Exploring the Effects of a Texting Program

in Reducing Tobacco Consumption

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Dedication

This thesis is dedicated to my family, Paula and Davis, and my parents, Michael and Joan, for all of their support.

Abstract

Texting-based tobacco cessation programs have shown the potential to be a legitimate type of intervention that can provide support to tobacco users seeking to reduce their tobacco consumption. This study used semi-structured interviews to follow up with participants who had enrolled in a text-based tobacco cessation program (N=12). Major themes that emerged included the positive rapport participants felt towards the automated program, the power of accessibility for a program based entirely on a mobile phone, and the value of positive feedback on quitting sent via texts. Overall, participants accepted a text-based tobacco cessation program as a viable intervention mode, and the majority of respondents (10 out of 12) reported a reduction in their tobacco consumption at the 2-month follow-up.

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Chapter 1

Introduction

The Problem: Tobacco Usage

Tobacco usage is the leading preventable cause of death in the United States and costs the country nearly $200 billion each year, with approximately half of that money related to healthcare and half to lost work productivity (CDC, 2004). What makes tobacco use so deadly is that it can harm every organ in the body and has been linked to various types of cancer. In fact, tobacco use is responsible for one third of all cancer deaths, and the CDC (2003) estimates that each year in the United States 440,000 individuals die of illnesses related to tobacco or cigarette smoke. Research has also shown how toxic smoking is to those in close proximity to cigarette users in the form of secondhand smoke, which can increase the chance of cancer or heart disease for anyone exposed.

Curbing cigarette smoking and other tobacco use is an issue grappled with by public health professionals as well as people who actually use these products. The CDC (2011) estimates that nearly three quarters (69%) of tobacco users want to quit each year, and that in 2010 slightly over half of the tobacco using population made an attempt. One reason why quitting tobacco is so difficult is due to the addictive properties of nicotine and the tobacco companies' manipulation of a cigarette's properties to make it even more addictive. Nicotine is a highly addictive substance because it acts as both a stimulant and as a depressant that alters brain functioning. Many of those who try to quit are

unsuccessful, and those who do successfully quit often require multiple quit attempts, counseling, support and pharmacotherapy.

Programs to Help People Stop Using Tobacco

To reduce the detrimental impacts of tobacco use on our society's health and our government checkbooks, the federal government and all 50 states provide free services and programs designed to help individuals quit using tobacco and prevent others from ever starting. While there are various types of programs offered, there has yet to be a health intervention program in tobacco control that is both effective *and* reaches the majority of tobacco users.

In the field of tobacco control, quitlines are widely considered the most effective type of intervention. Quitlines are telephone-based programs where a person who is ready to abstain from tobacco telephones the quitline to receive tobacco cessation coaching, counseling, medications and/or self-help literature. In a 2008 update to the United States Public Health Service Clinical Practice Guideline *Treating Tobacco Use and Dependence* (Fiore et al., 2008), quitlines were listed together with pharmacotherapy as one of the best interventions for reducing tobacco dependence. Counselors often tailor their services based on the needs of the caller with the goal of enhancing participants' motivation to quit, setting goals for quitting and providing strategies for preventing and/or coping with cravings and relapses. First established in the 1980s in Australia, quitlines were later introduced to the United States in 1992 when California created the first publically funded quitline (Anderson & Zhu, 2007).

Despite overwhelming evidence that demonstrates the usefulness of quitlines, they are estimated to only serve fewer than 2% of all tobacco users annually (Cummins, Bailey, Campbell, Koon-Kirby, & Zhu, 2007), leaving the vast majority of tobacco users quitting on their own or using non-evidenced based strategies. One reason quitlines are unable to reach more tobacco users is due to the high costs of promotion and operation. Based on a survey of North American quitlines in 2011, the median quitline operating budget was determined to be around $1.5 million dollars (NAQC, 2011). Quitlines often require a substantial number of trained counselors who specialize in tobacco cessation and motivational counseling techniques to provide support to callers, in addition to the costs of the infrastructure, technology, media campaigns and pharmacotherapy. Nonetheless, quitlines have been studied in depth and are considered to be a very cost-effective intervention in tobacco control (e.g., Kahende, Loomis, Adhikari, & Marshall, 2009).

Supplementing Quitlines with 21st Century Technology

Due to the significant cost of operating quitlines in addition to the proliferation of technology in our lives, quitlines as well as other areas of public health promotion have experimented with offering electronic venues for providing similar support services. One format that quitlines have begun offering in the last decade is the use of an online portal or website that allows users to access self-help materials, interact with counselors and order medication or other similar services without ever speaking directly with a counselor. These programs have been offered either as standalone programs or in conjunction with telephonic services as an additional mode of support.

One potential benefit of a web-based program is that participants can access help whenever they are on the internet and are not restricted to speaking with a counselor at a previously scheduled time. This program format may also appeal to individuals who prefer to quit without interacting with a counselor over the phone or who feel more comfortable with the anonymity provided by electronic communication. As of 2011, over half (28) of the 53 US quitlines offered web-based support (NAQC, 2011), however, there have been mixed results in the literature about their effectiveness (Japuntich et al., 2006).

Using technology as a format to deliver health communication and intervention makes sense since more and more tasks are being completed online or over a mobile phone. According to a recent study by Pew Internet and American Life Project (2013), in 2013 85% of US adults owned a mobile phone, and 31% of mobile phone users reported that they had used it to look up health-related information. This natural progression of integrating the internet and mobile phone technology into our daily routines has led to the development of mobile phone based health promotion interventions.

One recent innovation gaining recognition across health promotion fields is the use of mobile phone text messages as a mode for delivering health communication. Text messages or SMS messages (Short Message Service) are electronic messages that are sent between mobile phones, usually with a limit of 140 bytes or 160 alphanumeric characters. They are sent using a lower bandwidth than a telephone call and are often cheaper than making calls by a mobile or landline phone. The omnipresence of mobile phones, the potential to customize text messages, and the low level of difficulty required to use the

technology suggest that texts may be capable of delivering cost-effective health promotion interventions on a grand scale.

Florida's Tobacco Cessation Program

In the state of Florida, tobacco users seeking free support for quitting tobacco have three options supported by the Bureau of Tobacco Free Florida, a comprehensive tobacco control effort funded with tobacco settlement dollars and mandated by a state constitutional amendment. The cessation programs are available from the www.TobaccoFreeFlorida.com website. All three program formats are provided by Alere Wellbeing, Inc. (Alere) as part of their Quit for Life® program. The most popular option is the classic quitline model, where users work with a counselor from the Florida Quitline to make a personalized quitting plan over the phone. This is the most widely recognized and used of all of the tobacco cessation programs offered in Florida and receives the largest emphasis in their statewide tobacco prevention media campaign.

The second most used program provided to Floridians is Web Coach®, a website that provides self-help literature, activities, and access to a community of counselors and current and former tobacco users. Users can also currently register to receive a two-week supply of nicotine replacement therapy through the website if they meet certain eligibility requirements. After registering online, users are given access to the website and can use it at any time. Some register to use Web Coach only and others register to use it to supplement their Quitline counseling.

The third type of program available to all Floridians is offered by the Florida Area Health Education Centers (AHEC) Network for those looking to quit in a group setting.

Individuals can sign up to receive support, guidance and medication through this program while working directly with facilitators and other current smokers.

Since 2012, individuals who register for either the Quitline or Web Coach have also had the option of signing up for Text2Quit®, an interactive and fully automated texting program that provides support to participants as they try to reduce their tobacco dependence. The Text2Quit program was created by Voxiva, Inc., a mobile health firm that is famous for creating the Text4Baby® program, a program that educates mothers about their own health during pregnancy and their child's health through his or her first birthday. In 2011, Voxiva and Alere partnered to provide Text2Quit exclusively as part of Alere's Quit for Life suite of programs (Voxiva, 2011).

The Text2Quit program is designed to aid tobacco users throughout the quitting process by sending text messages that provide support, encouragement, advice and distractions. The program includes a library of over 300 text messages that are sent to participants over the course of five months based on their progression through the quitting process and their level of participation in the program. The messages that Text2Quit sends are tailored around people's quit date, the amount of tobacco they use, and information related to any medications they received from Web Coach or the Quitline. (Participants are not able to request medications directly through Text2Quit). Participants can set their quit date, the date that they specify as the date they will quit using tobacco, through Web Coach, the Quitline, or directly through Text2Quit. None of the messages are read or sent by counselors.

Purpose of the Study

Since text-based tobacco cessation programming is a relatively new innovation, there is a limited amount of research on the topic. The research that has thus far been conducted in the field has primarily focused on outcomes (i.e., have the programs demonstrated an increased chance for participants to quit compared to individuals quitting on their own?) One important area that this burgeoning field has not yet adequately addressed is an exploration into how individuals who participate in text-based tobacco cessation programs actually use and interact with the program. This study explores this question of user experience by reporting on qualitative interviews with a sample of individuals who registered for Web Coach and signed up and used the Text2Quit program. The research questions addressed by the study are 1) how do participants experience the Text2Quit program and 2) how do participants feel it affects their tobacco usage?

Overview of the Paper

This study will first review relevant literature on the use of mobile phones in public health promotion and their utilization in tobacco control. The intervention, Text2Quit, will then be described followed by a discussion of the methods used to collect the qualitative data. Following that is a description of how the data were analyzed and important themes present in the data. The paper will close with a discussion about the results and their relevance to the field of tobacco control as it moves towards more heavily integrated programming using the latest technological innovations.

Chapter 2

Review of the Literature

An exciting development in the public health landscape is the addition of mobile phone technology in health communication and promotion. This area can either be viewed through a lens focusing primarily on public health and secondarily on innovative interventions or vice versa. This study focuses on the latter, specifically on how mobile technology is changing the landscape of public health interventions and tobacco control in general. This chapter first reviews innovations in the field using mobile phones and texting as a vehicle for public health interventions. Then relevant public health clinical studies are reviewed and later those in tobacco control. Social cognitive theory is then discussed to show how text-based interventions seek to help tobacco users break their habits by modifying their own behavior. This chapter then concludes with a summary of the research that has been conducted on tobacco cessation texting programs and discusses the few qualitative studies that have explored the content and features of texting-based tobacco cessation programs.

