BRDSNBZ: A MIXED METHODS STUDY EXPLORING ADOLESCENTS' USE OF
A SEXUAL HEALTH TEXT MESSAGE SERVICE

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ABSTRACT

JESSICA FITTS WILLOUGHBY: BrdsNBz: A mixed methods study exploring
adolescents' use of a sexual health text message service
(Under the direction of Dr. Jane D. Brown)

Sexual health text message services are becoming increasingly popular, but little is known about who uses such services and why. This project details the implementation of a campaign promoting a state-wide sexual health text message service that allows teens to text directly with a health educator and uses a mixed method design to assess who uses the service, what motivates use, and potential barriers to using the service. A theory of information seeking through text messaging is posited based on previous information seeking and communication theory and tested with adolescents.

A social marketing campaign was created promoting a North Carolina sexual health text message service and conducted in six middle and high schools in the North Carolina Piedmont region in Fall 2012. More than 2000 students in four schools completed online questionnaires that assessed awareness of the service, perceptions, and use. Focus groups and in depth interviews were then conducted with middle and high school students.

Results indicate teens who are sexually active and in relationships are more likely to use the service. A teens' level of uncertainty about sexual health influences affect, which in turn leads adolescents to assess various information options. Positive attitudes toward the service and credibility perceptions are direct predictors of intentions to use. Efficacy was found to be an indirect predictor, working through credibility perceptions to

influence intentions to use. Although teens may have an interest in using the service, there are barriers associated with use. Survey findings and qualitative results indicate that teens are interested in using a sexual health text message service, but perceived costs, fear of parents finding out about service use, and a lack of understanding of how to use the service were barriers for some teens. This study has implications for sexual health text message services, especially those that allow teens to connect directly with a health educator.

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CHAPTER 1

New media for sexual health promotion

Adolescence is a time of emotional, cognitive, and physical changes (Archibald, Graber, & Brooks-Gunn, 2008).[1] Teens experience physical changes such as the development of secondary sex characteristics and increased hormones. Their capacity to regulate emotions increases and more abstract thinking is possible (Yurgelun-Todd, 2007). Adolescents also often experience changes in their social environment associated with these factors, such as when others find them physically attractive and parents begin to allow more independent decision-making.

Adolescents often have questions about their physical development, relationships, and sex (Kang, Cannon, Remond, & Quine, 2009; Kang & Quine, 2007; Vickberg, Kohn, Franco, & Criniti, 2003; Willoughby & Jackson, 2013). Adolescents have indicated that they would like to get information about sex from their doctors (Boekeloo, Schamus, Cheng, & Simmens, 1996), parents, and peers (Boyer, Levine, & Zensius, 2011), but adolescents do not always turn to these resources for information. When adolescents do attempt to get sexual health information, they may face barriers such as lack of access, embarrassment, or lack of confidentiality (Ackard & Neumark-Sztainer, 2001; Boekeloo

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[1] Adolescence is the transitional stage between childhood and adulthood typically marked by the onset of puberty. Although some of the physical changes of puberty can begin earlier than adolescence (U.S. Department of Health and Human Services, 2012), researchers tend to define adolescence as anywhere between 10 and 24 years of age. This project focuses on early and middle adolescents, ages 11-18.

et al., 1996; Klein & Wilson, 2002). Adolescents have said that they feel uncomfortable bringing the topic of sex up with a physician, for example, although they want to talk about body changes, contraception, STDs and pregnancy. Girls report being more uncomfortable than boys in discussing such topics, and younger teens are more reluctant than older teens (Ackard & Neumark-Sztainer, 2001).

With the difficulty associated with getting health information from such interpersonal sources, teens often turn to other sources of information, including the Internet. According to representative surveys, half of all 8-to-18-year-olds in the United States have used the Internet for health information (Rideout, Foehr, & Roberts, 2010). More than 40 percent of online teens have specifically sought information on topics related to sexual health, such as pregnancy, birth control, HIV/AIDS or other STDs (Rideout, 2001). Information on the Internet may contain inaccuracies, however, and some websites that young people use may not be as high quality as commercial sites (Buhi et al., 2010). Additionally, adolescents may have trouble finding the information they want when using the Internet to search for sexual health information (Buhi, Fuhrmann, & Smith, 2009; Hansen, Derry, Resnick, & Richardson, 2003).

Practitioners who work to improve adolescents' sexual health have been looking for new ways to provide teens with accurate and timely sexual health information and have begun focusing on providing information in channels and media, such as cell phones, that teens use frequently (Levine, 2011). At last count, more than three-fourths of U.S. adolescents have cell phones, with most sending 50 text messages a day (Lenhart, Ling, Campbell, & Purcell, 2010). Adolescents from all socio-economic backgrounds and racial groups have cell phones (Lenhart, Ling, et al., 2010); U.S. adolescents spend, on

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average, 1.5 hours a day sending and receiving text messages (Rideout et al., 2010).

About half of U.S. adolescents send on average 1,500 text messages a month (Lenhart,

Ling, et al., 2010), and one in three sends more than 100 text messages a day -- 3,000 text

messages a month. Because of such active use, text messaging has become an

increasingly popular way to reach teens with sexual health information (Levine, 2011).

Three main types of text messaging services provide sexual health information for

adolescents and young adults. One involves the use of an automated service in which the

teen texts the service to opt in and then receives a menu with instructions to text certain

prompts for specific information. One example of this is the San Francisco SexINFO

service (Levine, McCright, Dobkin, Woodruff, & Klausner, 2008). Another type allows

teens to opt in to the service and receive messages related to sexual health on a regular

basis (e.g., the Hookup). This type of service has been shown to significantly increase

knowledge and possibly influence behaviors (Gold et al., 2011). A third type, known as

two-way text message services, allows for a teen to text any question to a sexual health

educator who replies with factual information (Phillips, 2010). An example of this is the

North Carolina BrdsNBz service.

BrdsNBz

North Carolina has had a sexual health text message service, called BrdsNBz,

since 2009. The service, created and operated by the Adolescent Pregnancy Prevention

Campaign of North Carolina (APPCNC), is a two-way text message service that allows a

teen to text a question to a sexual health educator and receive a response via text message

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quickly and confidentially (Phillips, 2010). The service is anonymous, with a system de-identifying the sender before the health educator receives the question and responds.[2]

BrdsNBz has received national acclaim and been promoted in various news outlets, including a *New York Times* article (J. Hoffman, 2009). The service received the Healthy Teen Network's National Outstanding Emerging Innovation Award in 2010, an award for Best Practice by the National Clearinghouse for Families and Youth, and was runner up for the Southeastern Council of Governments' Innovation Award in 2010. The service now offers licenses to organizations in other states (e.g., Maryland, Texas, South Carolina and Washington) so that they can provide the service in their area without incurring startup costs.

The purpose of BrdsNBz is to provide adolescents with information about sexual health with the hope that accurate information will help reduce negative sexual health outcomes such as teen pregnancy and sexually transmitted diseases (STDs). Teen pregnancy and STDs are problematic in the United States—the United States has one of the highest teen birth rates of all developed countries (Martinez, Copen, & Abma, 2011) and adolescents and young adults in the United States frequently contract STDs (Centers for Disease Control and Prevention, 2010). Teens acquire nearly half of all STDs, but are only about a quarter of those who are sexually experienced (Weinstock, Berman, & Cates, 2004).

A variety of physical and psychosocial variables have been found to be associated with negative sexual health outcomes in adolescents. For example, teens from a lower

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[2] The service does have a protocol in place to reverse engineer the phone number if someone indicates harm to himself or others in a message.

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socioeconomic status or those who develop earlier than their peers may initiate sex younger, and be at greater risk for teen pregnancy and contracting STDs (Udry, 1979; Young, Turner, Denny, & Young, 2004). Other factors such as frequent exposure to sexual media content, lack of parental monitoring, and weak connection to schools have been found to be associated with sexual risk behaviors (Brown et al., 2006; Collins et al., 2004; Kirby, 2002a, 2002b; Lohman & Billings, 2008).

Similar to BrdsNBz, other sexual health text message services are also targeted to populations that may be more likely to experience negative sexual health outcomes. For example, SexINFO targeted ads promoting their service to African Americans in neighborhoods of lower socioeconomic status (Levine et al., 2008). An evaluation of the promotion found that awareness of the service was higher with members of the target audience—young African Americans.

Although adolescents and young adults have indicated that receiving sexual health information through text messages is convenient and of interest to them (Gold, Lim, Hellard, Hocking, & Keogh, 2010; Wright, Fortune, Juzang, & Bull, 2011), little research has been done on the extent to which the services are used and under what circumstances. Few evaluations of sexual health text message services have been conducted, with those that have being focused on text message services that send persuasive messages on a set timeline. In one evaluation, researchers conducted a randomized controlled trial of a service available to Australian young adults (ages 16 to 29) and found that service exposure increased knowledge about sexual health and resulted in increased monogamy (Gold et al., 2011). The evaluation did not include an option in which participants chose to receive messages about sexual health, however, assessing only the impact of messages

sent on a regularly scheduled basis as a form of mobile advertising. In Australia, individuals can agree to receive mobile advertisements in exchange for access to certain Internet sites on their phones.

A randomized controlled trial evaluating a similar service in Australia recruited young adults at a music festival and placed them either in a control group or an intervention group that received messages about sexual health through email and text messages (Lim et al., 2012). After 12 months, knowledge about sexually transmitted infections was higher in the treatment group and women in the intervention group were more likely to have had an STI test or talked to a doctor about sexual health.

A qualitative assessment of a U.S. service that also sends out messages about sexual health on a set timeline was conducted on the San Francisco "Hookup" service. The Hookup allows adolescents to opt in and receive weekly messages on topics about relationships, dating, and sexual health. It also provides a search function through which adolescents can get information on testing services. Perry and colleagues (2012) found that service users liked the weekly text messages, were not concerned about cost, and felt text messaging provided a private way to learn about such topics. This study, however, did not recruit people who were already using the Hookup, but instead recruited from teen clinics, providing information on how to sign up for the Hookup and conducting focus groups four weeks after recruitment so that teens had time to receive four messages from the service. While it is valuable to understand what teens think of such services, this situation is somewhat artificial with the recruiters creating the use that was evaluated. It is not clear that teens who choose to use the service on their own would have a similar experience or perspective.

