). Two findings, with large effects, have been consistently documented. First, perceptions of how much other students drink is strongly associated with one’s own drinking (Neighbors, Lee, Lewis, Fossos, & Larimer, 2007). Second, there is a consistent discrepancy between perceived and actual descriptive norms, which refer respectively to perceptions regarding the prevalence of drinking among peers relative to the actual prevalence of drinking among peers. Research findings consistently show that students tend to overestimate the drinking of their peers (Borsari & Carey, 2003). Moreover, the discrepancy between perceived and actual norms is larger for heavier drinkers. These findings have provided a theoretical basis for norms based alcohol intervention strategies. One such strategy is personalized normative feedback, which provides feedback about one’s own drinking, one’s perceived norms for drinking, and actual drinking norms. This information provides two discrepancies to heavy drinkers highlighting that their perceived norms are exaggerated and that they drink more than other students (Lewis & Neighbors, 2006).

Personalized normative feedback for quantity and frequency of alcohol consumption has been found to be efficacious as a stand-alone intervention (Lewis & Neighbors, 2007; Neighbors, Larimer, & Lewis, 2004; Neighbors et al., 2010). Furthermore, social norms information has been incorporated in almost all college alcohol interventions that provide multi-component personalized feedback (M. B. Miller et al., 2013). Despite the strong support for social norms as an etiological basis for heavy drinking and its successful
implemenation in interventions, interventions have primarily focused on norms for consumption. The present study seeks to advance the research on norms by integrating it into a novel theoretical perspective (Deviance Regulation Theory; Blanton & Christie, 2003) and by examining its effects not on alcohol use itself, but on behaviors designed to regulate at-risk alcohol consumption.

**Protective Behavioral Strategies**

Alcohol protective behavioral strategies (PBS) have been defined as “behaviors that individuals can engage in while drinking alcohol in order to limit negative alcohol-related consequences” (Martens et al., 2004, p. 390). Based on the most commonly used measure, the Protective Behavioral Strategies Scale (PBSS; Martens et al., 2005), there are three subtypes of PBS including Stopping/Limiting Drinking PBS (e.g., “Determine not to exceed a set number of drinks”, “Alternate alcoholic and nonalcoholic drinks”), Manner of Drinking PBS (e.g., “Avoid drinking games”, “Drink slowly, rather than gulp or chug”), and Serious Harm Reduction PBS (e.g., “Use a designated driver”, “Make sure you go home with a friend”). Encouraging individuals to use such strategies is consistent with the harm reduction model of reducing drinking (Marlatt, Baer, & Larimer, 1995), and has some similarities with behavioral self-control treatments from the 1970s and 1980s (see Walters & Bennett, 2000). A host of cross-sectional studies have shown that greater use of PBS is associated with less alcohol use and fewer alcohol-related problems among college student drinkers (see D’Lima, Pearson, & Kelley, 2012; Martens et al., 2005; Martens, Pederson, LaBrie, Ferrier, & Cimini, 2007; Martens et al., 2004; Pearson, 2013; Pearson, D’Lima, & Kelley, 2013). Further, recent research has shown that PBS use is also a prospective predictor of both alcohol consumption and related problems (Napper, Kenney, Lac, Lewis, & LaBrie, 2013).

Other studies have examined PBS in the context of brief alcohol interventions. Some studies have suggested that including PBS use in such interventions can positively impact alcohol use and/or related problems. For example, three studies examining the efficacy of brief interventions showed that increases in PBS use mediated the effects of the interventions on alcohol use (Barnett, Murphy, Colby, & Monti, 2007; Larimer et al., 2007; Murphy et al., 2012). Another study showed that, across three group-delivered brief interventions, increases in PBS use over time were associated with decreases in alcohol use and related problems (Martens, Cimini, et al., 2007). A recent study examining the efficacy of a brief motivational intervention focusing solely on PBS use, though, did not show any effects relative to control on alcohol use or related problems (Martens, Smith, & Murphy, 2013). Considering the conflicting evidence regarding the potential role and efficacy of PBS-based content in a clinical context, additional studies addressing these issues seems prudent. The current study tests a theory driven intervention, centered on PBS norms, to increase the use of PBS among college student drinkers.

**Deviance Regulation Theory**

Deviance Regulation Theory (DRT) is a theory of behavioral action based on social identity and perceived social norms (Blanton & Christie, 2003). This model suggests that individual intentions, motivations, and behaviors vary as a function of (a) the perceptions regarding the base rates of a given behavior, and (b) evaluations of individuals who do, or do not, engage
in that behavior. The theory makes two specific postulates. First, individuals will strive to deviate from social norms when this deviation allows them to “stand out” in positive or meaningful ways or reduces the likelihood that they will “stand out” in negative ways. Second, individuals will maintain behavior close to the perceived social norm when increasing behavior offers no benefit to individual identity. The basic predictive model is depicted in Figure 1.

Thus, when the perceived base rate of normative behavior is low, telling individuals that others who engage in the behavior (the perceived minority) are judged as more positive should increase individual motivation to “stand out” in a positive or meaningful way. In contrast, telling them that individuals who do not engage in the behavior (the perceived majority) are more negative should not affect motivation. If the base-rate of a given behavior is perceived to be high, telling individuals that others who do not engage in the behavior (the perceived minority) are seen as more negative should increase individual motivation to avoid “standing out” in a negative way. In contrast, telling them that individuals who do engage in the behavior (the perceived majority) are more positive should not affect motivation. Thus, DRT predicts that the effects of message framing on behavior will depend on perceived base-rates of the behavior. Relatedly, research suggests that the effects of message framing are often dependent on its believability and/or persuasiveness, without which, individuals are unlikely to accept the message (Rothman & Salovey, 1997; Updegraff & Rothman, 2013). Although it has not been tested, it is quite possible that the DRT effect is more robust for those who endorse a stronger belief in the message frame. This may be especially important when it comes to norm based drinking interventions (Polonec, Major, & Atwood, 2006). To date, a number of studies have supported the predictions of DRT for diverse health behavior intentions (though not actual behavior) including condom use, flu vaccination, refusal of sexual advances, and hand washing (Blanton & Burkley, 2008; Blanton & Christie, 2003; Hall & Blanton, 2009). Further, two recent studies have found evidence linking DRT to alcohol use among college students (Ferrer, Dillard, & Klein, 2012; Lewis et al., 2010). However, neither of these was designed to directly test tenets of the theory.

