



Influence of Norm-Based Messages on College Students' Binge Drinking Intentions: Considering Norm Type, Regulatory Mode, and Level of Alcohol Consumption

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ABSTRACT

This study examined the influence of norm-based messages on U.S. college students' binge drinking intentions, focusing on norm type, locomotion and assessment regulatory modes, and level of alcohol consumption as possible moderators. Results of an online experiment ($N = 519$) revealed significant three-way interactions among regulatory mode (assessment/locomotion), level of alcohol consumption, and norm type (i.e., descriptive vs. injunctive norms) on binge drinking intentions. The relative persuasiveness of descriptive vs. injunctive norm-based messages was contingent upon an individual's locomotion/assessment regulatory mode and overall alcohol consumption level. Findings from this study extend research on social norms and regulatory mode and provide useful suggestions for the norm-based college drinking intervention.

Binge drinking is prevalent among U.S. college students. In 2016, approximately 40% of full-time U.S. college students were active binge drinkers (Substance Abuse and Mental Health Services Administration, 2017). Binge drinking is usually defined as men consuming five or more drinks and women consuming four or more drinks in one setting (National Institute on Alcohol Abuse and Alcoholism, 2015). It can lead to a number of social and health hazards and has detrimental consequences on college students' academic performance (White & Hingson, 2013). Thus, it is imperative to identify effective college drinking intervention strategies.

Many studies indicated that college students tend to overestimate peer drinking norms—leading to their excessive alcohol use (Berkowitz, 2004; Borsari & Carey, 2003; Carey, Borsari, Carey, & Maisto, 2006; Cox & Bates, 2011; Neighbors et al., 2010). Based on this finding, a social norms approach, which focuses on correcting norm misperceptions surrounding a behavior through the use of norm-based messages, was subsequently developed (for a review, see Berkowitz, 2004). However, the social norms approach in mitigating college drinking problems received mixed support (DeJong et al., 2006; Mattern & Neighbors, 2004; Perkins & Craig, 2006; Wechsler et al., 2003).

One reason for the inconsistent support might be a lack of understanding of the different types of norms used in the norm-based messages, such as descriptive norms (i.e., perceived prevalence of a behavior among peers) and injunctive norms (i.e., perceived peer approval of a behavior) (Cialdini, Reno, & Kallgren, 1990). Additionally, individuals with different characteristics might respond differently to norm-based messages. For example, regulatory mode, which represents an individual's self-regulatory emphasis on prompt action

(locomotion) or critical evaluation (assessment) (Kruglanski et al., 2000), may influence an individual's responses to descriptive vs. injunctive norm-based messages. Finally, level of alcohol consumption should be considered when assessing the effects of norm-based messages as it is closely related to people's alcohol-related normative perceptions and personal drinking attitudes (Polonec, Major, & Atwood, 2006). The purpose of the current research then is to understand how the effectiveness of norm-based college drinking intervention messages varies as a function of norm type, regulatory mode, and level of alcohol consumption.

Descriptive norms vs. injunctive norms

Descriptive and injunctive norms are two widely studied normative perceptions (for a review, see Chung & Rimal, 2016). Descriptive norms refer to individuals' perceived prevalence of a behavior and injunctive norms are defined as individuals' perceived social approval of a behavior (Rimal & Real, 2005). Both descriptive and injunctive norms can predict human behavior (Cho, 2006; Cialdini et al., 1990; Yun & Silk, 2011). However, conformity to the two types of norms is associated with different motivations (Cialdini & Trost, 1998). Specifically, people conforming to descriptive norms are usually driven by their needs for accuracy and efficiency because descriptive norms can provide people with “a decisional shortcut” about what is the most appropriate action to take in a situation (Cialdini et al., 1990, p. 1015; Jacobson, Mortensen, & Cialdini, 2011). By contrast, injunctive norms imply to people that they would receive social sanctions if they did not comply with a group (Cialdini et al., 1990). Hence, people conforming to injunctive norms are

usually motivated by their interpersonal needs, such as the need to strengthen group cohesion (Jacobson et al., 2011).

Descriptive and injunctive norms have received extensive examination in the studies about college drinking, particularly descriptive and injunctive drinking norms at the university level (e.g., Carey et al., 2006; Cho, 2006; Crawford & Novak, 2010; Neighbors et al., 2010; Yang, 2018). While research consistently shows university descriptive and injunctive drinking norms independently predict college students' alcohol consumption, there are mixed findings about which type of social norms is more important. For instance, Cho (2006) and Foster, Neighbors, and Krieger (2015) found that college students' perceptions of their university peers' descriptive drinking norms were positively related to their alcohol use whereas students' perceived university injunctive drinking norms had no relationship with their drinking. By contrast, other research discovered that students' perceived university injunctive (vs. descriptive) norms were more closely related to their drinking behaviors (Paek & Hove, 2012). Also, Crawford and Novak (2010) found that when college students believed drinking was an important part of their college experience, their perceptions of both university descriptive and injunctive drinking norms strongly and positively predicted their alcohol consumption.