Another study focused on evaluating a campaign promoting the San Francisco-based SexINFO service (Levine et al., 2008). Surveys were conducted at local clinics to which the service referred texters. The evaluation mainly assessed service awareness and did not include an evaluation of who used the service or impacts of service use. Awareness of the service was highest among the targeted audience – young African Americans with cell phones in the target neighborhoods. The study found that only 10% of people who heard about the service had used it, but no additional information was provided on users. The evaluation did not consider who actually used the service and their motivations for use.

Theories of information seeking suggest various motivating factors for seeking information (Afifi & Weiner, 2006; Kahlor, 2010), but little of this theorizing has been applied to text messaging services for health. Research is needed to understand what motivates an adolescent to use a sexual health text message service and to evaluate their impact and efficacy (Noar & Willoughby, 2012; Willoughby & Jackson, 2013). This project is designed to move the study of mobile sexual health research forward by examining who uses such services and why in the context of theories of information seeking. Additionally, studies previously conducted have looked primarily at the impact of text message services that send messages to adolescents on a regularly scheduled basis. This study will instead look at a different and increasingly common type of service that allows teens to seek out information related to sexual health.

To examine who uses sexual health text messaging services and why, adolescents must know such services are available and be able to use them. Although BrdsNBz has been available in North Carolina since 2009, the service has not been well promoted.

Limited promotion has occurred in health education classes in a few schools and in targeted MySpace advertisements when the program was first available, but little else has been done since to promote use of the service by teens in North Carolina. This project first promoted the service to N.C. adolescents in three middle schools and three high schools and then assessed which adolescents used the service and what motivated use.

Project scope

This project used a sequential explanatory mixed methods design, specifically a post-test only field experiment followed by focus groups and interviews, to examine: (1) which factors influence an adolescent's decision to use a sexual health text message service; (2) whether adolescents at greater risk for negative sexual health outcomes use a sexual health text message service; and (3) why adolescents may or may not use such a service. As part of this project, existing theories of information seeking were modified and applied to help explain adolescents' sexual health information seeking via text messaging.

In this dissertation the evaluation of the in-school campaign promoting the BrdsNBz service is discussed first (Chapter 2). The campaign was conducted in six schools in the North Carolina Piedmont. All students in four of the schools were invited to complete online questionnaires, with students in one middle school completing a shortened questionnaire due to time restrictions (See Table 1 for details on schools).

Table 1. Schools receiving campaign and data collected

School	City, County	Complete survey taken	N	Chapter in which data are used
West Stokes HS	King, Stokes	Yes	802	2, 3, 4, 5
Chestnut Grove MS	King, Stokes	Yes	596	2, 3, 4, 5
Southeastern MS	Walnut Cove, Stokes	Yes	311	2, 3, 4, 5
Kannapolis MS	Kannapolis, Cabarrus	No	416	2, 4, 5

In the following chapters, the main research questions of why a teen might choose a sexual health text message service, who is using such services, and what barriers may prohibit use, are addressed. Each of these chapters is written as a stand-alone article suitable for submission to a peer-reviewed journal; targeted journals are listed at the beginning of each chapter.

In Chapter 3, the motivations behind use of a sexual health text messaging service are explored, specifically examining the role of uncertainty, affect, credibility, efficacy and attitudes on intent to use. The chapter discusses various theoretical models of information seeking, and posits a new model applied to sexual health text message services, based on teens' use of the BrdsNBz service.

In Chapter 4, the characteristics of service users are described, examining whether those at greater risk for negative sexual health outcomes are using the service. In Chapter 5, the results of qualitative research, specifically focus groups and in depth interviews, are used to assess what influences use of the text messaging service and what barriers may limit use. In Chapter 6, all the findings, the implications of these findings for other sexual health text message services, and connections to other research are discussed.

CHAPTER 2

"Everyone has questions:"

Effectiveness of a social marketing campaign promoting use of a sexual health text service by teens

Sexual health text services are becoming an increasingly popular way to provide sexual health information to adolescents (See Lim, Hocking, Hellard and Aitken, 2008 and Levine, 2011 for a review of these types of services). More than three-fourths of adolescents have cell phones, and most teens use text messaging. On average, about half of teens send 1,500 text messages a month, or 50 text messages a day. About one third of teens send 100 text messages a day or more (Lenhart, Ling, et al., 2010). Research with teens also demonstrates that cell phones and text messaging are a way that teens are interested in accessing information on sexual health (Gold et al., 2010; Wright et al., 2011).

Such services may provide sexual health information to adolescents on a set schedule (e.g., The Hook-up), allow adolescents to request information through an automated system (e.g., SexInfo), or provide adolescents with access to a health educator (e.g., BrdsNBz). Some sexual health text services have been found to be associated with knowledge change, and even change in behaviors (Lim et al., 2012). Most services have not been well-promoted so use may be unnecessarily low. Public health programs cannot be effective unless the target population is aware of the services and able to access them.

Little research to date has focused on the promotion of sexual health text message services. An exception is the San Francisco SexInfo service that allows young people to access an automated service menu that provides prompts so that the texter can text for information on topics such as sexually transmitted diseases and contraception (Levine, et al., 2008). The SexInfo service was promoted to teens and young adults in San Francisco, encouraging awareness of the service. Promotions included posters, palm cards and bus shelter ads that were placed in locations populated by African American youth (the target audience). Palm cards were distributed on the street and in school and banner ads targeted youth ages 18-24 on a website (Yahoo). In an evaluation of the campaign that used a convenience sample of young adults in three clinics to which SexInfo users were referred, researchers found service awareness high among the target population.

Although the SexInfo campaign was found to increase awareness, to date, no other articles have been published about promotions of sexual health text message services, and none have focused on the promotion of a service that allow teens to interact directly with a health educator. Such services are becoming increasingly popular due to low start up and maintenance costs (R. Adler, 2009; Fogg & Allen, 2009). This article discusses and assesses the effectiveness of a social marketing campaign that was created to promote a state-wide text message service connecting adolescents to health educators.

BrdsNBz

BrdsNBz is a two-way text messaging service created and run by a non-profit organization in central North Carolina (Phillips, 2010). The organization created BrdsNBz in 2009 as a way for adolescents to reach health educators and receive accurate

information about sexual health. BrdsNBz has received coverage in the *New York Times* (J. Hoffman, 2009) and a number of awards.[3]

The purpose of BrdsNBz is to provide adolescents with information about sexual health with the hope that accurate information will help reduce negative sexual health outcomes such as teen pregnancy and sexually transmitted diseases (STDs). More than one-third (39%) of teens have indicated that health information they acquire online has influenced health behaviors (Rideout, 2001) and accurate information is an important component for adolescents' sexual health decision making (Bearinger, Sieving, Ferguson, & Sharma, 2007). Although the BrdsNBz service has been available in North Carolina since 2009, it has not been well-promoted. Targeted MySpace ads were used in 2009 to increase awareness, but most marketing has been limited to word of mouth efforts by health educators in schools. Thus, a social marketing campaign was created to promote the North Carolina BrdsNBz sexual health text message service.

Everyone has Questions

The *Everyone has Questions* campaign was developed using a social marketing strategy. Social marketing uses marketing principles and techniques to convince a target audience to voluntarily change behavior (Kotler, Roberto, & Lee, 2002). Social marketing campaigns are built on the idea of exchange theory, focusing on the views of the consumer and the benefits that can be provided to them (Lefebvre & Flora, 1988). The *product* being marketed in this case was a service – BrdsNBz, a sexual health text-messaging service. The goal of the campaign was to increase awareness of the BrdsNBz

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[3] BrdsNBz has received the Healthy Teen Network's National Outstanding Emerging Innovation Award in 2010, an award for Best Practice by the National Clearinghouse for Families and Youth, and was runner up for the Southeastern Council of Governments' Innovation Award in 2010.

service and to encourage teens to use it if they had questions they wanted answered by a health educator. *Price* associated with BrdsNBz could include the actual cost of text messaging. Although the service is free and available to all teens in North Carolina (Phillips, 2010), cell phone providers may charge individuals for each text message sent or received. Additionally, there could be a cost of embarrassment at using such a service or having questions related to sexual health.

Formative research was conducted with the target audience - teens in North Carolina - to better assess perceived price issues and other elements of the marketing mix (i.e., the 4 Ps). The target audience in this case was fairly broad. While the text message service was designed for all North Carolina teens, it is intended mainly for teens aged 13-18 (who are most likely to be sexually active or approaching an age where they will become sexually active). In-depth interviews, followed by focus groups, were used to gain insight into what teens perceived as both the benefits and costs of using such a service. The information gathered from this formative research was then used to develop the campaign promoting the service.

The campaign was based on the formative research and also was guided by theory. From the formative research (interviews and focus groups), the concept of *everyone has questions* was developed. The campaign incorporated elements from the Theory of Planned Behavior (Ajzen, 1991), such as the fact that having questions about sexual health was normative (e.g., everyone has questions, it's normal to have questions). The campaign also incorporated elements from Social Cognitive Theory (Bandura, 1986), such as behavioral modeling and self-efficacy, with images of teens using the service and simple instructions on how to use the service (See Figure 1). Additional focus groups

were conducted after the messages had been created to garner feedback on attractiveness, comprehension, and relevance of the specific messages.