Mobile Phones in Public Health

The ubiquitous position mobile phones have in our society has created an opportunity for improving wellbeing and health in ways that just decades ago would have seemed unimaginable. Using mobile phone technology in public health communication even has its own classification, mHealth, which stands for mobile health. Mobile health is a form of the larger field of eHealth (electronic health), which refers to the practice of using computers, mobile phones and other forms of electronic communication to deliver

health services. Unlike web-based interventions that require a computer and an internet connection and can be prohibitively costly and have other accessibility issues, mobile phones can come with very low cost plans and allow individuals to use the internet or applications over wireless connections. In the United States, the number of households that own a mobile phone (85%) is higher than those that have a computer (76%) (Pew Internet & American Life Project, 2013; Thom, 2013), but this disparity is much greater in developing countries, a third of which have more mobile phones than residents (Cole-Lewis & Kershaw, 2010).

There are numerous examples of how the expansion of mobile phone technology has redefined the public health landscape. At the most basic level, it has made communication between doctors and patients easier by allowing doctors to reach patients at any time, not requiring them to be home or in the office to answer a landline. In a more complex example, one study demonstrated the effectiveness of tracking blood pressure in diabetic patients using Bluetooth technology (a short-range wireless data exchange protocol), which transmits the results to a blood pressure monitoring system and then sends the information to a server (Logan et al., 2007). The server instantly processes the data and then sends feedback and coaching messages back to the patient and, if necessary, contacts the physician as well.

This prototype was developed in response to focus group findings that showed people were less comfortable using computers and the internet than they were using their mobile phone. Other studies have investigated the use of additional built-in mobile phone features that have been used in monitoring health or providing support such as “apps”

(software applications installed on smartphones), GPS (global positioning systems) for tracking individuals or tracking geospatially tagged references and cameras for taking photos and sending pictures to physicians or counselors. However, the mobile phone feature that shows the most promise for positively impacting health communication is one that almost every mobile phone is capable of: text messaging.

Texting Programs in Public Health

With the vast majority of American adults now owning mobile phones that are capable of sending and receiving text messages, the possibility of using texting-based interventions is emerging as a feasible and cost-effective means of communication and interaction on a large scale. However, creating and operating a texting program requires a fair amount of technical sophistication both to create the program and to ensure that it meets the requirements of various wireless carriers. Depending on the complexity of the texts and the protocols, complex algorithms are most likely needed to determine the time, frequency and content of each text message (Ybarra, Holtrop, Bagci Bosi, & Emri, 2012). A database is also necessary to store the text library and the participant responses.

There are many examples in the literature investigating different text-messaging programs that have been used in health promotion, such as sending reminders for medical appointments, sending medical results, monitoring medical conditions, remote diagnosis, data collection and interventions (Fjeldsoe, Miller & Marshall, 2012). However, there appear to be just three main categories of text-based interventions that have been studied and reported on in clinical trials in public health (Wei, Hollin & Kachnowski, 2011): (1) medication adherence, (2) clinical management, and (3) behavioral modification.

Text-Messaging and medication adherence. The first category is using text messages to help individuals adhere to their medication schedule. In one randomized controlled trial (RCT), patients with a history of asthma were sent a daily text message reminding them to take their anti-asthmatic medication for eight weeks. Among patients who received daily text messages, a greater proportion adhered to medication schedules compared to patients in the control group. There was a significant difference of 17.8 percentage points in the proportion in compliance (Strandbygaard, Thomsen, & Backer, 2010). However, other studies have yielded no significant treatment effect for using text-based programs to increase medication adherence, but have still shown positive effects (e.g., Cocosila, Archer, Haynes, & Yuan, 2009).

Text-Messaging and clinical management. The second type of text-based intervention that has been investigated in clinical trials is clinical management, which means managing or directing health care. One RCT that showed promising results used a text-message intervention to monitor and treat those who suffer from bulimia nervosa (Shapiro et al., 2010). During the study, every night individuals in the intervention were required to send a text message to the program that included certain indicators, such as the number of binge eating episodes and the number of purging episodes. They would receive an automated, tailored message in response that provided either feedback or encouragement. The study found that a significant percentage of patients adhered to self-monitoring using the text messaging program. Similar to medical adherence, however, other studies have displayed smaller or no impact from text-based clinical management interventions (e.g., Wei et al., 2011).

Text-Messaging and behavioral modification. The third and most studied of all text-based interventions in health promotion are those that target behavior modification, usually in weight and tobacco control. According to one meta-analysis, by the end of 2009 there were nine RCT text-based interventions targeted at behavior modification. Out of the nine trials, six studies showed significant impacts of the intervention (Wei et al., 2011). The following section looks more in-depth at interventions used in tobacco control to target behavior modification.

Texting Programs in Tobacco Cessation

There is excitement in the field of tobacco control for implementing text-based interventions as adjunct or stand-alone programs. Even the federal government has created two of its own free text-based systems, SmokeFreeTxt and QuitNowTXT, for providing quitting support. One reason why the field is so excited about text messaging programs is their potential to reach a larger portion of the tobacco-using population, as well as traditionally harder to reach subpopulations, such as young adults and those in socioeconomically disadvantaged groups. Compared to other age groups, youth are most likely to try to quit on their own using the "cold turkey" method and less likely to seek professional assistance. Less than 5% of those who quit "cold turkey" are likely to maintain abstinence over one year (Wells et al., 2011).

Despite the ostensible excitement in the field, a body of evidence supporting texting-based interventions as a viable alternative to quitlines is only just beginning to emerge and has not yet determined the appropriate role these programs should have in tobacco control. In 2012, the Cochrane Library published a report systematically

analyzing all of the published randomized and quasi-randomized studies on the topic of text-based interventions in tobacco control to find out which ones met stringent quantitative requirements that could be used to determine the effectiveness of these types of programs (Whittaker, McRobbie, Bullen, Borland, Rodgers, & Gu, 2012). To be included in the review, studies had to meet the statistical and procedural requirements of RCTs, follow up at six months post intervention and report quit outcomes. In addition, the intervention needed to be a primary intervention (i.e., a text-based program would be excluded if it was used to just send appointments to participants in a quitline).

Out of the 64 studies that the authors found to date, only five met these criteria and three were based on the same program. The next few paragraphs will review the three studies that were based on the same program and summarize the other two. Only these studies and one other were reviewed in this report since they met the stringent criteria used in Whitaker et al. (2012), which sometimes included access to unpublished data. The one study that was excluded from Whitaker et al. (2012), but is included in this study was due to the inability of the authors to differentiate the effects between the web portion and texting portion of the program since they were integrated. All of the statistical methods did meet their criteria.

Randomized Controlled Trials of Text-based Tobacco Cessation Programs

The three studies that investigated the same program were completed in 2005 in New Zealand and in 2009 and 2011 in the UK. The program was first called STOMP (Stop Smoking over Mobile Phone) in New Zealand, but renamed Txt2Stop for the British use of the program. The first of these studies (Rodgers et al., 2005) included

slightly over 1,700 tobacco users who were 16 years of age and older, had a mobile phone, and were recruited through web, radio and broadcast advertisements to participate in the study. Quit rates calculated at six weeks were identified as primary outcomes and the 12 and 26 week quit rates were secondary. While quitting success at six weeks is a positive outcome, it should be noted that quit rates calculated at this interval do not meet the industry standard for calculating a quit rate. According to the North American Quitline Consortium (2009), it is recommended that quitting status should be assessed seven months after enrolling in a program (or six months after an intervention begins).

The other two studies used the same program with slightly modified language for use with a UK audience. The first one used a relatively small sample with only 200 participants (Free et al., 2009) and served as a pilot for the second, which appears to be the largest randomized trial in the field to date with 5,800 participants randomized into groups (Free et al., 2011). Both recruited participants through media advertisements and had short-term primary outcomes collected at four weeks and long-term outcomes collected at six months.

In Rodgers et al. (2005), participants were randomly assigned into a treatment group, who received messages as part of STOMP and a control group, who received a single text every two weeks that did not provide cessation support. Those invited to use the program were asked to set a quit date within one month of beginning the program and then received regular, personalized text messages that provided advice, support and encouragement. Participants began receiving 5-6 logically sequential text messages from the library of over 1,000 text messages the week prior to their quit date, and this

frequency continued for one month after the quit date passed. One text message was then sent every two weeks until the end of the trial.

In addition to receiving texts, participants were able to text words like “CRAVE” to the program when they wanted on-demand support in the form of text messages that helped a participant overcome an urge to use tobacco. They were also set up with a “quit buddy,” a person who shared similar characteristics and quit dates that they could correspond with via text. Text2Stop was almost identical to the STOMP program described above, except for changes in language fine-tuned for the British audience.

Outcome measures in Rodgers et al. (2005) were calculated based on whether the participant had not been smoking for the past week when asked at the first follow-up, six weeks after the intervention began. While more participants in the intervention group had quit (28% compared to 13% in the control group with a Relative Risk [RR] of 2.20), short-term success does not meet the industry standard mentioned above for determining quit rates. The Rogers et al. (2005) study did examine non-smoking status at 12 and 26 weeks, which they also reported as high but inconclusive due to higher attrition rates in the intervention group.

Similar to the STOMP study in New Zealand, in the second study (Free et al., 2009) a short-term quit outcome was calculated using a self-reported point prevalence indicator, i.e., that the person had not smoked for seven days immediately preceding the follow-up. At four weeks, outcomes were nearly identical to the original STOMP pilot (26% were quit in the intervention compared to 12% quit in the control with a RR of 2.08), which provides additional evidence of the short-term positive effects that a text-

based program can have on curbing tobacco dependence. Outcomes were not reported at the end of the pilot (six-month follow up), due to a lack of statistical power resulting from small sample size and sample attrition.