**Study Overview**

The present pilot study examines the effects of a deviance regulation based intervention on alcohol protective behavioral strategies, alcohol use, and alcohol-related consequences among active college student drinkers. The study hypotheses are nested within the broader social norms literature. Specifically, we expected that higher perceived social norms surrounding the use of PBS would be associated with higher PBS use, and higher PBS use would, subsequently, be related to lower alcohol use and fewer alcohol-related problems. Consistent with DRT, these associations were expected to vary as a function of message framing regarding individuals who do, or do not, use PBS. Thus, the pilot study had four main hypotheses. In each analysis, we examine belief in the DRT framing manipulation as a moderator to test for acceptance of the DRT message.

**H1:** Consistent with previous research (Lewis, Rees, & Lee, 2009), we hypothesized that perceived social norms regarding alcohol PBS use would be associated with actual PBS use.
**H2:** Consistent with DRT, it was hypothesized that among those with lower levels of alcohol PBS use norms, use of PBS would increase among those who received a positive frame (H2a); however, among those with higher levels of alcohol PBS use norms, use of PBS would increase among those who received a negative frame (H2b). It was unclear if select PBS subtypes would be more susceptible to the intervention, so we evaluated the effects on all three PBS subscales.

**H3:** Among PBS subtypes affected by the DRT intervention, it was hypothesized that differences in alcohol use, as a function of DRT effect, would be mediated by PBS use. Specifically, at low levels of PBS norms, there would be a significant positive association between the positive frame and PBS use, and this would result in lower weekly alcohol use (H3a). However, at high levels of PBS norms, there would be a significant positive association between the negative frame and PBS use, and this would result in lower weekly alcohol use (H3b).

**H4:** Extending the above model, it was hypothesized that differences in the likelihood of alcohol-related consequences, as a function of DRT effect, would be mediated by PBS use and alcohol consumption. At low levels of PBS norms, there would be a significant positive association between the positive frame and PBS use, resulting in indirect negative associations between the positive frame and alcohol-related consequences via both PBS use and alcohol use (H4a). However, at high levels of PBS norms, there would be a significant positive association between the negative frame and PBS use, resulting in indirect negative associations between the negative frame and alcohol-related consequences via both PBS use and alcohol use (H4b).

**Methods**

**Participants**

Participants (n = 76; 53.95% female) were current college student drinkers. They were recruited during the spring semester of 2014 from a Midwest university for a study examining “Longitudinal Use of Protective Behavioral Strategies.” All participants were recruited via the University psychology research subject pool. The sample ranged in age from 18-24 (M = 19.29, SD = 1.42). Ninety-three percent of the sample was White, 3% Asian, and 4% other or who did not wish to respond. Participants received course credit as an incentive for participation.

**Procedure**

This study was comprised of two phases: a screening phase (Phase I) and an intervention phase (Phase II). In both phases participants completed an online informed consent. All surveys were administered anonymously via a secure online survey system. In Phase I, participants (n = 207) completed an online survey assessing demographic information as well as indices of alcohol use including typical weekly alcohol use (assessed via the DDQ-M) and alcohol-related problems (assessed via the YAACQ), and use of PBS (assessed via the PBSS). Non-abstainers (n = 149) were invited to participate in Phase II (the intervention). Individuals who did not drink during the course of the six-week study were
excluded during the final analyses, as alcohol consumption is a necessary condition to
measure PBS use.

Of those invited into Phase II, 45 opted not to participate, and 104 enrolled in Phase II and
completed at least the initial week of the intervention. The CONSORT flow chart is depicted
in Figure 2. Once enrolled, participants logged onto the secure server and completed a brief
weekly intervention. They also reported their alcohol use, alcohol-related problems, and use
of PBS over the previous week. All participants were sent a weekly email (through the
secure server) on Tuesday mornings asking them to complete the survey for the week. This
email included a link to their condition (positive or negative) and a password to log onto the
server. Participants had 72 hours to complete the weekly survey, at which point their
password expired. Reminder emails were sent on Wednesday and Thursday mornings of
each week. The North Dakota State University Institutional Review Board approved this
study and all participants were treated in accordance with APA ethical guidelines for
research.

**Intervention**

Participants were randomly assigned to receive a positively or negatively framed message
about individuals who do, or do not, use PBS. There was no control condition, as deviance
regulation theory posits that the effect of message frame serves as its own control as a
function of perceived norms pertaining to the behavior in question (here, the use of PBS).
Participants where told: “Here are some things we have found in our research at NDSU over
the last few years. Please indicate if you knew this or not.” In the positive frame, participants
were told: “People who report that THEY DO USE these strategies...” In the negative frame,
participants were told: “People who report that THEY DO NOT USE these strategies...”
This was followed by a list of 12 statements (sample positive frame: “... tend to be viewed as
more responsible by their peers”; sample negative frame: “... are more impulsive and have
less self-control”) to which participants responded by selecting: no I didn’t know, yes I knew,
or do not wish to respond. Each of the twelve statements was developed during Fall 2013
from a qualitative pilot study in which students were asked to describe people who use, or
do not use, alcohol PBS. Participants received the same 12 items each week of the study as
an intervention reminder. In addition, in week 0 (i.e., the initial intervention day) the survey
also asked: “We're interested in your opinion of these findings as a student. Why do you
think that people who [DO: positive frame; DO NOT: negative frame] USE these strategies
are viewed so much more [positive: positive frame; negative: negative frame]?” In both
groups, participants were asked to provide “two or three reasons” in a free text format. We
hypothesized this may increase motivation by evoking preparatory change talk (W. R. Miller
& Rollnick, 2013).

**Measures**

**Modified Daily Drinking Questionnaire (DDQ-M)**—The DDQ-M (Dimeff, Baer,
Kivlahan, & Marlatt, 1999) was used to assess alcohol consumption. In Phase I, the DDQ-M
assessed typical weekly alcohol use over the last 6 months. The DDQ-M consists of a grid,
with the days of the week and free-text boxes under each day. Participants enter the number
of drinks consumed for each day of the week, during a typical week in the last 6 months. In

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Phase II, participants were presented with the same grid, however, during this phase they reported the number of drinks consumed on each day over the previous week, starting with last Tuesday, and running through the current Monday. For the analyses below, the sum of drinks endorsed from the previous week are used as the indicator of alcohol use for that week.