Figure 1: Example poster used in *Everyone has Questions* campaign

Figure 1: Example poster used in *Everyone has Questions* campaign

Place was selected based on recommendations of teens as well as access to teens and the possibility of high exposure to campaign messages. Place in social marketing refers to where goods and services are distributed (Grier & Bryant, 2005). Teens spend a large portion of each day at school, so middle and high schools were chosen as the place in which teens could best be reached. This in turn influenced promotion, the fourth P in the marketing mix. Posters were created to go into the schools, and promotional items

with information on the BrdsNBz service were distributed at school events and in classes. These promotional items included pens and highlighters, water bottles, sticky notes, lip balms, flyers, and wallet cards (See Appendix A for examples of the promotional materials).

Promotional items were developed and distributed because they allowed teens to have access to information about the BrdsNBz service with them at any time, and to see these items being used by others and be reminded about the service. The items were meant to serve as a "cue to action" (a concept from the Health Belief Model (Champion & Skinner, 2008)), reminding and encouraging teens to use the service if they had a question about sexual health. Formative research and feedback from an advisory group of teens in one of the target schools provided information on which promotional items would be seen as most interesting to teens.

Implementing the campaign

The campaign began in Fall 2012 and was implemented by health educators in the schools that participated. The purpose of the evaluation was to assess the effectiveness of the campaign, in the hopes of creating a campaign that could be prepared and distributed to other schools in North Carolina to increase service awareness and use. Health educators were recruited through an annual meeting of the state's public school health educators. Some of those originally interested in the project subsequently were not able to participate when more senior administrators balked at promoting a sexual health-related service at school. Ultimately, two counties in the North Carolina Piedmont participated and allowed two high schools, one alternative high school, and three middle schools to receive the campaign.

The schools' health educators were provided with materials to promote the service in the participating schools. One health educator served as the main contact in each county. The campaign began in September, with the start of the school year. Each middle school received 10 copies of three different posters; high schools received 10 copies of four different posters.[4]

Health educators were then provided with pens and wallet cards (~2,500) that had information on the BrdsNBz service including procedures for use and contact information. In October and November, additional promotional items were provided including lip balms (~ 500), water bottles (~ 200), and sticky note pads (~200). Health educators distributed items as they saw fit; at the alternative high school and middle school promotional items were distributed at school events (i.e., football games); the other schools distributed items primarily in homeroom classes.

The health educators also encouraged awareness of the service in other ways. One health educator encouraged students to save the BrdsNBz number to their cell phones and gave promotional items to teens who did. One school included information about BrdsNBz in the morning announcements. Another health educator had the students in her health class create commercials promoting BrdsNBz that aired on the local school cable channel.

Methods

Three methods of evaluation were used to assess campaign effectiveness: a text message survey of service users; service use data from the organization that runs the

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[4] High schools received a fourth poster that showcased a couple sitting together with the text "I love my boyfriend, but I don't think I am ready for sex." This poster was only displayed in high schools because of the specific reference to teens contemplating sex.

BrdsNBz service; and an in-school online questionnaire in the schools receiving promotions. Service use data included how many new users accessed the service and how many texts were sent to the service. When individuals used the service for the first time, they first had to "opt in." To opt-in, the texter sent the code word (NCTeen) to a phone number that allowed users to access the terms of use and then be able to use the service. The number of opt-ins thus represented new service users.

A short text message questionnaire was sent every two weeks to all new service users. An open-ended question asked about where they heard about BrdsNBz. Of the 173 new service users who were sent a text questionnaire over the campaign period, 76 responded for a response rate of 43.9%.

The in-school online questionnaire was conducted in December-January in four of the six schools in which the campaign was run. Questions asked about awareness, use and perceptions of the service. In the middle schools, students typically took the survey during a specific class period (i.e., physical education) and in the high school, computer labs were set up to allow students to access the online questionnaire during a specific class period (i.e., second block). Of the six schools, four (three middle schools and one high school) asked students to complete the online questionnaire. Students in one of the middle schools that participated completed a shortened questionnaire due to time constraints. The total number of students surveyed was 2,204. The four schools had 2,980 students enrolled as of Jan. 1, 2013 with an average daily attendance rate of 95%. Since 48 parental opt outs were collected, the possible number of participants on any given day in the four schools was 2,782. Thus, the on-line in-school survey response rate was 79% (See Appendix B for a table of the response rates by school).

Service use did increase during the campaign (See Figure 2, which shows the number of new BrdsNBz users and the number of texts the service received per month).

Figure 2: BrdsNBz service use, June 2012-December 2012
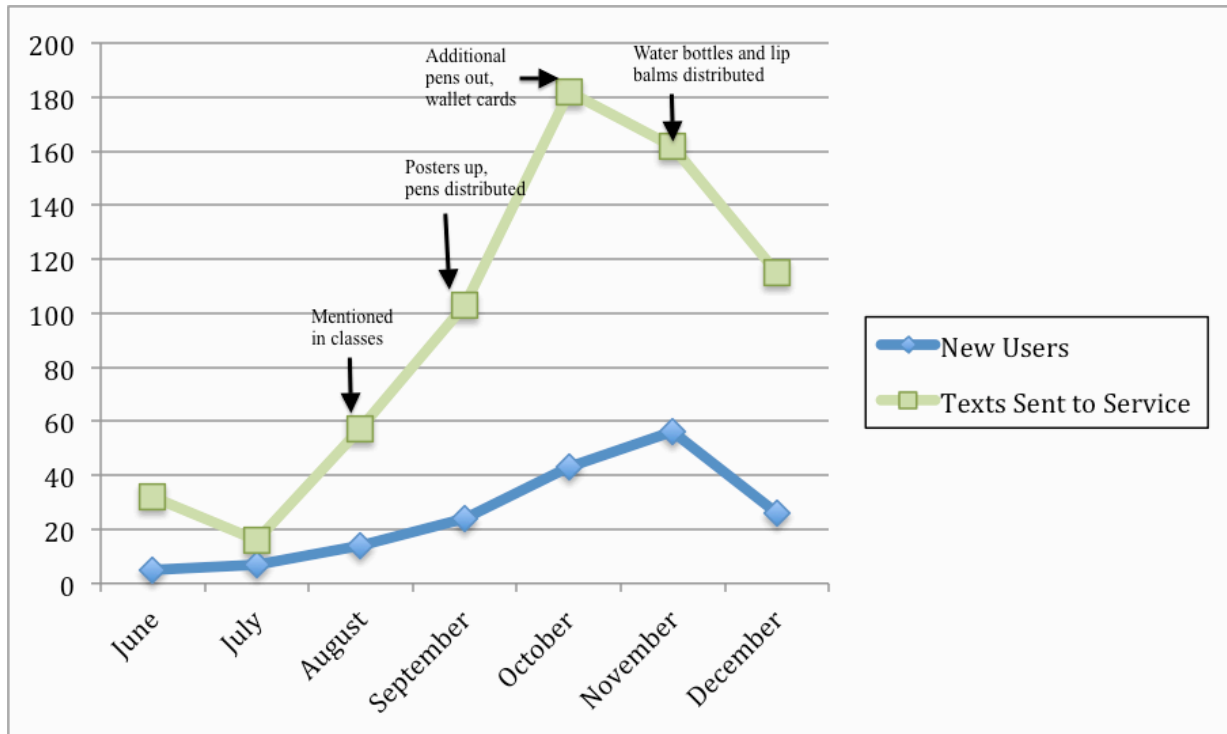
As can be seen in Figure 2, promotion of the service began in September, although one school was promoting the service as early as late August, which is when a brief spike in use and texts sent to the service occurred. In September, schools began displaying the posters, which also was associated with an increase in use. Later in September, pens and wallet cards were distributed to students as service use continued to increase. In mid-October to early November, additional promotional items including lip balms and water bottles were distributed, as service use continued. The peak of new users but not a concomitant increase in texts in November was probably due to one health educator encouraging her students to save the BrdsNBz service number in their phone

and to opt in to the service. Her students may have opted in but not asked a question. The use data dropped off in December after all promotional items had been distributed and only the posters remained.

According to the text-based survey, 67.1% of new users (N= 51) said they heard about BrdsNBz through the campaign or through their school.

In the school-based on-line survey, more than half (50.4%) of respondents said they had heard of BrdsNBz. Almost two-thirds (63.7%) of teens who had heard of BrdsNBz reported hearing about it or seeing advertising for it in the last three months. Additionally, teens were able to not only recognize that they had heard of BrdsNBz, but a number of teens were able to recall information about the service.[5] Of participants who said they had heard of a sexual health text service, 55.8% correctly identified the name of the service as "BrdsNBz"[6] and 46.3% correctly identified the purpose of the service as answering teens' questions about sexual health via text message.[7]

Most teens who reported hearing of BrdsNBz in the last three months (n=651) reported hearing about BrdsNBz through posters (59.8%, n=389), a class (50.4%, n=328), from giveaway items (37.2%, n=242), from flyers or handouts in school (25.5%, n=166) or from friends (21.4%, n=139).[8] Of all the teens in the schools surveyed, regardless of

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[5] Only data from three of the schools was used in this analysis because one middle school required a shortened questionnaire. The open-ended recall questions were omitted from the shortened questionnaire and instead a recognition question was asked.

[6] Or some spelling variation of BrdsNBz.

[7] Responses that indicated BrdsNBz answered sexual health questions via text were coded as correct.

[8] This question was asked as a "check all that apply," so participants could indicate all sources in the last three months from which they heard about BrdsNBz.

their awareness of the BrdsNBz service, 6.7% (n=144) used the BrdsNBz service. Of

participants who indicated they had heard of BrdsNBz, 14.1% used the service.

To examine whether service use differed by school, a series of variables related to

awareness were assessed. The high school in the analysis appeared to have been the most

successful at promoting the service with more teens in the high school having heard about

BrdsNBz (62.5%) and using the BrdsNBz service (11.2%) (See Table 2). Teens in the

high school also reported receiving more promotional items such as pens (26.3%) and

water bottles (17.7%).