Free et al. (2011) had a much larger sample and consequently greater statistical power. It confirmed the short-term effects found in the previous two studies (28% in the intervention quit compared to 12% of the control with an RR of 2.37) at four weeks, but also used a biochemical verification process to verify the self-reported evidence. While there were fewer who were biochemically verified as quit, there were still twice as many who quit in the intervention group as in the control group (11% in the intervention compared to 5% in the intervention with an RR of 2.20). However, unlike the previous two trials, this study was able to provide evidence that individuals participating in the program had a better chance to be quit six months after the program began than those in the control group (24% compared to 18% with a 1.32 RR) using a seven day point prevalence measure.

There are two more approved studies in Whitaker et al. (2012) that are summarized here. In the first study, participants were recruited from both existing tobacco cessation programs (N=1335) and internet panels (N=2195) and then randomized into five groups: 1) a tailored internet cessation program, 2) a tailored text-based program, 3) both programs, 4) a choice among all three options, or 5) a control group that received information about the quitting programs in Australia (Borland, Balmford, & Benda, 2013). The text-based program, onQ, is similar to the previously discussed programs and uses both bidirectional and unidirectional messages to provide advice,

support and behavioral tracking. The study examined utilization of all four treatment conditions and investigated what interest there was in new, innovative programs and if participants were more likely to use a single program or multiple ones. Similar to the previous studies, a seven-day point prevalence indicator was one of the outcomes used to assess effectiveness, and only those results related to this study are presented here. At one month follow-up, those in the onQ texting program were significantly more likely to be quit than those in the control (21.4% compared to 15.2%), which again provides evidence of the short-term impact of text-based tobacco cessation programs. Outcomes were again collected at 6 months post intervention, but unlike Free et al. (2011) showed no significant differences between those who were randomly assigned to the texting program (24.1%) and those assigned to the control group (20.1%).

The fifth study reviewed in Whitaker et al. (2011) studied a unique type of texting program where a text message contained a web link to a video that was sent to participants who could then download it onto their mobile devices, again in New Zealand. The videos were based on social cognitive theory where participants would observe quitting behavior by watching videos of role models who achieved each step of the quitting process. The same six-month follow up outcome was used to determine the effectiveness of this multimedia study. This trial targeted younger smokers than the other studies (average age of 27) and, due to the difficulty of recruiting this demographic through online and radio ads, ended up with a smaller sample size than they expected (just over 200). Despite positive feedback from participants about the program, the quit

outcomes at six months were slightly, but not significantly lower for the intervention (26.4%) than for the control group (27.6%).

One study was found that met all but one of the standards in Whitaker et al. (2012) and is worth reporting here. Similar to Borland et al. (2013), this study used a randomized controlled trial design to assess Happy Ending (HE), a multimedia program that includes text-based messages, an online website, an IVR system, and program emails (Brendryen, Drozd, & Kraft, 2008). The reason this was excluded from Whitaker et al. (2012) was not due to trial deficiencies, but because the results for the trial could not be entirely separated out for the online and text-based portion of the program (which was not the purpose of the study). The study was designed to test the program as a whole.

Developed in Norway, Happy Ending was a digital smoking cessation program that incorporated many forms of multimedia into a single comprehensive program (Brendryen, Drozd, & Kraft, 2008). To participate in the study, individuals had to be tobacco users and 18 years of age and older. Participants were randomly assigned to a control condition, where they received a long self-help booklet, or to the Happy Ending program. The program focused on using media to apply principles from cognitive behavior therapy to teach individuals how to solve their own problems related to quitting. Over the course of one year, participants in the program received over 400 contacts using various forms of media, emailed links to web pages, IVR, and text messages.

While the Happy Ending program is not a text-message only program, it did have significant positive long-term outcomes, similar to Free et al. (2011). Using repeated point abstinence measures where the same participants were followed up at one, three,

six, and 12 months, this study demonstrated a statistical difference between the intervention group's quit rate at six months (29%) and the control group's (14%). There were 290 individuals in the study, and individuals in both groups were eligible for nicotine replacement therapy (NRT) as an incentive to participate in the study, which is also considered by itself an evidenced-based intervention for tobacco users. There was a smaller, but still substantial difference reported at 12 months (33% quit in the intervention versus 23% in the control); however, the authors suggested that this weaker effect was due to increased attrition rates between six and 12 months and possibly those in the control group making an additional quit attempt.

Despite the small number of RCT studies, the results clearly indicate that text messaging is a promising form of health communication with great potential in the field of tobacco cessation as well as other areas. Since this is a new field, the characteristics of the programs are still evolving and will most likely continue to be refined until there are clear standards for how texting programs should be best optimized and in what capacity. Most of the texting-based programs in the field of tobacco cessation share a common foundation in that they are based on the principles of social cognitive theory, a framework created by Bandura (1977; 1986) that explains how behavior can be modified. The next section will summarize this theory and highlight some of the ways these programs correspond to the theory.

Texting Programs and Behavioral Change

Texting-based tobacco cessation programs, like other self-help programs, are designed to encourage individuals to modify their behavior based on the support they

receive from the program. Assisting tobacco users in quitting tobacco requires processes to motivate them to make a quit attempt and motivation to stay abstinent once they quit (Hughes, 2003). Based on social cognitive theory (SCT), personal motivation to change behavior is the product of cognitive, behavioral, personal, and environmental forces acting together (Bandura, 1986). In tobacco cessation, this translates to enabling tobacco users to break previous emotional, psychological and environmental connections related to tobacco use.

The SCT concept most relevant to tobacco cessation is self-efficacy, a core determinant in behavior that describes a person's belief that he or she is capable of reaching personal goals. Because social cognitive theory argues that "cognitive processes play a prominent role in the acquisition and retention of new behavior patterns" (Bandura, 1977, p. 192), by providing certain types of information, these programs are designed to encourage individuals to change their beliefs in their abilities. In order for a person's behavior to change, the individual must first have both an *outcome expectancy* that a certain behavior will lead to a certain outcome (e.g., quitting tobacco will lead to longer life) and an *efficacy expectation* that the person has the capability to execute the behavior (e.g., that a person can actually stop using tobacco). Meeting both of these criteria is essential for behavioral modification in a SCT framework.

According to Bandura (1977), there are four types of information that influence these expectations that individuals use to judge their efficacy, and these also correspond to protocols in texting based programs. First there are performance accomplishments, which are based on an individual's experience mastering behavior. Any time an

individual achieves success, the behavior that led to that success is reinforced. Alternatively, when a person experiences repeated failures, it reduces the likelihood that the behavior will occur. However, after repeated successes the efficacy expectations are increased as is the anticipation of long-term success, which can offset negative effects caused by intermittent failures. This concept overlaps with another concept of SCT, self-regulation. Self-regulation theory posits that by gaining concrete skills through experience (performance accomplishments), a person can increase his or her self-control (McAlister, Perry, & Parcel, 2008).

Many of the text-based programs encourage "mini-quits," which provide an opportunity to experience the behavior of quitting on a small scale. Participants are asked by the program to try quitting for a certain number of hours in preparation for their real quit. By experiencing quitting and what it feels like to have a small success, their efficacy expectation can be increased. As one cessation expert put it, "[Q]uit attempts should be thought of like practice sessions in learning a new skill—at some point one hopes to 'get it right'" (Hughes, 2003, p. 1056).

The second type of information that individuals use to judge their efficacy is through vicarious experience or observational learning, which is seeing others perform or model the behavior and witnessing the effects. Seeing someone clearly achieve an outcome after demonstrating a behavior demonstrates efficacy and can help convince an individual that the outcome is possible to attain. This can work positively or negatively. For instance, if an individual witnesses multiple people trying to quit using tobacco and failing, they may have reduced self-efficacy for quitting. Many of the text-based

programs provide an opportunity to view or learn from others who have quit. For example, in STOMP (Rodgers et al., 2005) and Text2Stop (Free et al., 2009; Free et al., 2011), participants received text messages from former quitters outlining their success stories to help provide motivation to quit. In Whitaker's (2011) study using text-messages as a vehicle for sending links to videos of former smokers, the role models all played ex-smokers, and they told stories of their difficult experiences quitting and the techniques and coping skills that worked for them.

The third type of information that influences expectations is to use verbal persuasion to help individuals achieve an outcome. Most cessation programs, text-based and others, provide constant encouragement and feedback. For example, in the Text2Stop program (Free et al., 2011), on the fourth day after quitting, participants receive a message that says, "Day4=Big day - cravings still strong? Don't worry tomorrow will be easier! Keep your mind & hands busy…" If a participant indicates through a text that she lapsed during a quit attempt, she is immediately provided support with a message like, "Don't feel bad or guilty if you've slipped. You've achieved a lot by stopping for a while. Slip-ups can be a normal part of the quitting process. Keep going, you can do it!" Through consistent encouragement, individuals can be convinced to work harder and try longer and can increase their self-efficacy beliefs.

The fourth type of information comes from emotional arousal, which acknowledges that there is a physiological component that affects self-efficacy. While this is considered the least influential of the four types of information, it is recognized as important in the field of tobacco control since part of the tobacco addiction is manifested

through the physical sensation of having a cigarette in one's hand or mouth. Removing this form of comfort can increase an individual's anxiety and discomfort level, which can negatively impact his or her self-efficacy beliefs. Many text-based programs address the physiological aspect of quitting in two ways. During the quitting phase of the intervention, regular text messages are sent to the participants that include various tips to help mollify these habits (such as eating carrots or chewing gum when you feel a need to put a cigarette in your mouth). Most programs also provide on-demand support, where participants can text keywords to a program like "crave" or "tips" to receive tips on the spot that may distract tobacco users from these types of cravings or habits.

While the psychological determinants of self-efficacy discussed above are central to SCT, there are also environmental determinants. According to SCT, an additional method for influencing behavior through the environment is called facilitation, "the provision of new structures or resources that enable behaviors or make them easier to perform" (McAlister et al., 2008, p. 174). One implicit benefit of text-messaging programs is the capacity of mobile phones to retain supportive text messages in one's phone for later viewing when support is needed. Unlike phone-based cessation (where you must speak to a person to receive support), online programs (where you must be in front of an internet ready device) or even self-help materials (which you must locate to read), mobile phones are typically carried all the time, making these resources always conveniently available.