**Young Adult Alcohol Consequences Questionnaire (YAACQ)**—The YAACQ is a 48-item survey used to assess alcohol-related consequences. During phase I, participants endorsed consequences (yes/no) they had experienced during or after alcohol consumption over the past 6 months. During Phase II, the YAACQ was used to assess the frequency of problems experienced over the past week. Previous research supports the reliability, validity, and test-retest of YAACQ among college students (Read, Kahler, Strong, & Colder, 2006; Read, Merrill, Kahler, & Strong, 2007). In addition, the YAACQ has been successfully used as a measure of alcohol-related consequences among college students in a web diary format (Pearson et al., 2013). In the current data, both the Phase I internal consistency (α = .91) and Phase II internal consistency across each week (α = .86-.98) were adequate. Given the low base-rates of weekly alcohol-related consequences, the primary analyses used a dichotomous variable to indicate if individuals experienced any alcohol-related consequences the previous week.

**Protective Behavioral Strategies**—Protective behavioral strategies were measured using the Protective Behavioral Strategies Survey (PBSS; Martens et al., 2005). The PBSS consists of 15 items that assess three domains of PBS: Manner of Drinking (5 items; sample item: “Avoid mixing different types of alcohol.”), Serious Harm Reduction (3 items; sample item: “Use a designated driver.”), and Limiting/Stopping Drinking (7 items; sample item: “Drink water while drinking alcohol.”) Participants rated the frequency of each PBS used during the previous week on a five-point Likert-type scale (0 = never, 4 = always). Previous research supports the reliability and validity of the PBSS among college students (Martens et al., 2005; Martens, Pederson, et al., 2007) as well as the use of the PBSS in a daily diary format (Pearson et al., 2013). Internal consistencies of the weekly PBSS subscales, across weeks, were adequate in the current study (SLD: α = .88-.94; MD: α = .77-.87; SHR: α = .93-.95).

**Normative Use of Protective Behavioral Strategies**—In week 0 (i.e., initial intervention week) participants were asked: “What percent of NDSU students do you believe regularly engage in these strategies?” Participants responded in a free text box. Participants were also asked this each week to examine possible changes in normative PBS use as a function of the intervention.

**Framing Condition Belief**—Following the intervention statements, participants were told: “Sometimes, we tell people this research and they don't believe it. How much do you believe the above findings?” They responded on a 5-point response scale (1 = not at all, 5= absolutely believe). This was included as research shows that framing effects are dependent on how strongly an individual accepts/believes the framing message (Rothman & Salovey, 1997).
Data Preparation and Analysis Overview

Normative use of alcohol PBS was originally scored as a continuous variable (i.e., percent of PBS use among college students). To facilitate comparisons across conditions among high- and low-PBS use norms, we dichotomized this variable using a median split at 51% (we also examined this using a continuous variable which resulted in nearly identical results). This resulted in 37 participants in the high PBS norms group (positive frame: n = 18; negative frame: n = 19) and 39 participants in the low PBS norms group (positive frame: n = 20; negative frame: n = 19). The primary analyses evaluated three distinct outcomes to test the hypotheses: (1) PBS use last week, (2) alcohol use last week, and (3) alcohol-related consequences last week.

As the current data contains nested observations across six weeks, we analyzed the data from a multi-level framework. PBS use, as a function of time in weeks, was added to the initial model to evaluate PBS trajectories across the six-week intervention. Within-subjects variables (i.e., time in weeks and drinks consumed each week) were person-mean centered; between-subjects variables (i.e., gender, framing condition, belief in frame, and PBS norms group) were grand mean-centered (Bryk & Raudenbush, 1992). The analyses utilized a Bayesian approach, which is appropriate for nested/hierarchical data (Dagne, Howe, Brown, & Muthén, 2002) and analytically robust with small samples (B. O. Muthén & Asparouhov, 2012). Primary analyses for the hypotheses were tested in Mplus 7.11 using the Bayes estimator (L. K. Muthén & Muthén, 2012). Level-2 random variances utilized the inverse-gamma distribution – a commonly used quasi-informative prior for random variances (Gelman, Carlin, Stern, & Rubin, 2004). All other parameters were estimated using non-informative priors. Both models converged on the initial run in less than 2500 iterations. Model convergence was confirmed using a second run of 10,000 burn-in iterations. Convergence was further verified following recommendations of B. O. Muthén (2010). Notation of “statistically significant” effects refers to the probability that the 95% Bayesian Credibility Interval does not include zero.

Results

Descriptive, univariate, and bivariate statistics

Descriptive data and bivariate correlations of between-subjects variables are listed in Table 1. Race did not vary across condition nor did any of the between-subjects or baseline data. The alcohol-related variables were correlated in a manner consistent with previous research. Age was positively correlated with YAACQ scores. Number of weeks of participation was positively correlated with baseline normative perceptions of PBS use and was inversely correlated with age and DDQ-M scores. Women (M = 5.39, SD = 1.07) completed more assessment weeks than men (M = 4.71, SD = 1.67), t(74) = 2.13, p = .034.

There were a total of 386 post-intervention person-weeks out of total possible 456 person weeks (i.e., 76 participants x 6 weeks) resulting in an overall participation rate of 84.65%. Individuals participated for an average of 5.18 weeks (SD = 1.12; Range: 2-6). Across weeks, median time spent on the intervention site was 12 minutes 40 seconds, and this did not vary across conditions (p = .952). Participants consumed an average of 4.95 drinks per
week ($SD = 6.18$; Range: 0-32), drank on an average of 1.06 days each week ($SD = 1.17$; Range: 0-7), and reported an average of 1.65 alcohol-related consequences each week ($SD = 3.64$; Range: 0-27).