Table 2. School exposure to service and campaign

School name	Heard about BrdsNBz % (n)	Saw posters promoting service % (n)	Received pen % (n)	Received water bottles % (n)	Used BrdsNBz % (n)
High School A (802)	62.5 (501)	44.3 (355)	26.3 (211)	17.7 (142)	11.2 (90)
Middle School A (596)	54.5 (325)	11.9 (71)	9.1 (54)	5.4 (32)	2.9 (17)
Middle School B (311)	53.1 (165)	28.3 (88)	17.7 (55)	7.4 (23)	7.7 (24)
Middle School C (416)	11.8 (49)	4.8 (20)	1.7 (7)	2.2 (9)	3.1 (13)

To examine differences in service awareness and use by school, z tests of

proportion were used. Service awareness differed by school, with significantly more

students in High School A reporting awareness of the service than students in any other

school ($p<.001$). Students in Middle School A and Middle School B were also

significantly more likely to be aware of the service than students in Middle School C

($p<.001$). Service use did differ by school with teens in two schools more likely to have

sent questions to the BrdsNBz service than teens in the other schools. Significantly more

students in High School A and Middle School B used the BrdsNBz service than the

students in the other two schools ($p<.01$). Teens in High School A, the school that had

significantly more awareness of the service and more use, had a health educator who served as a champion for the campaign. Teens in Middle School B, which also had a higher service use, also had a health educator who was a proponent of the service. Middle School C, which had the least awareness and service use, had a health educator who served as a champion for the service but who worked with the school only on a part-time basis.

Discussion and Conclusions

The three types of data used to assess the effectiveness of the campaign document that the campaign successfully informed teens about the BrdsNBz service and increased use. Although not all teens in all the schools were aware of the service, the use data suggests a correlation between campaign-related activities and use. The text message survey data indicate that the majority of teens who used the service for the first time during the campaign heard about the service from the campaign.

While the school-based survey can not conclusively show that there was an increase in awareness of the service since no baseline data were collected, it does show that a number of teens in the school systems that received promotions were aware of the service and 14% of students who were aware of the service used it. The students reported hearing about BrdsNBz through the various campaign elements including posters and promotional items, with the teens in High School A, the school with the campaign advocate, reporting the most awareness and use. Which school teens attended appears to have had an impact on service use. Teens in the high school with the health educator who helped promote the campaign and those in the middle school with the campaign-endorsing health teacher were more likely to use the service than those in schools with

less enthusiastic campaign facilitators. Descriptive statistics of how students heard of the service supports this conclusion, as about half of the students who said they had heard of BrdsNBz also said they had heard about it in a class. Middle school C also had a health teacher who supported the project and worked to promote the service, but since her work at the school was part time, this could have limited interaction with students and lessened the level of campaign awareness. This campaign relied heavily on health educators who typically are the school employee most likely to be communicating with students about health issues. One purpose of this evaluation was to assess whether providing schools through their health educators with items to promote a sexual health text service would increase use and awareness. The results suggest that it is important to enroll health educators in the project to ensure endorsement and distribution of materials.

While this study design suggests that the *Everyone has Questions* campaign increased awareness and use of the BrdsNBz service, a number of limitations should be kept in mind. First, the data related to service use are correlational, so we cannot be sure that the new users were a direct result of the campaign, and the sample does not have a control group to compare use and awareness against. The lack of control schools was in part due to an inability to predict the extent to which students would use the service. It was judged to be more important at this early stage in the evaluation of such services to ensure an adequate sample size of users rather than to be able to compare campaign effects between schools. Second, although the text survey had a good response rate, we cannot be sure the sample is representative of everyone who used the service. It is not clear which users did not respond. Third, the school-based online survey data provides information on awareness and service use, but not all schools in which the campaign was

conducted participated in the post-exposure survey, which could limit the generalizability of findings.

It also should be noted that the campaign was expensive (approximately $5000) when the relatively small number of users is taken into account. Clearly, promotion of the service was helpful in generating use but return on investment is also important to consider, especially for low-budget non-profit organizations such as the organization running BrdsNBz. This extensive campaign that included posters, word of mouth, and promotional items cost approximately $833 per school. Based on the in school survey, four of the schools had 144 BrdsNBz service users. This means that the campaign cost approximately $24 per user ($833/144).

Mass communication campaigns to promote health often do not focus on cost effectiveness, but campaign planners probably should think more about how they can get the most for their often scarce funds (Bertrand, O'Reilly, Denison, Anhang, & Sweat, 2006). Noting that the posters and in class information about BrdsNBz were two of the most common ways teens indicated they had heard of the service suggests that perhaps focusing future in-school campaigns on posters and word of mouth would be sufficient to increase use. Relatively expensive promotional items, such as water bottles and pens, may not be worth the cost.

Despite the increase in use of the service over the course of the campaign, only 14% of teens who heard of BrdsNBz reported using it. This low level of use among those who had heard of the service could be due to a number of factors, such as a lack of understanding of how to use the service, a lack of sexual health questions in the time period, or a lack of interest in ever using such a resource. Future research should examine

what influences teens' decisions to use such services and why they might not use such services when they are aware of them. Since more than 85% of the students in the school survey sample said they send text messages, clearly this medium is a viable option for reaching teens, but it will be valuable to learn more about service perceptions and motivations for use. The following chapters in this dissertation help to address some of these questions.

Overall, the *Everyone has Questions* campaign promoting the BrdsNBz service was successful at increasing use among middle school and high school students. Having a campaign advocate or champion in the school who will also promote the service and distribute campaign materials may be crucial.

CHAPTER 3

Testing a model of sexual health information seeking via text messaging

Text message services that provide sexual health information to adolescents are becoming increasingly popular, although it is unclear when a teen might turn to such a resource for sexual health information. Teens have indicated that they are interested in obtaining sexual health information from parents, peers, and physicians (Boyer et al., 2011), but they often face barriers such as embarrassment (Ogle, Glasier, & Riley, 2008) or a lack of confidence in the information provided (Boyer et al., 2011). Since sexual health text services provide teens access to information in an anonymous and convenient format, such services might be a way to overcome such barriers.

Although specific theories related to adolescents' sexual health information seeking do not yet exist, the current literature provides insight into what motivates someone to seek information more generally. Information seeking is also becoming an increasingly popular area of study within health communication, with researchers focusing on when and why a person will seek health information.

A number of models of information seeking exist (e.g., the Planned Risk Information Seeking Model, the Comprehensive Model of Information Seeking, the Theory of Motivated Information Management, etc.) but it is not clear in the interactive media environment which factors are most important for information seeking by adolescents, particularly about sex. Adolescents have a number of questions related to

sexual health, but they often do not feel that they can go to health care professionals or their parents for information (Boekeloo et al., 1996; Ogle et al., 2008). The majority of teens have sought health information online, and many online teens (44% in one nationally representative sample) have sought information about pregnancy, birth control, HIV/AIDS or other STDs (Rideout, 2001). More than one-third (39%) of teens who have searched for health information online indicated that they changed their behavior because of the health information they found (Rideout, 2001), and having accurate information about sexual health is important for adolescent sexual health decision making (Bearinger et al., 2007). Although many teens are searching online for sexual health information, Jones and Biddlecom (2011) found from interviews with a small sample of adolescents that the Internet was not seen as a main source of information about contraception and abstinence, in part because the adolescents did not trust the information they could find.

It currently is not clear what affects an adolescent's decision to use a new media resource, such as a text messaging service, for sexual health information. This paper proposes a theoretically grounded model of what influences teens' decisions to use an interactive sexual health text message service and tests the model with a sample of adolescents.

Information seeking models

A number of information seeking models and theories exist. Most of these are based on the idea that uncertainty leads to either emotion or anxiety that can then produce information seeking behaviors (Afifi & Morse, 2009; Afifi & Weiner, 2004; Brashers, 2001; Kahlor, 2010). Some information seeking models developed in other fields are relevant to adolescents' use of new media for sexual health information. For example,

Afifi & Weiner (2004) proposed the Theory of Motivated Information Management (TMIM) to address information seeking in interpersonal contexts. The model has been applied to a number of topics including partner discussions about sexual health (Afifi & Weiner, 2006) and family discussions about organ donation (Afifi et al., 2006). Other theories, such as the Planned Risk Information Seeking Model (PRISM), proposed by Kahlor (2010), do not specify the context in which the model applies, suggesting that the model is relevant for both interpersonal and mediated communication.

Little empirical research has examined motivators of health information seeking in a computer-mediated environment, although a few models have been developed. Dutta-Bergman (2006) proposed an integrated model of health information seeking on the Internet based on a number of theories such as the Theory of Planned Behavior and the Health Belief Model. The model proposed that the situation, the seeker's personality, demographic characteristics and history impact his or her motivation and efficacy for Internet use, which then in turn may impact more distal outcomes related to health (Dutta-Bergman, 2006). Models more generally associated with a patient's seeking of health information have also been posited, focusing on the role of context (e.g., situation the person is in), intervening variables (demographic, psychological, etc.), an activating mechanism (such as self efficacy) and seeking behaviors (Josefsson, 2006). Taking these models into account, as well as the various literatures on interpersonal communication and more general studies of health information seeking, a theoretical framework that is relevant to the computer-mediated environment of text messaging for sexual health information is posited and tested here.

Theoretical linkages

Because text messaging is a kind of computer-mediated communication that involves elements of interpersonal communication (one person texts and another person responds), interpersonal communication models are relevant. One theory that has empirical support is the Theory of Motivated Information Management (See Figure 3) (Afifi & Weiner, 2004). According to TMIM, uncertainty about information can lead to anxiety that prompts individuals to evaluate the possible outcomes of seeking the desired information and to assess whether they are able to acquire the information they desire (Afifi et al., 2006; Afifi & Weiner, 2004; Afifi & Weiner, 2006). The most recent revision of the model (Afifi & Morse, 2009) includes emotion as a mediator influencing information seeking, instead of only anxiety.

