Abstract

Decades of research on the social norms approach (SNA) has shown that informing people of how their behavior compares to their peers’ is an effective way to reduce risky behavior. The SNA has been particularly successful at reducing drinking on college campuses. However, one recent study may have found a way to improve upon the SNA: rank-framing messages (Taylor, Vlaev, Maltby, Brown, & Wood, 2015). This study found that re-framing social norms messages to show how students’ alcohol consumption ranks relative to their peers is more effective at increasing information-seeking. The current study is a replication of this study. Rank-framed messages did decrease drinking behaviors, but did not increase information-seeking. Possible explanations and the potential merit of rank-framed social norms interventions are discussed.

Replication of a Rank-Framed Social Norms Experiment

Over the past several decades a large body of research has shown that people tend to overestimate their peers’ risky behaviors, which often encourages people to engage in risky behaviors themselves in a misguided attempt to behave within the norm. Our perception of what
everyone else is doing can be a powerful predictor of our own behavior (Lapinski & Rimal, 2005). However, our perceptions tend to be incorrect, and we tend to overestimate how often others engage in risky behavior (Borsari & Carey, 2003). Dozens of studies have shown that people overestimate other people’s behaviors, including sexual activity (Barriger & Vélez-Blasini, 2013; Pariera, 2013), drug use (Martens et al., 2006), and alcohol consumption (Borsari & Carey, 2003; Campo et al., 2003; Perkins & Berkowitz, 1986). For example, college students who overestimate how much alcohol others consume are more likely to increase their alcohol consumption, too (Berkowitz, 2004). Researchers have leveraged this phenomenon with the social norms approach, which decreases risky behavior by correcting people’s misperceptions about its prevalence. The social norms approach typically provides audiences with accurate information about a misperceived norm, thus encouraging people to reduce their own risky behavior to fit the new, healthier norm.

Numerous studies have used the social norms approach to decrease risky behavior, with a particular emphasis on alcohol consumption (see Berkowitz, 2004 and Perkins, 2015 for reviews). For example, social norms interventions have been successful at reducing student binge-drinking at dozens of universities in the U.S. alone (Berkowitz, 2004; Lewis & Neighbors, 2006). These interventions typically inform students of the actual average behavior of their peers (called descriptive norms), with messages such as “The majority of [this school’s students] drink alcohol once per week…” (Perkins & Craig, 2006), or ”74% of [this school’s] drinkers have 0-4 drinks on the average Friday night” (“Dartmouth College Social Norms Campaign,” n.d.). While studies have consistently demonstrated the effectiveness of informing people of the average person’s behavior, different types of norms have different influences (Park, Klein, Smith, & Martell, 2009). One recent study found a potential way to improve upon descriptive social norms
interventions: rank-framing messages (Taylor, Vlaev, Maltby, Brown, & Wood, 2015). Rank-framed social norms messages inform a person of their behavior relative to others. This design stems from a relatively new body of work showing that people are influenced more by their rank relative to others than how they differ from the average (Stewart, Chater, & Brown, 2006; Vlaev, Chater, Stewart, & Brown, 2011). Some studies have shown that rank-framed messages affect perceived benefits of exercise (Maltby, Wood, Vlaev, Taylor, & Brown, 2012), perception of severity of mental illness (Melrose, Brown, & Wood, 2013), and perception of risk of developing alcohol-related disorders (Wood, Brown, & Maltby, 2012).

In the only study examining behavioral outcomes, Taylor et al. compared the effect of rank-framed and other social norm messages on reducing heavy drinking. They identified heavy drinkers and randomly assigned them to one of four interventions: absolute only (messages that stated the official guidelines for alcohol consumption for their gender), absolute comparison (messages comparing their consumption with the official guidelines for their gender), mean comparison (messages comparing their consumption with the average consumption by others of the same gender), and rank comparison (messages about how their consumption ranked compared with others of the same gender). Participants received one email per week for four weeks, then completed a follow-up questionnaire about their alcohol consumption, along with the option to request information about reducing drinking. Participants in all conditions reported a decrease in alcohol consumption, but there was no difference between conditions. However, participants in the rank-framed condition were significantly more likely to request information about reducing drinking than those in the other three conditions.

Replication of this study is crucial. Understanding the effectiveness of rank-framed messages has the potential to generate more impactful interventions. A better approach to social
norms research would likely be of significance to scholars in communication, public health, and psychology, as well as people working on the frontlines at universities to decrease harmful student drinking.

**Method**

**The Original Study**

The original study included 101 (66 female) university students recruited through email and social media. Participants’ drinking behavior was measured with the Alcohol Use Disorders Identification Test (AUDIT-C), a previously validated scale that measures harmful drinking (Bradley et al., 1998). The scale consists of three questions about alcohol consumption, with each question worth 0 to 4 points. A total score of five or higher is considered harmful drinking (Rumpf, Hapke, Meyer, & John, 2002), so participants who scored lower than five were excluded from the study. Participants were also asked to report the number of standard drinks consumed per week, and the number of alcohol units consumed per week, with the help of a chart showing the number of units in different drinks. Participants were then randomly assigned to one of the four conditions.

