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Tailored Texts: An Application of Regulatory Fit to Text Messages Designed to Reduce High-Risk Drinking

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by

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Dedication

For my mother, Tina; father, Brian; and brother, Joseph – Thank you for your unwavering support and for being examples of faith, education, and love. Always together, a family forever.

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Text-message interventions have been successful for weight loss, medication adherence, contraceptive use, smoking cessation, and sunscreen use. Although there are robust findings on message delivery and outcomes, little work has been done to look at message content from a communication and message language perspective. The goal of this study was to compare two versions of text message wording and the impact that each has on college students' drinking behaviors. The study used regulatory focus and regulatory fit as the frameworks for message language manipulation. Regulatory fit is a model used to explain how individuals make decisions about engaging in goal-oriented behaviors and asserts that messages can be framed as either prevention-oriented or promotion-oriented.

In this 2 (regulatory fit orientation- prevention or promotion) x 3 (treatment group- congruent, incongruent, or control) x 2 (pre-test, post-test) experiment, participants (N=279) were randomly assigned to one of three groups: the congruent group

(received messages that matched their regulatory focus), incongruent group (received messages that were mismatched with their regulatory focus), and the control group (received general health messages). Messages were tailored by regulatory fit (prevention-oriented or promotion-oriented), which was assessed prior to the intervention. Findings from mixed factorial analyses of covariance and univariate analyses of covariance revealed no significant differences among the treatment groups for use of protective strategies, consequences from drinking, attitudes toward the program, and perceived message persuasiveness. Additionally, there was no evidence to suggest that participants in the congruent and control groups changed their drinking behaviors.

The findings did suggest that prevention-oriented individuals who received text messages that were incongruent with their regulatory focus reported drinking alcohol for more hours than participants in the congruent or control groups. Mean scores illustrated a pattern suggesting that prevention-oriented individuals who received incongruent messages were also more likely to consume a higher quantity of drinks and engage in high-risk drinking behaviors than individuals in the congruent and control groups. Therefore, there is reason to believe that sending text messages about alcohol that do not match an individual's regulatory focus can lead to negative drinking behaviors.

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Chapter 1: Introduction

Health messages need to do more than convey information to audiences (Freimuth, 1979; Maibach & Parrott, 1995). They need to make audiences feel engaged and motivated to take action in the face of a potential health threat (Dillard & Shen, 2005; Parrott, 1995). Even more importantly, health messages need to target specific audiences within a population and tailor their content to audience needs (Kreuter & Wray, 2003; Rimer & Kreuter, 2006). If health messages fail to persuade audiences that making a recommended behavior change is feasible and worthwhile, then recipients will be non-compliant with the recommendation (Witte, 1992). Strategically manipulating the linguistic features of a health message is one method for enhancing message persuasiveness (Glowacki, 2016; Rothman & Salovey, 1997). The current study will use regulatory fit (Crowe & Higgins, 1997; Freitas, Liberman, & Higgins, 2002; Higgins, 2000; Higgins, Shah, & Friedman, 1997) as a framework for sending tailored messages about managing alcohol consumption to college students.

Regulatory fit is a theoretical framework used to explain how individuals make decisions about engaging in goal-oriented behaviors (Aaker & Lee, 2006; Higgins, 1997, 1998). Regulatory fit has been used to explain how and why individuals are motivated to pursue goals and rests on the assumption that individuals are either promotion-oriented (i.e., focused on obtaining positive outcomes) or prevention-oriented (i.e., focused on avoiding negative outcomes) (Avnet & Higgins, 2003; Higgins, 2000). Regulatory fit asserts that messages can be framed as either prevention-oriented (e.g., "Inactivity may lead to poor health.") or promotion-oriented (e.g., "Being physically active may improve your health."). Preference for either type of message is determined by the attitudes and

values of the message recipient; people react to the messages in ways that are consistent with their current goal orientations (Avnet & Higgins, 2003). Promoters engage in behaviors because they are driven to pursue goals that lead to positive outcomes, whereas preventers pursue goals that protect against the occurrence of negative outcomes (Latimer et al., 2008; Spiegel, Grant-Pillow, & Higgins, 2004). Furthermore, promotion focused individuals tend to be more concerned with accomplishments and advancement, while prevention focused individuals are more concerned about protection and safety (Higgins, 2002). These distinctions are similar to Atkinson's (1964) work on success and failure-avoidance orientations. Regulatory fit has been used as a framework for comparing prevention and promotion messaging about resisting temptation (Freitas et al., 2002), engaging in physical activity (Latimer et al., 2008) and sunscreen use (Lee & Aaker, 2004). Designing health messages that align with the recipient's regulatory focus can increase response efficacy and self-efficacy among message recipients (Keller, 2006). Applying regulatory fit to messages about alcohol consumption will not only extend the literature on this model, but it will also contribute to an understanding of effective message strategies for combatting problematic drinking behaviors.

High-risk drinking is a problem for many campuses and has been responsible for student deaths, injuries, and sexual assaults (NIAAA, 2016a). Prevention efforts have been shown to be successful when they intervene at both the individual and community level (Saltz, 2011) and when they utilize preferred modes of communication. College students send an average of 70 to 300 texts per day (Harrison & Gilmore, 2012) and many prefer this channel of communication because it facilitates social connectedness and gives students a sense of control over their networks (Rosen, Whaling, Carrier,

Cheever, & Rokkum, 2013). College students also value text messaging because of its affordability, convenience, and its ability to facilitate the coordination of social events (Leung, 2007). Many universities use text messaging as a means for informing students of emergencies, but very few have pursued the potential that text messaging may have for health promotion. Providing students with information about resources on campus and tips for making healthy decisions via text messaging can contribute to the health and well-being of college students (Napolitano, Hayes, Bennett, Ives, & Foster, 2013).

There is ample evidence indicating that text message interventions are effective in health contexts and have been linked with changes in smoking (Rodgers et al., 2005), alcohol consumption (Weitzel, Bernhardt, Usdan, Mays, & Glanz, 2007), getting vaccinated (Vilella et al., 2004), and sexual health (Lim, Hocking, Hellard, & Aitken, 2008). Recent work also indicates that tailored text messages are even more likely to prompt behavior change (Wei, Hollin, & Kachnowski, 2011; Kerr et al., 2012). However, little has been done to evaluate these messages from a communication perspective. Applying a theoretical framework (regulatory fit) to the design of text messages about alcohol will facilitate customized message content and will increase the likelihood that these messages are adhered to (Brug, Campbell, & van Assema, 1999; Bull, Kreuter, & Scharff, 1999). Providing students with customized feedback and tailored messages about their drinking that align with their goal orientations can be an effective way to combat excessive alcohol consumption on college campuses (NIAAA, 2013).

Alcohol Misuse on College Campuses

Even though multiple campaigns have been implemented to curb high-risk

drinking behaviors on college campuses, alcohol consumption on campuses within the United States continues to occur at alarming rates (Substance Abuse and Mental Health Services Administration, 2014). High-risk, or at-risk, drinking is defined as more than three drinks per day and more than seven drinks per week for women, and more than four drinks per day, or more than 14 drinks per week for men (National Institutes of Health, 2016). According to the National Institute on Alcohol Abuse and Alcoholism (NIAAA; 2016) the consequences of risky drinking are far reaching. Nearly all college students, whether they drink or not, are impacted by the effects of alcohol because of the problematic consequences resulting from high-risk alcohol consumption. The NIAAA (2016a) reports that approximately 80% of college students consume alcohol, about half of whom do so through binge drinking. Binge drinking is defined as a blood alcohol concentration (BAC) level of 0.08g/dL or higher, which typically means four drinks for women and five drinks for men, within the span of two hours (NIAAA, 2016a). Over 97,000 cases of sexual assault or rape are reported per year because of alcohol and more than 690,000 college students have been physically assaulted by other students consuming alcohol (NIAAA, 2016b). Alcohol-related injuries are also responsible for the deaths of 18,000 college students each year. In addition to the bodily harm inflicted on college students, alcohol has played a role in vandalism and in the academic decline of nearly 25% of college students (NIAAA, 2016a). Even though there are high rates of alcohol misuse and abuse reported on college campuses, students often fail to recognize that they have a drinking problem (Perkins, 2002). Students tend to emphasize the positive consequences of their drinking episodes (i.e., social engagement) rather than the negative ones (Park, 2004). Therefore, intervention efforts need to get at the root of what

motivates students to partake in or abstain from drinking (Murphy et al., 2001).

There have been multiple efforts to implement successful interventions that aim to reduce high-risk drinking on college campuses (Borsari & Carey, 2000; Schaus, Sole, McCoy, Mullet, & O'Brien, 2009; Turrisi, Jaccard, Taki, Dunnam, & Grimes, 2001). However, many of these programs fall short of accomplishing long-term changes in drinking behavior. One of the reasons why many of the campaigns against drinking on college campuses struggle to take hold is because they rely on standardized, global messages rather than sending messages tailored to individual attitudes (Wechsler, Kelley, Weitzman, San Giovanni, & Seibring, 2000). In their meta-analytic review of college student drinking interventions, Carey and colleagues (2007) found that interventions that provided personalized feedback were the most successful at reducing rates of alcohol consumption. Educating students about the risks of alcohol is not enough (Wechsler, Nelson, & Weitzman, 2000). Students need to be persuaded that high-risk drinking is a real threat (Ruiter, Abraham, Kok, 2001; Wiite, 1993), that they can take action in the face of this threat (Bandura, 1990; Block & Keller, 1995), and that there are alternatives to engaging in the threating behavior (Witte, 1994). Rather than telling students to stop drinking entirely, it is more helpful to provide them with information about self-protective strategies (i.e., drinking water while drinking alcohol, eating food before drinking) because doing so helps students recognize that they can still drink, but in ways that are safe and less likely to result in negative consequences (Benton et al., 2004; Martens et al., 2004).

This aligns with the tenets of the Extended Parallel Process Model (EPPM; Witte, 1992, 1993) which asserts that fear appeals are most effective when they induce moderate

levels of fear and higher levels of efficacy from receivers. Message recipients need to perceive the existence of a threat, but also perceive themselves as capable of taking protective action against the threat (Witte, 1994, 1998). If an individual is too fearful and does believe he/she is capable of taking action against a threat, he/she will ignore the message (Gore & Bracken, 2005). EPPM has been used to explain cardiovascular disease risk to patients (McKay, Berkowitz, Blumberg, & Goldberg, 2004) and promote hand-washing (Botta, Dunker, Fenson-Hood, Maltarich, & McDonald, 2008), and is helpful for understanding how health promoters can talk with individuals about health threats in ways that encourage the individual to take action, rather than tune-out the threat (Maloney, Lapinski, & Witte, 2011). Applications of EPPM to alcohol have found that messages about drinking are more likely to impact behavior when they elicit perceptions of both threat and self-efficacy (Moscato, Black, Blue, Mattson, Galer-Unti, & Coster, 2001; Rimal, 2001). Merely telling college students that high-risk drinking is dangerous is not enough, students need to perceive that they are capable of taking action to prevent the consequences of high-risk drinking. Messages that aim to provide information about protective drinking strategies need to illustrate the dangers associated with high-risk drinking, but also incorporate a means of fostering self-efficacy (Moore, Soderquist, & Werch, 2005). These messages are also likely to resonate if they speak to the individual's goal-pursuit preferences (Freitas & Higgins, 2002; Wang & Lee, 2006).

Many of the campus-wide efforts to prevent alcohol misuse have relied on social norms approaches, which have been shown to be ineffective because their messages are often perceived as irrelevant or not credible (Thombs, Dotterer, Olds, Sharp, & Raub, 2004), fail to produce prolonged changes in attitudes (Campo, Cameron, Brossard, &

Frazer, 2004) and drinking behaviors (Clapp, Lange, Russell, Shillington, & Voas, 2003), and can result in misinterpretation of the messages (Russell, Clapp, & DeJong, 2005). This is not surprising considering the NIAAA's (2012) explanation that social-norm approaches, which seek to fix misperceptions of peer alcohol consumption, are most effective when applied at the individual level when they provide customized feedback. Using a one-size-fits-all approach when disseminating messages about alcohol norms is less likely to elicit behavior change than when the delivery of those messages is tailored to individual orientations toward drinking (Carey, Scott-Sheldon, Carey, & DeMartini, 2007). Recent work has attempted to address this issue by using mobile devices as tools for providing customized feedback to college students who drink. Kuntsche and Labhart (2013) sent frequent text messages to college students asking about their weekend drinking habits, Bernhardt and colleagues (2005) used mobile phones to gather self-reports of daily drinking habits, and Mason et al. (2014) sent tailored text messages to college students that led to changes in drinking behavior. Other researchers have also implemented text messaging programs aimed at providing feedback based on individual responses (Suffoletto et al., 2014) and alcohol consumption levels (Moore et al., 2013). All of these are examples of programs that have been effective at targeting college student drinking, but much of the work in this area neglects to consider the effects that variations in wording may have on message effects.

Correcting misperceptions is an effective way to reduce harmful drinking behaviors among college students, but difficult to do considering that students who drink tend to overestimate the amount of alcohol needed to blackout (Mallett, Lee, Neighbors, Larimer, & Turrisi, 2006) and overestimate the extent to which their peers consume large

quantities of alcohol (Perkins, Haines, & Rice, 2005). Online, educational initiatives like "Think About It" (formally known as "Alcohol.Edu") have been put in place to warn incoming students of the dangers of high-risk drinking, but students often fail to remember the material or practice the recommended behaviors covered in these programs (Barry, Hobbs, Haas, & Gibson, 2015; Paschall, Antin, Ringwalt, & Saltz, 2011). These programs may have short-term, positive effects in terms of increasing knowledge and awareness of alcohol-related consequences, but without continued follow-up communication, the effects are likely to diminish (Wyatt, DeJong, & Dixon, 2013). Additionally, programs like "Think About It" are not able to provide ongoing, customized feedback to students, which can render the programs ineffective considering Blow and colleagues' (2006) finding that tailored booklets led to significant decreases in alcohol consumption among at-risk drinkers. Targeting segments of student drinkers within the larger student body can help health promoters get their messages across more effectively (Slater, 1996). The amount of alcohol consumed by college students on a single campus can vary widely, which is why it is important that health message designers consider the variations of drinking behavior within their target populations.

Chapter 2: Health Messages, Regulatory Fit, and Hypotheses

Tailored Health Messaging

One of the reasons why some health campaigns and interventions fall short of reaching their goals is because they fail to segment or target specific audiences within the larger population (Maibach & Parrott, 1995; Rimal & Adkins, 2003). Disseminating health messages too broadly can backfire because recipients are more likely to attend to a message if they perceive that it speaks to their specific needs or values (Salovey & Wegener, 2003; Schneider et al., 2001). Targeting messages to segmented audiences can generate better reactions from recipients because they are more likely to react positively if they perceive that the actors in the messages are similar to them (Kreuter, Strecher, & Glassman, 1999; Schoenbachler, Ayers, Gordon, 1996). Recent work has shown that the most persuasive health messages are those that go beyond targeting at the group level by tailoring their content for individual receivers (Noar, Benac, & Harris, 2007). Tailored messages are defined as those that focus on individual-level characteristics, which are used to design messages that are meaningful for individuals, rather than groups (Kreuter, Oswald, Bull, & Clark, 2000; Noar, Harrington, & Aldrich, 2009). Studies examining the effects of tailoring on health behavior change have used messages tailored by such variables as race (Kalichman & Coley, 1995), self-efficacy (Campbell, DeVellis, Strecher, Ammerman, DeVellis, & Sandler, 1994), existing conditions (Sethares & Elliott, 2004), medical record data (Jibaja-Weiss, Volk, Kingery, Smith, & Holcomb, 2003), and perceived barriers to change (Strecher, Kreuter, Den Boer, Kobrin, Hospers, & Skinner, 1994). Tailored messaging interventions have been carried out for smoking

cessation (Prochaska, Velicer, Fava, Rossi, & Tsoh, 2001; Strecher, Shiffman, & West, 2006), high-risk drinking (Blow et al., 2006), contraceptive use (Garbers, Meserve, Kottke, Hatcher, & Chiasson, 2012; Scholes et al., 2003), mammography screening (Rimer et al., 2001; Saywell, Champion, Skinner, Menon, & Daggy, 2004), flu vaccination (Weaver et al., 2003), cervical cancer screening (Paul, Redman, & Sanson-Fisher, 2004), physical activity (Naylor, Simmonds, Riddoch, Velleman, & Turton, 1999), and skin cancer prevention (Bernhardt, 2001).