An ANOVA of mean PBS use the week prior to the intervention indicated a significant effect of perceived PBS use norm group, $F(1, 72) = 4.66, p = .034$, $d = 0.49$. Individuals in the high PBS use norm group utilized more PBS the week prior to the intervention ($M = 2.13$, $SD = 0.90$) than those in the low PBS use norm group ($M = 1.64$, $SD = 1.06$), which is broadly consistent with hypothesis 1. There were no pre-intervention differences in PBS use by DRT frame, $F(1, 72) = 1.11, p = .296$, or the interaction of DRT frame $\times$ PBS norms group, $F(1, 72) = 0.78, p = .380$. Thus, post-intervention differences within each PBS use norms group were hypothesized to be a function of the DRT frame.

**Primary analyses**

**Use of Protective Behavioral Strategies**—To examine effects of DRT on PBS use, we estimated a Bayesian multilevel linear regression model to test the hypothesis that use of alcohol PBS would conform to DRT predictions. The model estimated mean levels of all three PBS scales (i.e., Manner of Drinking, Limiting/Stopping Drinking PBS, and Serious Harm Reduction) as well as interactions with the DRT intervention across time for all three PBS scales. The following model was specified:

$$
\text{Level 1: PBS Use}_{it} = \pi_{0i} + \pi_{1i} (\text{Time}_{it}) + \pi_{2i} (\text{Drinks Consumed}_{it}) + e_{it}
$$

$$
\text{Level 2: } \pi_{0i} = B_{00} + B_{01} (\text{Gender}) + B_{02} (\text{Frame}) + B_{03} (\text{PBS Norm Group}) + B_{04} (\text{Frame Belief}) + B_{05} (\text{Frame } \times \text{ PBS Norm Group}) + B_{06} (\text{Frame Belief } \times \text{ PBS Norm Group}) + B_{07} (\text{Frame } \times \text{ Frame Belief}) + B_{08} (\text{Frame } \times \text{ Frame Belief } \times \text{ PBS Norm Group}) + u_{0i}
$$

$$
\pi_{1i} = B_{10} + B_{11} (\text{Frame}) + B_{12} (\text{PBS Norm Group}) + B_{13} (\text{Frame Belief}) + B_{14} (\text{Frame } \times \text{ PBS Norm Group}) + B_{15} (\text{Frame Belief } \times \text{ PBS Norm Group}) + B_{16} (\text{Frame } \times \text{ Frame Belief}) + B_{17} (\text{Frame } \times \text{ Frame Belief } \times \text{ PBS Norm Group}) + u_{1i}
$$

$$
\pi_{2i} = B_{20}
$$

Though not depicted above (for the sake of space), the model simultaneously estimated all three PBS subscales and all three time slopes. Thus, the initial model was approximately equivalent to a three-process latent growth model. At Level 1, time, $t$, was the week of the study for person $i$. Drinks Consumed were the number of drinks individual $i$ consumed during week $t$. We added the number of drinks consumed as a covariate as opportunities to utilize PBS are limited by alcohol use. Intercepts and time slopes for all PBS scales were allowed to vary randomly. At level 2, we controlled for the effect of gender on the PBS intercepts, and examined the effects of DRT frame, PBS use norms, belief in the frame, and interactions among the latter three variables on the intercepts and time slopes. Table 2 depicts the results of this analysis. Estimates are presented below.

**Stopping/Limiting Drinking (SLD) PBS**—Examination of the ICC for the SLD PBS intercept indicated less than half of the variance in SLD PBS was at the between-subjects
level (ICC = 0.474; 95% BCI 0.369 to 0.584). At level 1, there was a positive relationship between drinks consumed that week and SLD PBS use ($B = 0.033$, $SD = 0.010$; 95% BCI = 0.013 to 0.053). There was no effect of the DRT intervention on the mean use of SLD PBS. There was a positive, though non-significant slope of SLD PBS across time that was not moderated by the DRT intervention. At level 2, there was a positive relationship between PBS use norms and SLD PBS use ($B = 0.511$, $SD = 0.236$; 95% BCI = 0.057 to 0.984), supporting H1.

**Serious Harm Reduction (SHR) PBS**—The effects on SHR PBS were similar to those of SLD PBS. The ICC for the SHR PBS intercept indicated less than 40% of the variance in SHR PBS was between-subjects (ICC = 0.389; 95% BCI 0.282 to 0.510). At level 1, there was a positive relationship between drinks consumed that week and SHR PBS use ($B = 0.093$, $SD = 0.014$; 95% BCI = 0.066 to 0.120). As with SLD PBS, there was no effect of the DRT intervention on mean use of SHR PBS. There was a negative, though non-significant slope of SHR PBS across time that was not affected by the DRT intervention. At level 2, there was a positive relationship between PBS use norms and SHR PBS use ($B = 0.700$, $SD = 0.279$; 95% BCI = 0.176 to 1.270), supporting H1.