Participants received one email per week for four weeks with a message “Before taking part in this study you were drinking more alcohol than is recommended by health experts” followed by a message framed according to the condition (see Table 1). In the fourth email, participants completed the same questionnaire, and were asked if they wanted more information. Three types of information were offered including experts’ recommendations on alcohol consumption, links to websites about alcohol consumption, and contact information for people worried about their alcohol consumption. Participants could select as many as they wanted.

**The Present Study**
Contact was made with the authors of the original study for more details to ensure that the replication was as identical as possible. The survey and procedures were identical to those in the original study, but the original study was conducted in the United Kingdom, and this replication takes place in the United States. However, both countries have similarly high rates of drinking (World Health Organization, 2011), and traditional social norms research has been found to decrease drinking in both countries (Bewick et al., 2010; Borsari & Carey, 2003; Wesley Perkins, 2015; Robinson, Jones, Christiansen, & Field, 2014). Also, the scales used in the original study were developed and tested in the U.S. (Bradley et al., 1998).

Participants were recruited via a random selection of email addresses from a large mid-Atlantic university. Twelve hundred email addresses were selected. Of these, 467 students began the survey, and 155 qualified and completed the pre-test survey. Of the 155 participants, 60.6% ($n = 94$) were men. Because the legal drinking age in the United States is 21, participants were asked for their age range, rather than their exact age, to avoid asking participants to admit drinking alcohol under-age. Most participants were 18-21 (61%), followed by 22-24 (29%), and 25 or older (10%). Of the 155 participants that qualified, 91 (59%) completed the post-test.

**Results**

Many participants recalled seeing all four emails (46.2%), while 35.2% recalled seeing three emails, 7.7% recalled seeing two emails, and 11.0% recalled seeing only one email. In the original study, the dependent variables were alcohol consumption by units and AUDIT-C scores. While alcohol units are a precise measure of volume of alcohol consumption, reporting requires some calculations on the part of the participant (e.g. a small glass of wine is 1.5 units, a medium glass is 2 units, and a large glass is 3 units). Moreover, the chart that guides this process, which was identical to that used in the original study, uses milliliters as the measurement (e.g. a
“normal beer, large bottle/can, 4.5%, 440ml”). It is conceivable that U.S. students would have difficulty calculating their alcohol unit consumption, so, for the current study, number of standard drinks was also analyzed as a dependent variable of interest. This variable was measured in the original study, but the authors did not report findings for it.

First, a one-way ANOVA was done to see whether there were differences in alcohol use between conditions in the pre-test. There were no statistically significant differences between groups, as measured by alcohol units ($F(3,154) = .63, p = .60$), AUDIT-C scores ($F(3,154) = .26, p = .86$), nor standard drinks ($F(3,153) = 1.15, p = .33$). T-tests were run to measure differences across conditions between pre- and post-test. There was a statistically significant decrease in alcohol units consumed ($t(90) = -1.95, p = .05$) between pre-test ($M = 14.80, SD = 12.98$) and post-test ($M = 12.38, SD = 10.46$), and in AUDIT-C scores ($t(90) = -4.76, p < .001$) between pre-test ($M = 6.04, SD = 1.21$) and post-test ($M = 5.36, SD = 1.70$). The decrease in standard drinks ($t(90) = 1.94, p = .06$) approached statistical significance (see Table 2 for all means and standard deviations of pre- and post-test scores).

A one-way ANOVA of the post-test scores minus the pre-test scores showed there was no statistically significant difference between conditions in reduction of alcohol consumption measured by alcohol units ($F(3, 90) = .23, p = .88$), nor by AUDIT-C scores ($F(3, 90) = 61, p = .61$). The difference between conditions in reduction of standard drinks was statistically significant ($F(3,89) = 3.06, p = .03$). Post-hoc tests revealed that the participants in the rank-framing condition reduced their standard drink consumption more than those in condition 2 (absolute comparison), ($p = .05$). Participants in condition 2 reported higher standard drink consumption than in their pre-test, but the increase was not statistically significant ($t(28) = .92, p$
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There were no statistically significant differences between the rank-framing condition and condition 1 or 3.

Chi-square tests revealed that between those who took the post-test and those who did not, there was no statistically significant difference in age ($p = .19$), but more men (51%) took the post-test ($X^2 = -9.41, p = .002$), than women (26%). Independent t-tests revealed there were no statistically significant differences between women and men on post-test scores by alcohol unit reduction ($p = .49$), AUDIT-C score reduction ($p = .33$), nor standard drink reduction ($p = .99$). Between those who did and did not take the post-test there was no statistically significant difference in baseline scores, as measured by units consumed ($p = .14$), and standard drinks ($p = .16$). However, the AUDIT-C scores of those who took the post-test ($M = 6.04, SD = 1.21$) were significantly lower ($t(153) = 2.10, p = .04$) than the scores of those who did not ($M = 6.50, SD = 1.49$).