Although tailoring shows a lot of promise, there is still evidence to suggest that in some of the tailored health interventions, audiences failed to see how the supposedly tailored materials were applicable to their lifestyles (Kreuter, 1997). This emphasizes the need for messages to not only be engaging and informative, but persuasive as well (O'Keefe and Jensen, 2007). If the language within a health message fails to consider the linguistic features that serve as persuasive mechanisms, then the message will fail to motivate the recipient to take action (Glowacki, McGlone, & Bell, 2016). Rothman et al. (2006) and Upegraff and colleagues (2007) concluded that manipulating messages by their frame (gain or loss) and motivational orientation (approach or avoidance) can enhance the effects of message tailoring. Thus, there is some evidence to suggest that communication frameworks can serve as a viable means for improving tailored messages. While there has been a growing body of work evaluating the effectiveness of tailored print messages on health behavior change, a smaller body of work has evaluated the effectiveness of tailored text messages, and an even smaller body of work has assessed tailoring with the use of a communication framework. Therefore, the goal of the current study is to evaluate the effectiveness of a text message intervention, tailored by

regulatory fit, aimed at reducing high-risk drinking among college students.

Text Message Health Interventions

Mobile health (mHealth) devices have been growing in popularity within the world of healthcare (Free et al., 2013; Kumar, Nilsen, Pavel, & Srivastava, 2013). Smartphone apps and messaging services allow for fast transfer of data and real-time feedback, enabling more efficient communication between individuals and those on whom they rely for health information (Istepanian, Jovaov, & Zhang, 2004; Klasnja & Pratt, 2012). These technologies also promote greater health efficacy given their ability to send reminders about treatment adherence, encourage physical activity and healthy eating, and store crucial health statistics (McGillicuddy et al., 2013; Silva, Lopes, Rodrigues, & Ray, 2011). While there is ample evidence indicating that mHealth technologies can help individuals become more proactive with their health care (Cafazzo, Casselman, Hamming, Katzman, & Palmert, 2012), a less extensive body of work has examined the message design and message features that are being used to facilitate health. Text message interventions in particular, have been successful for weight loss (Patrick et al., 2009), medication adherence (Lester et al., 2010), contraceptive use (Hou, Hurwitz, Kavanagh, Fortin, & Goldberg, 2010), smoking cessation (Rodgers et al., 2005), and sunscreen use (Armstrong et al., 2009). Although there are robust findings on message delivery and message outcomes, little work has been done to look at message content. Messages are more likely to elicit positive responses when they are tailored (Weitzel et al., 2007) and interactive (Rafaeli, 1988); however, a better understanding of how message content affects message impact would allow professionals to increase the efficacy of these interventions (Finitsis, Pellowski, & Johnson, 2014). The current study

aims to optimize construction of messages about alcohol consumption delivered to college students who drink by testing whether regulatory fit tailored or non-tailored text messages are more effective at eliciting changes in drinking behaviors.

Some short message service (SMS) studies have focused on dose, or message frequency (Hanauer, Wentzell, Laffel, Laffel, 2009; Haug, Meyer, Schorr, Bauer, & John, 2009), length of intervention (Finitsis et al., 2014; Vaughn, Gersten, & Chard, 2000), and interactivity, or message contingency (Rafaeli, 1988; Wise et al., 2006). Findings from this line of work suggest that exposure to repeated, redundant messages is an effective method for eliciting a desired outcome or behavior (Hornik et al., 2013; Stephens et al., 2013) and that sending interactive messages (messages prompting a response), rather than static ones, can be useful for influencing attitudes and shaping persuasion processes (Sundar, Kalyanaraman, & Brown, 2003; Sundar & Kim, 2005). These are important variables to consider when designing text message interventions but if the messages themselves are not persuasive, recipients will be non-compliant with the recommended behaviors (McGlone, Bell, Zaitchik, & McGlynn, 2013). Increased attention has been given to the message composition features that enhance the persuasiveness of printed health materials in recent years (Chang, 2011; Cho, 2012; Dillard & Shen, 2005), but this movement has failed to take hold in the mobile health domain.

Although there are robust findings on text message delivery and message outcomes, little work has been done to look at text message content from a communication and message design perspective. For instance, researchers have found that patients with hypertension made positive changes to their health behaviors after receiving frequent reminders from a text messaging program (Hacking et al., 2016), and

that lifestyle-focused, semi-personalized text messages sent to patients with heart disease are effective at helping patients lower their blood pressure and increase their physical activity (Chow et al., 2015). Text message interventions such as these are effective at prompting positive health behavior changes, but rely on a message/no-message design. Little attention is given to the manipulation of the message content, which may contribute to larger effect sizes and to more long-term behavior changes, especially if the message recipient feels persuaded by the message content. Tailored text messages are shown to be especially effective at prompting behavior change (Woolford, Clark, Strecher, & Resnicow, 2010). However, a more refined understanding of how the content of these tailored messages affects message impact would increase the efficacy of these interventions (Sundar et al., 2003).

Recent work indicates that tailored messages are more effective at prompting health behavior change than non-tailored messages (Bernhardt et al., 2007; Kerr et al., 2012; Weitzel et al., 2007) but few studies have used a communication framework to tailor messages by a message content variable. Additionally, Wei et al.'s (2011) review on text messaging health interventions illustrates that medication adherence, type 2 diabetes care, weight management, smoking cessation, and healthy eating are some of the most common health behaviors studied in text messaging studies. A smaller amount of studies have looked at the potential that text-messaging interventions have on alcohol consumption. Those that have been done on this topic have found that text messaging is a viable medium for encouraging positive changes in drinking behavior (Lieberman & Huang, 2008; Kypri, Sitharthan, Cunningham, Kavanagh, & Dean, 2005; Suffoletto, Callaway, Kristan, & Clark, 2012). Text messaging is a relatively affordable and easy

technology to use; thus, it has great potential to facilitate healthy decision-making among large student populations (Obermayer, Riley, Asif, & Jean-Mary, 2004; Napolitano et al., 2013). There are promising, evidence-based findings from mobile phone health interventions (Free et al., 2011; Mason et al., 2014) that also illustrate young adults' positive attitudes toward text messaging interventions (Kuntsche & Robert, 2009). With regard to contributions to college student health, the current study will provide more information about message design features that can help young adults engage in safer drinking behaviors.

Existing work with text-messaging and health care suggests that text messaging programs help with self-efficacy and goal-setting for individuals attempting to change or take control of their health (Cole-Lewis & Kershaw, 2010; Franklin et al., 2006). Text message programs are an effective way to promote messages focused on self-management because they motivate individuals to make healthy choices (Bauer, Okon, Meermann, & Kordy, 2012; Free et al., 2011) and remind individuals to stick with their treatment regimens (Chen, Fang, Chen, & Dai, 2008' Downer, Meara, Da Costa, & Sethuraman, 2006). Self-management has become a recent point of focus in health interventions (Lorig & Holman, 2003), but is not always given enough attention in programs targeting college student health (Javeed, 2016). The Centers for Disease Control and Prevention (2013) explains, "Self-management education or training is a key step in improving health outcomes and quality of life. It focuses on self-care behaviors, such as healthy eating and being active." Self-management plays a critical role in college student health because many college students are living on their own for the first time and have to make choices about healthy eating, managing stress, sexual activity, alcohol

consumption, and drug use (CDC, 2016). The text-message program proposed in the current study is an innovative way to address risky drinking behaviors among college students and foster self-management of alcohol consumption. University-wide alcohol misuse prevention and intervention efforts need to consider the students' worldviews and lifestyles (NIAAA, 2016b) in order to send relevant and impactful messages (Anghelcev & Sar, 2011). College students have multiple opportunities to partake in excessive alcohol consumption (NIAAA, 2016a), but offering students practical tips for avoiding negative consequences of unsafe drinking, as the current study sets out to do, is a unique way to communicate suggestions for reducing risky drinking behaviors.

Gain-Loss Framing

Regulatory fit serves as an appropriate framework for a tailored text message health intervention because there is strong evidence indicating that messages targeting an individual's goal orientation can lead to behavior change (Avnet & Higgins, 2006; Cesario, Higgins, & Scholer, 2008; Lee & Aaker, 2004; Uskul, Keller, & Oyserman, 2008). However, none of the regulatory fit studies to date have focused on tailored messaging and alcohol consumption, and only one regulatory fit project has incorporated text messaging (Shaw et al., 2013a; 2013b). The origins of regulatory fit can be traced back to prospect theory, which was developed by Kahneman and Tversky (1979) as a way to explain how and why people make choices amidst uncertain circumstances. Prospect theory is a behavioral, economic model that asserts there are two pathways to decision-making: loss aversion or gain attainment, a principle that was first presented by Markowitz (1952). Prospect theory was developed as an alternative to expected utility theory (Bernoulli, 1738; Neumann & Morgenstern, 1944; Savage, 1954), which rests on

the assumption that people make decisions after evaluating the probability that the outcome will be useful to them. In their critique of expected utility theory, Tversky (1975), and later Kahneman and Tversky (1979), point out that individuals are not always rational when making decisions, especially if they are uncertain about the outcomes or are faced with having to make a potentially risky decision. Kahneman and Tversky (1979) explain that loss aversion is a crucial factor driving decision-making and that people put more effort into avoiding losses rather than pursuing gains. This notion of pursuing gains and averting losses has led to what many social psychology and communication scholars now refer to as gain-loss framing.

Gain-loss framing serves as a useful framework for assessing the impact that messages have on behavioral intentions and decision-making in specific instances, or contexts. Meyerowitz and Chaiken (1987), Wilson et al., (1988), Banks et al. (1995), Rothman and Salovey (1997), and Detweiler et al. (1999) were some of the first researchers to apply gain-loss framing to messages specifically about health. Gain-framed and loss-framed messages have been tested to evaluate changes in a variety of health behaviors including oral hygiene (Rothman, Martino, Bedell, Detweiler, & Salovey, 1999), breast self-examinations (Meyerowitz & Chaiken, 1987), pap tests (Rivers, Salovey, Pizarro, Pizzaro, & Schneider, 2005), smoking cessation (Toll et al., 2007), and MMR vaccinations (Abhyankar, O'Connor, & Lawton, 2008). However, the utility of this framework as a tool for eliciting health behavior change has been challenged. While individual studies and a review from Gallagher and Updegraff (2011) have found support for the benefits of using one frame over the other, a meta-analytic review from O'Keefe and Jensen (2007) suggests that there are no significant differences between gain-framed

messages and loss-framed messages with regard to their ability to persuade audiences. O'Keefe and Jensen (2009) again found in their meta analysis of 53 gain-loss framing studies that there is very little evidence to suggest that one type of appeal is more effective at persuading than the other. O'Keefe and Jensen (2011) conclude from their past reviews and meta-analyses that "Even if there are not broad-scale differences in persuasiveness between gain- and loss-framed appeals (e.g., such that loss-framed appeals are more persuasive for disease detection behaviors), it is still possible that such a difference might emerge for some more specific behavioral domain (e.g., dental hygiene)" (p. 4). This is an important distinction to make because it illustrates that while gain-loss framing may not be helpful when designing messages about general health practices, it may still be useful when designing messages about specific health behaviors. Additionally, regulatory fit emphasizes the need for a message to fit with the regulatory focus of the individual and that because of this, messages are more effective at persuading when they are tailored to that individual difference (Aaker & Lee, 2006; Avnet & Higgins, 2003; Higgins, 2000). Most applications of gain-loss framing do not consider tailoring messages by individual differences.

It is important to review these findings for the current study because gain-loss framing and regulatory fit share some common ground. Both frameworks conceive of goal-attainment and decision-making as a two-pronged process: avoiding losses and preventing negative outcomes, or acquiring gains and obtaining positive outcomes. However, while there is certainly overlap between the two frameworks, researchers need to be careful not to use them interchangeably because there are fundamental differences between the two. Gain-loss framing is a useful framework for understanding motivations

behind decision-making and behavior change. However, one must not overlook the fact that gain-loss framing was created as an attempt to understand how people make choices in one situation (Kahneman & Tversky, 1979). Prospect theory was designed to explain acute, one-time decision-making behaviors and was not intended to serve as a framework for evaluating how and why people make choices over time. This is an important distinction and can help explain why researchers may not find significant effects when comparing gain-framed and loss-framed messages across multiple instances. Unlike gain-loss framing, regulatory focus does attempt to explain how individuals engage in long-term decision-making and argues that individual differences (i.e., goal-orientation) play a critical role in decision-making, which can work along with the principle of loss aversion.

Regulatory Focus and Fit

Higgins' (1997, 1998) work on regulatory focus theory sought to further refine explanations for why individuals are behaviorally motivated to approach positive outcomes and avoid negative outcomes. Higgins (1997) explains that self-regulation plays a key role in making evaluations when faced with having to make decisions. More specifically, that individuals tend to operate under either a promotion focus (in which the emphasis is placed on accomplishments and aspirations) or a prevention focus (in which the emphasis is placed on safety and responsibilities). Unlike previous self-regulatory models that relied on regulatory anticipation (expectations of pleasure or pain) and regulatory reference (perceptions of positive outcomes and negative outcomes), regulatory focus theory attempts to account for the roles that emotion and persuasion play in motivational messages (Higgins, 1997; Van-Dijk & Kluger, 2004). Higgins, Shah, and Friedman (1997) further describe how promotion-focused goals and prevention-focused

goals are distinct from one another in their explanation that promotion goals can be conceived of as chronic ideal goals, or goals that an individual strives toward for a long period of time; whereas prevention goals are conceived of as ought goals, or goals that an individual views as a duty or requirement. Although there is a plethora of work documenting the relationship between goal attainment and emotional responses (Higgins, 1987; Brendl & Higgins, 1996), the Higgins et al. study (1997) illustrates that regulatory focus enhances this relationship.

Crowe and Higgins (1997) elaborated further on the distinction between promotion and prevention focus in their assessment of goal orientation on task performance. They explain that because a promotion focus is associated with accomplishment and advancement while a prevention focus is associated with responsibility and safety, it makes sense that when faced with a task, promotion focused individuals performed better and prevention focused individuals gave up sooner. They explain that this effect occurred due to the differences in nature between a promotion focused state (wanting to advance and make progress) and a prevention focused state (acting precautionary and wanting to make safe decisions). Shah and Higgins (1997) added an additional layer to the relationship between regulatory focus and task performance by introducing expectancy as a variable that influences goal commitment. They point out that past expectancy-value models propose that commitment to goals is shaped by both expectations and the value of achieving that goal (Lewin, Dembo, Festinger, & Sears, 1994; Mitchell, 1982). However, Shah and Higgins (1997) argue that expectancy alone and value alone can shape commitment to goal attainment. Their hypothesis was supported by their finding that regulatory focus creates an interaction

effect of expectancy and value on goal attainment. More specifically, they found that a promotion focus enhances perceptions of expected utility and a prevention focus enhances perceptions of working toward an outcome that is already guaranteed.

One of the biggest differences between regulatory focus theory and other theories that attempt to explain motivation and decision-making processes (i.e., gain-loss framing) is that regulatory focus can function as both a chronic variable and as a situational variable (Forster, Higgins, & Idson, 1998; Higgins, Klein, & Strauman, 1985; Shah, Higgins, & Friedman, 1998; Roney, Higgins, & Shah, 1995). For instance, Keller and Bless (2006) applied regulatory fit to assess students' cognitive performance and measured both their chronic regulatory focus (Higgins et al., 1997) and their situational regulatory mechanisms elicited by descriptions of a math exam. Descriptions were manipulated to fit either the promotion condition or prevention condition and they found that when situational regulatory focus matched chronic regulatory focus, test performance increased. Additionally, they concluded that students not only performed better on their tests after reading descriptions that aligned with their promotion or prevention orientations, but that the personality questionnaire served as a valid assessment for measuring regulatory focus as a chronic variable. This is an important to conclusion to consider, especially in the context of health campaigns and health messaging. As noted in the previous section, findings on the effectiveness of gain-loss framing in health messages are inconclusive (Gallagher & Updegraff, 2011; O'Keefe & Jensen, 2007, 2009). Gain-loss framing should be conceived as a situational variable, rendering its effects as temporary, rather than lasting. While the effects of gain-loss framing can be quite robust in a one-shot situation (i.e., applying sunscreen once), they are less likely to

hold up when attempting to alter behavior over a long period of time (i.e., wearing sunscreen every time an individual goes outside). Higgins' (1997, 1998) conceptualization of regulatory focus is more conducive to health communication studies in which researchers want to elicit long-term behavior change because it relies on the premise that goal-orientations are formed early on, which shapes how an individual goes about accomplishing a goal. Additionally, to the extent that a message fits one's focus, it is more likely to encourage persistence of the recommended behavior (Cesario et al., 2008).

Originally, work on regulatory focus had addressed how promotion and prevention orientations as individual differences influence decision-making (Crowe & Higgins, 1997; Higgins et al., 1997; Higgins, 1998). Higgins (2000) later explained that regulatory "fit" occurs when individuals pursue goals in ways that are in accordance with their regulatory focus. Value from fit not only transfers to the value of goal pursuit, it also contributes to one's perceived quality of life (Avnet & Higgins, 2003; Higgins, 2000, 2005). Messages appeal to recipients to the extent that they fit with an individual's regulatory orientation (Cesario & Higgins, 2008). Preference for either type of message (promotion-oriented or prevention-oriented) is determined by the attitudes and values of the message recipient; people react to messages in ways that are consistent with their current goal orientations (Avnet & Higgins, 2003, 2006; Cesario et al., 2004). Therefore, messages can be manipulated to fit a promotion or prevention-oriented individual's regulatory focus. This is useful for health messages seeking to enhance self-efficacy and response efficacy (Keller, 2006).

