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Delivering normative feedback to heavy drinking college students via text messaging: A pilot feasibility study[☆]

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HIGHLIGHTS

- Accurate descriptive, injunctive norms sent to college students in 28 daily texts.
- Demonstrated feasibility and acceptability of using text messages to target norms.
- Participants in experimental group reduced drinking behavior at post-test.

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ABSTRACT

Correcting misperceptions in drinking norms is an established method of reducing college student drinking; however, delivery of accurate norms has typically been limited to a single dose within the confines of an alcohol intervention. The present study tests the feasibility, acceptability, and preliminary efficacy of using text messages to promote pro-moderation descriptive and injunctive norms. Following a baseline survey, 68 heavy drinking college students were randomly assigned to receive 28 daily messages with either accurate norms information (experimental group, $n = 34$) or fun facts (control group, $n = 34$). Participants rated each message on a 5-point scale of interest, and at the end of the 28 days completed a follow-up assessment of normative perceptions and drinking behavior. The study protocol was feasible: 87% of invited students completed the screener, 64% of eligible students completed the consent form, and 93% agreed to participate. All messages were delivered and 98% were rated. Regarding acceptability, the mean interest rating for the alcohol-related text messages was 2.84 ($SD = 1.30$), and no participants withdrew from the study. Although between-group differences were not observed at follow-up, participants in the experimental group showed significant reductions between baseline and follow-up on peak drinks, frequency of heavy episodic drinking (HED), negative consequences, and injunctive norms ($ps < 0.01$). Results lay the groundwork for development of a text-based prevention strategy for use in college settings.

1. Introduction

Alcohol misuse among college students is associated with persistent rates of consequences, including injuries and even deaths (Hingson, Zha, & Weitzman, 2009). Because current interventions targeting college student drinking produce small effect sizes (Carey, Scott-Sheldon, Carey, & DeMartini, 2007; Tanner-Smith & Lipsey, 2015), it is essential to develop and test novel prevention strategies. In the present study, we test acceptability and feasibility of one such novel approach involving repeated exposure to SMS text messages that depict accurate descriptions of peer drinking behaviors and beliefs.

One strong predictor of high-risk drinking among college students is perceived norms (Perkins, 2002). Descriptive norms (DN, what others do) and injunctive norms (IN, what others approve of) are positively associated with drinking, both cross-sectionally and longitudinally (Larimer, Turner, Mallett, & Geisner, 2004; Lee, Geisner, Lewis, Neighbors, & Larimer, 2007; Mollen, Rimal, Ruiter, Jang, & Kok, 2013; Read, Wood, & Capone, 2005). However, estimates of others' drinking (DN) often exceed reports of one's own behavior, and estimates of others' approval of drinking behaviors (IN) are usually more permissive than one's own attitudes (Borsari & Carey, 2003). In other words, many students believe others drink and approve of drinking more than the

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student does, and often perceived norms are exaggerated relative to actual norms. In addition, students endorse more personal approval of protective behavioral strategies than they ascribe to others (DeMartini, Carey, Lao, & Luciano, 2011). The phenomenon whereby privately held attitudes are more conservative than perceived peer attitudes is sometimes termed “pluralistic ignorance” (Prentice & Miller, 2003).

Exaggerated perceived norms can have adverse effects on individuals and the community. Not only do perceived DN and IN predict later drinking behavior (Larimer et al., 2004; Wardell & Read, 2013), but self-other differences in DN (i.e., the perception that peers (others) are engaging in heavier drinking than the student is) predict increased drinking over time, suggesting that students conform to their (mis)perceptions (Carey, Borsari, Carey, & Maisto, 2006). Perceptions of self-other differences in IN can also serve to perpetuate permissive drinking environments, whereby individual students who do not share the perceived approval of excessive drinking feel in the minority (Prentice & Miller, 1993), and those holding pro-moderation attitudes (i.e., beliefs that it is a good idea to drink at low levels and/or take safety precautions to avoid risk while drinking) do not express their opinions for fear of social isolation (Glynn, Hayes, & Shanahan, 1997). Theoretically then, correcting such misperceptions could result in behavior change.

Personalized normative feedback is included in many efficacious interventions to reduce college student drinking (Carey et al., 2007; Carey, Scott-Sheldon, Elliott, Garey, & Carey, 2012; Crouce & Larimer, 2011; Lewis & Neighbors, 2006). Nearly all of these interventions have provided accurate descriptive norms to correct misperceptions of peer drinking behavior, in one or two exposures. Importantly, mediation analyses consistently support DN as a mechanism of change in alcohol consumption (Reid & Carey, 2015).

