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An initial examination of the effects of deviance regulation theory on normative perceptions

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ABSTRACT

Background: This study examines the effects of Deviance Regulation Theory (DRT) on changes in normative perceptions of protective behavioral strategies (PBS). Methods: Participants (n = 104 college student drinkers; 59.62% women) enrolled in a 6-week, web-based, longitudinal study to test the effects of a DRT intervention on indices of PBS use. Participants were assigned to either the high or low PBS norm group based on their self-reported PBS norms. Participants were randomized to receive either a positively framed message about individuals who do use PBS or a negatively framed message about individuals who do not use PBS. Participants reported the percent of their peers who they believed used PBS (PBS normative belief) each week for 6 weeks. Results: Participants who reported low preintervention PBS norms showed a moderate increase in mean PBS norms postintervention if they received a negatively framed message about those who do not use PBS. Participants who reported high preintervention PBS norms showed a slight, nonsignificant, increase in mean PBS norms postintervention if they received a positively framed message about those who do not use PBS. Conclusions: Both of these were counter to hypotheses and suggest DRT may anchor perceived norms, preventing an increase in normative beliefs

Introduction

Previous research has shown that normative perceptions, whether accurate or not, often predict behavior (Berkowitz, 2004). This is particularly true in college, where perceptions about the use of alcohol among peers frequently predict a number of alcohol-related outcomes (Borsari & Carey, 2003). This is complicated by the fact that normative perceptions about alcohol use among peers are often inaccurate, resulting in a bias toward higher perceived alcohol use among peers, and subsequently higher rates of individual alcohol use and alcohol-related consequences (Neighbors, Dillard, Lewis, Bergstrom, & Neil, 2006). Consequently, interventions aimed at modifying normative beliefs among college student drinkers have become a popular area of research (Lewis & Neighbors, 2006). Research also suggests that changes in perceived norms, as a function of the intervention, mediate intervention effects (LaBrie et al., 2013). To date, modification of perceived drinking norms has been limited to alcohol-related outcomes (e.g., drinking, consequences, etc.). Furthermore, these interventions have lacked a strong theoretical underpinning. The current analysis examines the extent to which a theoretically grounded intervention increases norms for responsible alcohol use.

Alcohol protective behavioral strategies (PBS) are behaviors individuals use while drinking to prevent or reduce alcohol-related consequences (Martens et al., 2004). Several studies have shown a negative association between PBS use and a myriad of alcohol outcomes among college student drinkers (see Benton et al., 2004; D'Lima, Pearson, & Kelley,

2012; Delva et al., 2004; Martens, Ferrier, & Cimini, 2007; Martens et al., 2005; Martens, Pederson, LaBrie, Ferrier, & Cimini, 2007; Martens et al., 2004; Pearson, 2013; Pearson, D'Lima, & Kelley, 2013). Research shows that normative beliefs about peer PBS use are associated with individual PBS use (Dvorak, Kramer, Stevenson, Sargent, & Kilwein, 2017; Dvorak, Pearson, Neighbors, & Martens, 2015; Dvorak, Pearson, Neighbors, Martens, & Stevenson, 2016; Lewis, Rees, & Lee, 2009). Thus, increasing PBS norms may result in increased PBS use, and subsequently reduced alcohol-related consequences.

Deviance regulation theory (DRT) is a model of action and identity (Blanton & Burkley, 2008; Blanton & Christie, 2003; Blanton, Stuart, & Van den Eijnden, 2001). According to DRT, behavior is guided by two factors: (1) normative perceptions about a behavior and (2) evaluations of individuals who do, or do not, engage in the behavior. The basic premise of DRT is that individuals will modify behavior if (1) it allows them to stand out in a positive way when perceived norms are low or (2) decreases the chances they may stand out in a negative way when normative perceptions are high. It has been hypothesized that DRT may result in transitions in normative perceptions to maintain consistency with behavioral changes (Blanton & Christie, 2003). Thus, when normative beliefs are low, DRT predicts a positive message may increase behavior and subsequently perceived norms. Alternatively, when perceived norms are high, DRT predicts a negatively framed message will produce increases in behavior and potentially an increase in perceived norms. This was

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tested using data from a recent DRT clinical trial meant to increase the use of alcohol PBS.