The mixed findings about the relative effects of descriptive vs. injunctive norms on college drinking behaviors highlight the importance of distinguishing between the two types of norms in the context of norm-based college drinking. Also, to use social norms optimally in norm-based communication, it is important to identify the conditions under which one type of normative information is more likely to bring about positive behavioral change. Cialdini et al. (1990) maintained that descriptive norms and injunctive norms can influence people's behaviors only when they are salient in people's minds. They supported this argument through a series of experiments on littering by varying the salience of social norms across situations (e.g., increase salience of descriptive norms by exposing participants to a littered environment). Individual disposition can also affect norm salience and hence the influence of social norms (Cialdini et al., 1990). For instance, Kredentser, Fabrigar, Smith, and Fulton (2012) found that self-monitoring moderated the influence of descriptive vs. injunctive norm-based messages on people's behavioral intentions.

Built on prior research that has taken an individual difference approach to understand the relative importance of descriptive and injunctive norms, the present research examines two key personal characteristics—regulatory mode and level of alcohol consumption—as moderators of the influence of descriptive vs. injunctive norm-based drinking messages on college students' binge drinking intentions.

Regulatory mode: Locomotion vs. assessment

Regulatory mode is concerned with the approach people take to fulfill their goals, which contains two dimensions: locomotion and assessment (Kruglanski et al., 2000). Locomotion is the self-regulatory activity of moving from one state to another (Higgins, Kruglanski, & Pierro, 2003). It is associated with a personal commitment to “the psychological resources that will initiate and maintain goal-related movement in a straightforward and direct manner, without undue distractions or delays”

(Kruglanski et al., 2000, p. 794). By contrast, assessment regulatory mode “constitutes the comparative aspect of self-regulation concerned with critically evaluating entities or states, such as goals or means in relation to alternatives in order to judge relative quality” (Kruglanski et al., 2000, p. 794). It is related to a greater focus on doing “the right thing” (Kruglanski et al., 2000, p. 793).

Locomotion and assessment are orthogonal constructs and each mode can be situationally induced or differentially emphasized by individuals as a chronic personality trait (Higgins et al., 2003). As personal variables, locomotion and assessment have unique relationships with a series of individual attributes (Kruglanski et al., 2000). For instance, assessment was negatively associated with impulsivity and decisiveness and positively related to fear of failure and invalidity; on the other hand, locomotion was positively related to impulsivity and decisiveness and negatively related to fear of failure and invalidity. Also, assessment had a positive association with social anxiety, depression, low self-esteem, need for social comparison, and sensitivity to social criticism; in contrast, locomotion had no relationship with need for social comparison and was negatively related to social anxiety, depression, low self-esteem, and sensitivity to social criticism (for a review, see Kruglanski et al., 2000).

Many personality variables differently associated with locomotion and assessment are predictive of human behaviors. As a result, locomotion and assessment are also found differentially associated with a wide array of behaviors, such as work engagement and performance (e.g., Amato, Baron, Barbieri, Bélanger, & Pierro, 2017; Chernikova et al., 2016; De Carlo et al., 2014), providing social support (Cavallo, Zee, & Higgins, 2016), retirement saving contribution (Kim, Shin, Heath, Zhang, & Higgins, 2017), decision-making (Mannetti et al., 2009), consumer purchase behavior (Pierro et al., 2013), procrastination (Pierro, Giacomantonio, Pica, Kruglanski, & Higgins, 2011), academic achievement (Garcia et al., 2015; Kruglanski et al., 2000; Zhang et al., 2015), instructional styles (Pierro, Presaghi, Higgins, & Kruglanski, 2009), and conflict resolution (Webb, Coleman, Rossignac-Milon, Tomasulo, & Higgins, 2017). Of relevance to this research is the linkage of locomotion and assessment with adolescents' and young adults' health risk behaviors. For instance, Brizi, Chirumbolo, Mannetti, and Scerbo (2017) found that high levels of locomotion vs. assessment was associated with college students' stronger intentions to engage in health risk behaviors. Ravis, Sheeran, and Armitage (2010) found adolescents' assessment orientation moderated the relationship between their past and future smoking behaviors. As assessment became stronger, the relationship between past and future smoking behaviors became weaker. Locomotion did not show such moderation effects.