**Manner of Drinking (MD) PBS**—The ICC for MD PBS indicated less than 38% of the variance in MD PBS was between-subjects (ICC = 0.372; 95% BCI 0.262 to 0.489). At level 1, there was a positive relationship between drinks consumed that week and MD PBS use ($B = 0.046$, $SD = 0.010$; 95% BCI = 0.026 to 0.066). At level 2, women endorsed higher rates of MD PBS than men ($B = 0.465$, $SD = 0.193$; 95% BCI = 0.079 to 0.843). As with SLD PBS, there was a positive, though non-significant slope of MD PBS across time that was not moderated by the DRT intervention. H1 was not supported for MD PBS as the level 2 association between PBS norms and MD PBS was not significant. However, consistent with hypothesis 2, there was a significant DRT effect (DRT frame × PBS norms), which varied by belief in the DRT frame, on the MD PBS intercept ($B = 1.230$, $SD = 0.547$; 95% BCI = 0.149 to 2.308). At low levels of belief in the DRT frame (i.e., -1SD) there was no effect of the DRT intervention ($B = -0.334$, $SD = 0.583$; 95% BCI = -1.481 to 0.784). However, at high levels of belief in the DRT frame, there was a significant DRT frame × PBS norms effect ($B = 1.584$, $SD = 0.583$; 95% BCI = 0.529 to 2.680). Figure 3 depicts this interaction at high levels of belief in the DRT frame. Among individuals in the low perceived PBS norms group, those who received a positive frame reported higher rates of weekly MD PBS use than those who received a negative frame (positive: $M = 1.728$, $SD = 0.234$; negative: $M = 0.997$, $SD = 0.273$; $B = 0.733$, $SD = 0.354$; 95% BCI = 0.025 to 1.426). Consistent with DRT, this relationship was reversed among individuals in the high perceived PBS norms group where those who received a positive frame reported lower rates of weekly MD PBS use than those who received a negative frame (positive: $M = 1.591$, $SD = 0.308$; negative: $M = 2.452$, $SD = 0.272$; $B = -0.853$, $SD = 0.411$; 95% BCI = -1.651 to -0.045). In sum, among those with a strong belief in the DRT frame there was an immediate post-intervention effect on mean levels of MD PBS use, but not in changes in MD PBS use over time. Though this effect did not significantly increase across the 6-week timeframe, it did not decay either.
Alcohol Use and Consequences—To examine the effects of the DRT intervention on alcohol use and alcohol-related consequences, via PBS use, we estimated a Bayesian multi-level moderated-mediation path model. As only mean levels of MD PBS were affected by the intervention, our analysis is limited to mean weekly levels of this specific protective strategy (i.e., we did not include time slopes). The full model is depicted in Figure 4. Alcohol use was the number of drinks consumed by participant $i$ during week $t$. Weekly alcohol-related consequences were scored dichotomously. Thus, the outcome was an indicator of whether or not person $i$ experienced any alcohol-related consequences during week $t$. At the within-subjects level, alcohol use and MD PBS use were free to covary and modeled as predictors of the likelihood of experiencing any alcohol-related consequence that week. The model intercepts of all three variables were allowed to vary randomly. Thus, the level 1 (within-subjects) model represents weekly associations amongst these three variables, as the previous analysis indicated no change in PBS across time. At the between-subjects level, experiencing alcohol-related consequences was predicted by MD PBS use and alcohol consumption. MD PBS use also predicted between-subjects alcohol consumption. MD PBS use was predicted by DRT frame, PBS norms, belief in the DRT frame, and the interaction of these three variables. Gender was added as a covariate.

At the within-subjects level, MD PBS use and alcohol consumption had a significant positive correlation. In addition, both MD PBS use and alcohol consumption were positively associated with the likelihood of experiencing an alcohol-related consequence that week (note that the analysis includes both drinking and non-drinking weeks). Individuals used more PBS during weeks when they consumed more alcohol, and these were, in turn, associated with an increased likelihood of experiencing an alcohol-related consequence that week. In contrast, at the between-subjects level, individuals who used more MD PBS across the entire study also consumed less alcohol and were less likely to experience alcohol-related consequences. Alcohol use was positively related to the likelihood of experiencing an alcohol-related consequence, though, this did not reach conventional levels of statistical significance after partialling the variance across within- and between-subjects levels and controlling for MD PBS use and gender. As with the first analysis, women endorsed higher rates of MD PBS use than men ($B = 0.469, SD = 0.171, 95\% \text{ BCI } = 0.137 \text{ to } 0.804$).

Contrary to H3a, in the low PBS norms group there was no indirect association between the DRT frame and alcohol use via MD PBS when frame belief was held constant at its mean ($ab = -0.735, SD = 0.676; 95\% \text{ BCI } = -2.379 \text{ to } 0.289$). Nor was H3b supported at mean levels of DRT frame belief. There was no significant indirect association between the DRT frame and alcohol use via MD PBS in the high PBS norms condition ($ab = -0.903, SD = 0.653; 95\% \text{ BCI } = -2.481 \text{ to } 0.088$). However, the positive association between DRT frame × PBS norms × Belief in DRT frame predicting MD PBS use (established in hypothesis 2) remained significant ($B = 0.964, SD = 0.494, 95\% \text{ BCI } 0.036 \text{ to } 1.957$). Thus, we further examined the final hypotheses, conditional on belief in the DRT frame.

As with the first analysis, the DRT effect (DRT frame × PBS norms) was not associated with MD PBS at low levels (i.e., $-1SD$) of belief in the DRT frame ($B = -0.033, SD = 0.529, 95\% \text{ BCI } -1.097 \text{ to } 1.005$). However, at high levels of belief in the DRT frame (i.e., $+1SD$) the DRT effect was a significant predictor of MD PBS use ($B = 1.539, SD = 0.504, 95\% \text{ BCI }$...
Table 3 depicts specific and total indirect effects from DRT frame to alcohol use/problems at high and low levels of DRT frame belief. For each PBS norms level (norm coded 0 = low norms group, 1 = high norms group), DRT frame was recoded to be consistent with hypotheses and aide in interpretation (low norms group: 0 = positive frame, 1 = negative frame; high norms group: 0 = negative frame, 1 = positive frame).

When frame belief was high (i.e., +1SD), indirect effects conformed to hypotheses. At high frame belief, alcohol use was lower in the positive frame condition than the negative frame condition among the low PBS norms group. Similarly, at high frame belief, alcohol use was lower in the negative frame condition than the positive frame condition among the high PBS norms group. As might be expected, at low levels of DRT frame belief, none of the indirect effects were significant. Thus, in both cases, the effects conformed to DRT prediction when DRT frame belief was high, offering partial support for H3a and H3b.

Hypothesis 4 examined the indirect effects of DRT frame on the likelihood of alcohol-related consequences in the high and low PBS norms groups. At mean levels of DRT frame belief, in the low PBS norms group, there was no specific indirect effect from frame to alcohol problems via MD PSB (ab = -0.164, SD = 0.183; 95% BCI = -0.632 to 0.075) or via MD PBS and alcohol (ab = -0.007, SD = 0.066; 95% BCI = -0.155 to 0.132). Nor was the total indirect effect significant (ab = -0.184, SD = 0.177; 95% BCI = -0.616 to 0.073). Similarly, at mean levels of DRT frame belief, in the high PBS norms group, there was no specific indirect effect from frame to alcohol problems via MD PSB (ab = -0.207, SD = 0.184; 95% BCI = -0.658 to 0.043) or via MD PBS and alcohol (ab = -0.013, SD = 0.073; 95% BCI = -0.182 to 0.133). Nor was the total indirect effect significant (ab = -0.230, SD = 0.178; 95% BCI = -0.660 to 0.030). Thus, at mean levels of DRT frame belief neither H4a nor H4b were supported. These effects were then examined at high and low levels of DRT frame belief (see Table 3).