Study overview

The current analysis examines the previously untested supposition that DRT may result in changes in perceived norms. It was hypothesized that individuals with low preintervention PBS norms, who received a positive frame about those who used PBS, would show an increase in normative PBS beliefs postintervention. It was also hypothesized that individuals with high preintervention PBS norms, who received a negative frame about those who used PBS, would show an increase in normative PBS beliefs postintervention. It was unclear if this would occur immediately postintervention or gradually over time; thus, both of these outcomes were examined.

Methods

Participants

Participants (n = 104; 59.62% females) were college student drinkers recruited for a study examining "Longitudinal Use of Protective Behavioral Strategies." Participants were recruited via the University psychology research subject pool. The sample ranged in age from 18 to 24 (M = 19.26, SD = 1.34). Ninety-one percent of the sample was Caucasian, 5% Asian, 1% African American, and 3% were other or did not wish to respond. Participants received course credit as an incentive for participation.

Measures

Normative use of protective behavioral strategies

Each week, after reporting on use of PBS from the previous week, participants were asked: "What percent of NDSU students do you believe regularly engage in these [protective behavioral] strategies?" Participants responded in a free text box. This variable was used initially for preintervention categorization and served as the postintervention outcome of interest. *Preintervention categorization*: Perceived normative beliefs at the onset of the study, prior to the intervention (i.e., week 0), were used to form quasi-experimental categorizes for high or low normative beliefs (see study design and overview section). Individuals (n = 57) who endorsed 50% or lower were placed into the low PBS norms group. Individuals (n = 47) endorsing 51% or greater were placed into the high PBS norms group. *Postintervention criterion*: Participant ratings on this variable in weeks subsequent to the intervention served as the criterion variable for the current analysis. These continuous values were used to examine the differences in normative PBS use perceptions as a function of the intervention.

Procedure

Intervention

Participants were randomly assigned to either a positive or negative frame. Individuals then received frame consistent messages describing peers who do, or do not, use alcohol PBS. Each frame was prefaced with the following statement: "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." Participants who received a positive frame were told: "People who report that THEY DO USE these strategies are seen by their peers as …." Participants who received a negative frame were told: "People who report that THEY DO NOT USE these strategies are seen by their peers as …." These prompts were followed by 12 statements (sample positive message: "… more reliable and dependable"; sample negative message: "… more impulsive and have less self-control"). After the intervention, participants were 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 internalizing the messages (Miller & Rollnick, 2013). This form of intervention has been used successfully in the past research (see Dvorak et al., 2017, 2015, 2016, 2018).

Study design and overview

This study consisted of two phases: a screening phase (Phase I) and intervention phase (Phase II). Participants completed online informed consent for both phases. Survey instruments were administered anonymously online. In Phase I, screened participants (n = 207) provided demographics and measures of alcohol involvement. Self-reported drinkers (n = 149) were invited to participate in Phase II. Phase II required participants to complete an online assessment each week for 6 weeks. Among those invited, 45 opted out and 104 enrolled. Enrolled participants were randomly assigned to receive either a positive or negative frame. Within each frame, quasi-experimental groups were formed based on preintervention PBS norms resulting in four conditions: Low norms-negative frame (LN/NF: n = 29), low norms–positive frame (LN/PF: n = 28), high norms–negative frame (HN/NF: n = 26), and high norms–positive frame (HN/PF: n = 21). After enrollment, participants logged onto a secure server providing weekly assessments of alcohol and PBS use as well as the primary outcome here, percentage of students who they believe use PBS (i.e., PBS norms). The university Institutional Review Board approved the current study. Participants were treated in accordance with APA ethical guidelines for research. Two previous manuscripts, utilizing a more restricted sample, have been published from this data (Dvorak et al., 2015, 2016).