Regarding information-seeking, 22 participants (24%) requested at least one source, and five of those requested more than one. Three people from condition 1 (13%), 8 people from condition 2 (27.6%), four people from condition 3 (25%), and seven people from condition 4 (30.4%) requested additional information. Chi-square tests revealed that those in the rank-framing condition were not more likely to request at least one type of information than those in condition one ($X^2(1) = 2.04, p = .15$), condition two ($X^2(1) = .05, p = .82$), nor condition three ($X^2(1) = .14, p = .71$). Gender was not related to information-seeking ($X^2(1) = 1.99, p = .16$). Chi-square tests also revealed there were no statistically significant differences between conditions 1 and 2 ($X^2(1) = 1.63, p = .07$), conditions 1 and 3 ($X^2(1) = .92, p = .34$), nor conditions 2 and 3 ($X^2(1) = .04, p = .85$).
To summarize, the original study found that across conditions there was a reduction in drinking behavior, which is also what was found in the current study. The original study found that participants were not more likely to reduce their drinking in one condition than the other, but the current study found that participants in the rank-framing condition reduced their standard drink consumption more than those in the absolute comparison condition. The original study found that participants in the rank-framing condition were significantly more likely to request information, and to request more information, than participants in the other conditions, but the current study did not find any statistically significant differences in information-seeking between conditions.

**Discussion**

The aim of this study was to determine the merits of using rank-framed messages to decrease college drinking and other risky behaviors. The study found that traditional and rank-framed social norms interventions, and interventions informing people of recommended alcohol consumption may be an effective way to reduce alcohol consumption among college students. However, because there was no control condition it is possible that alcohol consumption went down over time, regardless of intervention. Rank-framed messages were more effective at decreasing alcohol consumption than informing people how they compare to expert recommendations, but this finding was likely due to the fact that participants in the absolute comparison condition actually had higher alcohol consumption in the post-test, albeit an increase that was not statistically significant. In the original study, rank-framed messages lead to more information-seeking, but in the current study none of the conditions had an effect on information-seeking. Because this replication found that rank-framed messages performed as well as traditional social norms messages at decreasing alcohol consumption, and did not lead to
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more information-seeking, more research is needed to understand the extent to which these types of messages can influence behavior change. Due to attrition, both studies had somewhat small numbers (78 in the original study, 91 in the current study), reducing the statistical power to compare differences. Future research would benefit from larger sample sizes.

The potential impact of rank-framed messages is still worthy of further study, given the past research showing that people process information this way, but there are important considerations to keep in mind for future research testing these messages. One is the importance of understanding the boundaries of what college students deem believable in norms messages (Park, Smith, Klein, & Martell, 2011; Smith, Atkin, Martell, Allen, & Hembroff, 2006). Wide gaps in perceived versus actual drinking norms are likely to be rejected by college students as not believable. Because participants in the current study received tailored messages, it is possible that those in the heaviest drinking categories (e.g. “you drink more units per week than 95% of male participants”) rejected the norms messages they perceived. In fact, researchers have found that the heaviest drinkers may actually adopt unhealthier attitudes following exposure to normative messages (Campo & Cameron, 2006). Future studies should determine the range of believability, and test the effect of a fixed rank-comparison across users. Studies have also found that social norms campaigns are only effective when altering students’ perceptions of the drinking behavior of their friends, rather than the campus population as a whole (Campo et al., 2003). Future research on rank-framed messages should test messaging referring to close referents rather than school populations.

None of the conditions had any effect on information-seeking. Information-seeking about alcohol reduction varies by gender (Verissimo & Grella, 2017), but the small number of participants in this study did not allow for an evaluation by gender. One possibility for the
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general lack of interest in information-seeking is that the three types of information offered were not the most pertinent to this population. For example, one option was expert recommendations for alcohol consumption, but participants in the first two conditions were already told recommended alcohol consumption, so may not have wanted more of this information. Also, a study on information-seeking among heavy drinkers in college found that most prefer informal resources (e.g. friends and family) to anonymous resources (Buscemi et al., 2010). The authors also found that norm discrepancy was negatively associated with utilizing information sources. They argue that, despite believing that one drinks more than one’s peers do, the social sanctions in college for heavy drinking are minimal, and thus fail to motivate help-seeking.

As the original authors point out, reducing harmful drinking is a complex behavioral change requiring multiple components. Social norm interventions continue to offer a far-reaching, low-intensity method for reducing drinking behaviors. Due to the high levels of troublesome drinking on U.S. college campuses, it is crucial to continue to test and refine effective social norms interventions. Rank-framed messages offer promise, but researchers must continue to tweak, amend, and replicate social norms interventions to increase their effectiveness and decrease harmful drinking on college campuses.
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