Because regulatory fit is rooted in self-regulatory systems and has been described

as a key factor in explaining motivation (Higgins, 1998), it lends itself to messages about self-regulation and avoidance of excessive, or potentially harmful behaviors. Although there is some evidence that regulatory focus can function as a situational variable (Keller & Bless, 2006), the primary principle inherent to regulatory focus is that individuals tend to have a chronic disposition toward either obtaining positive outcomes or avoiding negative ones. This is an important distinction to make, especially for the current study because the goal is to measure how messages tailored by fit create changes in drinking behavior over a period of two months. Furthermore, the goal is that participants will be motivated to continue to make positive choices related to alcohol consumption and reduce negative drinking behaviors, even after the completion of the study.

As noted previously, the project from Shaw and colleagues (2013a, 2013b) is the only study to date that has used regulatory fit in a text message intervention. Shaw's team (2013a) first conducted a pilot study in which participants who had recently completed a weight loss program were sent one text message every day about diet and exercise. The majority of participants sustained weight loss over a three-month period and all of the participants reported that daily text messages were helpful for losing weight. For the second part of this project, Shaw's team (2013b) randomly assigned participants who had recently completed a weight loss program to a promotion, prevention, or control text message group. Weight was assessed at baseline and at a three-month follow-up. The text messages helped participants maintain weight loss over the three-month period and those in the prevention and promotion groups lost five to 10 percent more weight than those in the control group (Shaw, 2013b). While these results are certainly encouraging for text message interventions and provide evidence for the utility of regulatory fit as a

framework for text message effectiveness, the study did not include a tailoring component. Participants did complete the regulatory fit assessment at baseline, but these scores were not used to tailor the messages. Rather, these assessment scores were used at the end of the intervention to serve as a measure of fit. The current study will administer a regulatory focus assessment at baseline that will allow messages to be tailored to the individual based on his/her regulatory orientation.

Hypotheses

Regulatory fit relies on the principle of message congruence. Therefore, a true test of regulatory fit should assess the effects of both congruent messages (messages that align with an individual's regulatory focus) and incongruent messages (messages that are misaligned with an individual's regulatory focus). For instance, Benjamin and Flynn (2006) tested both congruence and incongruence in their assessment of the effectiveness that transformational leadership has on goal-pursuit. Testing matched and mismatched promotion-oriented and prevention-oriented will allow for a more thorough of evaluation of regulatory fit, specifically with regard to its impact on message tailoring. Given that (a) there is evidence to suggest that tailored health messages are more effective at eliciting behavior change than non-tailored messages (Garbers et al., 2012; Kreuter & Wray, 2003; Noar et al., 2007), (b) text message interventions have been successful at decreasing alcohol consumption among college students (Mason et al., 2014; Moore et al., 2013; Weitzel et al., 2007), and (c) regulatory fit enhances the persuasiveness of health messages (Cesario et al., 2004; Cesario & Higgins, 2008), the following hypotheses are proposed:

H1a: Participants in the congruent group will report drinking for a fewer number of hours than participants in the incongruent and control groups.

H1b: Participants in the congruent group will report consuming a fewer number of drinks than participants in the incongruent and control groups.

H1c: Participants in the congruent group will report fewer incidences of consuming five or more drinks in one sitting than participants in the incongruent and control groups.

H2: Participants in the congruent group will report fewer high-risk drinking behaviors than participants in the incongruent and control groups.

H3: Participants in the congruent group will report using more protective strategies when drinking than participants in the incongruent and control groups.

H4: Participants in the congruent group will report fewer consequences from drinking than participants in the incongruent and control groups.

H5: Participants in the congruent group will have more positive attitudes toward the messages than participants in the incongruent and control groups.

H6: Participants in the congruent group will perceive the messages as more persuasive than participants in the incongruent and control groups.

Chapter 3: Method

This study used a 2 (between-subjects factor) x 3 (between-subjects factor) x 2 (within-subjects factor) mixed factorial experimental design to evaluate the effects of regulatory focus orientation and treatment group assignment on pre-test/post-test measures of alcohol consumption, use of protective strategies, and consequences from drinking. Attitudes toward the message program and message persuasiveness were measured with post-test scores only. All data were collected online using Qualtrics software and were analyzed with SPSS software.

Participants

Participants (N=279) were undergraduate students with ages ranging from 18 to 26 (M = 19.40, SD = 1.17). Sixty-eight percent were female and self-reported racial identities included White (n=140), Hispanic or Latino/a (n=57), Asian or Pacific Islander (n=57), biracial or multiracial (n=13), Black (n=6), and "other" (n=4). Sixteen percent (n=44) indicated that they were members of a fraternity or sorority. Participants were also asked to report on their text-messaging behavior (treated as a covariate). The majority of participants (n=159) reported sending and receiving 50 or fewer text messages per day, while the remaining 43 percent of the participants (n=118) reported sending and receiving more than 50 messages per day. Fifty-eight percent of the participants (n=162) reported exchanging text messages with five or fewer people per day and the remaining 42 percent of the sample (n=115) reported exchanging text messages with six or more people per day. Table 1 contains additional demographic information.

Recruitment

All participants were enrolled in HealthyhornsTXT, a text message program sponsored by University Health Services that sends information to undergraduate student subscribers voluntarily signed up for the program about health-related campus events, resources, and tips for engaging in healthy behaviors. More specifically, it sends information to subscribers about behaviors related to sleeping, mental health, stress, nutrition, physical activity, drinking, and safe sex. The participants in the current study were a subset of the larger HealthyhornsTXT participant pool and had the option to participate in a "special study" if they met the eligibility criteria. The majority of participants in the HealthyhornsTXT program had originally been recruited through "Think About It," an alcohol education program. All incoming students are required to complete this program and upon completion of the program, students have the option to opt-out of HealthyhornsTXT (they are asked to provide their phone numbers at an earlier stage of the program). However, any student can subscribe to HealthyhornsTXT by texting "HORNS" to 512-277-5539.

Preliminary Studies

To establish feasibility of data collection through the HealthyhornsTXT program, a preliminary study was conducted in the fall of 2015 (Glowacki, Kirtz, Cance, Wagner, Bernhardt, & Barrera, 2016). The goal of this preliminary study was to focus on message frequency and to make conclusions about dose as a variable influencing text message intervention effectiveness. Participants in this preliminary program reported that the HealthyhornsTXT program "increased my awareness of my health and ways to improve my health" and "increased my knowledge on how to stay healthy at UT." They also reported, "the messages I received about health were relevant for me and my experiences

as a UT student," "I liked the messages I received," and "I took a specific action to improve my health as a result of receiving a text message from HHTT." With regard to the messages about high-risk drinking and protective strategies, participants' qualitative responses included, "The drinking tips were healthy and had some great pointers about steps to take before and after drinking. For example, the suggestion to eat before and to hydrate before and after" and "I saw signs of alcohol poisoning this past weekend that I read from the link sent on a text message." These findings indicated that students viewed the program favorably and that there was reason to believe that the program impacted students' health behaviors and, more specifically, high-risk drinking behaviors.

As part of these preliminary studies, text message dose was evaluated in order to make conclusions about how dose affects message effectiveness. Participants were randomly assigned to a daily condition (received one text message from HealthyhornsTXT per day) or a weekly condition (received one text message per week). An independent samples *t*-test was conducted to compare scores between the two groups on their assessments of the program. The two groups differed significantly in their responses to the items: "I received too many messages from this program" and "I didn't receive enough messages from this program." Those in the daily group were more likely to report receiving too many messages (M=2.96, SD=0.91), compared with those in the weekly group (M=2.63, SD=.89), $t(756) = -4.87$, $p<.001$, and those in the weekly group were more likely to report not receiving enough messages (M=2.56, SD=0.86) compared with those in the daily group (M=2.27, SD=0.77), $t(756) = -4.83$, $p<.001$. Therefore, there was evidence to suggest that a middle ground between one text message per day and one text message per week from the HealthyhornsTXT program is ideal for students.

There was also reason to believe that the drinking behaviors within the sample would vary, given that 36% of participants in a HealthyhornsTXT preliminary study reported not consuming alcohol within the last 30 days, 36% reported consuming alcohol on at least one to three days, 19% reported consuming on at least four to five days, and 6% reported consuming alcohol six or more days in the past 30 days. When asked to report on the number of times a participant had five or more drinks in one sitting within the last two weeks, responses ranged from never/not within the last two weeks (77%), one time (11%), two times (6%), three times (2%), and four or more times (2%). This variation in drinking behaviors allowed for better conclusions to be made about the effectiveness of the text message intervention. Furthermore, there was reason to believe that there would be a variation of prevention-focused individuals and promotion-focused individuals based on results from a separate, preliminary study. Of the 35 participants who completed this preliminary study, 16 were prevention-focused and 19 were promotion-focused. This was done to help ensure that neither orientation would be over-represented in the current study's sample.

Procedure

All HealthyhornsTXT subscribers received a text message on August 30, 2016 at 4:00pm asking if they would be interested in participating in a special study. If subscribers responded "yes," they were sent the link to the screening survey via text message. If they responded "no," they continued to remain in the subscriber pool. Appendix B contains the screening survey. As an incentive for retention in the study, those who were eligible to participate were told that they would receive two Amazon gift cards upon completion of the study; a 10-dollar gift card for completing the pre-test

questionnaire and a 20-dollar gift card for completing the post-test questionnaire. Thirty dollars was chosen as the amount because it is the same amount used in the Shaw et al., 2013b study. Study protocols and materials were reviewed by the University of Texas Institutional Review Board and data collection did not begin until approval was granted.

Screening Assessment

Eligible participants for the present study were selected through a screening survey. Because the goal of the study was to measure changes in alcohol use, only students who reported drinking were eligible for participation. Subscribers received a filter question asking, "Have you had at least one alcoholic drink within the last two weeks?" and had the option to select "yes" or "no." Those who responded "no" were not included in the study sample and were put back into the subscriber pool. One thousand, one hundred and twenty-four individuals accessed the survey. One hundred and ninety-one were removed from the dataset because they did not include their phone numbers and thus, could not be placed into the treatment groups. Of the 933 participants who completed the screening survey, nearly half (n=454) reported that they had not had an alcoholic drink within the last two weeks. The remaining 479 eligible participants were kept in the study so that their regulatory focus orientations could be calculated. The screening survey was opened at 4:00pm (CST) on August 30, 2016 and was closed at 11:00am (CST) on September 3, 2016.

A median split of scores on the Regulatory Focus Assessment (Higgins et al., 1997) was used to determine prevention and promotion orientations. Sample items include: "Compared to most people, I typically get what I want out of life," "As a child, I

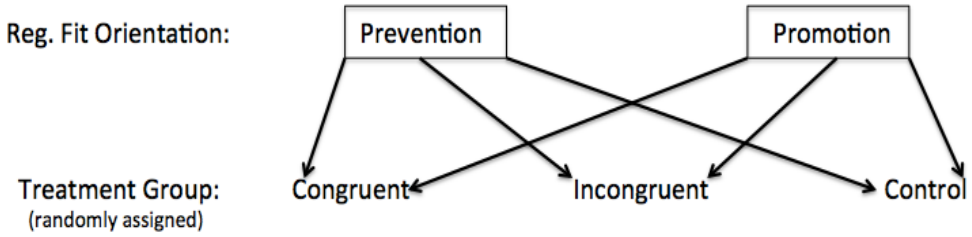
obeyed the rules and regulations established by my parents," and "I feel like I have made progress toward being successful in my life." Responses range from one ("Rarely") to five ("Very Often"). A median split allowed for the creation of a categorical variable, which was needed to divide participants into the treatment groups. The decision to use a median split was also based on past regulatory focus studies (Cesario et al., 2004; Higgins et al., 2001). The difference scores (promotion score minus prevention score) ranged from -9 to 21, with a median of five. There were 35 participants who had a score of five. Given this, half of these individuals were placed in the promotion group and half were placed in the prevention group. Of these 35, 24 completed both the pre-test and post-test and thus, were included in the final analysis.

Assignment to Treatment and Messaging Groups

To ensure that participants in the current study were randomly assigned to each of the three treatment groups, the following process was used: 1) Removed participants who did not complete the screening survey (did not enter phone number of respond to the regulatory focus assessment); 2) Sorted by responses to the drinking criterion question, so that the non-drinkers (n=479) could be moved to a separate spreadsheet and be put back into the HealthyhornsTXT subscriber pool; 3) Calculated the prevention/promotion scores by subtracting participants' prevention scores from their promotion scores and then used a median split to identify who was promotion-focused and who was prevention-focused; 4) Moved the data to a "treatment group" Excel workbook, inserted a column with a list of randomly generated numbers, sorted by the random numbers, moved 1-160 to the congruent group (n=160), 161-320 to the incongruent group (n=160), and 321-479 to the control group (n=159); 5) Sorted by prevention/promotion orientation

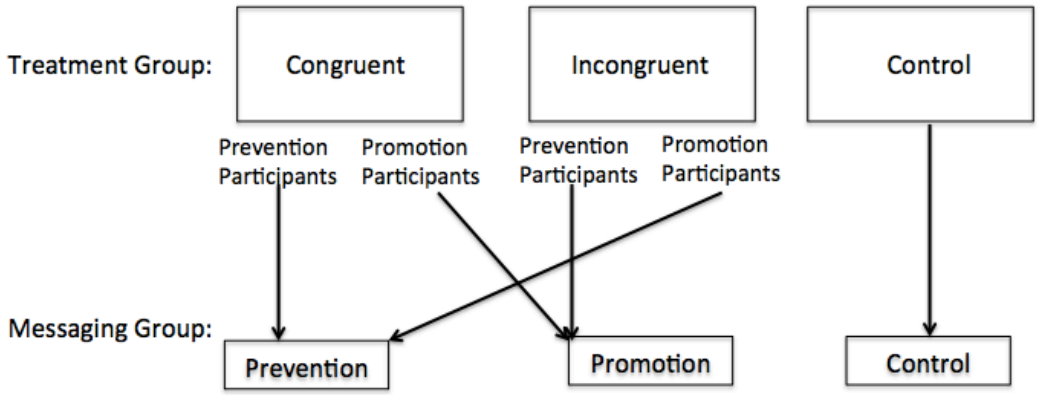
so that the number of participants in each group could be determined. There were 90 prevention-focused and 70 promotion-focused participants in the congruent group, 77 prevention-focused and 83 promotion-focused participants in the incongruent group, and 90 prevention-focused and 69-promotion focused participants in the control group. The following figure illustrates the assignment of participants to treatment groups:

Figure 1. Assignment to Treatment Groups



The final step in this process involved creating another Excel workbook for the messaging groups, which was sent to Mosio (the text message service provider). All of the prevention-focused participants from the congruent treatment group were assigned to the prevention-messaging group, and all of the promotion-focused participants from the incongruent treatment group were assigned to the prevention-messaging group. All of the promotion-focused participants from the congruent treatment group were assigned to the promotion-messaging group, and all of the prevention-focused participants from the incongruent treatment group were assigned to the promotion-messaging group. All of the "control" participants from the treatment groups were moved to the control-messaging group. The prevention-messaging group had 173 participants, the promotion-messaging group had 147 participants, and the control group had 159 participants (N=479). This figure illustrates the assignment of participants to their respective messaging groups:

Figure 2. Assignment of Participants to Messaging Groups



Baseline Assessment

After the participants had been assigned to their corresponding messaging groups, a baseline assessment was administered to all of the groups. The pre-test questionnaire (created using Qualtrics) was sent to eligible participants' mobile phones at 4:00pm (CST) on September 7, 2016 and was closed at 1:00pm on September 9, 2016. Participants received a text message from HealthyhornsTXT containing a link to the questionnaire. A reminder message was sent at 1:00pm (CST) on September 8, 2016. In order to protect anonymity of participants' responses, participants had the option to click on a link at the end of the questionnaire that directed them to a separate questionnaire so that they could enter their email addresses for payment. All Amazon gift card were sent electronically to the email addresses listed by the recipients and were administered immediately after the pre-test questionnaire had been closed. The pre-test assessed current drinking behaviors, high-risk drinking, use of protective strategies, and consequences experienced from drinking. The majority of these items were taken from

the National College Health Assessment (NCHA), the measure currently used by the Health Promotion Resource Center to assess UT students' health behaviors. Participants in all three treatment groups received the same questionnaire and every participant was asked to provide a unique code (birth month and street address number), which was used to connect pre-test responses with post-test responses. Four hundred and eighty-four responses were recorded on the pre-test. Participants who did not provide an identification code were removed because this was the most essential piece for matching pre-test scores with post-test scores. Ten participants completed the survey more than once and in these instances, the earlier set of responses was kept and the responses entered at a later date and time were removed. This left 437 remaining participants in the pre-test dataset. Appendix C contains the complete pre-test questionnaire.