Figure 3: Theory of Motivated Information Management (Afifi & Weiner, 2004)
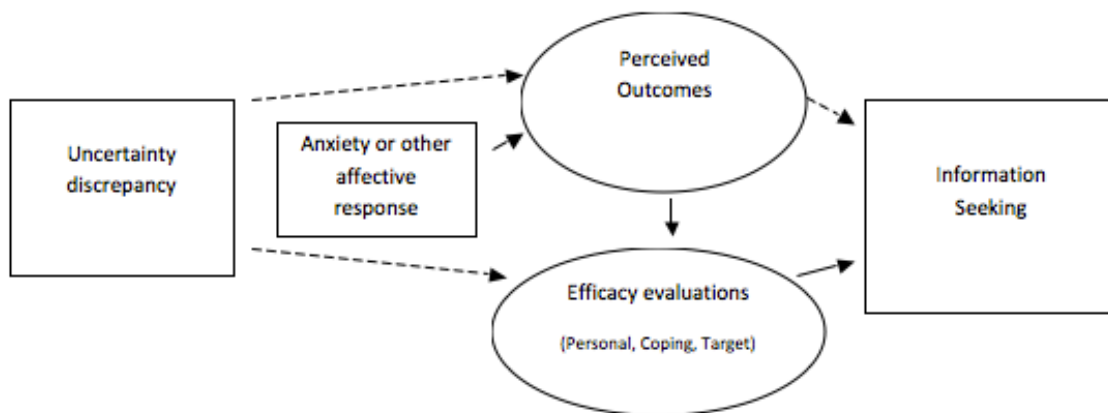
TMIM, similar to other information seeking theories (i.e., Uncertainty Management Theory) posits that the information seeking process begins with uncertainty. According to Brashers (2001), uncertainty exists when "details of the situation are ambiguous, complex, unpredictable, or probabilistic; when information in unavailable or inconsistent; and when people feel insecure in their own state of knowledge or the state

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of knowledge in general" (p. 478). TMIM does not use the general concept of uncertainty, however, and focuses instead on the specific role of uncertainty discrepancy, which is the difference between a person's current level of uncertainty and his or her desired level of uncertainty (Afifi & Weiner, 2004). Other researchers have used similar concepts in their information seeking models. The Planned Risk Information Seeking Model (Kahlor, 2010), for example, includes the concept of "information insufficiency." Information insufficiency is the "perceived need for additional information, which is the difference between perceived current knowledge and knowledge needed to deal adequately with the risk" (p. 374).

Information insufficiency, like uncertainty discrepancy, is derived from the concept of a sufficiency threshold (Chaiken, 1980) postulated in the Heuristic-Systematic Processing Model (Chaiken, 1987). That model of information processing proposes that how individuals process information depends on the distance between a person's actual confidence about an issue and their desired confidence level (Afifi & Afifi, 2009). This gap between the actual level of confidence and the desired level of confidence can be closed when one has sufficient information about the desired topic. Although information insufficiency is not referred to as "uncertainty," it fits with Brashers' (2001) definition as it focuses on insecurity about levels of knowledge. Here the term "uncertainty discrepancy" will be used because more empirical research has documented the existence of this concept.

When a person experiences uncertainty discrepancy, he or she may feel anxiety that he or she then wants to reduce (Afifi & Weiner, 2004; Brashers, 2001). The revised TMIM also suggests that anxiety may not be the only motivating emotion, as other

emotions such as fear and hope may stimulate information seeking (Afifi & Morse, 2009). Discrete emotions are believed to result from unique combinations of cognitive appraisals of a situation (Lazarus, 1991; Scherer, Schorr, & Johnstone, 2001). These appraisals are often automatic (Zemack-Rugar, Bettman, & Fitzsimons, 2007) and involve assessing how an individual's goals may be impacted by a situation. This can result in tendencies to think or act in certain ways (Fredrickson, 1998; Frijda, Kuipers, & ter Schure, 1989; Lazarus, 1991). Appraisal theories of emotion predict that higher levels of uncertainty lead to discrete emotions, such as fear, anxiety, or hope (Lazarus, 1991; Smith & Ellsworth, 1985).

Other information seeking theories also are based on elements of the appraisal theories of emotions. The Risk Information Seeking and Processing Model (RISP) posits that perceptions of risk are associated with emotions (Griffin, Dunwoody, & Neuwirth, 1999; ter Huurne, Griffin, & Gutteling, 2009). Previous research has indicated that there are significant and positive associations between risk perceptions and affective responses and perceived need of additional knowledge (ter Huurne et al., 2009). These theories indicate that when an adolescent is more uncertain about a sexual health topic than he would like to be, he is likely to feel some sort of affect,[9] and this affective response may occur automatically and impact future behaviors. In Kahlor's (2010) test of PRISM, affect, which in her study captured elements of worry and fear, was found to be a significant predictor of information seeking.

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[9] Although there are some conceptual differences, in this project I use the terms affect and emotion interchangeably to represent the person-environment relationship that results from various internal states.

According to the TMIM, after experiencing some type of affect, an individual will progress through a series of stages, cognitively assessing (although this may be done subconsciously) outcome expectancies and efficacy evaluations. Outcome expectancies are defined as the benefits and costs that a person expects will result from action (Afifi & Weiner, 2004). Outcome expectancies are similar to attitudes, only more specific in terms of the context of information seeking. One example of an attitude toward seeking would be a person's perception that seeking information about his sexual health is useful. Research has found mixed results in the relationship between information seeking and outcome expectancies (e.g. Afifi et al., 2006). Attitudes toward seeking have been found to significantly predict seeking behaviors, however (Kahlor, 2010), and research has found that attitudes toward behaviors are strong predictors of actual behavior (Ajzen & Fishbein, 2005). Because of the amount of research that has been done on attitudes and the stronger understanding of their relationship to behavior, this model will include attitudes toward seeking instead of outcome expectancies.

In addition to outcome expectancies, TMIM proposes that people make efficacy evaluations, which includes assessing one's ability to perform the seeking behavior. TMIM focuses on three types of efficacy: communication efficacy, coping efficacy and target efficacy. Communication efficacy "involves actors' assessments of their ability to competently engage in the information management action from the target source," (Afifi & Morse, 2009, p. 89). This concept is similar to the concept of self-efficacy, which according to Bandura (2004) is one's belief that he or she has the ability to exert control over a specific behavior. Self efficacy has been found to be an important motivator of behavior change (Strecher, DeVellis, Becker, & Rosenstock, 1986).

Self-efficacy is also similar to the concept of perceived behavioral control from the Theory of Planned Behavior, which Kahlor (2010) uses in the PRISM information-seeking model. In Kahlor's model, perceived behavioral control is a significant predictor of information seeking. Similar concepts related to self-efficacy have been studied in new media environments. Internet self efficacy, which is a person's perceived ability to use the Internet to get health information, has been found to be a mediator between health and web variables and information seeking behaviors (Rains, 2008). In Dutta-Bergman's (2006) model of Internet use for health care, efficacy is predicted to impact Internet use behaviors and more distal health outcomes.

Based on these various findings, it is likely that communication efficacy related to text messaging would mediate the connection from uncertainty discrepancy and emotional response and information seeking behaviors. For example, an adolescent who has some knowledge about STDs, but doesn't feel that she knows enough about STDs to adequately protect herself, may experience anxiety about her lack of knowledge. She may then evaluate whether she thinks she is capable of accessing the information she desires. This decision about whether she has the ability to get the desired information will influence her information seeking behaviors.

The second type of efficacy in TMIM is coping efficacy, which is related to the individual's judgment of whether he or she has the resources to deal with the outcomes of using a particular information management strategy. An example of this would be whether a woman thinks she can deal with the knowledge that her partner might have had other sexual partners. If she does not feel that she could cope with knowing how many people her partner has been with, she is not likely to discuss sexual history with him

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(Afifi & Weiner, 2006). Although the TMIM makes a case for this type of efficacy, it does not seem to fit in a mediated situation and is more tied to some of the interpersonal contexts in which TMIM has previously been studied. It will therefore not be included in the model or this study.

Target efficacy in TMIM is related to an individual's assessment of whether the target the person hopes to acquire information from has "access to the sought-after information and is likely to be honest in her or his transmission of information" (Afifi & Morse, 2009, 89). The concept of target efficacy is similar to the concept of credibility, which is often examined in the study of computer-mediated communication (Eysenbach, 2007; Yifeng & Sundar, 2010) and has been found to be a significant predictor of information seeking behaviors online (Lemire, Paré, Sicotte, & Harvey, 2008). Three dimensions of credibility have been identified: medium credibility (the level of trust people have in a specific medium); source credibility (the perceived ability and motivation of the source within the medium to provide accurate information); and message credibility (elements of the message itself are examined and determined to be credible or not) (Yifeng & Sundar, 2010).

Source credibility is the most relevant type of credibility in this project as it may influence one's decision to use a service, and it is also the most in line with the idea of target efficacy proposed in the TMIM. Target efficacy has been found to be a significant predictor of seeking behaviors (Afifi & Weiner, 2006), as has credibility perceptions (Lemire et al., 2008). Although the TMIM indicates that credibility is a part of the efficacy evaluations, it seems more likely that in a computer mediated environment, credibility and self-efficacy would work independently of each other and therefore will

be included as independent concepts in the model and empirical tests. These elements of attitude, self-efficacy evaluation, and credibility assessment likely influence one's intent to and experience with seeking information.

**Connecting the model to text messaging for sexual health information**

In the example of using a text message service for sexual health information, it is proposed that even before an adolescent experiences uncertainty, individual factors will predispose him or her to some level of uncertainty (See Figure 4). Other models have posited that predisposing factors, such as demographics, personality or situation may impact evaluations and then outcomes indirectly (Dutta-Bergman, 2006; Josefsson, 2006). Adolescence as a developmental stage is a time of physical, cognitive, and emotional growth (Archibald et al., 2008). Teens may be more predisposed to experience uncertainty if they are from certain backgrounds, or if they are experiencing the changes associated with adolescence differently than their peers. For early maturing females, for example, the mass media have been found to be important sources of information, sometimes even serving as a kind of "sexual super peer" (Brown, Halpern, & L'Engle, 2005). Early maturing teens may be more likely to have additional levels of uncertainty because of the timing in which they are experiencing changes, and may turn to the media for information because other sources such as peers and parents may not recognize their interest in sexual topics.