Analysis overview

The present data contain weekly observations nested among 104 participants across 6 weeks. Thus, the data were analyzed

using a multilevel framework. Primary analyses were conducted in *Mplus* 7.4 (Muthén & Muthén, 2012) using a Bayesian approach with an unstructured level 1 covariance structure, which is appropriate for nested/longitudinal data (Dagne, Howe, Brown, & Muthén, 2002) and small samples (B. O. Muthén, 2010). One observation (i.e., 1 person-week) was missing on the outcome variable, and thus was excluded from the analysis. Between-subject variables (i.e., PBS norm group and framing condition) were grand-mean centered. Time in study was person centered; thus, the model intercept represents mean postintervention DRT effects on perceived PBS norms among peers, while the time slope represents change in perceived PBS norms among peers across time (Singer & Willett, 2003). The level 1 intercept and time slope varied randomly and utilized an inverse-gamma distribution (~IG[0.001, 0.001])—a commonly used quasi-informative prior for random variances (Gelman, Carlin, Stern, & Rubin, 2004). Noninformative priors were used for all other parameters. Model convergence was verified in accordance with recommendations by Muthén (2010). In addition, the analysis utilized 20,000 burn-in iterations. Potential scale reduction in the last iteration of the analysis was 1.000. Kolmogorov–Smirnov statistic, comparing posterior distributions across chains 1 and 2 using 100 draws, was nonsignificant. Below, notation of "statistically significant" refers to the inclusion (or lack thereof) of 0 within the 95% Bayesian credibility intervals. Bayesian credibility intervals are based on the standard deviation of the posterior distribution (SD_p). For the analyses, paths are unstandardized allowing for interpretable group comparisons using model coefficients.

Results

Descriptive statistics

The outcome variable, perceived PBS use among peers, ranged from 0% to 100% ($M = 52.39\%$, $SD = 20.07$). Normative PBS use perception among peers is presented in Table 1. There were a total of 541 postintervention person-weeks out of possible total of 624 person weeks (i.e., 104 participants × 6 weeks), resulting in an overall compliance rate of 86.70%. Individuals completed an average of 5.45 weeks ($SD = 0.92$; Range: 2–6). There were no differences in participation by gender, $t(102) = -1.609$, $p = .111$. Nor were there differences in gender distribution across the four groups, $\chi^2(3) = 1.69$, $p = .760$. There were also no differences in participation weeks by condition, $F(3, 100) = 1.300$, $p = .279$. There were differences in preintervention PBS norms (perceived percent PBS use among peers) by norm group ($B = 32.556$, 95% BCI = 28.727, 36.681), as might be expected since this variable was used to form the norm groups prior to the intervention. Importantly, there were no differences in preintervention PBS norms by DRT framing condition ($B = 1.224$, 95% BCI = −1.901, 6.608), indicating randomization was successful. In addition, there was no effect of the frame × norm interaction on preintervention PBS norms ($B = -6.818$, 95% BCI = −15.173, 0.813). Comparisons of preintervention perceived norms in the high ($p = .424$) and low ($p = .128$) norm groups did not differ significantly. Thus, postintervention differences in PBS norms were expected to be the result of the DRT manipulation.

Primary analysis

The primary analysis utilized a multilevel Bayesian model to examine the effects of DRT on postintervention difference in PBS norms and changes in PBS norms across time. At level 1, study week (person-centered) predicted within-subject PBS norms. At level 2, DRT frame (grand-mean centered), norm group (grand-mean centered), and the interaction of the two (frame × norm group) were added as predictors of mean (i.e., between-subject) postintervention PBS norms (i.e., weekly rating of perceived percent of peers who use PBS) and the level 1 time slope (i.e., changes in perceived PBS norms across time). None of the level 2 variables predicted variability in the time slope, indicating that postintervention changes in PBS norms did not vary across time as a function of the intervention. Thus, level 2 predictors of the time slope (i.e., DRT

Table 1. Perceptions of percent of PBS use among peers in each condition across the study.

DRT Conditions	Week 0		Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
Low norms–negative frame	**Preintervention**	**Postintervention**						
Mean percent PBS use	39.21		42.25	43.00	41.93	41.29	43.00	46.38
Standard deviation	9.94		10.30	11.04	10.70	11.64	13.59	11.74
Range	20–50		25–75	20–60	20–60	18–60	20–75	23–75
Weekly *n*	29		28	24	27	21	29	16
Low norms–positive frame								
Mean percent PBS use	34.57		38.31	33.17	37.50	35.42	36.78	36.15
Standard deviation	12.59		15.81	15.66	11.99	13.91	14.30	15.32
Range	10–50		10–70	0–65	15–65	15–65	10–65	15–65
Weekly *n*	28		26	23	24	21	27	20
High norms–negative frame								
Mean percent PBS use	69.04		65.17	65.69	64.05	64.92	66.00	69.27
Standard deviation	9.15		13.58	14.72	16.36	16.76	18.60	11.34
Range	52–88		35–85	20–85	20–90	20–90	10–100	40–90
Weekly *n*	26		24	26	21	25	24	22
High norms–positive frame								
Mean percent PBS use	71.38		66.80	71.70	67.32	69.17	68.20	63.50
Standard deviation	10.75		14.90	14.24	17.83	15.46	15.30	27.41
Range	54–90		36–90	36–90	20–90	35–90	30–90	0–90
Weekly *n*	21		20	20	19	18	20	16