Adolescence and young adulthood feature the peak of the prevalence of many health risk behaviors (Park, Scott, Adams, Brindis, & Irwin, 2014). Proper self-regulation can protect young people from engaging in a health risk behavior (Quinn & Fromme, 2010). Because locomotion and assessment are two fundamental components of self-regulation, they have implications for understanding young people's decisions about whether or not to perform a health risk behavior. Consequently, more studies should be conducted to decipher

the role of regulatory mode in shaping young people's health risk decision-making. Particularly, in a recent study, scholars (Mannetti, Pierro, Higgins, & Kruglanski, 2012) found that locomotion and assessment differentially interacted with the constructs of theory of reasoned action in predicting behaviors and behavioral intentions. Greater locomotion was associated with a stronger relationship between people's attitudes and intentions to attend gym classes and the relationship between intentions and actual exercise behaviors. On the other hand, greater assessment strengthened the relationship between subjective norms and intentions to attend gym classes. Perceived peer norms are an important antecedent of young adults' health risk behaviors (Berkowitz, 2004). Based on Mannetti et al.'s (2012) finding, studies aiming to understand young adults' regulatory mode and health risk behaviors could attend to the potential interaction of regulatory mode with norm-related variables on behavior.

In this research, we focus on how regulatory mode might interact with communication strategies about social drinking norms among college students. Alcohol use is a highly prevalent behavior among college students and self-regulation has been found an important factor to combat students' irresponsible drinking (Quinn & Fromme, 2010). However, to the best of our knowledge, self-regulatory mode has not been studied as a regulator of differently framed norm-based drinking intervention messages. As mentioned previously, descriptive norms and injunctive norms are associated with different motivational foci. Descriptive norms are associated with people's individual focus on being efficient and accurate whereas injunctive norms are associated with people's interpersonal concern of avoiding social sanctions and maintaining group cohesion (Cialdini et al., 1990). Because locomotion is not related to interpersonal needs for social comparison and is negatively related to sensitivity to social criticism (Kruglanski et al., 2000), people with a strong locomotion orientation should not prefer injunctive norm-based messages. Instead, because of their stronger commitment to prompt actions, people with a strong (vs. weak) locomotion orientation may be more responsive to descriptive norm-based messages. In comparison, people with a strong assessment orientation emphasize social comparison. They may constantly assess their behaviors against some social standard to be sure they are doing "the right thing" (Kruglanski et al., 2000, p. 793). Although both descriptive and injunctive norms can suggest social appropriateness of a behavior, injunctive (vs. descriptive) norms implying social values about a behavior might be more important for high assessors (Cialdini et al., 2006). As such, we expect that people with a strong (vs. weak) assessment orientation will be more responsive to injunctive norm-based messages. Per these arguments, we expect an interaction between norm type and regulatory mode such that:

H1: For college drinkers with a strong (vs. weak) locomotion orientation, messages based on descriptive vs. injunctive norms will more likely lead to reduced binge drinking intentions.

H2: For college drinkers with a strong (vs. weak) assessment orientation, messages based on injunctive vs. descriptive norms will more likely lead to reduced binge drinking intentions.

Level of alcohol consumption

To study the effects of norm-based drinking intervention messages, it is important to differentiate students drinking at high and low levels because people having unique drinking experiences may have developed different alcohol-related normative perceptions. Students drinking at higher levels were more likely to overestimate university peer drinking norms than those drinking at lower levels (Carey et al., 2006; Polonec et al., 2006). Also, students drinking at different levels may respond differently to the same norm-based drinking intervention messages. For instance, Jung, Shim, and Mantaro (2010) found that binge drinking college students were not persuaded by norm-based drinking intervention messages due to psychological reactance. But this effect was not found among moderate drinkers. Furthermore, Miller and Leffingwell (2013) found that high-risk college drinkers compared to low-risk drinkers rated different components of norm-based anti-drinking messages less favorably.

No studies have yet examined whether students' drinking levels would influence their responses to descriptive vs. injunctive norm-based messages. However, a prior motivation study suggested that the effectiveness of descriptive vs. injunctive norms information was a function of people's self-regulatory capacity such that descriptive (vs. injunctive) norms information was more influential for people with low self-regulatory capacity and injunctive (vs. descriptive) norms information was more effective for people with high self-regulatory capacity (Jacobson et al., 2011). In general, people who drink at high (vs. low) levels possess lower self-regulatory capacity (e.g., Hull & Slone, 2004; Quinn & Fromme, 2010; Wills & Stoolmiller, 2002). As a result, students drinking at high (vs. low) levels might more likely respond favorably to descriptive vs. injunctive norm-based drinking intervention message. However, no prior studies have examined the interplay of norm type and level of alcohol consumption in the context of norm-based communication. Hence, we propose the following research question:

RQ1: Will norm type interact with college drinkers' level of alcohol consumption to influence the effectiveness of norm-based messages?