Experimental Design and Stimulus Messages

In their meta-analytic review of tailored health messaging interventions, Noar and colleagues (2007) point out a major shortcoming in the literature which is that, "a number of studies in this literature, however, have compared tailored messages with no-treatment control conditions, which is not a true test of tailoring per se" (p. 683). Given this, the current study included a control condition in which participants still received messages from the HealthyhornsTXT program about general health topics (e.g., physical activity, safe sex, nutrition). The decision to send messages about topics other than alcohol was made based on existing health text-message intervention studies in which the researchers send either, no messages to members of the control group, or send messages about topics other than the one under investigation (Petrie, Perry, Broadbent, & Weinman, 2012; Suffoletto et al., 2012). In order to be consistent across message groups, neither the

control nor experimental messages included links or "text-back" words. None of the messages could be longer than 160 characters and they all had to include "HLTHYHRNS" at the beginning of the message. Two independent raters coded all of the intervention messages as a manipulation check. The raters were given the definitions of prevention-focused and promotion-focused orientations and were then asked to view all of the messages (one at a time). The raters were instructed to identify each message as a prevention message or promotion message. Both of the raters were in 100 percent agreement with the researcher and correctly identified each message's intended focus. A linguistic expert with prior experience in working with regulatory fit also reviewed the messages.

The study was a 2 (regulatory fit orientation- prevention or promotion) x 3 (treatment group- congruent, incongruent, or control) x 2 (pre-test, post-test) mixed factorial design. Participants were randomly assigned to one of three groups: the congruent group (received messages that matched their regulatory focus), incongruent group (received messages that were mismatched with their regulatory focus), and the control group (received general health messages). Messages were tailored by regulatory fit (prevention-oriented or promotion-oriented), which was assessed prior to the intervention. The incongruent condition allowed for a more true experiment to be conducted and provided a more thorough test of regulatory fit because it had the potential to produce more evidence for the importance and value from fit. If the congruent messages failed to produce significant decreases in quantity of drinks consumed and high-risk drinking behaviors, but the incongruent messages increased these behaviors, then a case could still be made for the value of message fit. Appendix A contains the

complete library of messages used in this study, as well as the schedule of delivery dates and times.

Intervention

The text message intervention began on September 12, 2016 at 4:00pm and ended on November 4, 2016 at 4:00pm and lasted for a total of eight weeks. Text messages were sent on Monday, Tuesday, Thursday, and Friday. All three groups received the same messages on Mondays, which were about health topics other than alcohol. All three groups received the same messages on Tuesdays, which were about entering one's phone number in a drawing for a chance to receive a Torchy's Tacos gift card. These messages are used by UHS as incentives for staying in the HealthyhornsTXT program. UHS wanted to retain control over these messages and thus, wrote the text messages for Mondays and Tuesdays. For the Thursday and Friday text messages, those in the experimental groups received messages about alcohol and those in the control group received general health messages. Originally, this study had been designed with the intention that participants in the experimental groups only receive messages about alcohol and that they receive three alcohol-related messages per week. However, the supervising organization declined this original request and only allowed for two alcohol messages per week to be sent to recipients. This organization was concerned about subscribers opting-out of the program if they received too many messages about alcohol.

Length of intervention in past text message studies has ranged from approximately one month to 12 months (Wei et al., 2011). A two-month period was chosen because it prevents participant fatigue, is a feasible timeframe considering the

parameters of the HealthyhornsTXT program, and is still a sufficient amount of time for the intervention to generate potentially statistically significant findings (Bernhardt et al., 2009; Cocosila, Archer, Haynes, & Yuan, 2009; Ollivier et al., 2009). The decision to send four messages per week was based on existing program standards and was supported by findings from a HealthyhornsTXT preliminary study.

All text messages were sent at 4:00pm (CST), except for the Tuesday (incentive) messages, which were sent at 12:00pm (CST). 4:00pm is the standard time of delivery used in the HealthyhornsTXT and it allows for recipients to receive messages about alcohol consumption close to the time of when they are engaging in the behavior, but before they become inebriated. The last intervention message was sent on November 4, 2016 at 4:00pm and the link to the post-test questionnaire was sent via text message on November 6, 2016 at 4:00pm (CST). The final reminder to complete the post-test was sent on November 8, 2016 at 4:00pm (CST) and the post-test was closed on November 9, 2016 at 8:30am (CST). All study participants received a text message on November 13, 2016 thanking them for their participation and informing them that they would still be part of the HealthyhornsTXT program even though the study had ended. According to a user- statistics report generated by Mosio, eight of the 479 participants in this study had opted-out of the HealthyhornsTXT program while the study was in progress.

Post-Test Assessment

At the end of the eight weeks, a post-test assessment was administered to all of the groups. The post-test questionnaire contained the same items as the pre-test questionnaire, but also contained additional items asking about the extent to which they

liked the messages they received, agreed with the messages they received, and were persuaded by the messages they received. Like the pre-test, the post-test provided a link at the end of the questionnaire that took respondents to a separate questionnaire so that they could enter their email addresses for receiving the final gift card.

One thousand, one hundred and twenty-seven responses were recorded for the post-test questionnaire. Given that there were only 479 participants who were eligible to be in the study, this signaled that some participants in the study accessed the questionnaire from multiple devices, and/or shared the questionnaire link with individuals outside of the study, and/or created fake email accounts with the hopes of receiving additional gift cards. To address this issue, the following steps were taken to clean the data and determine the awarding of participate incentives: 1) Duplicate email addresses (n=63) were removed; 2) Email addresses entered on the post-test that matched those entered on the pre-test (n=272) were sent Amazon gift cards; 3) The remaining 697 email addresses were used to send verification emails asking recipients to confirm their phone numbers and unique codes (street address number and birth month) and thus, participation in the study; 4) 261 individuals responded to the verification email and of those, 77 were confirmed in the study and received their gift cards. As was the case with pre-test responses, if a participant completed the post-test questionnaire more than once, only the original set of responses was treated as valid and all data from responses entered at a later date were removed. Appendix D contains the complete post-test questionnaire. The following figure summarizes the steps of the study's procedure:

Figure 3. Study Process

Measures

Regulatory Focus Assessment. Participants were given a screening survey to measure their regulatory focus. The instrument was developed by Higgins, Shah, and Friedman (1997) and has been validated by Higgins et al. (2011) and Cesario et al. (2004). It is a five-point (1= "Rarely" 5= "Very Often"), 11-item, Likert-Type scale and contains such items as "Compared to most people, I typically get what I want out of life," "I feel like I have made progress toward being successful in my life," and "As a child, I obeyed rules and regulations established by my parents." The scale is intended to capture goal pursuit through either vigilant means or eager means. Regulatory focus orientation scores were determined by first, adding together scores on the prevention items, adding together scores on the promotion items, and then, subtracting the prevention score from the promotion score. Thus, a lower score on this scale is indicative of a prevention-focused orientation and a higher score is representative of a promotion-focused orientation. In accordance with the Cesario et al. (2004) study, a median split was used to create a categorical variable that classified participants as either prevention-focused or promotion-focused.

Pre-test Questionnaire

National College Health Assessment (NCHA). The NCHA was used to measure number of hours spent drinking (H1a), quantity of drinks consumed (H1b), and number of times consuming five or more drinks in one sitting (H1c). The following questions were included to measure the three outcome variables associated with current drinking behavior: "How many hours did you drink alcohol during the last time you partied/socialized?" "How many drinks of alcohol did you have the last time you partied/socialized?" "Over the last two weeks, how many times have you had five or more drinks of alcohol in one sitting?" Responses for the first question ranged from one (0 hours) to 10 (eight or more hours). Responses for the second question ranged from one (0 drinks) to 12 (10 or more drinks). Responses for the third question ranged from 1 (0 times) to 11 (10 or more times). Each question was treated as a single-item measure for evaluating the three dimensions of current drinking behavior. Delta scores were created by subtracting pre-test scores from post-test scores on each of the three items. Table 2 contains the means, standard deviations, Cronbach's alphas, and answer ranges for every measure.

The NCHA was also used to measure use of protective drinking strategies (H3) and negative outcomes (H4) experienced following a drinking episode and. Eleven Likert-type items were used to measure use of protective strategies. Sample items include: "During the last 12 months, when you "partied"/socialized, how often did you alternate non-alcoholic with alcoholic beverages?" "During the last 12 months, when you "partied"/socialized, how often did you eat before and/or during drinking?" "During the last 12 months, when you "partied"/socialized, how often did you stick with only one kind of alcohol when drinking?" and "During the last 12 months, when you

"partied"/socialized, how often did you pace your drinks to one or fewer per hour?" Answer choices ranged from one to six: "N/A, don't drink," "Never," "Rarely," "Sometimes," "Most of the time," and "Always." "N/A, don't drink" and "Never" responses were recoded into one score, so that the measure became a five-point scale. After checking reliability among the items, they were used to create a mean score for overall use of protective strategies. A delta score was created by subtracting pre-test scores from post-test scores for all of the participants. The pre-test scale had a Cronbach's alpha of .80 and the post-test scale had a Cronbach's alpha of 0.82.

Nine "Yes"/No" items were used to ask about negative outcomes resulting from drinking. They were introduced with the prompt, "Within the last 12 months, have you experienced any of the following when drinking alcohol?" and included: "Did something you later regretted," "Forgot where you were or what you did," and "Had unprotected sex." Original responses on these items were recorded as 1="Yes" and 2="No." These responses were recoded so that 1="Yes" and 0="No," which allowed me to create a sum score for the "Consequences" variable. Cronbach's alpha for the pre-test scale was .71 and was 0.75 for the post-test scale. A delta score was created by subtracting pre-test scores from post-test scores.

Alcohol Use Disorders Identification Test (AUDIT). The AUDIT (Saunders et al., 1993) is a 10-tem scale used to collect information about high-risk drinking behaviors (H2). The AUDIT assesses whether or not an individual has a drinking disorder, but can also provide an assessment of less severe levels of alcohol consumption. Sample items include, "How often do you have six or more drinks on one occasion?" and "How often during the last year have you found that you were not able to stop drinking once you had

started?" The first two questions have answer choices ranging from one ("Never") to five ("Four or more times a week"). The subsequent six items have answer choices ranging from one ("Never") to five ("Daily or almost daily"). The remaining two items have three answer choices: one ("No"), two ("Yes, but not in the last year"), and three (Yes, during the last year"). Responses were recoded in accordance with the Saunders et al. (1993) study, which treats the scale as a sum score ranging from zero 40. A higher score on this scale is indicative of alcohol abuse and a score higher than an eight "indicates a strong likelihood of hazardous or harmful alcohol consumption" (p. 804). The highest score on this scale was a 29. Cronbach's alphas for both the pre-test and post-test scales were 0.80. A delta score was created by subtracting pre-test scores from post-test scores for all of the participants.

Post-test Questionnaire

The post-test questionnaire contained the same items as the pre-test and in addition, included items asking about participants' attitudes toward the messages they received (H5) and the perceived persuasiveness of the messages (H6)

Attitudes Toward Messages and Message Persuasiveness. Five Likert-type items were used to measure participants' attitudes toward the messages they received while in the study. Answer choices ranged from one ("Strongly Disagree") to five ("Strongly Agree"). These items were derived from existing scales used for the evaluation of the HealthyhornsTXT program, as well as from Cesario and colleagues' (2004) measure. Sample items include: "I liked the messages I received" and "The messages I received were relevant for me." A mean score was created and the scale had a

Cronbach's alpha reliability score of 0.75. Cesario et al. (2004) also measured the extent to which participants were persuaded by the messages they received. The five-item, Likert-type scale used in this study included such items as: "The text-messages I received were convincing" and "The text messages I received influenced my health behaviors." Participants selected an answer from one ("Not at all") to seven ("Very"). A mean score was calculated for the "Persuasiveness" variable, which had a Cronbach's alpha of 0.89.

Data Analysis

Before testing for the main effects, the pre-test and post-test data sets were cleaned and merged. There were initially 484 responses to the pre-test and 1,127 responses to the post-test. Participants who did not provide a unique identifying number were removed (n= 180) because this information was necessary for matching pre and post-test scores. In cases where there were two or more responses provided by the same participant, the original set of responses was kept and subsequent responses were removed (n= 64). Participants' unique identifying codes were also matched with the codes provided on the screening survey in order to ensure that they were eligible for participation in the study. Responses to the pre-test and post-test were then matched up according to the unique identifying codes. Three hundred and twenty-four participants completed both the pre-test and post-test.

Forty-one participants were removed based on length of time it took to complete the survey. Participants were removed if they took less than five minutes to complete the pre-test or the post-test, or if they took longer than 24 hours to complete either questionnaire. The decision to remove participants who took longer than 24 hours to

complete the questionnaire was made after comparing the mean and medians for the duration of time spent on both the questionnaire. Initially, the mean duration was 9,352 seconds (156 minutes) and the median duration was 437 seconds (seven minutes), which suggested multiple outliers. An additional four participants were removed from the analysis because they stopped taking the survey after entering their unique identifying codes. This left a total of 279 participants across the three groups who met the inclusion criteria.

Power Analysis

The choice of sample size was based on statistical power considerations, with a goal of having power $(1 - \beta) = 0.85$ for detecting predicted effects that would account for 5% explained variance, applying two-tailed tests with a non-directional alpha of 0.05 (Ellis, 2010). In this experimental design, critical hypotheses oriented around single degree of freedom contrasts (Keppel, Saufley, & Tokunaga, 1989). The sample size recruited provided an approximate power of 0.88 under the aforementioned assumptions.

Chapter 4: Results

Randomization Check

Associations between the manipulated treatment group factor and the demographic variables (regulatory focus, sex, race, age, year in school, residence, and Greek life affiliation) in the sample were examined. There was no significant association between the manipulated factor and these variables, $p > .09$ in all cases.

Tests of Hypotheses

To test hypotheses, 2 x 3 x 2 repeated-measures (mixed factorial) ANCOVAs were conducted with regulatory focus (prevention or promotion) and message group (congruent, incongruent, or control) as between-participant factors, measurement time (pre- or post-intervention) as a within-participants factor, and participant sex (male or female), Greek affiliation (residing in a Greek organization or not), and pre-intervention text messaging behavior (an index of participants' self-reported frequency of send/receiving texts and number of contacts) as covariates. These covariates were chosen because prior research has demonstrated robust moderation effects of all three on the drinking and text-messaging behaviors of college students (American College Health Association, 2007; Park & Grant, 2005; Park, Sher, & Krull, 2008; Scott-Sheldon, Carey, & Carey, 2008; Wechsler & Nelson, 2001). The dependent variables were number of hours drinking, quantity of drinks consumed, number of times having five or more drinks in one sitting, high-risk drinking, use of protective strategies, consequences from drinking, attitudes toward the messages, and message persuasiveness. The alpha level for reaching statistical significance was set to a *p*-value of less than or equal to .05 for all

analyses. Means and SDs for all dependent variables by treatment group are presented in Table 3.

Number of Hours Drinking

Hypothesis 1a predicted a main effect of treatment group on reported drinking behavior, such that participants in the congruent group would report drinking for a fewer number of hours than participants in the incongruent and control group. Repeated-measures ANCOVA results did not find this main effect to be significant, F (2, 269) = 2.67, p = .07.

However, there was an interaction of regulatory focus and treatment group on number of hours drinking, F (2, 266) = 3.59, p = .029, Cohen's d =0.39. Planned comparisons indicated that the mean for the incongruent group (M= 4.64, SD= 1.97) was significantly different from the means for the congruent group (M= 3.60, SD= 1.61) and control group (M= 3.80, SD= 1.82) for prevention-focused participants, F (1,266) = 7.75, p =.005; means did not differ significantly between the incongruent group (M= 3.86, SD= 1.58), congruent group (M=3.81, SD= 1.45), or control group (M= 4.08, SD=2.09) for promotion-focused participants, F (1, 266) = .19, p > .05. Thus, Hypothesis 1a was partially supported. Prevention-focused participants in the incongruent group reported drinking for more hours than prevention-focused participants in the congruent and control groups. Table 4 illustrates mean hours drinking by treatment group and regulatory focus.

Quantity of Drinks

Hypothesis 1b predicted a main effect of treatment group on reported drinking

behavior, such that participants in the congruent group would report consuming a fewer number of drinks than participants in the incongruent and control groups. Repeated-measures ANCOVA results did not find this main effect to be significant, F (2, 269) = .84, p = .44.

However, there was an interaction of regulatory focus and treatment group on quantity of drinks consumed, F (2, 266) = 3.29, p = .039, d=.38. An examination of the univariate analysis suggested that the main effect for number of drinks did not significantly differ between treatment groups or regulatory focus groups, F (2, 266) = 1.62, p = .200. Thus, there was no support for Hypothesis 1b. Although the differences between groups were not statistically significant, the means followed the same pattern as those in Hypothesis 1a. For prevention-focused participants, those in the incongruent group reported consuming a higher number of drinks (M= 5.30, SD= 2.27) than those in the congruent group (M= 4.40, SD= 2.25) and control group (M= 5.07, SD= 3.17). Also, as was the case with Hypothesis 1a, this pattern held only for the prevention group. Table 4 illustrates mean quantity of drinks by treatment group and regulatory focus.