An adolescent's cognitive susceptibility to sex may also predispose him or her to greater levels of uncertainty. Cognitive susceptibility to sex is indicated by a teen's more permissive attitudes toward sexual behaviors and a willingness to engage in sex even though he or she might not be planning to have sex (L'Engle & Jackson, 2008; L'Engle,

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Jackson, & Brown, 2006). Adolescents with a higher cognitive susceptibility to sex have been found to have greater sexual desire, increased perceptions of the amount of sex in which their peers are engaged and more confidence in having sexual relationships than their abstinent peers (L'Engle et al., 2006). Pubertal timing and cognitive susceptibility, as well as various demographic factors, could impact the adolescent's level of uncertainty discrepancy, indicating that there is more information the teen would like to know.

According to the TMIM, uncertainty discrepancy will generate an emotional response. Depending on the adolescent's immediate context, this emotional response could involve perceptions of risk or anxiety, as many information-seeking models posit (e.g. TMIM, RISP), or could increase interest or confusion, which could encourage health information seeking. Motivated by emotions, the adolescent will assess his or her attitude toward seeking, in this case the benefits and drawbacks of seeking sexual health information from a text service. The adolescent will also assess efficacy levels associated with seeking information from a particular source. This includes assessing their personal efficacy, which is whether they are confident in their ability to get the desired information in the specified manner (e.g., text messaging). The adolescent would then assess the credibility of the source, which is similar to target efficacy as proposed in the TMIM and a distinct mediator often studied in CMC research. If the teen has positive attitudes, has sufficient efficacy, and views the text line as credible, he/she should then intend to seek information from the text message service.

Figure 4: Proposed Model of Motivators of Sexual Health Information Seeking
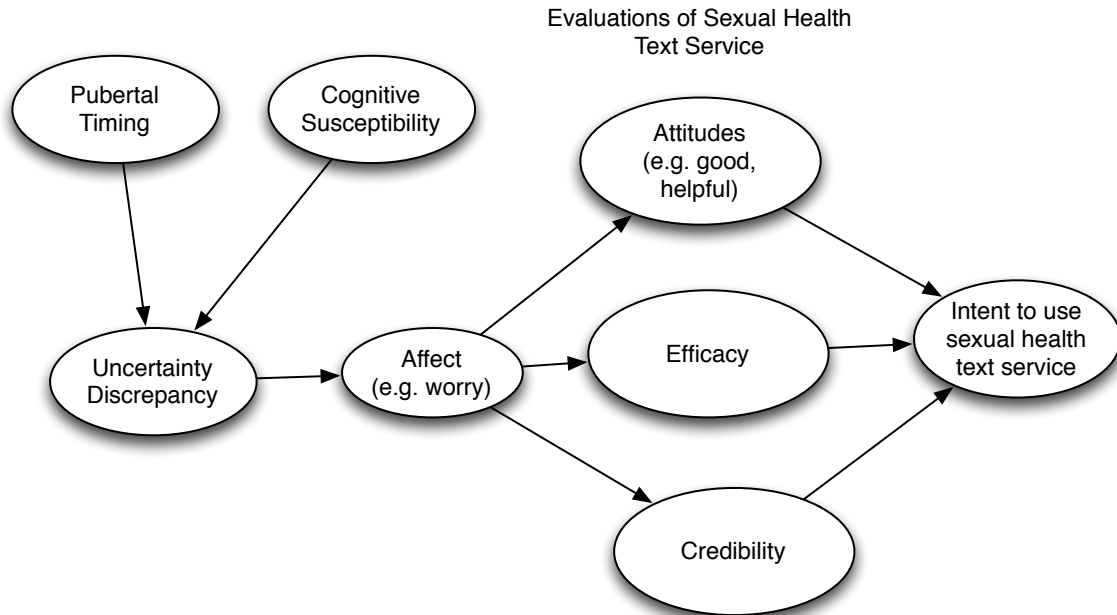
Based on the proposed model the following hypotheses and research questions will be addressed:

H1: Adolescents who experience early pubertal timing will have increased levels of uncertainty discrepancy.

H2: Adolescents who have higher levels of cognitive susceptibility to sexual behavior will have increased levels of uncertainty discrepancy.

H3: Uncertainty discrepancy will lead to an affective response (e.g., anxiety, worry).

H4: Uncertainty discrepancy, as mediated by affect, will be related to (a) attitude evaluations, (b) efficacy evaluations, and (c) credibility evaluations.

H5: Positive evaluations will be associated with greater intent to use a sexual health text message service for sexual health information.

RQ1: Does the proposed model, as applied to sexual health information seeking among adolescents, provide a good fit for the data?

Method

A three-month long campaign promoting a local sexual health text message service was conducted in three middle and three high schools in one Southeastern state in Fall 2012. The campaign promoted the sexual health text service BrdsNBz, which allows teens to text a sexual health question to a trained health educator (Phillips, 2010). BrdsNBz has been available in the state since 2009, but promotion had been limited. Students in three of the schools (two middle and one high school) completed a questionnaire through Qualtrics, an online survey management program.[10] All students were asked to assent before completing the survey, and parents could opt their student out of participating when forms went home with school information at the beginning of the year. The survey took approximately 20 minutes and was conducted during a time at school that administrators deemed appropriate (e.g., during the second block period in the library). For participating in the project, teens could provide their name and email address at the end of the otherwise anonymous survey for a chance to win gift cards for students in their school. The University's Institutional Review Board approved all procedures.

Of the students in the three schools whose data are used in this study, 1,709 participated in the survey out of 2,040 who would have been able to complete it on any given date for the response rate of 87%. Data were entered first into PASW 18.0 for

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[10] Two schools that received the promotional campaign did not complete the survey, as access to students was an issue. Another school completed a condensed version due to a lack of time and student availability. The condensed survey did not include any of the measures needed to assess the fit of the model; therefore, data from that school were not used.

cleaning and preliminary analysis. Cases then were selected for inclusion in the sample if participants indicated that they sent text messages ("Do you send text messages?") and they had heard of the BrdsNBz service ("Have you heard of a sexual health text message service called BrdsNBz?"). These two criteria were necessary because lack of the use of text messaging would impact intent to use a text message service and participants who had not heard of BrdsNBz were not asked the intent to use question. This left a sample of 870 participants.

Measures

Uncertainty discrepancy was measured with three items. Teens were asked to select the statement that best described them from the following options: "Which of the following statements best describes you: I know everything I want to about sexual health; I know a lot about sexual health, but I would like to know a little more; I know some about sexual health, but there is still some I would like to know; I know a little about sexual health, but there is still a lot I would like to know; I know nothing about sexual health, but there is very much I would like to know." The other two items were on a five-point Likert-type scale (1 = completely disagree, to 5 = completely agree) "I want to know more about sexual health topics than I do" and "I wish I knew more about sexual health."

Previous research has used a change score to assess uncertainty discrepancy (Afifi & Weiner, 2004; Afifi & Weiner, 2006) and the related concept of information insufficiency (Kahlor, 2007, 2010; Yang & Kahlor, 2012), taking the difference between participant ratings of their current knowledge and their desired knowledge. For this study, items were originally adapted to calculate a change score, but pilot test feedback from

adolescents indicated that the items were unclear and confusing. Additionally, previous research has indicated that calculating a change score can be problematic (Rosenthal, 2012). Given that other researchers have successfully measured the similar construct of information insufficiency without a change score, a similar strategy was employed here. The scale was found to be reliable (α=.79).

Demographic characteristics such as age (how old are you?), gender (what is your gender?) and race were measured. *Pubertal timing* was measured with the question "Do you think your body development is earlier or later than most girls/boys your age? Much earlier, somewhat earlier, about the same, somewhat later, much later." This item has been found to be a strong proxy for other measures of pubertal timing such as breast development and age at menarche (Halpern, Kaestle, & Hallfors, 2007).

Cognitive susceptibility was measured with five items on five point scales (L'Engle & Jackson, 2008; L'Engle et al., 2006) with items such as "If you had a boyfriend/girlfriend, how sure are you that you could refuse to have sex with him/her if you didn't feel like it? Extremely sure to not at all sure" and "How likely is it that you will have sex while in high school? Very unlikely to very likely." The scale was found to be reliable (α=.84).

Affect was measured with two items that assessed more traditional affect. Items were measured on a five-point Likert-type scale ranging from completely disagree to completely agree: "When I am unsure about something related to sex, it makes me feel nervous," and "When I am unsure about something related to sex, it makes me feel worried." The items were highly correlated with each other r=.68, p<.001.

Attitudes toward the sexual health service were measured with three items, measured on a five-point Likert-type scale ranging from completely disagree to completely agree: "Services that let you text a sexual health question to a health educator can be…helpful; good; useful." The scale was found to be reliable (α=.94).

Efficacy evaluations were measured with three items on a five-point Likert-type scale ranging from completely disagree to completely agree (e.g. "I am confident I know how to use the BrdsNBz service."). The scale was found to be reliable (α=.84).

Credibility of the service was measured with three items on a five-point Likert-type scale ranging from completely disagree to completely agree (e.g. "I can trust information from BrdsNBz."). The scale was found to be reliable (α=.91).

Intent to use the service was measured with one item: "Suppose you had a question about a sexual health topic. How likely is it that you would use the BrdsNBz service? Very unlikely, somewhat unlikely, somewhat likely, very likely." Intent to use the service was chosen as the dependent variable because the campaign promoting the service had been in schools for only three months. In such a short amount of time, not all teens may have had a question related to sexual health. Using intent allowed us to use all cases. The intent and use variables (whether participants used the BrdsNBz service) were moderately correlated ($r=.26$, $p<.01$).