Discussion of the Literature

The studies described above provide ample evidence that using the text-messaging component of a mobile phone as a treatment delivery option has wide-reaching effects that may lead to a new frontier in health communication. Studies have shown that researchers across public health are creating innovative programs based around the mobility, ubiquity and capability of mobile phones to contact and communicate with individuals in a way that was previously impossible. To help remind individuals about their medicine schedule or an upcoming appointment, a text message can be sent. To help patients self-manage their care, a text-based intervention can be used to inform physicians and patients how well they are maintaining their programs. In the field of tobacco cessation, text-based intervention may be the missing link in providing an effective program that can be used by the larger population.

Only in the last few years has a large-scale study demonstrated that a standalone text-based tobacco cessation program can help individuals quit tobacco with similar rates as those expected of quitlines at six months. While a single study does not provide sufficient evidence that text-based programs should be considered evidence-based interventions, it does appear possible that as programs are improved and more are created, there will be future studies confirming these findings. Many studies in the last five years have already shown the capability of text-based tobacco cessation programming to support tobacco users in the short-term with their first quit attempt. Motivating participants to make a quit attempt is one of the more important goals for any

tobacco cessation program and without which permanent tobacco cessation will not occur.

However, before text-based programs are crowned the intervention of the future, it is important to keep in mind that unlike other types of interventions that have operating guidelines and "best practice" instructions, thus far specific guidelines on how text-based programs should work are scarce. While many programs have clear similarities and are based on the underpinnings of social cognitive theory, there has been very little research to guide the field as it improves the existing text-based programs and creates new ones.

Only two research studies were found that addressed this deficiency, and just one involved speaking with actual participants from a text-based tobacco cessation program. The first study used a focus group design with 21 individuals who were between the ages of 20 and 33, used text-messaging on their mobile phones and were smokers or recently quit smokers (Bock, Heron, Jennings, Magee, & Morrow, 2012). This study helped affirm that there is an interest in the target audience for a text-messaging program as well as some ideas that may be useful in future programs, such as including social networking functions and the ability to modify program tailoring through an online interface. While this is a unique study and useful to the field as it develops new programs, it does not provide information about which features were useful to those who participated in an actual intervention.

The single study to date that was designed to evaluate a text-based tobacco cessation program by following up with a sample of actual participants was done by Jamison, Sutton and Gilbert (2012) on the Quittext pilot program in the UK. Using

evaluation questionnaires followed by semi-structured interviews, they were able to investigate participants' attitudes and perceptions of the program. There were two noticeable differences between this pilot program and other text-based programs reviewed. First, this program started on the quit date whereas others started weeks or a month before. Second, it sent texts to program participants less frequently than other programs (two texts daily was the maximum amount). One main implication based on their findings was the importance of tailoring the messages and protocols based on individual needs. Individuals wanted to be able to schedule the timing of their messages based on their own quitting habits and to modify the number and type of text messages they received. No program thus far studied allowed tailoring to this degree, however, this type of tailoring has the potential to add significant value to text-based programs.

The study described in this paper shares a similar goal with the Jamison et al. (2012) study, which was to investigate which aspects of a text-based cessation program were actually useful to participants and to understand participant behavior within the program. By using semi-structured interviews with a sample of users from a widely implemented US text-based program, this study hoped to yield useful information about what aspects were most beneficial and which were not. The following chapter provides a description of the Text2Quit program.

Chapter 3

The Intervention

The Text2Quit program is a widely used intervention in the United States for states offering tobacco cessation programming. It has been provided by Alere Wellbeing, Inc. (Alere) as part of their Quit For Life ™ suite of programs since 2012. The program is currently offered as an adjunct program to Alere's quitline (telephone-based) and Web Coach (website-based) programs. Consistent with the texting based tobacco cessation programs previously discussed, Text2Quit is based on social cognitive theory and uses a text messaging protocol to increase participant self-efficacy and outcome expectancy for quitting by providing support, advice and positive reinforcement (Abroms et al., 2012).

Text2Quit is an automated system that sends bidirectional and unidirectional text messages to participants and communicates directly with the Quitline and Web Coach databases. Bidirectional texting means that the program can send a message to participants that allow them to respond in a certain format that will then trigger another message. For example, if a participant received the message, "Please be honest, did you quit today? Reply YES or NO," the participant could reply "YES" or "NO" and receive either a congratulatory text for replying "YES" or an encouraging text if they replied "NO." However, any deviation of these messages, like "yeah" or "nope" would not be interpretable for the system to process, and error messages would be generated instead.

There are two main protocols of messages, and they are delivered according to where the participant is in the quitting process. A person is in the *prequit* stage before he

or she reaches his or her quit date and the *postquit* date after his or her quit date passes. Participants can also be in the *notquit* group when they indicate they did not quit on their quit date or have relapsed, in which case they are sent fewer messages per week. These messages are primarily geared towards asking participants to set a new quit date.

Messages are scheduled based on which phase each participant is in and where he or she is in relation to his or her quit date. Participants begin receiving texts a day or two after they register and will receive approximately three texts per week until the week before their quit date. From the week before their quit date until one week after, participants will receive 4-6 text messages per day. This number can be much higher if the texts are bidirectional and the participant responds, which then prompts a follow-up message. After this period, the texts steadily decline until the program ends roughly four months after the quit date.

The prequit stage. During the prequit stage participants are asked daily to track how many cigarettes they smoke and to report the total number the following day. The message participants receive reads, “Time for a pre-quit check-in. Reply with the number of cigarettes you smoked yesterday (e.g. 16).” Another prequit activity that participants are asked to participate in is called a Mini Quit Challenge, where participants are asked once a week to abstain from smoking for four hours. There is a text message sent prior to the challenge alerting a participant about the upcoming challenge and a message sent the following day after the challenge checking on how it went. At the time of the challenge, participants receive the following message, “Time for a Mini-Quit challenge. For the next 4 hours, stay away from cigs. Practice dealing with cravings without smoking. We'll

check in 4 hours." These activities are designed to prepare a participant for quitting by providing opportunities to practice quitting behavior, to feel success at quitting and to become cognizant of his or her smoking habits.

The postquit stage. As participants approach their quit date, they are scheduled to receive texts that inquire if they are ready to quit; if they are not, they are prompted to set a new quit date. If they are ready or they do not respond, they then enter the postquit stage. One of the primary purposes of the postquit phase is to provide constant support and tips throughout the day to quitters as they fight urges to smoke. The messages are also geared towards preventing a small slip, like smoking a single cigarette, from turning into a relapse where the participants return to their previous tobacco use behavior.

Keywords. Users can also text in keywords like "TIP" to receive support on how to get through cravings like "Go for a run! Exercise helps relieve tension & the urge to smoke. Try swimming, kick boxing, or tennis." There are almost 40 tips that can be sent in response to this keyword. After all of the tips have been sent to a participant, the tips are repeated.

Another commonly used keyword is "GAME," where participants receive a set of five multiple choice trivia questions not related to tobacco where the user can answer using the letters A, B, C or D to each question. After each response, the correct answer is texted to the participant. Since most cravings last five minutes or less, participating in a game during the craving can provide immediate support to participants who are struggling to overcome the urge to smoke and need a distraction. Users can opt out of the

program at any point by texting “STOP,” by adjusting their account in Web Coach or by speaking with a quitline counselor.

Text2Quit in the literature. There has been only one trial published about Text2Quit in a peer-reviewed journal, and it was coauthored by Voxiva, Inc., the company that created the program, along with authors from The George Washington University and Harvard University (Abroms et al., 2012). This was a small scale study that piloted Text2Quit and involved 23 college students with follow-up measures collected at two and four weeks post-intervention. While the study reported positive results for participant satisfaction and utilization of the program, it described the program as a “novel text messaging system that makes use of interactive and personalized text messages, features that appear to be more developed than in previous text messaging programs” (Abroms et al., 2012, p. 51). A review of the program made it clear that this high level of personalization was only in the pilot being studied and not the actual Text2Quit program as it is implemented at full scale.

While the pilot was tailored based on such data as the participant’s first name, gender, top three reasons for quitting and other personal information provided by the participants, the actual program is only tailored based on quit date, type of tobacco used, and whether the participants are receiving medication. It is unclear why the specialized components were removed from the system before moving it to production; however, it is possible that it is related to the complexity of the protocols and the costs associated with rolling them out in a fully automated setting.

Chapter 4

Methods

To explore how participants experience the Text2Quit program and their perceptions on how it impacts their tobacco use, a qualitative study was designed to solicit feedback from a sample of participants. Procedures were designed by the author for sampling, recruiting and interviewing participants, and then these tasks were conducted by Professional Data Analysts, Inc. This chapter goes into detail about how the study was designed and implemented.

Design of the Study

A single-group, basic qualitative study was designed to explore the experiences of participants in the Text2Quit program. This is a text-based tobacco cessation program offered free to all tobacco users in the state of Florida. This serves as an adjunct program for the Florida Quitline, a telephone counseling service, or Web Coach, an online counseling system. Participants in the study who registered for Web Coach and Text2Quit provided feedback through semi-structured interviews over the telephone approximately two months after they enrolled in the programs. A two-month follow-up period was used in order to best capture participants' thoughts and feelings on the program while they were still using it or had recently used it. This timeframe also provided most participants the opportunity to set a quit date and receive the typical protocols that occur before and after the quit date occurs.

Recruitment

Individuals who registered for Web Coach between February 24 and March 9, 2013 through Florida's www.TobaccoFreeFlorida.com website and also signed up for Text2Quit were eligible to be sampled from if they met the following exclusion criteria. To be eligible, this registration had to be the first time they were signing up for Web Coach, and they also could not upgrade to Quitline services during this two-month period. They also needed to provide consent to the last item on the registration form that requests permission to allow a third party to contact them to ask about their progress towards quitting. Any participants who had not provided a phone number, had not stayed in Text2Quit long enough to receive one message, or indicated they were already quit when they registered were also deemed ineligible. Unlike the requirement to participate in Text2Quit, whether participants had ever logged into Web Coach had no effect on their eligibility. After registration, participants were free to use one or both of the programs at their own discretion.

The Sample

Out of a total of 172 participants who registered for Web Coach and Text2Quit during this time period, 143 were eligible to be sampled from. Due to budget constraints, the high homogeneity of the participants, the author's previous experience interviewing similar populations, and recent research on sample sizes in qualitative research (Guest, Bunce, & Johnson, 2006), it was decided that 12 interviews selected from a sample size of 30 would be large enough to thoroughly understand the program and determine themes.