Five or More Drinks

Similarly, Hypothesis 1c predicted a main effect of treatment group on reported drinking behavior, such that participants in the congruent group would report fewer incidences of having five or more alcoholic drinks in one sitting during the past two weeks than participants in the incongruent and control groups. Repeated-measures ANCOVA results did not find this main effect to be significant, F = (2, 269) = .16, p = .85

However, there was a significant interaction of regulatory focus and treatment group for this dependent variable, $F = (2, 266) = 3.43$, $p = .034$, Cohen's d=.39. A follow-up univariate ANCOVA failed to identify significant differences between treatment or regulatory focus groups, F (2, 266) = 1.73, = p . 180. These findings suggest no support for Hypothesis 1c. However, like Hypotheses 1a and 1b, the mean scores illustrate a similar pattern such that prevention-focused participants in the incongruent group reported more instances of drinking five or more drinks of alcohol in one sitting (M= 2.02, SD= 1.42) than did those in the congruent group (M= 1.90, SD= 1.33) or control group (M=1.77, SD= 1.06). Table 4 illustrates the mean scores for number of times having five or more drinks in one sitting by treatment group and regulatory focus.

High-Risk Drinking

Hypothesis 2 predicted a main effect of treatment group on reported drinking behavior, such that participants in the congruent group would report fewer high-risk drinking behaviors (as measured by the AUDIT) than participants in the incongruent and control groups. Repeated-measures ANCOVA results did not find this main effect to be significant, $F = (2, 267) = .15$, $p = .86$

However, there was an interaction of regulatory focus and treatment group on high-risk drinking scores, F (2, 264) = 3.79, p = .024, d=0.40. The subsequent univariate analysis indicated the difference between groups was close to reaching significance, F (2, 264) = 2.61, p = .076. A planned comparison indicated that prevention-focused participants who received incongruent text messages reported marginally higher scores on the high-risk drinking assessment (M = 6.47, SD = 4.04) than others who received

congruent (M = 5.65, SD = 4.57) or control (M = 5.41, SD = 4.02) text messages, F (1, 264) = 3.68, p = .056, which aligns with the findings for Hypotheses 1a-1c. In contrast, promotion-focused participants who received incongruent texts reported lower high-risk drinking scores (M = 6.55, SD = 5.20) than others who received congruent (M = 7.51, SD = 4.39) or control (M = 7.95, SD = 5.26) texts, F (1,264) = 4.10, p = .043. Thus, Hypothesis 2 was partially supported. Table 4 illustrates mean scores for high-risk drinking by treatment group and regulatory focus.

Use of Protective Strategies

Hypothesis 3 predicted a main effect of treatment group on use of protective strategies, such that participants in the congruent group would report using more protective strategies than participants in the incongruent and control groups. Repeated-measures ANCOVA results did not find this main effect to be significant, F (2, 269) = .37, p = .70 Similarly, there was no significant interaction of regulatory focus and treatment group on use of protective strategies, F (2, 266) = .04, p = .961. Thus, Hypothesis 3 was not supported. Table 4 illustrates mean scores for use of protective strategies treatment group and regulatory focus.

Consequences from Drinking

Hypothesis 4 predicted a main effect of treatment group on consequences from drinking, such that participants in the congruent group would report experiencing fewer consequences from drinking than participants in the incongruent and control groups. Repeated-measures ANCOVA results did not find this main effect to be significant, F = (2, 269) = .80, p = .45. There was also no significant interaction of regulatory focus and

treatment group on consequences from drinking, F = (2, 266) = 1.58, p = .208. Therefore, Hypothesis 4 was not supported. Table 4 illustrates mean consequences by treatment group and regulatory focus.

Attitudes Toward Messages and Message Persuasiveness

Finally, Hypotheses 5 and 6 predicted main effects of treatment group on attitudes toward the messages and message persuasiveness, such that participants in the congruent group would have more positive attitudes toward the messages (H5) and would perceive the messages as more persuasive (H6) than participants in the incongruent and control groups. Because attitudes toward the messages and message persuasiveness were evaluated with post-test assessments only, univariate ANCOVAs were used for calculating differences between groups. ANCOVA results did not find a main effect for message attitude, F = (2, 269) = 2.04, p = .13 and did not find a main effect for message persuasiveness, F = (2, 269) = 1.96, p = .14. Further, there was not a significant interaction of regulatory focus and treatment group on message attitudes, F (2, 266) = 2.63, p = .074; significant interaction of regulatory focus and treatment group on message persuasiveness, F (2, 266) = 2.43, p = .09. Thus, Hypotheses 5 and 6 were not supported. Table 4 illustrates mean scores for message attitudes and message persuasiveness by treatment group and regulatory focus.

Delta Scores

Additional analyses were conducted to assess whether there were significant changes in drinking behavior, use of protective strategies, and consequences across time between the treatment groups. Delta scores were created for number of hours drinking

(H1a), number of drinks consumed (H1b), number of times having five or more drinks in one sitting (H1c), high-risk drinking (H2), use of protective strategies (H3), and consequences (H4) by subtracting pre-test scores from post-test scores. Univariate ANCOVAs were first conducted for each of the delta variables and in cases when there were significant main effects, pairwise comparisons were then used to determine if there were significant differences in the mean pre-test/post-test scores between the treatment and regulatory focus groups. The same covariates were included in the models (sex, Greek life affiliation, and text-messaging behavior).

Univariate ANCOVAs revealed no significant differences in changes from pre-test/post-test scores for number of hours drinking (H1a), F (2, 266) = 1.19, p = .31, number of drinks (H1b), F (2, 266) = .33, p = .72, number of times having five or more drinks in one sitting (H1c), F (2, 266) = 2.14, p = .12, and high-risk drinking (H2), F (2, 264) = .50, p = .61. There were also no significant differences in delta scores between the treatment and regulatory focus groups for use of protective strategies (H3), F (2, 266) = 1.37, p = .26, or consequences from drinking (H4), F (2, 266) = .34, p = .72.

Secondary Analyses

After testing for main effects, another round of analysis was conducted to determine if there were significant interactions between regulatory focus orientation and messaging group. This allowed for conclusions to be made about whether the type of message received (prevention or promotion) contributes to differences in scores between prevention-focused and promotion-focused participants on the dependent variables. The same covariates were included (sex, Greek life affiliation, text-messaging behavior).

Mixed factorial ANCOVAs revealed no significant interactions between regulatory focus orientation and messaging groups for: number of hours drinking, F (2, 266) = 1.78, p = .171, number of drinks, F (2, 266) = .50, p = .605, number of times having five or more drinks in one sitting, F (2, 266) = .57, p = .568, high-risk drinking, F (2, 264) = 1.73, p = .180, use of protective strategies, F (2, 266) = 1.73, p = .180, and consequences from drinking, F (2, 266) = 1.50, p =.225. Univariate analyses of covariance for message attitudes, F (2, 266) = .78, p = .458 and message persuasiveness, F (2, 266) = .78, p = .459 also failed to produce significant findings. Therefore, there was no evidence to suggest significant main effects of messaging group and regulatory focus on scores for any of the dependent variables. The means and standard deviations for these findings are in Table 5.

Chapter 5: Discussion

In this 2 (regulatory fit orientation- prevention or promotion) x 3 (treatment group- congruent, incongruent, or control) x 2 (pre-test, post-test) experiment, participants (N=279) were randomly assigned to one of three groups: the congruent group (received messages that matched their regulatory focus), incongruent group (received messages that were mismatched with their regulatory focus), and the control group (received general health messages). Participants completed an initial screening survey, pre-test assessment, and post-test assessment. The intervention lasted eight weeks. Three primary conclusions can be drawn from this study's findings: incongruent messages were more harmful than congruent messages were helpful, prevention-focused individuals were more sensitive to incongruent messages than promotion-focused individuals were, and a larger message dose would be beneficial for producing more robust differences between treatment groups. These conclusions have important implications for advancing theory and informing practice. Specifically, the findings on the impact of incongruent messaging on number of hours spent drinking extend the regulatory fit framework. The study's design might also be informative for future alcohol text messaging interventions. Theoretical and practical implications, as well as limitations, are discussed in the subsequent sections.

Theoretical Implications

Although the finding for Hypothesis 1a (number of hours drinking) was the only one to reach statistical significance, the findings for Hypothesis 1b (number of drinks), Hypothesis 1c (number of times having five or more drinks in one sitting), and Hypothesis 2 (high-risk drinking) approached significance in the hypothesized direction

and followed the same pattern as illustrated by a comparison of the mean scores; prevention-focused individuals who received incongruent messages reported engaging in more negative drinking behaviors. Therefore, there is evidence to suggest that incongruent messages might be more harmful than congruent messages are helpful for prevention-focused individuals. Although there is a large amount of evidence documenting the value of fit for message effectiveness (Higgins, 2000, 2005; Lee & Aaker, 2004), little has been done to evaluate the effects of message "misfit." Camacho, Higgins, and Luger (2003) observed that a violation of fit resulted in the perception that one's actions were morally wrong. Similarly, Zanna and Fazio (1982) documented the impact of "nonfit" messages on goal pursuit and found that experiencing fit led to more positive evaluations of an object than experiencing nonfit did. Worthy, Maddox, and Markman (2007) also evaluated the phenomenon of a regulatory mismatch and found that participants in the mismatched group behaved more poorly than participants in the fit group when having to make decisions about card selections, which was later bolstered by Grimm and colleagues' (2008) findings that individuals in a mismatched condition performed worse on a learning task than did individuals in a fit condition. Like these past studies, the current study found some support for the notion that messages incongruent with one's regulatory focus can negatively affect self-reported behavior. The current study is one of the first to look at the effects of incongruent, or mismatched, messages that are sent via text messaging and that attempt to influence a health behavior.

The main effects of treatment group and regulatory focus orientation approached statistical significance for high-risk drinking scores (as measured by the AUDIT scale). Planned comparisons did find support for the pattern described above; prevention-

focused participants in the incongruent group had higher (worse) scores than those in the congruent or control groups. However, the planned comparisons also revealed that promotion-focused participants in the incongruent group had lower (better) scores on the high-risk drinking assessment than those in the congruent and control groups. This goes against the proposed hypotheses and warrants further attention. Scores on the AUDIT scale can range from zero (no alcohol consumption) to 40 (alcohol abuse). The mean score on the AUDIT for both the pre-test and post-test was a 6.40 and the highest score was a 29. Additionally, the planned comparisons indicated that the difference in mean scores between the treatment groups for both the prevention-focused participants and promotion-focused participants was less than one. Therefore, there is evidence to suggest that the AUDIT assessment was not effective at capturing the variance in high-risk drinking behavior within the study's sample and that the majority of the participants were already at the lower end of the scale prior to the start of the study.

This study found significant main effects for prevention-focused participants. Given that promotion-focused and prevention-focused individuals have different needs in terms of goal pursuit and motivation, one might expect that these individuals respond to messages about responsible drinking differently. If promotion-focused people are driven primarily by nurturance and accomplishment and prevention-focused people are driven more by security and protection (Higgins, 2005), then it might be that the text messages in the current study spoke more to a need for safety, vigilance, and what one "ought" to do (the definition of a prevention-orientation) in the face of high-risk drinking, than to a need for succeeding, advancement, and one's "ideals" (the definition of a promotion-orientation). The majority of the text messages sent in this study used language that

referred to what one "should" do in order to prevent negative outcomes, which is more aligned with a prevention-focused individual's attempts to self-regulate through vigilant and avoidant means, than with a promotion-focused individual's attempts to self-regulate through eager means (Higgins, 2002).

In general, much of the messaging surrounding alcohol tends to use language that is traditionally prevention-oriented (e.g., "drink responsibly" and "high-risk drinking"). Individuals who tend to identify more with language centered on accomplishment and advancement might not be as engaged with topics and messages that are rooted in prevention. Past studies have used regulatory focus as a framework for evaluating alcohol messages (Park & Morton, 2015), but the current study is the first one to tailor alcohol messages by regulatory focus. Avnet and Higgins (2006) recommend that future work on regulatory fit evaluate the impact of framing on decision-making. The messages in the current study provided fairly direct recommendations for behavior and did little in the way of walking message recipients through decision-making efforts. A future version of this study might benefit from emphasizing the decision-making processes inherent to abstaining from high-risk drinking, rather than explicitly state what individuals who consume alcohol should or should not do.

Recent work on regulatory focus and fit has challenged initial assumptions that regulatory focus orientation is a sustained trait by asserting that regulatory focus orientation might vary depending on the situation (Keller & Bless, 2006; Spiegel et al., 2004). This is relevant to the current study because it suggests that some health issues might lend themselves more to either prevention-focused reactions or promotion-focused ones. For instance, efforts to regulate alcohol consumption and high-risk drinking are

often associated with safety concerns. Thus, the majority of messages about alcohol use are already inherently prevention-focused (i.e., focused on avoidance, responsibility, and vigilance). Comparing regulatory fit message interventions across health topics that are aligned with either promotion-focused or prevention-focused strategies can provide a more nuanced understanding about whether regulatory focus varies by context. For instance, comparing the effects of congruency between messages targeting high-risk drinking (avoidance-focused) and messages targeting physical activity (approach-focused).

This study found strong support for the phenomenon of regulatory focus. Even in cases where there were no significant main effects or significant interactions between treatment group and regulatory focus on the dependent variable (number of drinks, five or more drinks in one sitting, high-risk drinking, and consequences from drinking), regulatory focus was still statistically significant in these models. There was reason to believe regulatory focus accounted for significant variance in the drinking behaviors and consequences reported by participants; however, there was still only mixed evidence supporting regulatory fit. This implies that the design of the intervention, or some component of it (likely message dose), is suspect and should be considered when interpreting the contributions to the regulatory focus and fit frameworks.

Reactance Theory

The findings from this study can also be interpreted from a reactance theory lens. Reactance theory posits that messages impair behavior when they are perceived as too threatening or too imposing on one's freedom (Brehm, 1966, 1972; Brehm & Cole, 1966). If message recipients believe that they are unable to engage in the recommended

behavior due to a lack of resources or self-efficacy, then they are more likely to tune-out the message, or in some cases, do the opposite of the suggested behavior (Tennen, Press, Rohrbaugh, & White, 1981; Wortman & Brehm, 1975). Engs and Hanson (1982) used reactance theory to argue that by merely making drinking illegal for college students under 21, campuses were prompting individuals in this age group to react against drinking laws and engage in high amounts of alcohol consumption.

Allen and colleagues (1994) reached a similar conclusion in their study, which found that underage college students were more likely to consume higher levels of alcohol than their of-age peers. They posited that reactions to laws that ban alcohol consumption are in response to the perception that one's freedoms are being taken away and thus, reactions of defiance are ignited. There was evidence in the current study to suggest that the recommendations about alcohol consumption were perceived negatively by some participants when they did not fit with their orientations and in turn, led to a higher number of reported hours spent drinking and quantity of drinks consumed. The prevention-focused participants in the current study who received incongruent messages might have perceived that their decisions to drink alcohol in the manner that they chose was threatened and therefore, responded by drinking for even longer periods of time. Multiple researchers (Andrew, 1995; Dillard & Shen, 2005; MacKinnon & Lapin, 1998; Ringold, 2002; Schultz, Nolan, Cialdini, Goldstein, & Griskevicius, 2007) have looked at this boomerang effect and warn that public health and health promotion professionals need to take this into consideration when designing alcohol interventions. Future work in this area would benefit from combining reactance theory and regulatory fit in an effort to

assess further the harm of incongruent messages and the potential that they have for triggering reactance.

Practical Implications

This study's findings have important implications for alcohol text message interventions; namely, that individuals who drink might not benefit from receiving messages that are misaligned with their regulatory focus. Furthermore, the non-significant findings in this study are not to be overlooked because they point to opportunities for improvement in future college health text-messaging programs. There were no significant main effects for treatment group on measures of message persuasiveness, attitudes toward the program, use of protective strategies, and consequences from drinking. There are three potential reasons for this: the messages were not compelling enough, participants were not exposed to the messages for a sufficient period of time, or the measures failed to capture the variance in scores. The latter is most likely true for measuring differences on the "consequences" variable. The items for this scale ranged in severity of outcomes by asking about relatively trivial consequences ("Forgot what I did") as well as more serious consequences ("Had sex with someone without their consent"). The items describing more serious consequences like rape and physical assault may have elicited a social desirability bias that prevented participants from accurately reporting on their behaviors. This might have been the case with the scale used to measure use of protective strategies, which also ranged from non-face-threatening ("Alternated non-alcoholic with alcohol beverages") to face-threatening ("Used a designated driver"). To address this, future studies could include items that are less likely to elicit self-judgment or feelings of guilt from the participant. Future alcohol

text message interventions would also benefit from asking participants to report on their behaviors (consequences, use of protective strategies, drinking, etc.) as they are occurring, rather than asking them to recall at a later time. Prompts could be texted to recipients at times when it is likely that they are drinking and could ask these individuals to simply reply with a "yes" or "no" in response to questions about current behaviors.