H1 and H2 suggest that the relative effectiveness of descriptive vs. injunctive norm-based messages is likely a function of students' regulatory mode. To explore the possibility of a complex interaction involving norm type, regulatory mode, and level of alcohol consumption, we propose the following research question:

RQ2: Will college drinkers' level of alcohol consumption moderate the interactions hypothesized in H1 and H2?

Method

Participants

Undergraduate students enrolled in communication classes in a large northeastern university in the U.S. participated in this study in exchange of course credit. Those who indicated they had zero drinks in a series of typical drinking settings (see key measures for detailed question) were excluded from this study, which yielded a sample of 529 college drinkers. In this sample, 519 people completed the questionnaire and constituted the working sample of this research. These 519 college drinkers included 53.9% females, 46.1% males, 63.2% White, 12.5% Black, 13.3% Asian, 8.7% Hispanic, and 2.3% other races. The mean age is 19.77 ($SD = 1.88$).

Design and procedure

This experiment was approved by the University of Maryland (UM) IRB and was conducted in an online survey. In the survey, participants were first asked to provide an informed consent. Those who agreed to participate in this study proceeded to the study questionnaire and answered a series of questions about their demographic backgrounds and their drinking-related beliefs and behaviors as well as their locomotion and assessment regulatory mode. Then, an automatic algorithm randomly assigned participants to view either a descriptive or injunctive norm-based anti-drinking message. Following the presentation of the norm-based message, participants answered questions about their binge drinking intentions.

Norm message manipulation

Norm message manipulation was based on previous studies (Jung et al., 2010; Rimal, 2008) and was consistent with previous norm-based drinking intervention. The descriptive norm-based message claimed that college students usually held exaggerated perceptions about the prevalence of drinking in their university and then provided a series of quantitative evidence about the actual university drinking rates, such as

67% of UM students drink 4 drinks or fewer each time they party or socialize; 66.5% of UM students alternate non-alcoholic and with alcoholic beverages when partying; 22% of UM students choose not to drink alcohol at all.

The norm information was from the university health center at the time of study. Similar to the descriptive norm-based message, the injunctive norm-based message mentioned that college students generally overestimated their peers' acceptability of alcohol consumption and then presented a series of statistical evidence about actual university injunctive drinking norms, such as

67% of UM students disapprove of other students having more than 4 drinks each time they party or socialize; 66.5% of UM students disapprove of other students not alternating non-alcoholic and with alcoholic beverages when partying; 22% of UM students strongly disapprove of alcohol consumption.

Both the descriptive and injunctive norm-based messages were shown in a one-page print public service announcement

(PSA) together with a picture of college students aiming to enhance message identification. Two PSAs had the same picture, layout, font size, and type and one of them was randomly shown to the participants on a web page embedded in the online survey.

Key measures

Locomotion

Kruglanski et al.'s (2000) 12-item locomotion scale measured people's locomotion orientation. Sample items included: "I am a 'doer'"; "I am a 'go-getter'"; and "When I decide to do something, I can't wait to get started." Participants rated their agreement or disagreement with each statement on an 11-point scale and the mean of the answers was computed to represent the scale ($M = 7.38$, $SD = 1.36$, $\alpha = .85$).

Assessment

Kruglanski et al.'s (2000) 12-item assessment scale measured people's assessment orientation. Sample assessment items included "I often feel that I am being evaluated by others"; "I like evaluating other people's plans"; and "I often compare myself with other people." Participants rated their agreement or disagreement with each item on an 11-point scale. Answers were averaged to produce an index ($M = 7.06$, $SD = 1.28$, $\alpha = .77$).

Level of alcohol consumption

Based on prior studies (Real & Rimal, 2007; Rimal & Real, 2003), level of alcohol consumption was assessed by asking participants to provide their drinking quantity in several specific drinking contexts. Four open-ended questions were developed, such as "When you go to a bar, on average how many alcoholic drinks do you typically consume?" and "When you go to a party, on average how many alcoholic drinks do you consume?" Answers to the four questions were averaged into a composite ($M = 5.74$, $SD = 3.62$, $\alpha = .78$).

Binge drinking intentions

Measures for binge drinking intentions were adapted from Real and Rimal's (2007) and Jang, Rimal, and Cho's (2013) study. Participants were asked to give answers on an 11-point rating scale to: "How likely do you think you will have 5 or more (4 or more for females) drinks on one drinking occasion in the next 7 days?/30 days?/12 months?." Answers to these three questions were averaged into an index of binge drinking intentions ($M = 6.39$, $SD = 3.21$, $\alpha = .88$).