Though literature suggests that correcting exaggerated IN may also be a viable prevention strategy, few prevention interventions employ IN feedback with the goal of reducing risky drinking. A recent review found weak evidence for mediation by IN (Reid & Carey, 2015). However, most of the reviewed interventions did not attempt to change IN, and those that included IN manipulations failed to successfully change IN (i.e., the “a” path in mediation); thus strong tests of the potential for a successful IN manipulation to facilitate change in drinking are missing. Recently, two studies demonstrate the malleability of IN. Prince and Carey (2010) manipulated informational content embedded in a survey. Specifically, a page of the survey contained a statement describing campus-based attitudes towards drinking leading to negative consequences (e.g., “Most students find that being unable to remember parts of an evening of drinking is highly unacceptable”), and contrasting these norms with data indicating that acceptability was commonly overestimated. IN changed immediately following presentation of this corrective information. Similarly, IN feedback delivered face-to-face reduced perceptions of IN and consumption and consequences at a 1 month follow-up, relative to an assessment-only control (Prince, Maisto, Rice, & Carey, 2015). Importantly, norms feedback is most persuasive when DN and IN align, presenting a consistent message (Reid, Cialdini, & Aiken, 2010). While correcting both exaggerated DN and IN has a sound theoretical basis as a prevention strategy, this combination strategy has been underutilized in alcohol abuse prevention interventions.

Meta-analyses show that existing alcohol prevention programs produce significant but small effects, but most rely on traditional in-person or computer-delivered formats (Scott-Sheldon, Carey, Elliott, Garey, & Carey, 2014; Tanner-Smith & Lipsey, 2015). There is a need for novel approaches to not only adjust the content of prevention and intervention messages, but also the delivery mode. Text messaging affords a cost-effective opportunity to promote health behavior change, with nearly universal reach. Nearly all (98%) young adults ages 18–29 own cell phones, and 97% of cell phone users use text messages (Pew Research Internet Project, 2014). Reviews document the efficacy of text-based interventions on a variety of health outcomes (Cole-

Lewis & Kershaw, 2010; Fjeldsoe, Marshall, & Miller, 2009; Free et al., 2013; Mason, Ola, Zaharakis, & Zhang, 2015; Mohr, Burns, Schueller, Clarke, & Klinkman, 2013), with growing support for text-based interventions to reduce alcohol use (Bock et al., 2016; Suffoletto, Callaway, Kristan, Kraemer, & Clark, 2012; Suffoletto et al., 2014; Weitzel, Bernhardt, Usdan, Mays, & Glanz, 2007). Texts have been used effectively to deliver tips, educational content, and reminders of users' health goals (Klasnja & Pratt, 2012). To our knowledge, a text-based intervention designed specifically to correct misperceived norms has not been developed. However, such an intervention can reach students in the context of their daily lives with messages that compete with exposure to risky drinking and peer approval that maintains exaggerated unhealthy norms. Important for this investigation, the focus theory of normative conduct (Cialdini, Kallgren, & Reno, 1991) holds that norms are likely to influence behavior when they are made a salient focus of attention, which can be done with repeated text messages.

1.1. The present study

We conducted a pilot randomized controlled trial study to inform the development of an intervention that delivers normative feedback to heavy drinking college students via text messaging. Consistent with the phased approach described by Leon, Davis, and Kraemer (2011), the primary aims of this pilot study were to examine feasibility and acceptability of the proposed intervention. As a secondary aim, we gathered initial evidence of efficacy by examining within- and between-group change in an experimental and control group on levels of alcohol use, alcohol consequences, perceived descriptive and injunctive norms.

2. Materials and methods

2.1. Participants

Participants ($N = 68$) recruited from a residential 4-year college were eligible to participate if they were second-year students (because they were not currently the focus of other alcohol prevention efforts on campus), ages 18–20, met the NIAAA criteria for risky drinking (for men, ≥ 5 drinks in a day or > 14 in a week; for women ≥ 4 drinks in a day or > 7 in a week), and used text messaging at least weekly. Participants were excluded if they reported being in treatment for alcohol use disorder, an AUDIT score of 20 or higher (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001) (because a prevention intervention is unlikely to affect students with likely dependence), and/or inability to receive text messages during the study.

2.2. Procedures

The University's Institutional Review Board approved study procedures. Eligibility was determined via an online screening survey emailed by the University's Office of Residential Life. Eligible participants were directed to an online consent form and baseline survey, which collected information on demographic characteristics, past 30 day alcohol use, and perceptions of descriptive and injunctive norms of alcohol use and consequences. Upon survey completion, participants provided contact information and received \$15. Participants who completed the baseline survey and an orientation session to learn more about the study were randomly assigned to the experimental condition (accurate norms information, $n = 34$) or control condition (fun facts, $n = 34$). In both conditions, participants were sent a text message once per day (at 7:00 pm) for 28 days using the Qualtrics system. After these 28 days, participants completed an online follow-up survey within one week and received \$20.

Procedures within each of the two conditions were identical with the exception of message content. Participants in the control condition received messages containing a fun fact (e.g., “A single elephant tooth

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