The sample consists of 9 females and 3 males, aged between 21 and 53 with an average age of 38. The sample is made up of mostly white individuals (9) with one African American and two individuals who did not indicate their race. None of the women identified themselves as currently pregnant, however one did report that she was planning on becoming pregnant in the near future. Just one third of the sample (4) completed a college degree while just under half (5) had health insurance.

Because participants had to meet certain criteria to be eligible for the sample, a purposeful random sampling approach was used. Purposeful random sampling gives each person in the subpopulation who meets the criteria an equal opportunity to be included in the sample with the limitation that it does not provide generalizable results (Patton, 2002). In addition, while a purposeful random sampling procedure was used to select participants who would be eligible for the study, a stratified purposeful sampling strategy was originally planned but later adapted due to an inability to separate out utilization patterns by participant. Due to deficiencies in how data are collected by the vendor providing texting services, the only reliable measure that could be used to indicate if a person had used the program was whether he or she had been sent a text or not. A variable indicating the amount or duration of interaction with the program could not be reliably calculated without excluding eligible participants, so no such measure could be used.

Ethical Approval

Ethical approval for collecting data from Text2Quit participants was approved by the State of Florida Institutional Review Board for the purposes of Professional Data

Analyst, Inc.'s evaluation of Florida's comprehensive tobacco cessation programs. Professional Data Analysts, Inc. is a private evaluation firm that employs the author. Special permission to use the collected data for the purposes of this study was provided by Lauren Porter, manager of evaluation and surveillance for the Bureau of Tobacco Free Florida Department of Health (BTFF). These data are being analyzed primarily for the purpose of reporting user feedback to the BTFF, and this study conducts secondary analysis of these data. An evaluative report will be provided to Lauren Porter on the results from this study.

Interview item creation, questionnaire design and recruitment protocols were developed by the author while sampling and interviewing were conducted independently by Professional Data Analysts, Inc. After completing the data collection, the interview data were presented to the author without any identifying information or codes. The author was never in contact with any study participants, nor did he have access to identifying information about the program participants, so in consultation with the University of Minnesota Institutional Review Board, it was decided that no additional Institutional Review Board approval or waiver was needed for this secondary data analysis. (See Appendix A.)

Procedure for Data Collection

Approximately two months after enrolling in Text2Quit, those included in the sample were sent a pre-survey letter alerting them about the upcoming study. The letter came from Professional Data Analysts, Inc. and announced that during the coming weekend they would be contacted by phone to provide feedback on their experiences

using Text2Quit (See Appendix B). In appreciation for their time, they were told that they would receive ten dollars after completing the interview. Sending a pre-survey letter and timing it to arrive at the same time that participants are contacted is based on Dillman's (2000) evidenced-based tailored design method for increasing response rates.

A semi-structured telephone interview instrument was created to delve into specific aspects of program use. This type of instrument provides an opportunity for more flexible and conversational interviews and also allows interviewers to exercise their discretion and spend more or less time on certain subjects (Merriam, 2009). The result of using a semi-structured interview is that every question on the instrument may not have been asked to every participant; however, the conversation may yield more substantial information by allowing the interviewee to have some control in steering the interview. The author created the interview instrument and had other colleagues review it for face-validity before it was used. A copy of the interview instrument is located in Appendix C.

Interview protocols were created by the author that included voice mail message prompts, introductory prompts, directions for completing the interview, and the calling schedule. The survey protocols explained that all participants would be called up to five times until 12 interviews were completed. Calls were made throughout weekend and weekday hours, and those in the sample were called on average 2.8 times. Voice mail messages were left after the first call attempt if a person was not reached and all calls were tracked using SynchronizedSurvey™, Professional Data Analysts, Inc.'s proprietary caller management system.

The Interviews

A single interviewer with substantial experience conducting phone and face-to face-interviews was trained on the background of the program and the content of the interview. Due to limitations with the initial Institutional Review Board's waiver, it was decided that audio recordings would not be used. While audio recording is widely considered the best method for capturing qualitative data, some researchers have indicated a preference for not using a recorder due to how intrusive it can be for those being interviewed (Lincoln & Guba, 1985). To compensate for not using a recorder, the interviewer was directed to write down all answers in Microsoft Word during the interview, and, if she was unsure of an exact quotation, to verify with the participant before moving on to the next question.

In addition, immediately after an interview was completed, the interviewer reviewed all responses for completeness and accuracy and then wrote a page summarizing the interview and adding any additional comments that she noticed. All comments that were recorded verbatim were indicated using quotation marks before and after the comment. Each interview lasted approximately 20 minutes and all interviews were conducted in the first two weeks of May 2013. After completing all of the interviews, the interviewer reviewed them to make sure they did not include any identifying information. They were then given to the author for the purposes of this study. A total of 12 individuals out of a sample of 30 were interviewed.

Analysis of Interview Data

The data were analyzed using a systematic approach involving three steps outlined in Miles, Huberman, and Saldana (2014). The first step is referred to as data condensation, which involves simplifying and transforming the data in so it can be managed and interpreted. Before the data could be condensed, the author read each interview and summary twice to ensure that each interview was understood on its own terms. Then, using deductive coding, the author created lists of codes based on the interview items and research questions and coded the interviews according to this list. During the first coding, any emergent themes or ideas that were not included in the initial list were documented in a separate list and referred to as inductive codes. The interviews were then reviewed again and coded using these inductive codes.

The second process involved visually displaying the data to be able to identify patterns and draw conclusions. Since it was important in this study to see how often certain features were used and how participants felt about them, a simple checklist matrix was developed in Microsoft Excel™ to track all the codes. Codes that were created both deductively and inductively were listed in rows, and all of the interviews were listed in columns. For some codes, an "x" was placed in the corresponding cell if an interview met the criteria for that code or the cell was left blank if it did not. For other codes, instead of an "x," cells were used to store qualifying information in the form of actual terms or words. Examining the data across interviewees in matrix format provided a snapshot look at the prevalence of certain themes as well as insight into which ones could be collapsed together to make broader themes.

After the author created the codes and coded all of the data, the list and descriptions of codes were given to another researcher at Professional Data Analysts, Inc. who independently coded the data. Once the data were coded for the second time, the author reviewed and reconciled any discrepancies between the two versions. This systematic step of having an independent review of the data helped reduce the chance of researcher bias and error.

Drawing conclusions from the coded data fulfills the requirements for the last process of Miles et al.'s (2014) approach to analyzing qualitative data. Conclusions were drawn based on patterns and themes that were depicted visually in the checkbox matrix and organized based on how they helped answer the research questions. Some codes were counted to determine prevalence, and others were clustered together to observer a larger phenomenon. The conclusions, which are reported in Chapter 5, are compared to the results from two other qualitative studies on text-based tobacco cessation programs (Bock et al., 2013; Jamison, 2012).The results from this study are described in the following chapter.

Chapter 5

Results

This chapter describes the resulting patterns and themes that were determined during analysis. The themes were created by the author and verified by an additional researcher to ensure their accuracy and are organized below by research question. The first research question explored how individuals experienced the program. Themes that addressed this research question looked at what participants expected from this program at its onset all the way through how they experienced it over the two months. The second research question explored respondents' perceptions about how the program affected their tobacco usage. All text in italics is quoted verbatim from respondents with a non-identifiable participant number attached to each record.

RQ1: How do participants experience the Text2Quit program?

Theme 1: Expectations. Unsurprisingly, 11 out of the 12 respondents had never heard of Text2Quit when they agreed to sign up for it during their Web Coach registration. While the Department of Florida has an active media campaign that consists of broadcast, radio and social media, no advertisements have mentioned the Text2Quit program, nor is it mentioned on their website, www.TobaccoFreeFlroida, which describes all of their other program offerings. The single respondent in the study who knew about the program had heard about it from her boyfriend, who had used it to successfully quit smoking.

Since no one had been involved in Text2Quit or any other texting-based interventions and because there was very little information on the registration form

describing the program, respondents reported little or no expectation for the program, except that it might help them quit tobacco. Only two respondents felt misled into thinking that instead of communicating with a computer program, they would be texting directly with actual counselors. They said:

> *I thought that it would be something from a real coach – expected a more personal aspect. (Participant 5)*

> *I think it was pretty much what I thought. I guess I thought it might be more personal, maybe a real person doing it. (Participant 7)*

Since respondents knew so little about the program when they registered, it is interesting to observe that their reasons for opting into this additional service were somewhat diverse. Two respondents thought that texts would be good reminders to quit, while another two just wanted to quit with any additional support they could receive. Three respondents indicated that a text program might fit in with their lifestyle better, but for three different reasons: 1) since it was less personal, 2) because they were an avid cell phone user, and 3) because they were more comfortable with a phone than a computer. Only two respondents signed up because they were intrigued by the uniqueness of the intervention mode. Two respondents' comments are below:

> *Thought it would be good to try out – easy – I use my cell phone a lot, text a lot. (Participant 1)*

> *I was willing to try something new – seemed like less personal time involved. (Participant 2)*

Theme 2: Personal Relationship with the Program. Even for the two respondents who were surprised to not be texting directly with a counselor, it quickly became clear to all respondents that they were communicating with a computer program that would send out

text messages at certain times with various messages. Despite the knowledge that they were communicating with a computer program and not a person, respondents described the program as a "partner" and a "friend" based on the encouraging messages and the constant support they received from the program. Some of the positive feelings respondents had towards the program are listed below:

> *I felt like I had a partner by my side who wanted me to quit. (Participant 3)*
>
> *Yes – every day if they're going to be checking on me, I'm going to cut down one per day. (Participant 8)*
>
> *I know everyone gets the same, but [the messages] make you feel that they are talking to you. (Participant 9)*

Similar to the warm encouragement participants felt when they successfully quit for four hours or reduced their cigarette usage from one day to the next, when they did slip or lapse or increase the number of cigarettes they smoked from day to day, participants expressed feelings of remorse and disappointment. Not only did they feel that they were disappointing themselves, but they were disappointing their ally and someone whom they described they felt accountable to. Two respondents remarked:

> *The keeping track, how many are you smoking per day and it come[s] back with a reply. It made me feel guilty and I would cut down. (Participant 5)*
>
> *It's something that you know that you're not supposed to be doing – someone is watching you and you're not supposed to be doing that. (Participant 7)*

Only two out of the 12 individuals felt that they could not relate to the electronic voice of the system and that they needed more personal support. Both individuals later indicated that the next time they try to quit, they would try the online cessation program,

Web Coach, instead of Text2Quit so they could have more direct support. These two participants said:

> *It's like a machine behind and what do I care what the machine thinks? (Participant 6)*

> *The messages felt very robotic. They could be more personal by saying your name when they text you. Makes you feel like one of your friends is talking to you. (Participant 5)*

Theme 3: Tailored Messages. Unlike some of the other text-based tobacco cessation programs reviewed, Text2Quit uses very little tailoring to make messages appear customized to participants. The only tailoring that occurs is based on the number of cigarettes people indicate they use, their quit date, and if they are signed up to receive medication through Web Coach. This lack of personalization was extremely clear to participants as over half of the participants (7) reported that the text messages did not feel personal to them. Four respondents indicated that the messages would have been more personal if they addressed them by name whereas two respondents wished they were tailored based on an individual's schedule and when they were most likely to smoke. Some of the comments are below:

> *Maybe sort of if I had provided my specific triggers or maybe the times of day that I smoke – if texts had to do with that personally about why or when I smoke… would have been better around eating times. (Participant 1)*

> *More personal text messages to the person trying to quit - address by first name. (Participant 12)*

> *I don't know if you could do this, but the person that gets the text, it addressed their name. (Participant 9)*

While the majority of the respondents did suggest more personalization, three did report that it was acceptable to them to receive impersonal messages instead of more tailored messages. Generic messages were considered preferable by only a single participant. Referring to personalized messages, this participant said:

> *To me when I see messages like that, people are trying to judge me, and I don't like that from people who don't know me. (Participant 2)*

Theme 4: Message Content. Two-thirds of the respondents (8) were still receiving texts as part of the program when they were contacted for the follow-up interview two months after signing up. Despite the time they had been in the program and the number of messages each person received, there were only a few types of messages that individuals could recall receiving. The most frequent messages recalled were mini quit challenges, tracking, craves and tips. The types of messages individuals reported appreciating the most were those that provided encouragement, motivation and "just (the) overall daily advice that you're doing a good job."

Not a single respondent reported any educational message or messages containing quitting advice from ex-smokers as useful or not useful, and only one person mentioned using the trivia games as a smoking distraction. Below are a few comments respondents shared about useful features:

> *I liked the positive reinforcements and the ones that continued to let me know that I had a back-up. Made me feel like I had a friend at my side. (Participant 3)*

> *Tracking was the most helpful and gave me a challenge. (Participant 7)*

Theme 5: Program participation across the duration of the intervention. Despite the majority (7) of respondents expressing satisfaction with the program, there was a clear disparity between how respondents reported using the program in the first week or two and the rest of their time in the program. Half of the respondents (6) indicated that they used the program more intensively in the beginning of the program and then their interaction with it waned. Out of the six, four said they only sent keywords for on-demand support in the beginning and then stopped despite reporting its usefulness. One participant only looked forward to messages in the beginning, and another indicated thinking that messages from the program were only helpful in the beginning. Some of their comments are below:

> *At first I did [read them], but after the first week, I didn't so much. (Participant 1)*
>
> *In the beginning I did [send keywords] several times, but then less and less. (Participant 3)*
>
> *When I started, I [sent keywords] very often, but have reduced somewhat. (Participant 4)*

Only two respondents provided a rationale for their decreased involvement in the program. Respondents mentioned both the repetitiveness of the messages and the lack of inventiveness in the messages. They said:

> *More in the beginning and then as I got settled in, I didn't seem to take them as seriously… I think I might try to learn to use Web Coach – after a while the messages seemed the same. (Participant 7)*
>
> *Every smoker knows the tips to stop smoking… I know the things about eating carrots and celery. I had lollipops to keep my head and hands busy. (Participant 6)*

To answer this research question about how participants experience the Text2Quit program, the following five themes were uncovered: 1) participant expectations of the program, 2) the personal relationship participants had with the program, 3) the customization of messages, 4) the content of the messages and 5) participation across the duration of the program. Overall, participants accepted a text-based type program as a legitimate mode for receiving tobacco cessation support and found certain aspects to have powerful effects on their tobacco use.

RQ2: How do participants feel the intervention affects their tobacco usage?

The second research question explored the perceptions of participants on how the program had affected their tobacco usage habits. The program is designed to motivate participants to break their habits associated with tobacco use while providing encouragement and feedback as they learn to overcome urges, practice quitting and learn to believe that they have the ability to achieve abstinence. At the two-month follow up, five participants said they were currently not smoking, although the abstinence interval ranged from a few days to over a month. Of the seven participants who were still actively using tobacco, five had reduced their tobacco consumption since starting the program. Four out of these five had reduced their daily tobacco usage by roughly two-thirds while the fifth person was not sure how much. Altogether, 10 out of the 12 individuals were either completely abstinent or had lowered their tobacco consumption since beginning the program.

Theme 6: Impact on Tobacco Use. Challenging participants to track their tobacco consumption and report on it each day during the pre-quit phase of the program was cited as one of the most useful features in helping participants reduce their tobacco usage. Not only did it force participants to become cognizant of the daily amount they were using, but it helped them feel accountable if their daily consumption increased from the previous day. Some shared the following:

> *It helped me to see that I really was cutting back – it motivated me. (Participant 10)*
>
> *Very useful – because [tracking] reminded me that I might have had a bad day yesterday, and this was a new day and [I] was going to make that extra effort. (Participant 7)*

The other type of message that participants credited with being the most helpful in aiding their quitting process were the mini-quits, where they were challenged to stay tobacco free for four hours. Respondents indicated that they felt challenged to try quitting and that it gave them confidence in their ability to control their tobacco use. They said:

> *The mini-quits encourage you to try longer; those kind of got me trying longer without a cigarette. (Participant 10)*
>
> *Awesome – 4 hours isn't that long of a time period, but long enough to know that you might want to have a smoke… Always gave me the motivation. (Participant 8)*

Theme 7: Impact of Text-Based Mode. When reflecting on the timing of the texts, half (6) of the respondents indicated that they came at different times throughout the day, and almost everyone (10) said that they came at convenient times. The variability in timing appeared to make respondents think that a text could be sent to them at any time, which prompted some to wonder if they would receive a text when they were smoking. In

conjunction with the notion that many individuals felt accountable to the program, some indicated that thinking about the program gave them a reason to pause when smoking. A few commented:

> *They came at all different times – sometimes morning, sometimes lunch; it sometimes felt kind of creepy because I might have been thinking about going out to have a smoke, and then I got a message – it was like it was watching me! (Participant 8)*

> *(Tracking) was good – it helped me to prepare to put them down. I would wonder when they might text me again. (Participant 3)*

Respondents appreciated the accessibility of having powerful messages on hand when they encountered stressful situations where they might be more likely to use tobacco. Similarly, some respondents indicated the utility of being able to send text messages into the program for on-demand support at those times. They said:

> *I keep the text in my phone, and it reminds me every day not to give up. (Participant 4)*

> *I deleted some of them, but still have some and when I was really stressed, I'd read them. (Participant 7)*

> *Yes – later on in the evening when I wasn't doing anything and just go back through them. Looked at them when I had more time and think about them more. (Participant 2)*

All but one respondent signed up for Web Coach after either hearing about it from a media campaign or reading about it online; however, only 1 out of 12 individuals reported using it as much or more than Text2Quit. Almost all of the participants (11) reported they never logged in to Web Coach or rarely logged in and exclusively used Text2Quit, most often without any other form of support. Individuals credited the

convenience of the texting program as the main reason for using it over Web Coach. They said:

> *More convenient, (Text2Quit is) always with me. I only used Web Coach once. (Participant 4)*
>
> *Text2Quit (is) by far more convenient; have phone with me all the time. (Participant 8)*
>
> *Not really have time to get on computer. Too tired after a 12-13 hours day. (Participant 2)*
>
> *Even though I use the computer quite a bit, a lot of my triggers are when I'm more mobile, and the texts really helped. (Participant 3)*

Theme 8: Text-based Programs Are Not for Everyone. All five of the participants who were abstaining from tobacco at the time of the interview shared common characteristics for how they used they program. They were all engaged participants who read the texts right away, appreciated either the encouragement or motivation that the program gave and were aware that they had the capability of sending texts to the program when they needed on-demand help (compared with only 2 of the 7 who were not abstinent). In addition, all five participants read the messages they received more than once (compared to 4 of the 7 who were not abstinent) and during cravings thought about the messages they had received. Overall, they were highly satisfied and appreciative of the program and remarked:

> *Helped me become a non-smoker; really liked their tips and the day-to-day encouragement. (Participant 2)*
>
> *Very thankful that the program exists, you guys are doing a great job. If you don't succeed the first time, you can always try again. (Participant 3)*

The reasons why two individuals were unable to either quit tobacco or reduce their consumption may have been related to factors outside of the program's control. Participant 6 had tried quitting many times before and sounded as if he did not believe in his ability to quit. To this person, all of the information was redundant based on information he had learned in other programs and was uninspiring. In considering whether he might use Text2Quit or Web Coach in the future, he responded, "I don't know what would work for me."

The other participant who was unable to quit or reduce her tobacco consumption, Participant 11, had signed up for Web Coach for the explicit purpose of receiving free nicotine patches and was not interested in receiving other forms of support. This person signed up for Text2Quit because "I thought I had read that you wouldn't be charged having a pre-paid phone," but cancelled after being charged for all of the texts that the program sent. There was only one other individual (Participant 1) who had also cancelled his or her Text2Quit before the follow up occurred, and it was also due a prohibitively expensive cell phone plan where people were charged per text message.