Control variables

Based on previous study (Real & Rimal, 2007), a series of demographic variable were controlled for, including gender (53.9% females vs. 46.1% males), age ($M = 19.77$, $SD = 1.88$), residence location (48.4% off campus vs. 51.6% on campus), Greek organization membership (33.9% yes vs. 66.1% no), and first age of alcohol consumption ($M = 15.68$, $SD = 2.28$).

Results

Manipulation check

One multivariate analysis of variance found that norm type had a significant main effect at the multivariate level, $F(2, 525) = 66.90$, $p < .001$, $\eta_p^2 = .21$. As expected, participants exposed to the descriptive norm-based message reported that the message was more focused on the actual drinking behaviors of most students at the university ($M = 8.06$, $SD = 2.65$) than those exposed to the injunctive norm-based message ($M = 6.75$, $SD = 3.03$), $F(1, 517) = 27.58$, $p < .001$, $\eta_p^2 = .05$. Participants exposed to the injunctive norm-based message ($M = 8.48$, $SD = 2.51$) reported greater focus of the message on how their university students think about others' use of alcohol than those seeing the descriptive norm-based message ($M = 6.49$, $SD = 3.16$), $F(1, 517) = 62.00$, $p < .001$, $\eta_p^2 = .11$.

Hypotheses testing

A hierarchical regression analysis was conducted to address the study hypotheses and research questions with binge drinking intentions as the dependent variable. The regression model had a four-block structure. Block one contained all the control variables. Block two contained norm type, locomotion, assessment, and level of alcohol consumption. Block three contained all two-way interaction terms. In block four, the three-way interactions among norm type, assessment/locomotion and level of alcohol consumption were included. For all of the interaction terms, to reduce multicollinearity, variables making up the interaction terms were centered and standardized before forming products. Results of the regression analysis are shown in Table 1.

As shown in Table 1, binge drinking intentions were predicted by a number of variables in block one and two. Older college student drinkers ($\beta = .10$, $p < .05$), Greek organization members ($\beta = .11$, $p < .01$) and people who drank higher levels ($\beta = .49$, $p < .001$) reported greater intentions to binge drink in the future.

RQ1 asks whether level of alcohol consumption and norm type interact to influence the persuasiveness of norm-based drinking messages. Results suggested that binge drinking intentions were predicted by the interaction between norm type and level of alcohol consumption ($\beta = .10$, $p < .05$). To uncover the nature of this interaction, we estimated the effects of norm type at two values of level of alcohol consumption (high: $M + 1SD$ and low: $M - 1SD$). As shown in Figure 1, for those drinking at high levels, the descriptive norm-based message produced less binge drinking intentions ($b = 0.79$, $p < .05$) than the injunctive norm-based message. On the other hand, for those drinking at low levels, the descriptive and injunctive norms messages did not differ in their effects on binge drinking intentions ($b = -0.20$, $p = ns$).

H1 and H2 predict that locomotion and assessment regulatory mode would interact with norm type to influence binge drinking intentions, respectively. We found neither interaction was significant. However, per RQ2, the three-way interaction among locomotion, norm type, and level of alcohol consumption ($\beta = .25$, $p < .001$) as well as the three-way

Table 1. Hierarchical regression analysis: predictors of binge drinking intentions.

Predictors	β	ΔR^2
Block 1		.09***
Gender	-.04	
Age	.10*	
Residence location	-.01	
Greek organization membership	.11**	
Age of first drink	-.06	
Block 2		.22***
Norm type	.05	
Locomotion	-.03	
Assessment	.06	
Level of alcohol consumption	.49***	
Block 3		.03***
Norm type \times locomotion	-.02	
Norm type \times assessment	-.03	
Norm type \times level of alcohol consumption	.10*	
Locomotion \times level of alcohol consumption	-.09	
Assessment \times level of alcohol consumption	.19**	
Block 4		.03***
Norm type \times locomotion \times level of alcohol consumption	.25***	
Norm type \times assessment \times level of alcohol consumption	-.12*	
Total R^2	.36***	
Adjusted R^2	.34***	

Note: The reported numbers are standardized β from the last step of the regression model. Control variables: Gender: female = 0, male = 1; Residence location: off campus = 0, on campus = 1; Greek organization membership: no = 0, yes = 1; Norm type: descriptive norms message = 0, injunctive norms message = 1.

* $p < .05$. ** $p < .01$. *** $p < .001$.

interaction among assessment, norm type, and level of alcohol consumption ($\beta = -.12$, $p < .05$) were significant.