As noted above, the high-risk drinking assessment used in this study (AUDIT) did not capture much of the variance among the participants. The scores on this scale also indicated that there were not a lot of problematic drinkers within the sample. Alcohol interventions that want to test message effectiveness should aim for an audience that misuses or abuses alcohol in an effort to capture a wider range of responses to recommended drinking behaviors. This could also provide a better test of regulatory fit because the recommendations for safe drinking practices would be sent to individuals who actually need them. In this sense, the findings from the current study might have been limited by the sample's characteristics, especially with regard to how they view health. In other words, is the type of person who signs up for and stays in a text-messaging program that provides health tips likely to be healthier (and consequently, less likely to drink alcohol) than someone not enrolled in such a program? The results from this intervention might have been different if attempts had been made to recruit actively individuals representing diverse health backgrounds and attitudes toward health.

In terms of the timing of the intervention (September 4, 2016 through November 4, 2016), there might have been external factors that influenced participants' drinking behaviors above and beyond the study's intervention. These could include events like football games, exam periods, and music festivals. Health practitioners should take

measures to account for campus and local events when designing their interventions because even if the messages are designed adequately, there might be other reasons for a lack of change in drinking behaviors over time. In terms of program evaluation, administering questionnaires via mobile devices provided unique challenges that should be considered in future interventions. Because questionnaire links were sent to participants' mobile phones, it was not possible to provide a unique link or access code, nor was it possible to prevent participants from sharing the link with individuals outside of the study. Although there were only 479 subscribers who were eligible for participation in the study based on screening assessment scores, there were over 1,000 responses to the post-test questionnaire because of the incentive. This led to extra steps when cleaning the data but fortunately, because participants were asked to provide a unique code on every questionnaire, it was possible to match up responses across assessments and to remove responses that were not legitimate.

Limitations and Future Directions

This study's limitations are centered primarily on message exposure, length of intervention, and measurement sensitivity. Although the findings reached make important contributions to the literature on regulatory focus and fit, there were multiple hypotheses in this study that were not supported. This can be attributed to a low message dose; participants only received two text messages per week about alcohol. Past text message interventions found significant changes in health behaviors after sending daily messages to recipients. (Cocosila et al., 2009; Patrick et al., 2009; Rodgers et al., 2005). As noted in a previous section, a preliminary study conducted with the HealthyhornsTXT subscriber pool indicated that participants wanted to receive more than one message per week, but

less than one message per day. The current HealthyhornsTXT program uses this as a guide for sending three or four messages per week for subscribers. A dose of three to four messages about alcohol might have led to more support for this study's hypotheses.

In addition to low message exposure, sample size might have served as another limitation to this study. Multiple participants completed the survey in a very short amount of time (less than five minutes) and an even larger number of participants took longer than 24 hours to complete the survey. I made the decision to remove participants who did not meet the time criteria because of the uneven distribution, but this resulted in a smaller sample size, which could also be responsible for the non-significant differences. With regard to measures, the current study used the traditional regulatory focus assessment (Higgins et al., 1997), but future studies might benefit from using the health regulatory focus assessment (Gomez & Borges, 2013) instead. This instrument might be more effective at detecting differences between messaging groups given that it measures regulatory focus specific to health contexts.

Finally, it is important to consider that unlike past regulatory fit studies that used fliers or passages as their stimulus materials (Aaker & Lee, 2001; Kees, Burton, & Tangari, 2010; Wang & Lee, 2006), this study's manipulation relied on messages that were 160 characters long. The "value from fit" phenomenon may be more difficult to test with shorter messages, especially when those messages are only sent twice a week for a period of eight weeks. Shaw and colleagues (2013b) found that text messages tailored by regulatory focus were effective at stimulating weight loss. However, the participants in their study were actively trying to change their weight-related behaviors. This was not necessarily the case for the participants in the current study. Text-messaging

interventions that rely on regulatory fit might be more effective if they target a sample in which members are intentionally trying to change a behavior.

Conclusion

The two primary goals of this study were to assess the impact of text messages tailored by regulatory focus on drinking behavior, and to test further the concept of "value from fit" by evaluating incongruent messages. There was no evidence to suggest that participants in the congruent messaging group were more likely to change their drinking behaviors or be more persuaded by the messages they received than participants in the incongruent and control groups. The findings do suggest, though, that incongruent messages can lead to more alcohol consumption for prevention-focused individuals than congruent and control messages. This was illustrated by a significant difference in mean scores for number of hours drinking, and by differences in mean scores that were approaching statistical significance for quantity of drinks consumed and number of times having five or more drinks in one sitting. These findings extend existing work on regulatory fit and have important implications for text-messaging interventions aimed at reducing high-risk drinking among college students. Accounting for variables like regulatory focus orientation when designing a text-message intervention can enhance message effectiveness. This study provided strong support for regulatory focus theory; regulatory focus remained significant in nearly every analysis. Follow-up studies would benefit from a larger message dose but overall, this study's findings depict the harm that sending messages incongruent with one's regulatory focus can have on drinking behavior.

Table 1. Sample Characteristics (N = 279)

Measure	***n* (total)**	***%* (total)**	***n* (congruent group)**	***%* (congruent group)**	***n* (incongruent group)**	***%* (incongruent group)**	***n* (control group)**	***%* (control group)**
Female	187	67.0	64	34.2	58	31.0	65	34.8
Age								
18	45	16.1	20	44.4	16	35.6	9	20.0
19	108	38.7	31	28.7	37	34.3	40	37.0
20	84	30.1	28	33.3	25	29.8	31	36.9
21	22	7.9	7	31.8	9	40.9	6	27.2
22-26	18	6.5	2	11.1	7	38.9	9	50.0
Race								
White	137	49.1	44	32.1	40	29.2	54	39.4
Hispanic/Latino	56	20.1	21	37.5	19	33.9	16	28.6
Asian or Pacific Islander	58	20.8	17	29.3	21	36.2	20	34.5
Biracial or Multiracial	15	5.4	3	20.0	9	60.0	3	20.0
Black	7	2.5	2	28.6	4	57.1	1	14.3
Other/Declined to Answer	6	2.1	2	33.3	2	33.3	2	33.3
Year in School								
1st Year	45	16.1	19	42.2	16	35.6	10	22.2
2nd Year	141	50.5	45	31.9	44	31.2	52	36.9
3rd Year	60	21.5	19	31.7	21	35.0	20	33.3
4th Year	18	6.5	5	27.8	8	44.4	5	27.8
5th Year or More	14	5.0	1	7.1	5	35.7	8	57.1
Current Residence								
Other off-campus housing	182	65.2	56	30.8	67	36.8	59	32.4

Table 1 (continued)

Campus residence hall	65	23.3	26	40.0	16	24.6	23	35.4
Fraternity or sorority	13	4.7	1	7.7	4	30.8	8	61.5
Other university housing	11	3.9	4	36.4	5	45.5	2	18.2
Parent or guardian	5	1.8	1	20.0	1	20.0	3	60.0
Member of a Fraternity/Sorority?								
Yes	47	16.8	12	25.5	18	38.3	17	36.2
Text messages sent/received per day								
0-50	162	58.1	48	29.6	57	35.2	57	35.2
51-140	80	28.7	28	35.0	26	32.5	26	32.5
140+	36	12.9	13	36.1	11	30.6	12	33.3
No. of people exchanged text messages with per day								
0-5	167	59.9	54	32.3	57	34.1	56	33.5
6-10	73	26.2	23	31.5	24	32.9	26	35.6
11-15	22	7.9	8	36.4	8	36.4	6	27.3
15+	16	5.7	4	25.0	5	31.3	7	43.8

Table 2. Ranges, means, standard deviations, and Cronbach's alphas

Index	***Min.***	***Max.***	***M***	***SD***	**α**
Regulatory Focus (promotion score)	13	30	21.96	3.52	.63
Regulatory Focus (prevention score)	5	25	17.35	4.22	.78
Hours Drinking (pre-test)	1.00	10.00	3.94	1.83	--
Hours Drinking (post-test)	1.00	10.00	3.95	1.78	--
Number of Drinks (pre-test)	1.00	12.00	5.28	2.81	--
Number of Drinks (post-test)	1.00	12.00	5.18	2.86	--
Five or More Drinks (pre-test)	1.00	11.00	2.23	1.68	--
Five or More Drinks (post-test)	1.00	9.00	2.12	1.44	--
AUDIT (pre-test)	1.00	29.00	6.40	4.89	.80
AUDIT (post-test)	0.00	28.00	6.46	4.99	.80
Protective Strategies (pre-test)	1.64	5.00	3.36	0.63	.80
Protective Strategies (post-test)	1.00	5.00	3.33	0.66	.82
Consequences (pre-test)	0.00	9.00	1.58	1.73	.71
Consequences (post-test)	0.00	9.00	1.60	1.84	.75
Attitudes Toward Program	1.80	5.00	3.62	0.59	.75
Message Persuasiveness	1.60	7.00	4.84	1.20	.89
Delta Hours Drinking	-8.00	7.00	0.01	2.02	--
Delta Number of Drinks	-11.00	9.00	-.09	2.88	--
Delta Five or More Drinks	-8.00	5.00	-.12	1.47	--
Delta AUDIT	-11.00	17.00	0.04	3.15	--
Delta Protective Strategies	-2.36	2.73	-0.03	0.49	--
Delta Consequences	-9.00	9.00	0.03	1.84	--

Table 3. Means and Standard Deviations within Treatment Groups

Hours Drinking	*Congruent*	*Incongruent*	*Control*
	n= 89	*n= 94*	*n= 95*
	Mean= 3.69	Mean= 4.22	Mean= 3.92
	SD= 1.54	SD= 1.80	SD= 1.93
Number of Drinks	*Congruent*	*Incongruent*	*Control*
	n= 89	*n= 94*	*n= 95*
	Mean= 4.88	Mean= 5.37	Mean= 5.28
	SD= 2.64	SD= 2.63	SD= 3.27
Five or More Drinks	*Congruent*	*Incongruent*	*Control*
	n= 89	*n= 94*	*n= 95*
	Mean= 2.13	Mean= 2.14	Mean= 2.07
	SD= 1.43	SD= 1.42	SD= 1.49
AUDIT Score	*Congruent*	*Incongruent*	*Control*
	n= 89	*n= 92*	*n= 95*
	Mean= 6.43	Mean= 6.51	Mean= 6.45
	SD= 4.56	SD= 4.67	SD= 5.68
Protective Strategies	*Congruent*	*Incongruent*	*Control*
	n= 89	*n= 94*	*n= 95*
	Mean= 3.31	Mean= 3.31	Mean= 3.37
	SD= .70	SD= .59	SD= .70
Consequences	*Congruent*	*Incongruent*	*Control*
	n= 89	*n= 94*	*n= 95*
	Mean= 1.48	Mean= 1.65	Mean= 1.67
	SD= 1.51	SD= 2.13	SD= 1.84
Attitudes	*Congruent*	*Incongruent*	*Control*
	n= 89	*n= 94*	*n= 95*
	Mean= 3.64	Mean= 3.70	Mean= 3.53
	SD= .66	SD= .51	SD= .58
Persuasiveness	*Congruent*	*Incongruent*	*Control*
	n= 89	*n= 94*	*n= 95*
	Mean= 4.77	Mean= 5.04	Mean= 4.70
	SD= 1.22	SD= 1.12	SD= 1.24

Note: A lower mean score on the drinking variables is better than a higher mean score (indicates less alcohol consumption).

Table 4. Means and Standard Deviations within Treatment Groups by Regulatory Focus

Hours Drinking	*Congruent*	*Incongruent*	*Control*
	n=89	*n=94*	*n=95*
Prevention	Mean= 3.60	Mean= 4.64	Mean= 3.80
n=152	SD= 1.61	SD= 1.97	SD= 1.82
Promotion	Mean= 3.81	Mean= 3.86	Mean= 4.08
n=126	SD= 1.45	SD= 1.58	SD= 2.09
Number of Drinks	*Congruent*	*Incongruent*	*Control*
	n=89	*n=94*	*n=95*
Prevention	Mean= 4.40	Mean= 5.30	Mean= 5.07
n=152	SD= 2.25	SD= 2.27	SD= 3.17
Promotion	Mean= 5.54	Mean= 5.44	Mean= 5.59
n=126	SD= 3.01	SD= 2.93	SD= 3.42
Five or More Drinks	*Congruent*	*Incongruent*	*Control*
	n=89	*n=94*	*n=95*
Prevention	Mean= 1.90	Mean= 2.02	Mean= 1.77
n=152	SD= 1.33	SD= 1.42	SD= 1.06
Promotion	Mean= 2.46	Mean= 2.24	Mean= 2.51
n=126	SD= 1.52	SD= 1.42	SD= 1.88
AUDIT Score	*Congruent*	*Incongruent*	*Control*
	n=89	*n=92*	*n=95*
Prevention	Mean= 5.65	Mean= 6.47	Mean= 5.41
n=151	SD= 4.57	SD= 4.04	SD= 4.02
Promotion	Mean= 7.51	Mean= 6.55	Mean= 7.95
n=125	SD= 4.39	SD= 5.20	SD= 7.26
Protective Strategies	*Congruent*	*Incongruent*	*Control*
	n=89	*n=94*	*n=95*
Prevention	Mean= 3.34	Mean= 3.38	Mean= 3.40
n=152	SD= .69	SD= .60	SD= .75
Promotion	Mean= 3.28	Mean= 3.24	Mean= 3.33
n=126	SD= .72	SD= .58	SD= .62
Consequences	*Congruent*	*Incongruent*	*Control*
	n=89	*n=94*	*n=95*
Prevention	Mean= 1.35	Mean= 1.59	Mean= 1.43
n=152	SD= 1.53	SD= 2.14	SD= 1.59

Table 4 (continued)

Promotion	Mean= 1.68	Mean= 1.70	Mean= 2.03
n=126	SD= 1.47	SD= 2.15	SD= 2.12
Attitudes	*Congruent*	*Incongruent*	*Control*
	n=89	*n=94*	*n=95*
Prevention	Mean= 3.57	Mean= 3.81	Mean= 3.47
n=152	SD= .65	SD= .57	SD= .56
Promotion	Mean= 3.72	Mean= 3.61	Mean= 3.61
n=126	SD= .68	SD= .43	SD= .60
Persuasiveness	*Congruent*	*Incongruent*	*Control*
	n=89	*n=94*	*n=95*
Prevention	Mean= 4.82	Mean= 5.14	Mean= 4.56
n=152	SD= 1.16	SD= 1.11	SD= 1.12
Promotion	Mean= 4.69	Mean= 4.95	Mean= 4.91
n=126	SD= 1.32	SD= 1.14	SD= 1.39

Note: Means and SDs were calculated through univariate ANCOVAs on post-test scores.

Table 5. Means and Standard Deviations within Messaging Groups by Regulatory Focus

Hours Drinking	*Prevention* *n=52*	*Promotion* *n=44*	*Control* *n=56*
Prevention *n=152*	Mean= 3.60 SD= 1.61	Mean= 4.64 SD= 1.97	Mean= 3.80 SD= 1.82
Promotion *n=126*	Mean= 3.86 SD= 1.58	Mean= 3.81 SD= 1.45	Mean= 4.08 SD= 2.09
Number of Drinks	*Prevention* *n=52*	*Promotion* *n=44*	*Control* *n=56*
Prevention *n=152*	Mean= 4.40 SD= 2.25	Mean= 5.30 SD= 2.27	Mean= 5.07 SD= 3.17
Promotion *n=126*	Mean= 5.44 SD= 2.93	Mean= 5.54 SD= 2.93	Mean= 5.59 SD= 3.42
Five or More Drinks	*Prevention* *n=52*	*Promotion* *n=44*	*Control* *n=56*
Prevention *n=152*	Mean= 1.90 SD= 1.33	Mean= 2.02 SD= 1.42	Mean= 1.77 SD= 1.06
Promotion *n=126*	Mean= 2.24 SD= 1.42	Mean= 2.46 SD= 1.52	Mean= 2.51 SD= 1.88
AUDIT Score	*Prevention* *n=52*	*Promotion* *n=43*	*Control* *n=56*
Prevention *n=151*	Mean= 5.65 SD= 4.57	Mean= 6.47 SD= 4.04	Mean= 5.41 SD= 4.02
Promotion *n=125*	Mean= 6.55 SD= 5.20	Mean= 7.51 SD= 4.39	Mean= 7.95 SD= 7.26
Protective Strategies	*Prevention* *n=52*	*Promotion* *n=44*	*Control* *n=56*
Prevention *n=152*	Mean= 3.34 SD= .69	Mean= 3.38 SD= .60	Mean= 3.40 SD= .75
Promotion *n=126*	Mean= 3.24 SD= .58	Mean= 3.28 SD= .72	Mean= 3.32 SD= .62
Consequences	*Prevention* *n=52*	*Promotion* *n=44*	*Control* *n=56*
Prevention *n=152*	Mean= 1.35 SD= 1.53	Mean= 1.59 SD= 2.14	Mean= 1.43 SD= 1.59

Table 5 (continued)

Promotion	Mean= 1.70	Mean= 1.68	Mean= 2.03
n=126	SD= 2.15	SD= 1.47	SD= 2.11
Attitudes	*Prevention*	*Promotion*	*Control*
	n=52	*n=44*	*n=56*
Prevention	Mean= 3.57	Mean= 3.81	Mean= 3.47
n=152	SD= .65	SD= .57	SD= .56
Promotion	Mean= 3.61	Mean= 3.72	Mean= 3.61
n=126	SD= .43	SD= .68	SD= .60
Persuasiveness	*Prevention*	*Promotion*	*Control*
	n=52	*n=44*	*n=56*
Prevention	Mean= 4.82	Mean= 5.14	Mean= 4.56
n=152	SD= 1.16	SD= 1.11	SD= 1.12
Promotion	Mean= 4.95	Mean= 4.69	Mean= 4.91
n=126	SD= 1.14	SD= 1.32	SD= 1.39

Note: Means and SDs were calculated through univariate ANCOVAs on post-test scores.