Reflections on the Results

This chapter reported on the emerging themes in the study. There were five themes that provided information related to the first research question. These themes explored aspects of the program such as the tailoring and content of the messages and how they affected respondents' experience in the program. One of the most intriguing themes was the positive rapport respondents felt with the program. Respondents reported

that the positive feedback and encouragement made them feel like the program was a partner supporting them.

Three themes were discovered related to the second question, which explored how the program affected participant behavior relating to tobacco use. Ten of the 12 respondents reported some level of success in either quitting or reducing their tobacco use, and this success was often attributed to the challenging activities that prepared users to quit. Distinct characteristics related to the use of mobile phones, such as how many people carry them at all times, seemed to enhance the program by allowing respondents to both access previously received content at any time and have immediate access to the program through on-demand support features. The final chapter will examine these results in comparison to other research studies and explore the potential impact these findings could have in the field.

Chapter 6

Discussion

Texting-based interventions are emerging as a legitimate option for reducing health issues through behavioral modification on a global scale. Until recently, the excitement over the use of this technology in tobacco control was based on small-scale studies where only positive short-term outcomes could be concluded. While this lack of evidence does not appear to have dampened the expansion of these programs globally, every research paper on the topic seemed to conclude with the same call to the field for large-scale trials that would bolster the expansion of these programs.

That call has thus far been answered by a single research study (Free et al., 2011), which investigated the Text2Stop program, a standalone text-based intervention program in the UK. Using a randomized control trial design, 5,800 participants were randomized into control and treatment groups, and quitting outcomes were calculated at four weeks and six months. Using both self-reported quitting outcomes and biochemical verification, the study was able to provide evidence that texting-based programs can be used to reduce tobacco dependence at six months. Not only were those in the intervention group who received access to the program more likely to quit than those in the control group, they also demonstrated a respectable quit rate (24%) for a tobacco cessation intervention.

While one large-scale study has already demonstrated long-term effects and there are likely many more such studies on the way, it is time for the field to start critically analyzing the characteristics of these text-based programs in order to deduce which features are most useful to tobacco users and which encourage behavioral change. The

present study contributed to this area by collecting feedback from a purposive sample of Text2Quit and Web Coach participants in May 2013. This study was guided by two research questions that examined participants' experience with the program and how they perceived it affected their tobacco consumption.

Summary of Findings

The first research question explored how participants experience the Text2Quit program, a text-based tobacco cessation program. As described in Chapter 3, the Text2Quit program is an adjunct program offered free to tobacco users in Florida in conjunction with the Florida Quitline, a telephone counseling service, or Web Coach, an online self-service cessation program. Based on social cognitive theory, it provides support and advice tailored in a way that aids participants as they attempt to break their deeply seated tobacco related behaviors. It incorporates both bidirectional and unidirectional text messages into an elaborate system that sends out text messages to users based on their progress through the quitting process.

One interesting theme that shed light on this research question was the way in which participants described their relationship with the program. Similar to Jamison et al.'s (2012) findings that participants viewed the program as a person rather than a system, respondents in this study described their relationship with the program as they might describe their relationship with a counselor. Possibly related to both the positive message content and the sheer volume of messages, participants used words like "friend" and "partner" to describe the program and generally thought of the program as both a system to provide support and a system to be held accountable to that was always looking

over their shoulder. This relationship may have increased the importance of the messages they received and the likelihood that they would read them. A few participants mentioned that they would think about the program when they were considering smoking and the feeling of guilt helped motivate them to refrain from smoking.

Participants generally approved of another key feature of Text2Quit, the ability to send a keyword at any time to the program and receive an immediate reply. Similar to reviewing previously read texts at times of need, participants liked the convenience of being able to request support in the form of tips or distractions as their needs demanded. While the use of this feature faded over the time of the intervention, this may have been because the content became redundant or because participants forgot about this feature. Half the participants did not know or understand that they were able to receive on-demand support, so this may have been poorly communicated by the program or may be a general problem that plagues all text-based programs.

Unlike websites and even smartphone applications that have sections devoted to providing helpful step-by-step directions on how to use important program features, there is no location available to store this information for a program that consists only of texts. Without having a designated location (like a webpage) that provides users a description of how to use the features, a sizeable portion of the audience will most likely not be able to utilize the full spectrum of support that these types of programs offer. This limitation is inherent in all text-based programs unless a separate application or webpage is made available that outlines how to take advantage of the program features.

The second research question explored participants' feelings about how Text2Quit impacts their tobacco usage. The majority of respondents (10) were able to either quit using tobacco or reduce their tobacco consumption two months after they began using the program and overwhelmingly used the program as their only mode of support. There were two main pre-quit activities that respondents felt were most useful as they prepared to stop using tobacco. These activities encouraged participants to 1) track their tobacco consumption and 2) participate in mini-quit challenges where they abstained from tobacco usage for four hours at a time. Both of these activities are geared towards increasing participants' self-efficacy by providing a successful experience in tobacco abstinence and were mentioned as having a large impact in helping people reduce their tobacco consumption.

Perhaps just as important as the participant experiences in these activities were the messages they received from the program in response to their actions. Participants seemed to thrive on the positive support and encouragement they received from the program and credited it with helping them stay motivated for future challenges involved in the quitting process. Positive support is generally recognized in the field as an important aspect in aiding quitters. While the results from the study concur, it is especially interesting to observe that this type of support does not need to be delivered by a real person to be perceived as meaningful. Participants were well aware that the feedback they were receiving was computer generated, and yet it still was described as a powerful force in helping them quit. It appears that if the content is written in a way that resonates with participants and provides the support they need, the vehicle that delivers it

may be less critical. The acceptability of positive messages that reinforced positive behavior was also a theme that Jamison et al. (2012) found true in their feasibility study.

Despite a text message bank of over 300 unique messages and various categories of messages, participants could only recall a few types of messages. Besides the interactive activities used for practicing quitting and tracking cigarette use, participants could list few other useful types of messages. As part of the program's protocols, each person would have received educational messages about the harmful effects of tobacco and messages written from the viewpoint of former smokers providing reasons why they quit. While these areas are grounded in social cognitive theory, this finding suggests that educationally focused messages may have less of an impact on quitting than practical messages. This contradicts Jamison et al. (2012), which found that participants did appreciate educational messages related to health and wellness.

Decades of research have shown the impact of tailoring on influencing behavioral change. While Text2Quit does use tailoring to a small degree, its primary purpose is to provide information relative to a participant's quitting stage rather than to stimulate behavioral change. The majority of participants would have liked a greater degree of customization, even tweaking the messages so they could address participants by name. Considering the uniqueness of each individual's quitting routines and habits, it would seem a powerful addition to the program if it could schedule messages around the times a person uses tobacco. In addition, the program would be improved if participants could give more input into which types of messages they find most useful. This finding is consistent with the feedback collected by Bock et al. (2013) where participants indicated

a desire for user-generated content, like personal tips that participants could write to themselves that the program would send out.

Overall, participants accepted a text-based program as a viable mode for receiving cessation support. Without prior knowledge of the program and hardly any expectation of what to expect, participants reportedly enjoyed interacting with it, found it to be useful, and suggested many ways that it impacted their behaviors. Participants commented frequently on the unique ways that having a mobile-phone based program was helpful as they tried quitting. Not only was it powerful to receive messages throughout the day, but participants often retained previously read messages on their phones so they could reread them during stressful situations. This finding highlights the unique capability of a mobile phone to be accessed at any time simply because individuals usually carry them on their person at all times. This omnipresent support is a feature that other modes of intervention cannot offer. (Can you imagine, for example, if a counselor called five times every day to check-in on tobacco usage?) A texting program is also not dependent on having access to a wireless connection since the messages are saved onto the phone's physical memory.

Study Limitations

There are a number of limitations inherent in this study. While the purpose of this study was not to generalize to all tobacco users, the sample size was still rather small. One drawback of a small sample size drawn from a purposive sample is that the participants may not be representative of typical Web Coach and Text2Quit participants. In addition, since the sample was selected from a single registration month, external factors could have led certain participants to the programs who do not share common

characteristics with the overall tobacco using population. For example, there are a number of media campaigns active across the state of Florida that drive participants to the different cessation programs that could have impacted registration. Sampling from multiple enrollment periods should be considered in future studies to reduce the impact related to media campaigns.

Another limitation resulted from the deficiency of enrollment data. Due to the lack of accurate program utilization variables, the original design of stratifying the sample by utilization level could not be executed. If the utilization data were more reliable, it would have been possible to look at users who were both active in the program and those not active in order to better understand how participants' use of the program varied. The lack of utilization data also made it impossible to select individuals who had set a quit date and received both protocols of the program versus those who had just received the prequit texts. Additional studies should explore how the intensity of program interaction impacts quitting.

Finally there were two limitations related to the collection of data. First, the author was unable to personally conduct or listen to the interviews to get a personal sense of the interviewee's voice. It is possible that new revelations could have been made by hearing the levels of emotion in respondents' voices that may not have been fully captured in the interviewer's notes.

Second, the interviews were not recorded due to technical limitations with the IRB waiver. To reduce the impact this might have had on the data collection, precautions were taken to reduce interviewer error. A well experienced interviewer conducted all of

the interviews and was trained on taking notes verbatim from participants. The interviewer was instructed to write down every word before moving onto the next question, despite the effect this might have on fluidity of the conversation. The interviewer also wrote a summary of the field notes and interview responses immediately following each interview.

Implications for Research

This study raises important questions about the user experience in text-based tobacco cessation programs. Consistent with the literature, participants were generally quite satisfied with the program and found a text-based intervention acceptable and relatively easy to use. Participants also found success in the program at the two-month follow-up. Five out of 12 respondents reported that they were quit, and another five reported that they had reduced their tobacco intake. Future clinical studies should address the impacts of these types of programs on tobacco reduction and not simply tobacco abstinence. While tobacco abstinence is the goal of most programs, a reduction in tobacco use can also provide tremendous health benefits and increase the likelihood that a next quit attempt will be successful. Nevertheless, focusing on tobacco reduction is considered controversial in the field.