To examine the nature of the three-way interactions, the effect of the interaction between regulatory mode and norm type was estimated at two values of level of alcohol consumption (high: $M + 1SD$ and low: $M - 1SD$). As shown in Figure 2, among college students drinking at high levels and with a strong locomotion orientation, the message based on descriptive (vs. injunctive) norms produced less binge drinking intentions ($b = 1.37$, $p < .001$); among college students drinking at high levels and with a weak locomotion orientation, both messages led to similar intentions ($b = -0.37$, $p = ns$). Among college students drinking at low levels and with a strong locomotion orientation, the message based on injunctive (vs. descriptive) norms led to less binge drinking intentions ($b = -1.53$, $p < .01$); among college students drinking at low levels and with a weak locomotion orientation, the message based on descriptive (vs. injunctive) norms led to less binge drinking intentions ($b = 1.12$, $p < .05$).

The interaction among assessment, level of alcohol consumption, and norm type on binge drinking intentions is shown in Figure 3. According to Figure 3, among college students drinking at high levels and with a strong assessment orientation, both messages led to similar intentions ($b = 0.02$, $p = ns$); among college students drinking at high levels and with a weak assessment orientation, the message based on descriptive (vs. injunctive) norms led to less binge drinking intentions ($b = 1.56$, $p < .01$). Among college students drinking at low levels and with a strong assessment orientation, it appeared that the message based on descriptive (vs. injunctive) norms led to less binge drinking intentions. However, the difference was not significant ($b = 0.28$, $p = ns$). Finally, among college students drinking at low levels and with a weak assessment orientation, the message

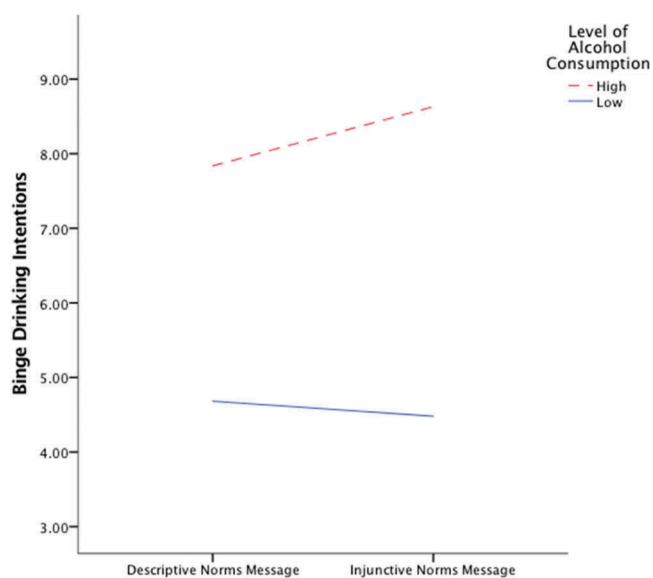


Figure 1. Two-way interaction between level of alcohol consumption and norm type.

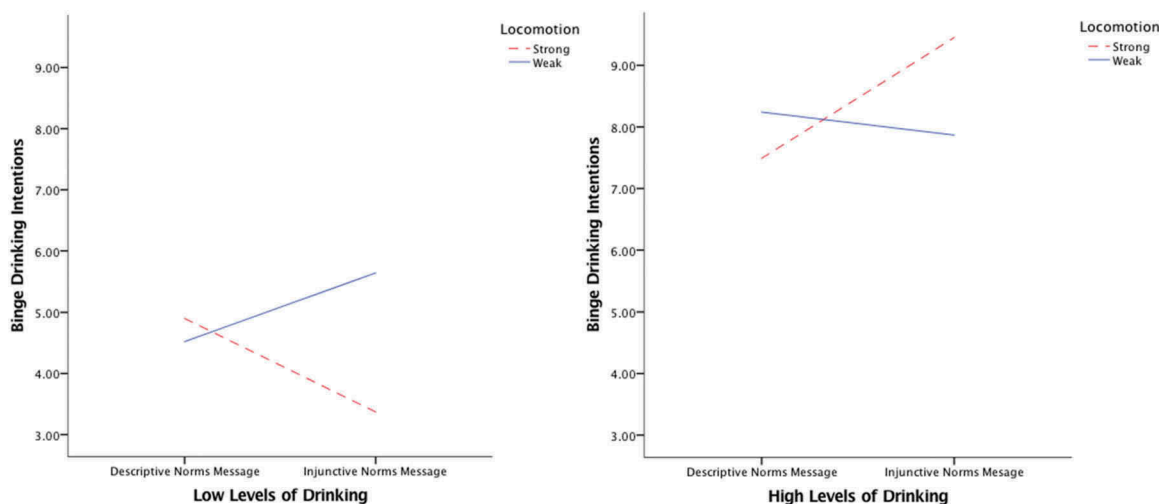


Figure 2. Three-way interaction among norm type, locomotion, and level of alcohol consumption.

based on injunctive (vs. descriptive) norms appeared to produce less binge drinking intentions. But the difference was not significant ($b = -0.68$, $p = ns$).