Results

Of the 870 participants whose data were included in the analysis, 53% were female. Ages ranged from 9-19, with a mean age of 14.4 ($SD=1.79$). The majority reported being White (89.4%), with 3.6% multi-racial, 2.8% Black, 2.2% Latino/a, 1%

Asian, and 1% Other. These demographic distributions were similar to the characteristics

of the surveyed population (Proximity, 2013; United States Census Bureau, 2010).

Preliminary tests of the data indicated that skewness and kurtosis were not

problematic, as all variables had a skew of less than 1.5 and kurtosis less than 1.5,

meeting acceptable standards (Kline, 2010). A missing data analysis revealed that every

variable had less than 5% missing, so missing data points were corrected for with

expectation maximization imputation in PASW 18.0. Data were then entered into the

IBM structural equation modeling software program AMOS. To test for mediation in

addition to the direct paths in the model, bootstrapping procedures using 2,000 bootstrap

samples and bias-corrected confidence intervals were used.[11] The zero-order correlation

matrix with the means and standard deviations for all variables included in the SEM

model analysis are presented in Table 3.

Hypothesis 1, which predicted that adolescents who experience early pubertal

timing would have increased levels of uncertainty discrepancy, was not supported (β = -

.01, *ns*).

Hypothesis 2, which predicted that adolescents with higher levels of cognitive

susceptibility would have increased levels of uncertainty discrepancy, was also not

supported (β =-.06, *ns*).

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[11] Preliminary T-tests were used to examine the data to see if males differed from females
on key variables and if users differed from non-users. Males did not differ significantly
from females on most variables, and when they differed, means were still in the same
direction. Non-users and users differed significantly on most variables, with users having
higher means for most variables than non-users. Because there was some difference in
these groups, in addition to the results presented here, models were run with females
only, males only, users only, and non-users only. Significant relationships were found to
be the same in all models regardless of gender or past service use, so all participant data
was used in subsequent analyses.

Table 3. Correlation matrix of SEM model variables (n=870)

Variable	Mean	SD	1	2	3	4	5	6	7
1. Pubertal timing	2.81	.90							
2. Cognitive susceptibility	2.37	1.05	-.13**						
3. Uncertainty	2.56	1.00	.03	-.07*					
4. Affect	2.39	1.19	-.01	-.06	.44**				
5. Attitude toward service	3.88	1.03	-.02	-.02	.30**	.17**			
6. Efficacy toward service	3.63	1.08	.03	-.02	.19**	.06	.52**		
7. Credibility of service	3.65	1.01	.04	-.08*	.23**	.11**	.53**	.76**	
8. Intent to use service	2.00	1.00	-.02	.02	.37**	.19**	.32**	.36**	.40**

*p<.05, ** p<.01 (2-tailed)

Hypothesis 3, which predicted that uncertainty discrepancy would lead to an affective response, was supported, as greater levels of uncertainty discrepancy about sexual health were associated with increased affect (β = .58, $p<.001$).

Hypothesis 4, which predicted that uncertainty discrepancy, as mediated by affect, would be related to (a) attitude evaluations, (b) efficacy evaluations, and (c) credibility evaluations, was also supported. The bootstapping analysis revealed a significant indirect effect for affect as a mediator of (a) uncertainty discrepancy to attitudes (β = .17, $p<.001$); (b) uncertainty discrepancy to efficacy evaluations (β = .13, $p<.001$); and (c) uncertainty discrepancy to credibility evaluations (β = .14, $p<.001$).

Hypothesis 5, which predicted that positive evaluations of attitudes, efficacy and credibility would be associated with greater intent to use a sexual health text message service was supported. The path between attitudes and intent was significant (β = .14,

p<.01) as was the path between efficacy evaluations and intent (β = .16, *p*<.05) and credibility (β = .24, *p*<.01).

RQ 1 asked if the proposed model, as applied to sexual health information seeking among adolescents, provided a good fit for the data. The model did not provide a good fit for the data, as evidenced by a significant chi-square (χ^2 = 1662.10, *p*<.001). Although the chi-square measure of fit is sensitive to large sample sizes, other measures of model fit also were less than ideal (RMSEA=.097; confidence interval at 90% =.093-.101; *p*-close=.000; Standardized RMR=173; CFI=.862).

The program AMOS provides modification indices that can help indicate where additional paths might be useful. The modification indices indicated a number of possible options, two of which were supported by previous literature. The modification indices encouraged a path between attitudes and efficacy, which is similar to the path in TMIM between outcome expectancies and efficacy that has been found to be significant in previous research with adolescents (Afifi & Afifi, 2009). Additionally, the model indicated that a path between efficacy and credibility would benefit the model. Such a relationship is also supported by previous TMIM work that has looked at the concept of target efficacy, similar to credibility, as part of efficacy evaluations (Afifi & Weiner, 2004). Given the supportive literature, the two additional paths were added and the model was run again.

The revised model was a good fit for the data (RMSEA=.053; confidence interval at 90% =.046-.059; *p*-close=.258; Standardized RMR=.078; CFI=.976, χ^2 =278.77, p<.001). Although the chi-square test statistic was significant (*p*<.001), this measure of fit is sensitive to large sample sizes (Bearden, Sharma, & Teel, 1982), so the other measures

of fit were used. In the revised model, most of the paths in the original model were still

significant (See Figure 5). Affect no longer had a direct effect on efficacy ($\beta = .12$, *ns*),

however, and efficacy no longer had a direct effect on intent to seek information from the

service (($\beta = .09$, *ns*). The indirect effects of attitudes on credibility through efficacy were

significant ($\beta = .46$, *p<.001*) as were the indirect effects of efficacy on intentions to use

BrdsNBz through credibility ($\beta = .08$, *p<.01*).

Figure 5: Revised Model of Motivators for Sexual Health Information Seeking

Evaluations of BrdsNBz Service
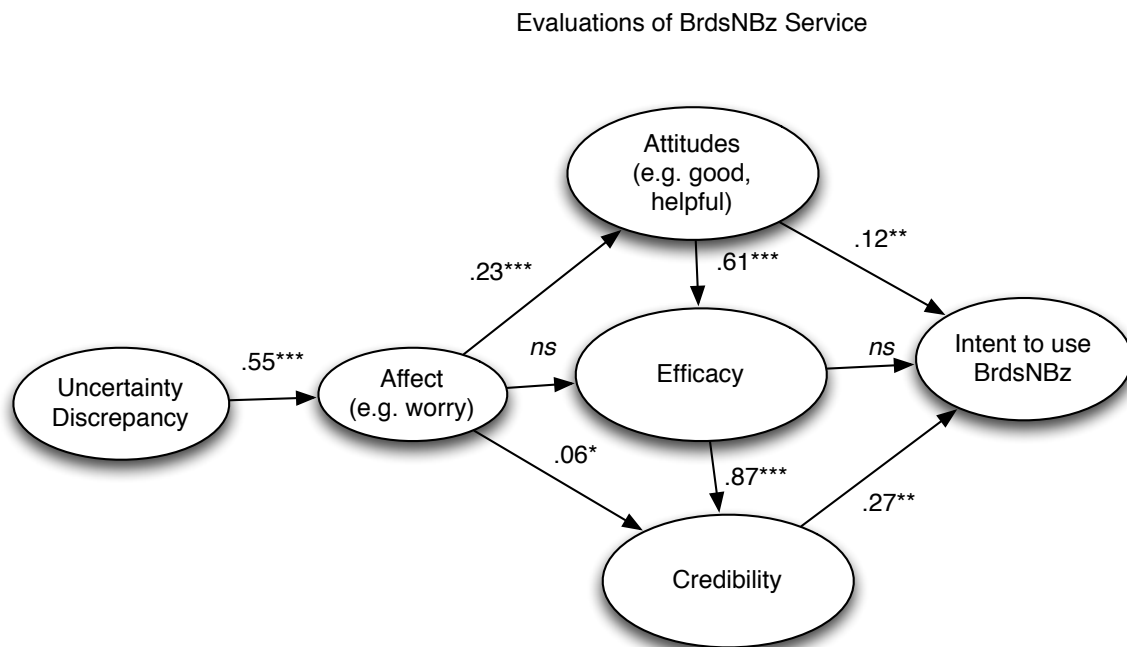
Model Fit Indices: RMSEA=.053, Confidence Interval at 90% = .046-.059, *p*-close=.258; Standardized RMR=.078; CFI=.976, χ^2=278.77, *p<.001.* n=870

Significant paths are indicated by **p<.05; **p<.01; ***p<.001.*

Discussion

Adolescents gather sexual health information from a number of sources, including

new media (Boyer et al., 2011; Lenhart, Purcell, Smith, & Zickuhr, 2010). We have not

yet determined what may motivate such information seeking, however. Theories of

information seeking from interpersonal communication, mass mediated communication and computer mediated communication can provide an important starting point for looking at possible motivators of information seeking behaviors in adolescents. The constructs examined here came from a variety of theories, and many were found to be predictive of intentions to use a sexual health text message service to seek sexual health information.

Uncertainty discrepancy was found to be strongly associated with affect, with adolescents who desired an increased level of sexual health knowledge being more likely to have anxiety or worry associated with the lack of sexual health knowledge. Although the original model did not provide a good fit for the data, two simple modifications that were grounded in previous literature and empirical research improved the fit considerably, indicating that the affective response was then associated with attitudes toward the text service, which impacted efficacy evaluations and credibility assessments. Positive assessments of credibility and attitudes toward a sexual health text service were associated with an increased intent to use the service.

Although efficacy was not found to have a direct effect on intent to seek sexual health information in the corrected model, efficacy evaluations were found to have an indirect impact on intentions though credibility evaluations. This indicates that if adolescents feel confident in their ability to use the service, they are also more likely to see the service itself as credible, which then impacts intentions to use the service. Previous research on TMIM treats the concept of target efficacy, which is similar to credibility, as part of a series of efficacy assessments that have been found to predict

information seeking behaviors, sometimes predicting seeking behaviors more strongly than other efficacy evaluations (Afifi & Weiner, 2006).