At high levels of DRT frame belief, in the low PBS norms group, neither the specific indirect effect from frame to alcohol problems via MD PSB nor via MD PBS and alcohol were statistically significant. However, the cumulative effect (i.e., total indirect effect) was statistically significant offering conditional support for H4a. Similarly, at high levels of DRT frame belief, in the high PBS norms group, there was no specific indirect effect from frame to alcohol problems via MD PSB or via MD PBS and alcohol. However, the total indirect effect did reach conventional levels of statistical significance. None of the indirect effects were significant at low levels of DRT frame belief. Thus, both H4a and H4b were supported, but only among those with a strong belief in the veracity of the DRT frame.

**Discussion**

Although alcohol protective behavioral strategies (PBS) use has been consistently related to lower alcohol use and reduced alcohol-related problems (Pearson, 2013), the efficacy of PBS-based interventions is mixed. At least three multi-component interventions have found PBS use mediates intervention effects (Barnett et al., 2007; Larimer et al., 2007; Martens et al., 2013; Murphy et al., 2012), whereas a single-component intervention targeting PBS use was not found to be effective (Martens et al., 2013). The purpose of the present study was to
examine the efficacy of a deceptively simple intervention for college student drinking based on DRT.

DRT predicts that individuals strive to deviate from the norm, or stand out, when doing so enhances their own positive identity. Whereas they want to conform to the norm, or avoid standing out, when doing so may strengthen a negative identity. For those who strongly believed in the DRT frame (i.e., the positive or negative characteristics ascribed to individuals who do or do not use PBS, respectively), we found results consistent with DRT in the form of a three-way interaction between DRT frame (positive vs. negative), perceived PBS norms (high vs. low), and belief in the DRT frame (high vs. low). Specifically, individuals with low PBS norms were most influenced by a positive frame (i.e., people who use PBS have desirable qualities), suggesting that they wanted to stand out in a positive manner, whereas individuals with high PBS norms were most influenced by a negative frame (i.e., people who do not use PBS have undesirable qualities), suggesting that they wanted to avoid standing out in a negative manner. This pattern was observed with Manner of Drinking (MD) PBS specifically, but not with Serious Harm Reduction (SHR) or Stopping/Limiting Drinking (SLD) PBS. Although the DRT frame did not significantly influence these other two types of PBS use, they were both significantly predicted by PBS norms, suggesting an important norms-related component for all three types of PBS (Benton, Downey, Glider, & Benton, 2008; Lewis et al., 2009). Importantly, change in MD PBS as a function of this three-way interaction had concurrent effects on alcohol use and alcohol-related problems, suggesting that our very brief PBS-based intervention demonstrated at least short-term efficacy on alcohol-related outcomes via the proposed mediator (i.e., PBS use).

Walton (2014) reviewed several very brief interventions for a range of behaviors that have inordinately large effects on behavior, which he collectively refers to as ‘wise’ interventions. These interventions are “wise” in that they are based on an understanding of a psychological process and use this understanding to modify behavior. Based on DRT, the present study may have found a “wise” alcohol intervention for college students based on the understanding of the asymmetrical effect of framing and perceived PBS norms on PBS use.

One practical implication from our findings is that they support distinguishing between distinct types of PBS. When we conducted analyses using a single measure including all PBS (analysis not shown here), we found the three-way interaction consistent with DRT. However, when we examined the three types of PBS, we found that this overall effect was driven by an effect on MD PBS only. Such findings are to some degree consistent with research that has shown that when the effects of each PBSS subscale are controlled for, the MD subscale tends to have the strongest unique relationship with alcohol-related outcomes (e.g., Martens et al., 2005). There are several potential explanations for these findings. First, it may be that these distinct types of PBS are differentially amenable to change. In the very least, our results suggest that MD PBS are more amenable to change in response to the brief DRT-based intervention implemented in the present study. Increasing the other types of PBS may require distinct intervention approaches. For example, PBS use is at least partially determined by temperament (D’Lima et al., 2012; Pearson et al., 2013; Pearson, Kite, & Henson, 2012), suggesting that changing PBS use may not be entirely volitional.

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In general, our findings between-subjects were consistent with hypothesis, supporting the notion that DRT can affect PBS use and subsequently alcohol use and problems. However, it seems paradoxical that MD PBS use, alcohol use, and alcohol problems were all positively related at the within-subjects level. Though PBS use is limited to times when individuals drank, and the model included both drinking and nondrinking weeks, we still expected a negative within-person association between PBS use and alcohol consequences after controlling for use. The research does suggest differential associations between PBS use and alcohol consequences, though typically MD PBS is inversely associated (see Pearson et al., 2013). This highlights the complicated nature of PBS-consequence associations (Pearson, 2013). Perhaps these differential associations are a function of parsing the variance across different levels and/or not controlling for the other forms of PBS use. This remains an important area for future research.

Clinical Implications

Our findings have several implications for college student alcohol interventions. First, our results may provide the strongest evidence for DRT in the alcohol field. Although previous studies have interpreted cross-sectional (Lewis et al., 2010) and prospective (Ferrer et al., 2012) alcohol norms data in terms of how they relate to DRT, the present study is the first experimental/intervention study to demonstrate a differential effect of positive vs. negative framing in accordance with DRT. Thus, our study supports the development of a broader range of DRT-based alcohol interventions. Although our study focused on PBS use, DRT-based interventions could be developed that target alcohol use or alcohol-related problems directly or alternatives to drinking (e.g., studying, exercising). Second, our results demonstrate more broadly the importance of understanding preexisting differences that may affect treatment response. For example, we found that we were able to increase PBS use among individuals with low and high perceived PBS norms by providing information that appears to induce the desire to stand out in positive ways or avoid standing out in negative ways, respectively. However, this effect was limited to individuals who strongly believed the message given. Together, these findings suggest tailoring interventions based on preexisting differences among college student drinkers is ideal. Third, our intervention had essentially no effect on individuals who did not believe in the DRT frame. It is important to maximize the believability of the information provided to college student drinkers and to minimize resistance. Several potential approaches could be drawn from the field of influence and persuasion. For example, the use of graphs and figures could be used to demonstrate the differences between individuals who use (and do not use) PBS, which is a common approach when providing normative feedback (Neighbors et al., 2010). Alternatively, having individuals provide their own reasons for using PBS would increase their alliance with the PBS message (Cialdini & Griskevicius, 2010). Identifying ways to increase belief in the message frame remains an important area of research. Finally, the data suggests that the greatest absolute level of PBS use was among those with high PBS use norms who received a negative frame. Thus, a sequential approach in which individuals first receive an intervention meant to increase PBS norms followed by a negatively framed message about those who do not use PBS may evoke the greatest increases in PBS use.
Limitations