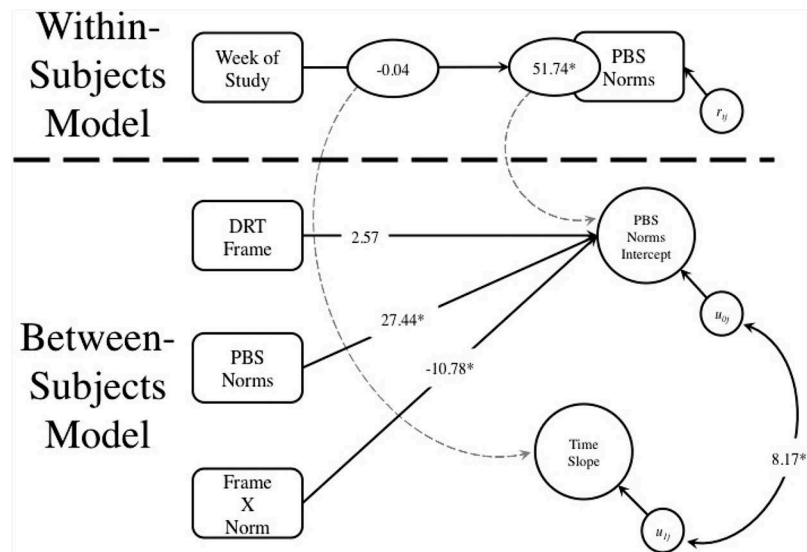*Note.* DRT: deviance regulation theory; PBS: protective behavioral strategies.

Figure 1. Model of change in perceived PBS norms as a function of the DRT intervention.

Note. All paths are unstandardized. PBS: protective behavioral strategies. Between-subject observations: $n = 104$ (participants); within-subject observation: $n = 541$ (participant weeks).*95% Bayesian credibility intervals do not include 0.

frame, norm group, and frame × norm) were removed, and the model was re-estimated. The final model is depicted in Figure 1.

In this model, there was significant variability in the level 1 intercept ($u_0 = 161.030$, 95% BCI = 119.647, 220.723) and time slope ($u_1 = 3.705$, 95% BCI = 1.930, 6.247). Approximately 25% of the variability in PBS norms was at the within-subject level (ICC = 0.749). Time in study was not associated with changes in PBS norms ($B = -0.044$, 95% BCI = −0.593, 0.488); however, higher mean PBS norms were positively correlated with the time slope ($B = 8.170$, 95% BCI = 1.533, 16.358). DRT frame did not predict PBS norms ($B = 2.573$, 95% BCI = −2.370, 7.485). As expected, norm group was associated with higher PBS norms ($B = 27.443$, 95% BCI = 22.473, 32.392). Consistent with