This study showed that through positive feedback and encouraging messages, participants had feelings about the program that were similar to how participants may feel towards a quitting counselor. While this connection appeared strong for those that benefited the most from the program, not all participants shared this perception. Specific research should investigate which types of text messages may elicit this connection with

a wider audience. It is well known in the field of tobacco control that intensive interventions produce better outcomes than less intensive interventions, so it is possible that strengthening this bond between participant and program may lead to a more intensive intervention.

Further, now that there are examples of multiple models of text-based tobacco cessation programs, research should be conducted to create more tailored programs that can be rolled out on a large scale. Consistent with other studies, these tobacco users felt that the more customized the support is, the more helpful it is. Considering how much personal information is usually collected when participants register for a program, these data need to be integrated into texting-based protocols so that highly individualized texts can be sent. While there may currently be technical limitations to building such a complex system, perhaps working with database architects would allow for the creation of a more optimal program.

Implications for Practice

While most tobacco cessation programs involve protocols that educate tobacco users on the harmful effects of tobacco and provide opportunities to learn from former tobacco users, this study showed that these types of messages were neither memorable nor useful. The most powerful messages were those that challenged respondents to practice quitting or track their behavior, as well as those that provided encouragement, motivation or feedback. While this was a small-scale study, future programs should investigate additional ways to interact with participants and determine how useful educational content is via a text message based system. Perhaps due to the power of

short, consistent messages, these interventions may lend themselves better to practical applications of the behavior that participants are supposed to learn.

This study also showed that participants wanted more customized content, as well as the ability to customize it themselves. While there may be some technical issues to solve before this is feasible, those are surmountable. There is, however, another major hurdle that needs to be addressed before a fully-customized program can be offered to Americans, namely the Health Insurance Portability and Accountability Act (HIPAA) of 1996. HIPAA places a responsibility on all health care providers and other entities that collect and process health data to safeguard personal health information (PHI).

According to the HIPAA Privacy Rule, all health information must be kept confidential unless an individual provides explicit consent. Text messages that convey specific information about a person (such as their name or their tobacco use) may violate this rule. In addition, the HIPAA Security Rule mandates that electronic media used to hold or transmit information, regardless of individual consent, must be done in a private, secure manner.

While it is unclear if text messages are considered electronic media and therefore subject to the Security Rule (phone calls that use similar technology are not), both rules do impact the level of customization possible for text-messaging programs. Since HIPAA rules are relatively vague and do not indicate what level of customization may violate the rules, it is up to programs to determine the right balance between protecting participant privacy while also providing a tailored program that provides the maximum amount of

support. Clearly this area needs more investigation so tobacco cessation programs understand what they can and cannot send through a text message.

Conclusion

This study explored the potential for text-based tobacco cessation programs to fill the gap in tobacco control by both providing effective programming and reaching a greater proportion of those still using tobacco. Relevant research was reviewed in mobile health, public health and tobacco control, and all areas present text-based programs as a powerful and viable option for promoting behavioral change. The youth population and those in socioeconomically disadvantaged groups are some of the hardest to reach among the tobacco using population, and those are precisely the groups that may benefit the most from a program that sends individual, discrete and anonymous text messages.

While there are some potential disadvantages to using mobile phones for treatment, such as the possible marginalization of those who are illiterate or those who cannot afford a mobile phone, advances in technology have mitigated even these situations. Many mobile phones can utilize software that reads texts aloud, and the costs of mobile phone ownership continue to decrease. Still, effective tobacco control utilizes multiple programs that together can appeal to a wider audience. Texting-based cessation programs appear to be able to create an environment that stimulates behavioral change and are fast on their way to becoming a viable option that can complement traditional quitline services.

It is a common requirement that states and other government agencies must wait to invest in programs until they have been adequately tested using randomized controlled

trials, the so-called gold standard in scientific research. However, this situation may be different. Technology changes at breakneck speeds, and it could be many more years before sufficient trials have been conducted, at which point the mode of intervention may have already changed. There are already both qualitative and quantitative studies that show the potential for text-based programs to positively impact and broaden the reach of tobacco control. Considering that roughly 98% of tobacco users are not receiving any kind of cessation support, investing in texting-based programs may be the responsible solution, even before future trials are completed.

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Appendix A: Email Correspondence from the UMN IRB Office

April 24, 2013

Harlan,

If you are receiving a completely de-identified dataset, and you do not have access to a link to the identifiers, the study does not meet the definition of Human Subjects Research, and you do not need to apply for IRB review. Human Subjects are defined as either interaction/intervention with living individuals or the use of private identifiable data. While your study is research, it is not defined as Human Subjects Research.

Please let me know if you have any questions.

Sincerely,

Christina
--
Sincerely,

Christina Dobrovolny, CIP
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Appendix B: Recruitment Letter

Dear << FirstName>>,

I'm writing to you today to ask for your feedback about the Text2Quit tobacco cessation texting program. The Florida Department of Health asked us to conduct a survey to learn what people think about the program. About two months ago you signed up for Text2Quit at *www.quitnow.net/Florida* or *www.TobaccoFreeFlorida.com* and agreed that we could contact you about your satisfaction with the program.

We'd like to speak to you about the Text2Quit program and will send you $10 as a thank you for your time.

We invite you to take part in a telephone interview about your experience and satisfaction with the program. The interview will last about 15 minutes, and we will send you $10 as a thank you for your time. We will try to call you starting on May 3rd, or you may call us at 1-866-418-5480 Monday through Friday.

Of all the people who try to quit smoking in the state of Florida, only a small percentage has used Text2Quit. We'd like to hear why you signed up for the texting program and what you thought of it. Your feedback will help improve the program so all Floridians have access to the best stop-smoking services possible.

We would like to thank you in advance for completing the survey. It is only with the help of people like you that we can learn the best ways to assist people as they try to quit smoking.

Sincerely,

Julie Rainey
Professional Data Analysts, Inc.

Appendix C: Interview Questionnaire

Introduction

Hello, may I speak to {first name}?
Hi, {first name}, my name is {interviewer name} and I'm calling from Professional Data Analysts. We're talking with people who signed-up for the Text2Quit stop smoking program which is part of the Florida Web Coach program. I'd like to hear about your experience with this program so we can learn how to make it better. I'll be happy to send you a $10 check as a thank you for your time. Do you have about 10 minutes now to talk about the Text2Quit program? *[If No, schedule a follow up time. If Yes, continue]*

Section 1. Background

1. When you registered online for Web Coach, you also signed up for **Text2Quit**. Had you heard about the Text2Quit program before signing up for it?
   [If they say an advertisements clarify if it was for WC or T2Q]
   If Yes – What had you heard about it?
   If no – What made you decide to sign up for it?
2. When you signed up for Web Coach, were you ready to quit using tobacco?
3. Are you currently using tobacco?

Section 2. T2Q Content

Now I'm going to ask you some questions about Text2Quit.

4. Did you feel that the text messages from Text2Quit provided useful information?

   If Yes – What types of messages from Text2Quit were most useful?
   [*Have them describe the messages]*
5. What types of messages were the least useful?
6. You may recall receiving messages about a pre-quit check-in. Did you ever reply with the number of cigarettes that you smoked the previous day?
   If Yes – Did tracking the number of cigarettes affect how much you smoked?
   How useful was tracking the number of cigarettes you smoked?
   [Did it help you try to quit later?]
7. Did you ever participate in a "Mini-Quit Challenge" where text2quit asked you to stay away from tobacco for the next four hours?
   If Yes– How did it go?
   Do you think this experience helped you the next time you tried to quit?
   [*Listen for increased belief in self]*
   If No – How come?
8. Did you feel that the messages were personal and written specifically to you?
   If Yes – What made them feel personal?

If No – Would you have preferred more personal messages?
How could they been more personal?

9. Did you know that you could text keywords to Text2Quit like "Crave" or "Tip" to get support when you needed it?

If Yes – How often did you text keywords to Text2Quit?
Which keywords do you remember using?
In what types of situations would use send keywords to Text2Quit?
Did this support help you resist the urge to smoke?

If NO – If you had known about it, would you have tried sending texts in to get support when you needed it?
If NO – How come?

10. Were there other parts of Text2Quit that you liked using?
11. Are you still receiving messages from Text2Quit?

Section 3. T2Q Delivery

12. Did the texts from Text2Quit arrive at a convenient time of day for you, or would you have preferred them at different times?
    If other times – When would have been better times to receive them?
13. Did you look forward to receiving the texts from Text2Quit or think about them when you were not reading them?
14. When you received text messages from Text2Quit, did you usually read them?
    If Yes – Did you read them right away or later?
    Did you ever read them more than once? [*If Yes, when would you reread them*]
    If NO – How often would you say you read them?

Section 4. Impact

15. Did you feel like the messages prepared you to try quitting?
    If Yes – How so?
    If NO – what could they have done to better prepare you?
16. When you were having a craving to smoke, did thinking about Text2Quit messages ever help you to resist the urge?
    If Yes – what about the program helped you?
17. During one of these cravings, did you ever text a keyword to Text2Quit to get help?
    If Yes – Which keyword did you use?
    Did sending the text help you resist the craving?
18. Was there ever a time when you were craving tobacco and you got a text that helped you not to smoke?

Section 5. Web Coach & Text2Quit

19. Which program would you say you used more, Web Coach or Text2Quit?
    If used one – Can you say why you used [*X*] more?
    If used both – Was it helpful having access to both programs?

Section 6. Reflections

20. When you signed up for Text2Quit, what kind of support did you expect to receive?
21. Would you say that Text2Quit met you your expectations?
    If Yes – In what ways?
22. If you could make any improvements to Text2Quit, what would you like to see changed?*[Listen for frequency, content, tailored, timing]*
23. If you were to seek help with quitting again, would you return toText2Quit or Web Coach?
    If Yes –Which one?
    If NO – What would you use to help you quit?
24. Did you have any technical problems or other difficulties using Text2Quit?
    If Yes – Can you describe the problems?
25. Is there anything else you'd like to tell me about your experience with Text2Quit or Web Coach?

That's all the questions I have for you today. Thank you very much for talking with me. I'd like to mail you a check for $10 as a thank you for your time. *[ONLY ENTER ADDRESS IN SynchrnonizedSurvey]*
Could you verify that this is the correct mailing address? (IF WRONG) To what address should I mail the check?