The present pilot study aimed to provide initial evidence for the efficacy of a DRT-based alcohol PBS intervention. Therefore, the sample size was admittedly small. This limits statistical power to examine a broader range of moderators and mediators of the intervention. The study was designed to detect moderate to large effects in this initial test of the DRT intervention. It is possible that some of the less robust effects, which might be expected in a DRT study (e.g., the Frame × PBS Norm two-way interaction), were not detected. It is also possible that our detected effects are actually less robust than reported, as low power can lead to overly optimistic estimates. This concern is somewhat tempered by the fact that the intervention main effects fell at the lower end of those reported in the original DRT experiments (Blanton, Stuart, & Van den Eijnden, 2001). It will be important to replicate these procedures in a larger trial with a more diverse sample in order to further establish reliable parameter estimates for this intervention. Additionally, with the short follow-up period, it is not possible to determine the longevity of the observed intervention effects. Larger sample sizes and longer follow-ups are needed to fully examine the efficacy of this intervention. Relatedly, our sample was predominantly white, with Midwest/rural backgrounds, limiting generalizability.

One strength of the present study was that a weekly diary was used to assess all study variables, which we argue reduces the effects of retrospective memory biases compared to traditional methods (i.e., assessment windows ranging from 30 to 90 days). However, retrospective memory biases have been shown to affect estimates of alcohol use in time frames as short as one week (Gmel & Daeppen, 2007); thus, the use of ecological momentary assessment (Shiffman, 2009) would allow a further reduction in retrospective memory biases in the self-reporting of all the constructs assessed in the present study and provide more statistical power to parse the within- and between-subjects associations among these variables.

Although we examined three distinct types of PBS use, our measure of PBS norms was a single item regarding the percentage of college students each participant perceived to “regularly engage in these strategies”. Previous studies have suggested that same-gender PBS norms are more predictive of one’s own PBS use, and that there are substantial differences in perceived PBS norms depending on the specific type of PBS (Lewis et al., 2009). Future studies based on DRT could include a more comprehensive assessment of PBS norms to capture these differences.

Conclusion

Consistent with the notion of wise interventions (Walton, 2014), the present study found that a deceptively simple alcohol PBS intervention was able to change PBS use, which in turn affected subsequent drinking outcomes. Additional studies with larger sample sizes and longer follow-ups are needed to replicate the findings from the present study and determine both the short-term and long-term efficacy of DRT-based interventions for college students. Given the need for effective, brief, cost-effective, and easily dispensable alcohol interventions for this population, we find our results very promising.
References


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Figure 1.
Predictions based on Deviance Regulation Theory
Figure 2.
CONSORT Diagram
Figure 3.
Post-intervention weekly MD PBS use under positive and negative DRT frames among high and low perceived PBS use norm groups with high (i.e., +1SD) belief in the DRT frame.

Note. PBS = Protective Behavioral Strategies; DRT = Deviance Regulation Theory; MDPBS = Manner of Drinking Protective Behavioral Strategies. Error bars are SD of posterior distribution for the observed parameter.

*95% Bayesian Credibility Intervals do not include zero.
Figure 4.
Multi-level moderated-mediation model of alcohol problems on DRT frame via PBS use at high and low PBS norms
Table 1

Descriptive statistics and bivariate correlations of between-subjects (n = 76) data

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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</thead>
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<td>1. Age</td>
<td></td>
<td></td>
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<tr>
<td>2. Gender</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3. Baseline PBS Use Norms</td>
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<td>.15</td>
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<td>4. Baseline Belief In Frame</td>
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<td>.12</td>
<td>-.12</td>
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<tr>
<td>5. DDQ-M</td>
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<td>-.17</td>
<td>.05</td>
<td>.03</td>
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<td></td>
<td></td>
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<td>6. YAACQ</td>
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<td>.19</td>
<td>.07</td>
<td>.08</td>
<td>.47</td>
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<td>7. Weeks Completed</td>
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<td>.32</td>
<td>.07</td>
<td>-.25</td>
<td>-.01</td>
<td></td>
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<tr>
<td>8. Condition</td>
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<td>-.08</td>
<td>.09</td>
<td>-.05</td>
<td>.17</td>
<td>.01</td>
<td>.06</td>
</tr>
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<td>Mean</td>
<td>19.29</td>
<td>0.54</td>
<td>53.07</td>
<td>3.99</td>
<td>8.53</td>
<td>8.86</td>
<td>5.18</td>
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<td>SD</td>
<td>1.42</td>
<td>0.50</td>
<td>20.87</td>
<td>0.78</td>
<td>8.68</td>
<td>7.31</td>
<td>1.12</td>
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<tr>
<td>Skew</td>
<td>1.44</td>
<td>-0.16</td>
<td>-.15</td>
<td>-.50</td>
<td>2.27</td>
<td>1.04</td>
<td>-1.32</td>
</tr>
<tr>
<td>Range</td>
<td>18-24</td>
<td>0-1</td>
<td>10-90</td>
<td>2.5</td>
<td>0-54</td>
<td>0-30</td>
<td>2-6</td>
</tr>
</tbody>
</table>

Note. DDQ-M = Modified Daily Drinking Questionnaire; YAACQ = Young Adult Alcohol Consequences Questionnaire. Gender coded: 0=Male, 1=Female; Condition coded: 0=Positive, 1=Negative.