Discussion

Our study investigated the effectiveness of norm-based anti-drinking messages as a function of norm type, college students' regulatory mode, and level of alcohol consumption, aiming to provide useful insights into norm-based college drinking interventions. We expect that stronger locomotion orientation is associated with more favorable response to the

message based on descriptive vs. injunctive norms and stronger assessment orientation is associated with more favorable response to the message based on injunctive vs. descriptive norms. Results from this study did not support a two-way interaction between locomotion or assessment and norm type but found a significant three-way interaction among norm type, locomotion or assessment, and level of alcohol consumption. Further analysis showed students drinking at high levels were more likely to respond to the norm-based messages in a way consistent with our expectations but students drinking at low levels were more likely to respond in an opposite direction. Possibly, light drinkers habitually paid

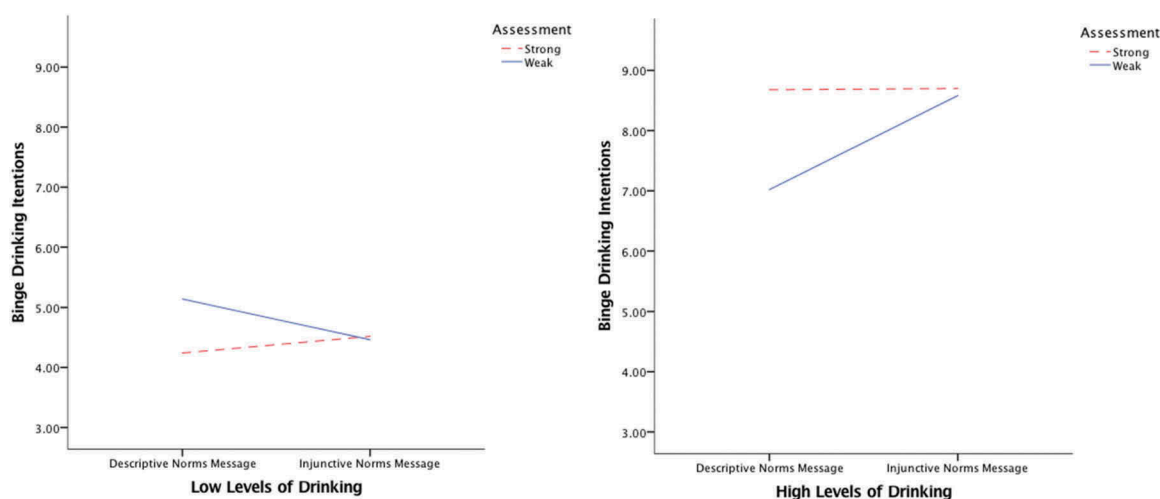


Figure 3. Three-way interaction among norm type, assessment, and level of alcohol consumption.

more attention to their regulatory mode-consistent norm information and developed normative perceptions close to our normative evidence. Hence, they found our normative message consistent with their regulatory mode less useful; on the other hand, they found the normative appeal inconsistent with their regulatory mode novel and persuasive. For students drinking at high levels, due to their high engagement in drinking, they might not want to spend great efforts processing both types of norm-based messages. Compared with regulatory mode-inconsistent message, messages consistent with regulatory mode might be easier to process and hence were better accepted.

Overall, our study found that heavy drinkers reported the message based on descriptive norms more effective than the message based on injunctive norms. The finding was consistent with prior observations that heavy drinking was associated with low self-regulatory capacity and low self-regulatory capacity was related with greater influence of descriptive (vs. injunctive) norm-based information (Jacobson et al., 2011).

Our study makes several theoretical contributions. First, to improve the efficacy of norm-based college drinking interventions, many prior studies examined the mediating and moderating mechanisms underlying the norm-behavior relation (e.g., Crawford & Novak, 2010; Jang et al., 2013; Real & Rimal, 2007; Rimal & Real, 2005). However, the factors related directly to effective norm-based communication received little attention. In this research, we examined both message and individual factors associated with persuasive norm-based college drinking communication, providing new insights into the norm-based college drinking literature. Second, a large amount of social norms research to date examined the moderating mechanisms underlying descriptive norm-behavior and injunctive norm-behavior relationship, respectively (e.g., Jang et al., 2013; LaBrie, Hummer, & Neighbors, 2008; Real & Rimal, 2007; Yang, 2018; Yun & Silk, 2011). But little has investigated the mechanism that can distinguish the effects of descriptive and injunctive norms, particularly individual difference moderators. Our study fills this research gap. Particularly, by examining locomotion and assessment as moderators of descriptive vs. injunctive norms influence, our

study provides a new perspective to understand the influence of norm-behavior relationship. Third, norm-based communication has been long studied as an important persuasion tactic (e.g., de Groot, Abrahamse, & Jones, 2013; Greene, Campo, Banerjee, 2010; Marshall & Feeley, 2006; Priebe & Spink, 2012). Our study enriches the understanding of this persuasion tactic by examining norm type as a messaging factor and regulatory mode and level of alcohol consumption as two individual difference moderators. Finally, our study extends the scope of regulatory mode studies by examining the regulatory mode theory in the context of norm-based college drinking communication.