hypothesis, the frame × norm interaction significantly predicted the level 2 PBS norms intercept ($B = -27.443$, 95% BCI = −10.776, −0.693). This interaction was probed by comparing between-subject levels of PBS norms across the four conditions (see Figure 2). Probing of the interaction revealed significant framing effects in the low PBS norm groups, with individuals endorsing higher postintervention PBS norms after receiving a negative frame (LN/NF: $M = 42.843$, $SD_p = 2.417$; LN/PF: $M = 35.410$, $SD_p = 2.457$; $B = 7.426$, 95% BCI = 0.74, 14.16). However, there were no significant differences by framing condition among those in the high PBS norm groups (HN/NF: $M = 65.197$, $SD_p = 2.545$; HN/PF: $M = 68.535$, $SD_p = 2.837$; $B = -3.317$, 95% BCI = −10.71, 4.08). The effect size of the intervention on mean PBS use norms
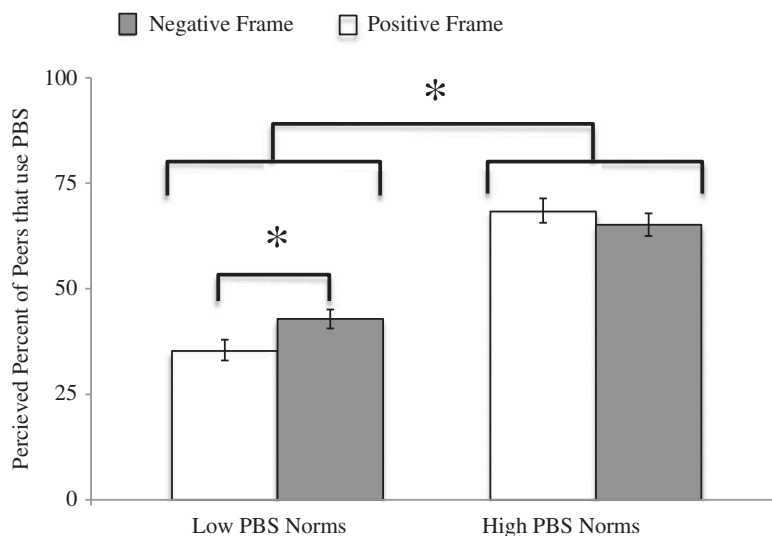

Figure 2. Perceived percent of PBS use among peers across DRT conditions.

Note. PBS: protective behavioral strategies. Error bars are 95% Bayesian credibility intervals.*95% Bayesian credibility intervals do not include 0.

between positive and negative frames in the low PBS norms group was moderate (LN/PF: 35.410, *SD* = 13.793; LN/NF: 42.843, *SD* = 11.024; Cohen's *d* = 0.57).

Discussion

Previous research has shown that PBS use is inversely associated with alcohol-related consequences (Pearson, 2013). Thus, identifying ways to increase PBS use is an important area of research. One way to do this is by increasing normative perceptions of PBS, as research indicates that increasing normative perceptions also increases behaviors (Berkowitz, 2004). The current analysis examined an intervention hypothesized to modify behavior by changing normative perceptions. The findings were counter to hypothesis. Participants that believed PBS use was low, prior to the intervention, showed an increase in perceived PBS use among peers after the intervention if they received a message negatively describing others who do not use PBS. There was no significant change in PBS norm perception among those who already held high PBS norm beliefs.

A tome of research exists showing that norm-based interventions can modify normative perceptions and subsequently influence behavior (e.g., see LaBrie et al., 2013; Lewis & Neighbors, 2006, 2007; Neighbors, Larimer, & Lewis, 2004; Neighbors et al., 2010; Perkins, Linkenbach, Lewis, & Neighbors, 2010). The basic notion is that a large discrepancy exists between individual perceptions of a behavior and the actual rates of the behavior. Norm-based interventions result in shifts toward more accurate normative perceptions (Lewis & Neighbors, 2007), and this mediates the effects of interventions (LaBrie et al., 2013). Research suggests that nationally, approximately 73% of college student drinkers engage in the use of PBS while drinking (Haines, Barker, & Rice, 2006). However, the mean perceived use in the current study was 52%. This is consistent with the larger alcohol use norms literature, in which normative perceptions are biased toward behaviors with more problematic outcomes (Perkins, Haines, & Rice, 2005; Prentice & Miller, 1993). Thus, protective strategies appear to be an area where norm-based interventions might have significant impact.

The most relevant issue in the current data is that PBS norms did not increase in the DRT-consistent conditions (low norm–positive frame or high norm–negative frame). In fact, the norms for the DRT inconsistent conditions (low norm–positive frame or high norm–negative frame) actually appear to increase. Mean postintervention norms were higher if individuals received a negative frame, relative to a positive frame, and were also in the low norms group. This was reversed (though not statistically significant) in the high norms group. DRT predicts that the message highlighting the counternorm (i.e., the minority) in each group is most salient. However, in both cases, the salient message for increasing normative perceptions appears to be the one referencing the majority group (i.e., a positive message about PBS users when users are perceived to be the majority and a negative message about PBS nonusers when nonusers are perceived to be in the majority). This is actually consistent with the theory of normative behavior (Goldstein, Cialdini, & Pratkanis, 2007), in which injunctive norms can synergistically interact with descriptive norms to modify normative misperceptions.