Appendix A

Message Library and Schedule

Date	Time of Delivery	Message Type	Prevention	Promotion	Control
8/30/16	4:00pm	Screening Survey	HLTHYHRNS: Hello again! Want to be part of a special HealthyhornsTXT project and score $30 this semester? Reply YES if you're interested and we'll send info. Yes → HLTHYHRNS: Thanks for your interest! Want to score $30 this semester? Take our quick survey to see if you're eligible to participate: bit.ly/30bucksyall No → HLTHYHRNS: That's ok! We're happy you're part of HealthyhornsTXT.	HLTHYHRNS: Hello again! Want to be part of a special HealthyhornsTXT project and score $30 this semester? Reply YES if you're interested and we'll send info. Yes → HLTHYHRNS: Thanks for your interest! Want to score $30 this semester? Take our quick survey to see if you're eligible to participate: bit.ly/30bucksyall No → HLTHYHRNS: That's ok! We're happy you're part of HealthyhornsTXT.	HLTHYHRNS: Hello again! Want to be part of a special HealthyhornsTXT project and score $30 this semester? Reply YES if you're interested and we'll send info. Yes → HLTHYHRNS: Thanks for your interest! Want to score $30 this semester? Take our quick survey to see if you're eligible to participate: bit.ly/30bucksyall No → HLTHYHRNS: That's ok! We're happy you're part of HealthyhornsTXT.
8/31/16	4:00pm	Screening Survey	HLTHYHRNS: Want to score $30 and join a special HealthyhornsTXT project? If you haven't already, take our survey to see if you're eligible: bit.ly/30bucksyall	HLTHYHRNS: Want to score $30 and join a special HealthyhornsTXT project? If you haven't already, take our survey to see if you're eligible: bit.ly/30bucksyall	HLTHYHRNS: Want to score $30 and join a special HealthyhornsTXT project? If you haven't already, take our survey to see if you're eligible: bit.ly/30bucksyall
9/7/16	4:00pm	Pre-test Survey	HLTHYHRNS: Congrats, you were selected for this semester's special project! Everyone who takes this survey bit.ly/10bucks1 will receive $10. So get started!	HLTHYHRNS: Congrats, you were selected for this semester's special project! Everyone who takes this survey bit.ly/10bucks1 will receive $10. So get started!	HLTHYHRNS: Congrats, you were selected for this semester's special project! Everyone who takes this survey bit.ly/10bucks1 will receive $10. So get started!
9/8/16	4:00pm	Pre-test	HLTHYHRNS: Last call for	HLTHYHRNS: Last call for	HLTHYHRNS: Last call for

		Survey	$10@Amazon! If you haven't already, take this short survey and #treatyoself to something nice. bit.ly/10bucks1	$10@Amazon! If you haven't already, take this short survey and #treatyoself to something nice. bit.ly/10bucks1	$10@Amazon! If you haven't already, take this short survey and #treatyoself to something nice. bit.ly/10bucks1
Week 1					
M 9/12/16	4:00pm	Content	HLTHYHRNS: Making a difference makes you happy! Voting and political engagement are associated with greater wellbeing. Register today: bit.ly/UTHornsVote	HLTHYHRNS: Making a difference makes you happy! Voting and political engagement are associated with greater wellbeing. Register today: bit.ly/UTHornsVote	HLTHYHRNS: Making a difference makes you happy! Voting and political engagement are associated with greater wellbeing. Register today: bit.ly/UTHornsVote
Th 9/15/16	4:00pm	Content	HLTHYHRNS: Thirsty Thursday? Stick with your group of friends to avoid unsafe situations and be sure you're not left out of the festivities.	HLTHYHRNS: Thirsty Thursday? Stick with your group of friends to stay safe and soak up all of the festivities.	HLTHYHRNS: Hungry for nutrition info? University Health Services has a Registered Dietitian to help you with your nutrition concerns.
F 9/16/16	4:00pm	Content	HLTHYHRNS: Ready for the Longhorns to take on Cal tomorrow? Wherever you're watching, snack while you drink so you don't miss a single play.	HLTHYHRNS: Ready for the Longhorns to take on Cal tomorrow? Wherever you're watching, snack while you drink so you catch every single play.	HLTHYHRNS: It might be fall, but it's still hot out there! Stay hydrated and carry a water bottle with you throughout the day.
Week 2					
M 9/19/16	4:00pm	Content	HLTHYHRNS: Midterms are still a month away, but it's never too early to pick up some smart study strategies! For test-taking tips, visit: bit.ly/UTSanger	HLTHYHRNS: Midterms are still a month away, but it's never too early to pick up some smart study strategies! For test-taking tips, visit: bit.ly/UTSanger	HLTHYHRNS: Midterms are still a month away, but it's never too early to pick up some smart study strategies! For test-taking tips, visit: bit.ly/UTSanger
Tu 9/20/16	12:00pm	Incentive	HLTHYHRNS: Thanks for entering to win our weekly Torchy's giftcards drawing! Winner will be contacted tomorrow. 1 entry per phone number & 2 winners per week.	HLTHYHRNS: Thanks for entering to win our weekly Torchy's giftcards drawing! Winner will be contacted tomorrow. 1 entry per phone number & 2 winners per week.	HLTHYHRNS: Thanks for entering to win our weekly Torchy's giftcards drawing! Winner will be contacted tomorrow. 1 entry per phone number & 2 winners per week.
Th 9/22/16	4:00pm	Content	HLTHYHRNS: Still celebrating the start of the semester? Keep track of the number of drinks you	HLTHYHRNS: Still celebrating the start of the semester? Keep track of the number of drinks you	HLTHYHRNS: Not getting enough sleep has been connected to increased appetite.

			have so you don't do or say something you'll regret later.	have so you can stay in control and remember your fun night out.	Do your brain and body a favor and take regular naps.
F 9/23/16	4:00pm	Content	HLTHYHRNS: Plan a safe ride home BEFORE you go out tonight! You'll avoid hurting yourself or someone else.	HLTHYHRNS: Plan a safe ride home BEFORE you go out tonight! You and your friends will make it home safe and sound.	HLTHYHRNS: Not a fan of exercising alone? Check out the UT RecSports group exercise schedule and sign-up today. They have everything from Aqua Fit to Zumba.
Week 3					
M 9/26/16	4:00pm	Content	HLTHYHRNS: Make a difference in our community! The Longhorn Center for Community Engagement is your hub for service at UT: bit.ly/UTvteers #LearnHereServeHere	HLTHYHRNS: Make a difference in our community! The Longhorn Center for Community Engagement is your hub for service at UT: bit.ly/UTvteers #LearnHereServeHere	HLTHYHRNS: Make a difference in our community! The Longhorn Center for Community Engagement is your hub for service at UT: bit.ly/UTvteers #LearnHereServeHere
Th 9/29/16	4:00pm	Content	HLTHYHRNS: Make the call! If a friend has an alcohol-related emergency, CALL 911. UT's Amnesty Policy means you'll avoid formal disciplinary action!	HLTHYHRNS: Make the call! If a friend has an alcohol-related emergency, CALL 911. UT's Amnesty Policy means you could save a life!	HLTHYHRNS: Stay calm and carry on (to confidential STI testing at UHS). Same-day and next-day appts are usually available!
F 9/30/16	4:00pm	Content	HLTHYHRNS: ACL weekend #1 is here! Bring an empty plastic or aluminum water bottle to stay happy and hydrated so you don't miss your fave bands.	HLTHYHRNS: ACL weekend #1 is here! Bring an empty plastic or aluminum water bottle to stay happy and hydrated so you can check out your fave bands.	Hungry for healthier options on campus? The "Healthy Suggestion" icon directs you to healthy menu items in UT dining halls!
Week 4					
M 10/3/16	4:00pm	Content	HLTHYHRNS: University Health Services is your source for high-quality healthcare on campus. We're here when you need us! healthyhorns.utexas.edu	HLTHYHRNS: University Health Services is your source for high-quality healthcare on campus. We're here when you need us! healthyhorns.utexas.edu	HLTHYHRNS: University Health Services is your source for high-quality healthcare on campus. We're here when you need us! healthyhorns.utexas.edu
Th 10/6/16	4:00pm	Content	HLTHYHRNS: Already in weekend mode? Chug water between drinks. Staying hydrated	HLTHYHRNS: Already in weekend mode? Chug water between drinks. Staying hydrated	HLTHYHRNS: Feeling overwhelmed? Visit the CMHC MindBody Lab. You can

			can help prevent a nasty hangover tomorrow!	can help you feel good tomorrow!	meditate and manage your stress right here on campus.
F 10/7/16	4:00pm	Content	HLTHYHRNS: Ready to take on OU? #PregameWith Pizza so you don't miss out on the action tomorrow. Hook 'em, Healthyhorns!	HLTHYHRNS: Ready to take on OU? #PregameWithPizza so you can catch all of the action tomorrow. Hook 'em, Healthyhorns	HLTHYHRNS: Allergies got you sneezy? You can get allergy shots at University Health Services right here on campus. #SaveTheTissues
Week 5					
M 10/10/16	4:00pm	Content	HLTHYHRNS: Getting a flu shot is easy and affordable! Pick a date during UHS Flu Shot Campaign and mark your calendar: bit.ly/noflu4u	HLTHYHRNS: Getting a flu shot is easy and affordable! Pick a date during UHS Flu Shot Campaign and mark your calendar: bit.ly/noflu4u	HLTHYHRNS: Getting a flu shot is easy and affordable! Pick a date during UHS Flu Shot Campaign and mark your calendar: bit.ly/noflu4u
Tu 10/11/16	12:00pm	Incentive	HLTHYHRNS: TMW you realize it's Taco Tuesday! Reply TACOS by 5pm today to enter to win a Torchy's giftcard. One entry per phone number.	HLTHYHRNS: TMW you realize it's Taco Tuesday! Reply TACOS by 5pm today to enter to win a Torchy's giftcard. One entry per phone number.	HLTHYHRNS: TMW you realize it's Taco Tuesday! Reply TACOS by 5pm today to enter to win a Torchy's giftcard. One entry per phone number.
Th 10/13/16	4:00pm	Content	HLTHYHRNS: Stick with your friends if you go out and drink tonight. Thirsty Thursdays can be fun, just avoid doing it alone!	HLTHYHRNS: Stick with your friends if you go out and drink tonight. Thirsty Thursdays can be fun, but are even better when you're with a group!	HLTHYHRNS: Healtyhorns Play Safe! Stop by the Health Promotion office SSB 1.106 and pick up 3 free male condoms, 1 female/internal condom, or a dental dam.
F 10/14/16	4:00pm	Content	HLTHYHRNS: The Horns are back home! Hydrate between drinks with water in the left hand and a hook 'em on the right so you don't crash early and miss the game.	HLTHYHRNS: The Horns are back home! Hydrate between drinks with water in the left hand and a hook 'em on the right so you can make it through the whole game.	HLTHYHRNS: Looking for something to do this weekend? The Austin Film Festival is going on now! Check out all of the featured flicks.
Week 6					
M 10/17/16	4:00pm	Content	HLTHYHRNS: That 1-3 PM slump is a great time to take a 20 min nap! Check out the Nap Map to find a cozy spot: bit.ly/NapMap	HLTHYHRNS: That 1-3 PM slump is a great time to take a 20 min nap! Check out the Nap Map to find a cozy spot: bit.ly/NapMap	HLTHYHRNS: That 1-3 PM slump is a great time to take a 20 min nap! Check out the Nap Map to find a cozy spot: bit.ly/NapMap

Tu 10/18/16	12:00pm	Incentive	HLTHYHRNS: Craving tacos? Reply TACOS by 5pm today to enter to win a Torchy's giftcard. One entry per phone number. Good luck!	HLTHYHRNS: Craving tacos? Reply TACOS by 5pm today to enter to win a Torchy's giftcard. One entry per phone number. Good luck!	HLTHYHRNS: Craving tacos? Reply TACOS by 5pm today to enter to win a Torchy's giftcard. One entry per phone number. Good luck!
Th 10/20/16	4:00pm	Content	HLTHYHRNS: Are you a cornhole champion? Jenga genius? Triumph at trivia? Eat before you go out so you don't get sloppy and lose your title.	HLTHYHRNS: Are you a cornhole champion? Jenga genius? Trivia triumph? Eat before going out to drink so you stay on top of your game and keep your title.	HLTHYHRNS: Visit the Health Promotion Lending Library in SSB 1.106! Hundreds of great resources FREE to check out. Show your body and mind some <3 <3.
F 10/21/16	4:00pm	Content	HLTHYHRNS: Gameday weekend is here! Get your game face on and drink water when you're out so you aren't hungover for tomorrow's game against K-State.	HLTHYHRNS: Gameday weekend is here! Get your game face on and drink water when you're out so you're ready and refreshed for tomorrow's game against K-State.	HLTHYHRNS: Walking for 45 minutes a day can make you more alert, improve your focus, and help you retain information. Need a study break? Get out and walk!
Week 7					
M 10/24/16	4:00pm	Content	HLTHYHRNS: Don't miss Voices Against Violence's "Breaking the Silence: Survivors of Dating and Relationship Violence Speak-Out" tomorrow bit.ly/VAVRVPM	HLTHYHRNS: Don't miss Voices Against Violence's "Breaking the Silence: Survivors of Dating and Relationship Violence Speak-Out" tomorrow bit.ly/VAVRVPM	HLTHYHRNS: Don't miss Voices Against Violence's "Breaking the Silence: Survivors of Dating and Relationship Violence Speak-Out" tomorrow bit.ly/VAVRVPM
Tu 10/25/16	12:00pm	Incentive	HLTHYHRNS: Last year Americans ate over 4.5 billion tacos! Reply TACOS by 5pm today to enter to win a Torchy's giftcard. One entry per phone number. Good luck!	HLTHYHRNS: Last year Americans ate over 4.5 billion tacos! Reply TACOS by 5pm today to enter to win a Torchy's giftcard. One entry per phone number. Good luck!	HLTHYHRNS: Last year Americans ate over 4.5 billion tacos! Reply TACOS by 5pm today to enter to win a Torchy's giftcard. One entry per phone number. Good luck!
Th 10/27/16	4:00pm	Content	HLTHYHRNS: Why do bats fly at night? They're afraid to drive! Plan a safe ride home tonight out so you're not caught in a spooky situation.	HLTHYHRNS: Why do bats fly at night? They're afraid to drive! Plan a safe ride home before you go out so you make it home safely.	HLTHYHRNS: Check out "Get Sexy. Get Consent." VAV's interactive theater performance about consent and healthy relationships. Thurs, 8pm, BUR 220
F 10/28/16	4:00pm	Content	HLTHYHRNS: Halloween	HLTHYHRNS: Halloween	HLTHYHRNS: Boo! It's not

			weekend is here! #PregameWithPizza before you hit the town so you don't miss out on those treats and showing off your costume.	weekend is here! #PregameWithPizza before you hit the town so you can get those treats and show off your costume all night.	just ghosts that need to be put to rest. Experts say you should sleep 7-9 hours a night, too!
Week 8					
M 10/31/16	4:00pm	Content	HLTHYHRNS: Happy Halloween! Trick, treat, and don't be scared to get yourself tested. For more info on STI testing at UHS, visit: bit.ly/STIsRspooky	HLTHYHRNS: Happy Halloween! Trick, treat, and don't be scared to get yourself tested. For more info on STI testing at UHS, visit: bit.ly/STIsRspooky	HLTHYHRNS: Happy Halloween! Trick, treat, and don't be scared to get yourself tested. For more info on STI testing at UHS, visit: bit.ly/STIsRspooky
Tu 11/1/16	12:00pm	Incentive	HLTHYHRNS: Wanna win some tacos? Reply TACOS by 5pm today to enter to win a Torchy's gift card. One entry per phone number. Good luck!	HLTHYHRNS: Wanna win some tacos? Reply TACOS by 5pm today to enter to win a Torchy's gift card. One entry per phone number. Good luck!	HLTHYHRNS: Wanna win some tacos? Reply TACOS by 5pm today to enter to win a Torchy's gift card. One entry per phone number. Good luck!
Th 11/3/16	4:00pm	Content	HLTHYHRNS: Ready to celebrate the end of midterms? Don't accept drinks from a stranger so you don't end up with anything unexpected in your drink.	HLTHYHRNS: Ready to celebrate the end of midterms? Don't accept drinks from a stranger so you always know what's in your drink.	HLTHYHRNS: In the midst of midterm madness? Visit the Sanger Learning Center in JES A332 for studying and test-taking tips.
F 11/04/16	4:00pm	Content	HLTHYHRNS: Hook 'em, Horns! If you're going out, stick with your group and plan a safe ride home to avoid getting left behind. #SquadGoals	HLTHYHRNS: Hook 'em, Horns! If you're going out, stick with your group and plan a safe ride home to get back safely and end the night with friends. #SquadGoals	HLTHYHRNS: Try something new this weekend! Check out a TeXercise Class or the rock climbing wall at Gregory Gym.
F 11/04/16	4:00pm	Post-test Survey	HLTHYHRNS: We want to hear your feedback on HealthyhornsTXT! Everyone who takes this survey bit.ly/10bucks3 will receive $20. So get started!	HLTHYHRNS: We want to hear your feedback on HealthyhornsTXT! Everyone who takes this survey bit.ly/10bucks3 will receive $20. So get started!	HLTHYHRNS: We want to hear your feedback on HealthyhornsTXT! Everyone who takes this survey bit.ly/10bucks3 will receive $20. So get started!