* p < .05
### Table 2
Bayesian multilevel regression analysis of weekly PBS use

<table>
<thead>
<tr>
<th>Model Parameters</th>
<th>L2</th>
<th>SLD PBS</th>
<th>HR PBS</th>
<th>MD PBS</th>
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</thead>
<tbody>
<tr>
<td>( \pi_0 ) Intercept</td>
<td>( B_{00} )</td>
<td>1.657*</td>
<td>2.762*</td>
<td>1.889*</td>
</tr>
<tr>
<td>Gender</td>
<td>( B_{01} )</td>
<td>0.300</td>
<td>0.263</td>
<td>0.465*</td>
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<tr>
<td>Frame</td>
<td>( B_{02} )</td>
<td>0.179</td>
<td>0.146</td>
<td>0.147</td>
</tr>
<tr>
<td>PBS Norm</td>
<td>( B_{03} )</td>
<td>0.511*</td>
<td>0.700*</td>
<td>0.327</td>
</tr>
<tr>
<td>Belief in Frame</td>
<td>( B_{04} )</td>
<td>−0.249</td>
<td>−0.255</td>
<td>−0.258</td>
</tr>
<tr>
<td>Belief ( \times ) PBS Norm</td>
<td>( B_{05} )</td>
<td>0.202</td>
<td>0.329</td>
<td>0.419</td>
</tr>
<tr>
<td>Frame ( \times ) PBS Norm</td>
<td>( B_{06} )</td>
<td>0.625</td>
<td>0.739</td>
<td>0.626</td>
</tr>
<tr>
<td>Frame ( \times ) Belief</td>
<td>( B_{07} )</td>
<td>0.043</td>
<td>−0.389</td>
<td>−0.129</td>
</tr>
<tr>
<td>Frame ( \times ) Norm ( \times ) Belief</td>
<td>( B_{08} )</td>
<td>1.171</td>
<td>1.045</td>
<td>1.230*</td>
</tr>
<tr>
<td>( \pi_1 ) Time in Study</td>
<td>( B_{10} )</td>
<td>0.044</td>
<td>−0.015</td>
<td>0.020</td>
</tr>
<tr>
<td>Frame</td>
<td>( B_{11} )</td>
<td>−0.060</td>
<td>−0.039</td>
<td>−0.035</td>
</tr>
<tr>
<td>PBS Norm</td>
<td>( B_{12} )</td>
<td>−0.021</td>
<td>0.013</td>
<td>0.005</td>
</tr>
<tr>
<td>Belief in Frame</td>
<td>( B_{13} )</td>
<td>−0.094</td>
<td>−0.126</td>
<td>−0.068</td>
</tr>
<tr>
<td>Belief ( \times ) PBS Norm</td>
<td>( B_{14} )</td>
<td>0.046</td>
<td>0.075</td>
<td>0.100</td>
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<tr>
<td>Frame ( \times ) PBS Norm</td>
<td>( B_{15} )</td>
<td>0.141</td>
<td>0.165</td>
<td>0.191</td>
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<tr>
<td>Frame ( \times ) Belief</td>
<td>( B_{16} )</td>
<td>0.150</td>
<td>0.035</td>
<td>0.104</td>
</tr>
<tr>
<td>Frame ( \times ) Norm ( \times ) Belief</td>
<td>( B_{17} )</td>
<td>0.126</td>
<td>0.023</td>
<td>0.034</td>
</tr>
<tr>
<td>( \pi_2 ) Drinks Consumed</td>
<td>( B_{20} )</td>
<td>0.033*</td>
<td>0.093*</td>
<td>0.046*</td>
</tr>
</tbody>
</table>

Note. Level 1 observations \( n = 76 \), Level 2 observations \( n = 386 \). Time in Study and Drinks Consumed centered within-subjects, all other variables centered between-subjects. L2 = Model Coefficients from the Level-2 equation. Frame = DRT Frame; Belief = Belief in DRT Frame; PBS Norm = Baseline Normative Perceptions on PBS Use. BCI = Bayesian credibility interval.

* 95% BCI do not include zero.
Table 3

Indirect effects from DRT frame to alcohol outcomes

<table>
<thead>
<tr>
<th>Model Parameters</th>
<th>Estimate</th>
<th>SD</th>
<th>95% BCI</th>
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</thead>
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<tr>
<td>High DRT Frame Belief - High PBS Norms</td>
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<tr>
<td>Specific Indirect Effects:</td>
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<td></td>
</tr>
<tr>
<td>Frame → MD PBS → Drinks</td>
<td>−1.545 *</td>
<td>0.960</td>
<td>−3.862 to −0.106</td>
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<td>Frame → MD PBS → Problems</td>
<td>−0.350</td>
<td>0.273</td>
<td>−1.023 to 0.019</td>
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<tr>
<td>Frame → MD PBS → Drinks → Problems</td>
<td>−0.025</td>
<td>0.118</td>
<td>−0.287 to 0.211</td>
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<tr>
<td>Total Indirect Effects:</td>
<td>−0.388 *</td>
<td>0.258</td>
<td>−1.007 to −0.015</td>
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<tr>
<td>High DRT Frame Belief - Low PBS Norms</td>
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<tr>
<td>Specific Indirect Effects:</td>
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<td></td>
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</tr>
<tr>
<td>Frame → MD PBS → Drinks</td>
<td>−1.755 *</td>
<td>1.084</td>
<td>−4.373 to −0.114</td>
</tr>
<tr>
<td>Frame → MD PBS → Problems</td>
<td>−0.406</td>
<td>0.315</td>
<td>−1.175 to 0.024</td>
</tr>
<tr>
<td>Frame → MD PBS → Drinks → Problems</td>
<td>−0.028</td>
<td>0.135</td>
<td>−0.324 to 0.247</td>
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<tr>
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<td>−1.158 to −0.016</td>
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<tr>
<td>Specific Indirect Effects:</td>
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<tr>
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<td>1.014</td>
<td>−2.140 to 2.003</td>
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<td>0.007</td>
<td>0.257</td>
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<td>0.065</td>
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<td>Total Indirect Effects:</td>
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<td>0.266</td>
<td>−0.550 to 0.549</td>
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<td>Frame → MD PBS → Drinks → Problems</td>
<td>−0.000</td>
<td>0.050</td>
<td>−0.119 to 0.100</td>
</tr>
<tr>
<td>Total Indirect Effects:</td>
<td>−0.016</td>
<td>0.207</td>
<td>−0.450 to 0.413</td>
</tr>
</tbody>
</table>

Note. Level 1 observations n = 76, Level 2 observations n = 386.

1. Frame coded positive = 0, negative = 1.
2. Frame reverse coded positive = 1, negative = 0
3. *95% BCI do not include zero.