Findings from our research add important insights into norm-based college drinking communication practice. Many norm-based anti-drinking campaigns have focused on changing descriptive norm beliefs (Paek & Hove, 2012). However, our study suggested that descriptive norm-based drinking intervention message might not be an ideal communication strategy for all college student drinkers, such as light drinkers with a strong locomotion orientation. Hence, college drinking intervention practice should pick proper norm-based persuasion strategies based on students' regulatory mode and level of alcohol consumption. Additionally, social media serve an important tool to deliver norm-based alcohol education messages (Ridout & Campbell, 2014; Yang & Zhao, 2018). In the past, chronic assessment was found positively related and locomotion was found negatively related to people's Internet use (Biraglia, Brizi, Salvati, Metastasio, & Mannetti, 2017). Therefore, compared with other people, people with a strong assessment orientation or a weak locomotion orientation might have a higher chance of being exposed to norm-based messages delivered through the Internet on social media. In our study, we found for people with a strong assessment orientation or a weak locomotion orientation, when drinking at low levels, descriptive vs. injunctive norm-based alcohol education message was more effective. This finding indicates that norm-based social media marketing campaigns aiming to prevent binge drinking among light drinkers might consider using more descriptive norm-based messages to enhance campaign effectiveness.

Notably, regulatory mode can be induced temporarily through social cues. For instance, locomotion could be induced by asking individuals to reflect upon times when they decided to do something without delay (Avnet & Higgins, 2003); assessment can be made situationally salient by asking individuals to think about times when they compared themselves with other people (Avnet & Higgins, 2003). Also, locomotion could become salient with the presence of rock music and dynamic images and assessment would be salient with classic, soft music and static images (e.g., Mannetti, Giacomantonio, Higgins, Pierro, & Kruglanski, 2010). When designing norm-based messages, practitioners could consider adding these cues to make messages more effective.

Some limitations of the study should be noted. First, due to the lack of a control group, it is unclear whether both descriptive and injunctive norm-based messages reduced college students' binge drinking intentions. However, the design of the current study fulfills the study purpose—to compare descriptive and injunctive norm-based messages. Second, our experiment instructed drinking participants to pay close attention to the norm-based messages, which reduces ecological validity of the study. Third, our data cannot speak for the long-term performance of the proposed persuasion effects. Also, we did not assess message effects on students' actual binge drinking behaviors. Moreover, our study did not measure and control for students' involvement in athletics, which was found to be related to drinking (Doumas, Turrisi, Coll, & Haralson, 2007). Finally, we used a convenience sample in this study.

In spite of these limitations, our study suggests several future research directions. First, prior study found that stronger locomotion orientation was associated with a stronger relationship between intentions and people's actual behaviors but did not find similar effect for assessment, suggesting locomotion might be a more important variable for implementing an action (Mannetti et al., 2012). Hence, future studies might want to test whether when the outcome is actual behaviors, our findings related to locomotion will be replicated but the significant interaction between norm message type, assessment and drinking quantity disappears. Second, prior research suggested that a combination of high locomotion and high assessment can lead to most desirable behavior outcomes (Pierro, Pica, Mauro, Kruglanski, & Higgins, 2012). Future studies can examine the interaction among assessment, locomotion and normative messages on binge drinking intentions. Additionally, media channels differ in information presentation format and quantity. For instance, social media support two-way communication and can show a huge amount of information from multiple sources simultaneously. On the other hand, radio and newspaper usually present information in a relatively simple and straightforward manner. Due to locomotion's emphasis on prompt movement and assessment's emphasis on evaluation, these two regulatory modes might be related to preferences for different media channels. Future studies should explore how locomotion and assessment are related to people's responses to drinking education messages from different media channels. Also, field experiment might be conducted in the future to better

understand the effects of norm type, regulatory mode, and college students' drinking quantity on their binge drinking behaviors. Finally, future studies can also explore the interaction between different types of social norms and regulatory mode as a predictor of college students' binge drinking behavior.

In conclusion, this research improves the understanding of the message and individual difference factors associated with norm-based communication in the context of college binge drinking. It is expected that more efforts should be devoted to identifying the effective communication strategies associated with norm-based college drinking intervention.

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