Su 11/06/16	1:00pm	Post-test Survey	HLTHYHRNS: Start the week off $20 richer. We'll give you $20 just for taking this survey: bit.ly/10bucks2	HLTHYHRNS: Start the week off $20 richer. We'll give you $20 just for taking this survey: bit.ly/10bucks2	HLTHYHRNS: Start the week off $20 richer. We'll give you $20 just for taking this survey: bit.ly/10bucks2
Tu 11/08/16	4:00pm	Post-test Survey	HLTHYHRNS: Last call for $20@Amazon! If you haven't already, take this short survey and #treatyoself to something nice. bit.ly/10bucks2	HLTHYHRNS: Last call for $20@Amazon! If you haven't already, take this short survey and #treatyoself to something nice. bit.ly/10bucks2	HLTHYHRNS: Last call for $20@Amazon! If you haven't already, take this short survey and #treatyoself to something nice. bit.ly/10bucks2
M 11/21/16	4:00pm	Thank You	HLTHYHRNS: Thanks for participating in our special project! Sending $20@Amazon soon for those who took the survey. Stay tuned for more tacos & HealthyhornsTXT!	HLTHYHRNS: Thanks for participating in our special project! Sending $20@Amazon soon for those who took the survey. Stay tuned for more tacos & HealthyhornsTXT!	HLTHYHRNS: Thanks for participating in our special project! Sending $20@Amazon soon for those who took the survey. Stay tuned for more tacos & HealthyhornsTXT!

Appendix B

Screening Survey

All responses in this survey will be kept confidential.

Have you had at least one alcoholic drink within the last two weeks?

- ❍ Yes
- ❍ No

This next set of questions asks about your past relationships and feelings. There are no right or wrong answers and all data are confidential so please be honest.

	Never or Seldom	Infrequently	Sometimes	Frequently	Very Often
1. Compared to most people, I typically get what I want out of life	☐	☐	☐	☐	☐
2. When I was growing up, I would "cross the line" by doing things my parents would not tolerate	☐	☐	☐	☐	☐
3. I have accomplished things that got me "psyched" to work even harder	☐	☐	☐	☐	☐
4. As a child, I got on my parents' nerves.	☐	☐	☐	☐	☐
5. As a child, I obeyed rules and regulations established by my parents	☐	☐	☐	☐	☐
6. As a child, I acted in ways that my parents thought were objectionable	☐	☐	☐	☐	☐
7. I do well at different things that I try	☐	☐	☐	☐	☐
8. Not being careful enough has gotten me into trouble at times	☐	☐	☐	☐	☐
9. When it comes to achieving things that are important to me, I don't perform as well as I would like to	☐	☐	☐	☐	☐
10. I feel like I have made progress toward being successful in my life	☐	☐	☐	☐	☐
11. I have found very few hobbies or activities in life that capture my interest or motivate me to put effort into them	☐	☐	☐	☐	☐

Please enter your cell phone number so we can make sure you still get our HealthyhornsTXT tips!

_____

Please enter the number of the month in which you were born.

_____

Please enter the digits of your current street address number.

_____

Appendix C

Pre-test Survey

Congratulations! You were selected for participation in our special HealthyhornsTXT project. If you complete this very short survey, you will receive a $10 Amazon gift card! You will be able to enter your email address at the end of the survey so we can send you the gift card. We will be in touch at the end of the semester with a second survey. If you complete that, you will receive a $20 Amazon gift card!

Please enter your phone number. This will help us make sure you keep receiving our HealthyhornsTXT tips.

_____
_____

Please enter the number of the month in which you were born. For example, if you were born in May, you would enter 05.

_____
_____

Please enter the digits of your current street address number.

_____
_____

As you go through the survey, remember that all of your responses will be kept confidential.

One drink of alcohol is defined as a 12 oz. can or bottle of beer or wine cooler, a 4 oz. glass of wine, or a shot of liquor straight or in a mixed drink.

How many hours did you drink alcohol during the last time you partied/socialized?

- ❍ 0
- ❍ 1
- ❍ 2
- ❍ 3
- ❍ 4
- ❍ 5
- ❍ 6
- ❍ 7
- ❍ 8
- ❍ 8+

How many drinks of alcohol did you have the last time you partied/socialized?

- ❍ 0
- ❍ 1
- ❍ 2
- ❍ 3
- ❍ 4
- ❍ 5
- ❍ 6
- ❍ 7
- ❍ 8
- ❍ 9
- ❍ 10
- ❍ 10+

Over the last two weeks, how many times have you had five or more drinks of alcohol in one sitting?

- ❍ None
- ❍ 1 time
- ❍ 2 times
- ❍ 3 times
- ❍ 4 times
- ❍ 5 times
- ❍ 6 times
- ❍ 7 times
- ❍ 8 times
- ❍ 9 times
- ❍ 10 or more times

Please remember that all survey responses will be kept confidential.

How often do you have a drink containing alcohol?

- ❍ Never
- ❍ Monthly or Less
- ❍ Two to four times a week
- ❍ Two to three times a week
- ❍ Four or more times a week

How many drinks containing alcohol do you have on a typical day when you are drinking?

- ❍ 1 or 2
- ❍ 3 or 4

❍ 5 or 6
❍ 7 or 8
❍ 9 or more

Please select one answer for each item. All responses will be kept confidential.

	Never	Less Than Monthly	Monthly	Weekly	Daily or Almost Daily
How often do you have six or more drinks on one occasion?	❍	❍	❍	❍	❍
How often during the last year have you found that you were not able to stop drinking once you had started?	❍	❍	❍	❍	❍
How often during the last year have you failed to do what was normally expected from you because of drinking?	❍	❍	❍	❍	❍
How often during the last year have you needed a drink in the morning to get yourself going after a heavy drinking session?	❍	❍	❍	❍	❍
How often during the last year have you had a feeling of guilt or remorse after drinking?	❍	❍	❍	❍	❍
How often during the last year have you been unable to remember what happened the night before because you had been drinking?	❍	❍	❍	❍	❍

	No	Yes, but not in the last year	Yes, during the last year
Have you or someone else been injured as a result of your drinking?	❍	❍	❍
Has a relative or friend, or a doctor or other health worker been concerned about your drinking or suggested you cut down?	❍	❍	❍

Within the last 12 months, have you experienced any of the following when drinking alcohol?

	Yes	No
Did something you later regretted?	❍	❍
Forgot where you were or what you did?	❍	❍
Got in trouble with the police?	❍	❍
Someone had sex with me without my consent?	❍	❍
Had sex with someone without their consent?	❍	❍
Had unprotected sex?	❍	❍
Physically injured yourself?	❍	❍
Physically injured another person?	❍	❍
Drive after drinking alcohol?	❍	❍

During the last 12 months, when you partied/socialized, how often did you:

	Never	Not Often	Sometimes	Often	Very Often/All of the Time
Alternate non-alcoholic with alcoholic beverages?	❍	❍	❍	❍	❍
Avoid drinking games?	❍	❍	❍	❍	❍
Choose not to drink alcohol?	❍	❍	❍	❍	❍
Determine, in advance, not to exceed a set number of drinks?	❍	❍	❍	❍	❍
Eat before and/or during drinking?	❍	❍	❍	❍	❍
Have a friend let you know when you've had enough?	❍	❍	❍	❍	❍
Keep track of how many drinks you were	❍	❍	❍	❍	❍

having?					
Pace your drinks to 1 or fewer per hour?	❍	❍	❍	❍	❍
Stay with the same group of friends the entire time you were drinking?	❍	❍	❍	❍	❍
Stick with only one kind of alcohol when drinking?	❍	❍	❍	❍	❍
Use a designated driver, walk, use public transportation, or take a cab?	❍	❍	❍	❍	❍

How old are you?

_____

What is your gender?

❍ Male
❍ Female
❍ Transgender

What is your year in school?

❍ 1st year undergraduate
❍ 2nd year undergraduate
❍ 3rd year undergraduate
❍ 4th year undergraduate
❍ 5th year undergraduate
❍ Grad student

How do you usually describe yourself?

❍ White
❍ Black
❍ Hispanic or Latino/a
❍ Asian or Pacific Islander
❍ American Indian, Alaskan Native, or Native Hawaiian
❍ Biracial or Multiracial
❍ Other, please list: _____

Where do you currently live?

- ❍ Campus residence hall
- ❍ Fraternity or sorority hall
- ❍ Other college/university housing
- ❍ Parent/guardian's home
- ❍ Other off-campus housing
- ❍ Other

Are you a member of a sorority or fraternity?

- ❍ Yes
- ❍ No

Approximately how many text messages do you send and receive per day?

- ❍ 0-20
- ❍ 21-50
- ❍ 51-80
- ❍ 81-140
- ❍ More than 140

How many people did you send and receive text messages from today?

- ❍ 0-5
- ❍ 6-10
- ❍ 10-15
- ❍ 15-20
- ❍ 20 or more

You will be sent a $10 Amazon gift card if you click this link. It will allow you to enter your email address so that we can send it to you.

Appendix D

Post-test Survey

Thank you for participating in our special HealthyhornsTXT project! If you complete this short survey, you will receive a $20 Amazon gift card! You will be able to enter your email address at the end of the survey so we can send you the gift card.

Please enter your phone number. This will help us make sure you keep receiving our HealthyhornsTXT tips.

_____
_____

Please enter the number of the month in which you were born. For example, if you were born in May, you would enter 05.

_____
_____

Please enter the digits of your current street address number.

_____
_____

As you go through the survey, remember that all of your responses will be kept confidential.

One drink of alcohol is defined as a 12 oz. can or bottle of beer or wine cooler, a 4 oz. glass of wine, or a shot of liquor straight or in a mixed drink.

How many hours did you drink alcohol during the last time you partied/socialized?

- ❍ 0
- ❍ 1
- ❍ 2
- ❍ 3
- ❍ 4
- ❍ 5
- ❍ 6
- ❍ 7
- ❍ 8
- ❍ 8+

How many drinks of alcohol did you have the last time you partied/socialized?

- ❍ 0
- ❍ 1
- ❍ 2
- ❍ 3
- ❍ 4
- ❍ 5
- ❍ 6
- ❍ 7
- ❍ 8
- ❍ 9
- ❍ 10
- ❍ 10+

Over the last two weeks, how many times have you had five or more drinks of alcohol in one sitting?

- ❍ None
- ❍ 1 time
- ❍ 2 times
- ❍ 3 times
- ❍ 4 times
- ❍ 5 times
- ❍ 6 times
- ❍ 7 times
- ❍ 8 times
- ❍ 9 times
- ❍ 10 or more times

Please remember that all survey responses will be kept confidential.

How often do you have a drink containing alcohol?

- ❍ Never
- ❍ Monthly or Less
- ❍ Two to four times a week
- ❍ Two to three times a week
- ❍ Four or more times a week

How many drinks containing alcohol do you have on a typical day when you are drinking?

- ❍ 1 or 2
- ❍ 3 or 4

❍ 5 or 6
❍ 7 or 8
❍ 9 or more

Please select one answer for each item. All responses will be kept confidential.

	Never	Less Than Monthly	Monthly	Weekly	Daily or Almost Daily
How often do you have six or more drinks on one occasion?	❍	❍	❍	❍	❍
How often during the last year have you found that you were not able to stop drinking once you had started?	❍	❍	❍	❍	❍
How often during the last year have you failed to do what was normally expected from you because of drinking?	❍	❍	❍	❍	❍
How often during the last year have you needed a drink in the morning to get yourself going after a heavy drinking session?	❍	❍	❍	❍	❍
How often during the last year have you had a feeling of guilt or remorse after drinking?	❍	❍	❍	❍	❍
How often during the last year have you been unable to remember what happened the night before because you had been drinking?	❍	❍	❍	❍	❍

	No	Yes, but not in the last year	Yes, during the last year
Have you or someone else been injured as a result of your drinking?	❍	❍	❍
Has a relative or friend, or a doctor or other health worker been concerned about your drinking or suggested you cut down?	❍	❍	❍

Within the last 12 months, have you experienced any of the following when drinking alcohol?

	Yes	No
Did something you later regretted?	❍	❍
Forgot where you were or what you did?	❍	❍
Got in trouble with the police?	❍	❍
Someone had sex with me without my consent?	❍	❍
Had sex with someone without their consent?	❍	❍
Had unprotected sex?	❍	❍
Physically injured yourself?	❍	❍
Physically injured another person?	❍	❍
Drive after drinking alcohol?	❍	❍

During the last 12 months, when you partied/socialized, how often did you:

	Never	Not Often	Sometimes	Often	Very Often/All of the Time
Alternate non-alcoholic with alcoholic beverages?	❍	❍	❍	❍	❍
Avoid drinking games?	❍	❍	❍	❍	❍
Choose not to drink alcohol?	❍	❍	❍	❍	❍
Determine, in advance, not to exceed a set number of drinks?	❍	❍	❍	❍	❍
Eat before and/or during drinking?	❍	❍	❍	❍	❍
Have a friend let you know when you've had enough?	❍	❍	❍	❍	❍
Keep track of how many drinks you were	❍	❍	❍	❍	❍

having?					
Pace your drinks to 1 or fewer per hour?	❍	❍	❍	❍	❍
Stay with the same group of friends the entire time you were drinking?	❍	❍	❍	❍	❍
Stick with only one kind of alcohol when drinking?	❍	❍	❍	❍	❍
Use a designated driver, walk, use public transportation, or take a cab?	❍	❍	❍	❍	❍

Now we'd like to hear your thoughts about the text-messages you received this semester from HealthyhornsTXT.

	1=Not At All	2	3	4	5	6	7=Very
The text-messages I received were persuasive.	❍	❍	❍	❍	❍	❍	❍
The text-messages I received were convincing.	❍	❍	❍	❍	❍	❍	❍
The text-messages I received were effective.	❍	❍	❍	❍	❍	❍	❍
The text-messages I received were coherent.	❍	❍	❍	❍	❍	❍	❍
The text-messages I received influenced my health behaviors.	❍	❍	❍	❍	❍	❍	❍

Please select one answer for each statement based on the text-messages you received from HealthyhornsTXT.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The messages I received about health were relevant for me.	❍	❍	❍	❍	❍
I liked the messages I received.	❍	❍	❍	❍	❍
The text messages I received increased my awareness of my health (or ways to improve my health) on a regular basis.	❍	❍	❍	❍	❍
I took a specific action to improve my health as a result of receiving a text-message from HealthyhornsTXT.	❍	❍	❍	❍	❍
I agreed with the text-messages I received.	❍	❍	❍	❍	❍

How old are you?

_____

What is your gender?

❍ Male
❍ Female
❍ Transgender

What is your year in school?

❍ 1st year undergraduate
❍ 2nd year undergraduate
❍ 3rd year undergraduate
❍ 4th year undergraduate
❍ 5th year undergraduate
❍ Grad student

How do you usually describe yourself?

❍ White
❍ Black
❍ Hispanic or Latino/a
❍ Asian or Pacific Islander
❍ American Indian, Alaskan Native, or Native Hawaiian

- ❍ Biracial or Multiracial
- ❍ Other, please list: _____

Where do you currently live?
- ❍ Campus residence hall
- ❍ Fraternity or sorority hall
- ❍ Other college/university housing
- ❍ Parent/guardian's home
- ❍ Other off-campus housing
- ❍ Other

Are you a member of a sorority or fraternity?
- ❍ Yes
- ❍ No

Approximately how many text messages do you send and receive per day?
- ❍ 0-20
- ❍ 21-50
- ❍ 51-80
- ❍ 81-140
- ❍ More than 140

How many people did you send and receive text messages from today?
- ❍ 0-5
- ❍ 6-10
- ❍ 10-15
- ❍ 15-20
- ❍ 20 or more

You will be sent a $20 Amazon gift card if you click this link. It will allow you to enter your email address so that we can send it to you.

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