Though there were no DRT-consistent changes in norms, previous research shows that DRT does work to change actual behavior. It appears that this change does not occur via changes in normative beliefs. Indeed, it would seem that in the DRT-consistent conditions, the preintervention norm actually becomes anchored, while in the non-DRT condition, we observe a small difference in norms. This may suggest that DRT operates by ensuring the perceived norm retains salience if the message is targeting the counternormative behavior. Thus, DRT may cause the norm to become cemented in place, to ensure that the message continues to carry value to the individual. For example, a positive message about PBS use becomes increasingly less important or informative to the individual when normative perceptions about the behavior increase, as this prevents them from standing out in important ways. The opposite may also hold for a negative message.

One important issue, addressed by the current study, has to do with the notion that norm-based interventions work by shedding light on the discrepancy between perception and reality. It has been suggested that norm-based interventions may be less successful for those with particularly high levels of discrepancy, as this may result in more cognitive dissonance, higher disbelief, and subsequent rejection of the intervention material (Berkowitz, 2004). The current analysis suggests that DRT may be particularly important for this group, as normative perceptions only changed among those with the most discrepant preintervention beliefs. Thus, in instances where drinking norms interventions are unsuccessful, PBS norms interventions utilizing a DRT message may be especially relevant.

Limitations and future directions

Several limitations of the current study should be noted. First, the measure of PBS norms, perceived percent of students who use PBS, was a single indicator that has not been used in previous research. It will be important for future research to utilize a more comprehensive measure to assess this construct. In addition, the intervention assessed constructs weekly; however, there is research indicating recall bias of alcohol variables in as little as 1 week (Gmel & Daeppen, 2007). Thus, future research would benefit by examining PBS norms from a day-to-day perspective using ecological momentary assessment (Shiffman, 2009). Next, the initial categorization dichotomized individuals based on high and low normative perceptions using a basic cut score. This was necessary in order to form groups and to reduce obvious collinearity with the outcome variable. Future research should seek to examine this potential phenomenon using more comprehensive measures of normative perceptions.

Another important limitation is inherently nested within the assessment of norms. According to Blanton, it is important to understand both the perceived norms of a behavior (i.e., whether it is common or uncommon) and if the behavior is perceived to be favorable or unfavorable (Blanton & Burkley, 2008; Blanton & Christie, 2003; Blanton, Koblitz, & McCaul, 2008). This conceptualization is consistent with

other research examining both the subjective and injunctive normative beliefs as mechanisms of change (Lee, Geisner, Lewis, Neighbors, & Larimer, 2007). Unfortunately, these two factors are somewhat conflated by the simple conceptualization of norms here. This may help to explain why these results were more consistent with theory of normative behavior (Goldstein et al., 2007). Future research should seek to examine both injunctive and descriptive norms in the context of DRT interventions. Finally, research suggests PBS norms are more predictive of one's own PBS use if the norms are gender linked. Further, there are significant differences in PBS norms depending on the specific type of PBS (i.e., stopping/limiting, harm reduction, or manner of drinking; Lewis et al., 2009). Thus, future research should conduct a more comprehensive, gender-based, assessment of PBS norms. This is the first study to show changes in PBS use norms. Future research should examine additional interventions, such as personalized normative feedback, as a way to increase normative perceptions of PBS.

Conclusion

The current study examined changes in PBS norms following a DRT-based intervention among college student drinkers. Consistent with previous hypothesizing (Blanton & Christie, 2003), we found that a negative frame resulted in increased PBS norms for those who held low levels of PBS norms prior to the negative frame. Interestingly, this occurred immediately after the intervention. Though this effect did not increase across 6 weeks, it did not decay either. There were no changes among those who held high PBS norms prior to the intervention. These findings suggest that negatively describing individuals that do not engage in positive behaviors may be one way to increase normative perceptions of positive behaviors among those who hold low normative beliefs. This is juxtaposed to the DRT prediction that a positive frame about individuals who engage in positive behaviors is most effective at increasing future behaviors among those with low normative beliefs. Future research should seek to reconcile these effects.

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