Efficacy, in this case, also may not have had a direct effect on information seeking because of the new media angle—teens may have felt confident in their ability to use a sexual health text service because of extensive experience with text messaging. Only participants who send text messages were included in the sample, and the median number of text messages study participants sent daily was 100 (mode=100).[12] Although being able to text does not necessarily mean they would know how to use the service— teens need to first opt-in to the service using a code word, and then may text the service directly—teens may feel confident that they could use such services easily and effectively if they so desired. This could make efficacy less of a motivator behind intent to use the service than other evaluations such as attitudes toward the service and credibility assessments. Future research should continue to examine the impact of efficacy evaluations on intentions to use various new media resources for sexual health information.

Understanding the motivations behind adolescent information seeking in new media is important for a number of reasons. First, it is important to identify the processes that may lead to information seeking. For example, understanding that credibility perceptions of a sexual health text service are associated with teens' intent to seek information from such a source indicates that teens do believe where they get information is important. However, this does not necessarily mean teens are good judges of source credibility. Establishing credibility may be difficult for youth, especially in new media

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[12] Median data was used as the number of text messages was skewed due to some overestimations of text message use (e.g., 5,000 messages sent in a day).

contexts (Eysenbach, 2007). This study finds that perceptions of credibility impact intentions to use a sexual health text message service for information, but it does not provide insight about how teens assess credibility of the source. In this specific example, credibility perceptions could have been higher since the promotion of the service occurred in schools, often through word-of-mouth from health educators as well as the promotional campaign.

Second, practitioners and health educators could use the patterns identified in this study to increase health information seeking by teens. If attitudes and credibility are two of the primary factors associated with seeking intentions, with efficacy having an indirect impact on intentions, targeting these key variables could increase use of resources. Health educators could provide information to teens about the credibility of certain websites or services, helping them to access information of higher caliber.

Although seeking information on sexual health can be beneficial because it may provide teens with accurate information that they can use in their decision-making processes, caution needs to be taken with the focus on information seeking. Not all information sources are created equal, and individuals may assess the credibility of information gathered based on peripheral cues, deeming misinformation as credible (Kim, Park, & Bozeman, 2011). Some sources of information online may contain inaccuracies, especially with complex or controversial topics (Buhi et al., 2010), possibly providing teens with information that is not only unhelpful, but harmful. In this case, the source of information examined was a sexual health text message service that allowed teens to communicate directly with a health educator, but different kinds of new media can be used to seek information, and some are more questionable than others.

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Although this study provides insight into what motivates adolescents to use a sexual health text message service, there are a number of limitations. First, the sample was from a cross-sectional study, using data only from one county in North Carolina. Although the sample is sufficient to look at relationships between key constructs, results may not be generalizable to other populations. Additionally, the study examines intent to use the service as opposed to actual behavior. While in some cases and many theories, intent is considered a predictor of actual behavior (e.g. the Theory of Planned Behavior (Ajzen, 1991)), and use of the service was moderately correlated with intentions to use, actual use data were not used because the short length of time teens were aware of the service may have limited actual use (e.g., teens may not have had a specific sexual health question within that time frame). Longitudinal studies could provide additional evidence of the motivations that influence use of sexual health text message services.

Conclusions

This model, which predicted that uncertainty discrepancy would influence affect, leading to a series of evaluations (attitudes, efficacy and credibility) that then influence intentions, was posited based on previous literature regarding information seeking from interpersonal, mass media, and new media communication channels. Text messaging services are a new way of providing information to teens, but little is known about what motivates a teen to use such a service to get sexual health information. Although the paths in the predicted model were found to be significant, the predicted model did not provide the best fit for the data. Previous literature suggested additional paths connecting attitudes, efficacy and credibility. The final model indicated that uncertainty discrepancy about sexual health is associated with adolescents' feelings of anxiety and worry about

sexual health. Attitudes, efficacy and credibility assessments about the text message service then influence adolescents' intentions to use the service to reduce that uncertainty. Efficacy was found to not have a direct effect on intent, possibly because of adolescents' ubiquitous use of text messaging, but efficacy did serve as a mediator, connecting attitudes to credibility, which then influenced intentions. This indicates that if teens feel a sexual health text message service is a good idea, their credibility perceptions are influenced, through their self-efficacy, and viewing the service as credible impacts intentions to use. Attitudes were also found to be a direct predictor of intentions to use, indicating that attitudes toward a sexual health text message service are an important motivator. This has implications for text message service providers, who should aim to influence positive attitudes toward their services to help bolster intentions to use.

CHAPTER 4

Knowing your audience:

Characteristics of teen users of a sexual health text message service

Although the United States saw a historic low in teen pregnancies in 2009 with a birth rate of 39.1 births for every 1,000 adolescent females, the United States still has a higher teen pregnancy rate than most other developed countries (Martinez et al., 2011). Teenage pregnancy is problematic for both the teen parents and their children. Teens who have children are more likely to drop out of school. Children of teen parents are more likely to have lower school achievement, more health problems, face unemployment as young adults, give birth while a teenager and be incarcerated at some time during adolescence (S. D. Hoffman, 2008).

Sexually active adolescents are also predisposed to other negative sexual health outcomes, such as sexually transmitted diseases. In the United States, females ages 15 to 19 have higher rates of chlamydia and gonorrhea than any other age group (Centers for Disease Control and Prevention, 2010). STDs are problematic because, if left untreated, many can result in infertility and even death due to HIV/AIDS, syphilis infections, or cervical cancer.

Certain factors reduce or increase the likelihood of negative sexual health outcomes for adolescents. Parent-child closeness and parental monitoring have been found to be associated with a decreased risk of adolescent pregnancy (Miller, Benson, &

Galbraith, 2001) as has connection to schools (Kirby, 2002b). Early pubertal timing (Udry, 1979), lower socioeconomic status (Young et al., 2004), and increased media use (Brown et al., 2006; Collins et al., 2004) have been found to be related to an increased risk for negative sexual health outcomes.

Health educators are working to make sure adolescents, including adolescents at an increased risk for negative sexual health outcomes, have accurate and reliable sexual health information. Text messaging services that provide sexual health information on request are becoming increasingly popular (see Levine, 2011 for overview). One service based in San Francisco, called SexInfo, allows teens to access sexual health information by texting a keyword to opt in to the service and navigating a series of prompts for additional information (e.g. for information about pregnancy, text B1). Teens are then able to access the desired information (Levine et al., 2008). In initial evaluations of SexInfo, service awareness was found to be high among the target population—low income African Americans. Cell phones may be a particularly good way to reach teens because the majority have cell phones, including minority teens and teens of lower socio-economic status, and most send more than 50 text messages a day (Lenhart, Ling, et al., 2010).

This study looks at demographic characteristics of sexual health text message service users and the various risk factors associated with negative sexual health outcomes, defined here as early sexual initiation (before age 15), pregnancy, or the acquisition of a sexually transmitted infection (before age 19), and determines which of these teens are using an existing sexual health text messaging service. Sexual health text messaging services are designed to provide information on demand to adolescents who

have a need for it. It is not clear, however, which teens are most likely to access such services.

Levels of risk

Adolescent pregnancy is a complex phenomenon with a variety of factors influencing whether a teen is at a greater risk than age mates. Sociodemographic, psychological and familial factors all play a role. Risk factors are environmental or individual hazards that can increase a person's chance of negative outcomes (Werner & Smith, 1982). Although risk factors can indicate that an individual is predisposed to a negative outcome, the presence of a risk factor does not guarantee that a negative outcome will occur. For example, if being of a lower socioeconomic status is a risk factor for adolescent pregnancy, it does not mean that an adolescent who is from a lower SES family will get pregnant, just that the probability of that teen getting pregnant is greater than for a teen from a family with more resources.

Bronfenbrenner's (1977) bio-ecological model is a valuable lens through which to examine the factors associated with increased risk for negative sexual health outcomes. Bronfenbrenner explained that different ecological levels affected human development in a nested system. The system starts with the individual whose development is influenced by factors such as age and gender. The microsystem is the setting in which the individual is at a given moment in his or her life (Bronfenbrenner, 1977). According to Bronfenbrenner (1977, p. 515), this level encompasses "the complex relations between the developing person and environment in an immediate setting containing the person." This could include SES as well as family structure. The mesosystem includes major settings in a person's life, such as schools or a faith community. The next level is the

exosystem, which involves more complex social systems, including the media, culture and public policy (Bronfenbrenner, 2005).

Based on the social ecological model, Small and Luster (1994) proposed a model to understand why some teens are sexually active. This model was based on the concept of cumulative risk, which posits that as one is exposed to more risk factors, the probability of becoming sexually active also increases. Small and Luster (1994) found empirical support for their model, with adolescents who experienced more risk factors being more likely to have participated in sexual activity. Another study based on the model found that for European American, African American and Latino adolescents, risk factors at the individual level, familial level and extra-familial level predicted their likelihood of having sex (Perkins, Luster, Villarruel, & Small, 1998).

In this study, Small and Luster's (1994) model guided selection of variables that may predict risky sexual behaviors at the individual level (i.e., race, age, pubertal status, relationship status), the familial level (family structure, SES), and the extra-familial level (mass media use, school connectedness).

Sexual health risk factors

Individual level. Race has been found to be associated with negative sexual health outcomes, including an increased risk of teen pregnancy. African American and Hispanic teens are more likely to get pregnant than their Caucasian peers (Centers for Disease Control and Prevention, 2011b). Minority populations also have been found to contract STDs at a higher rate than Caucasians (Centers for Disease Control and Prevention, 2011a).

Poor academic achievement has also been found to be associated with sexual risk behaviors, including earlier sexual initiation (Kirby, 2002b; Schvaneveldt, Miller, Berry, & Lee, 2001), although a clear causal path has yet to be determined. Schvaneveldt and colleagues (2001) found bidirectional effects on poor academic achievement and earlier sexual intercourse, suggesting that students who are not doing well in school have sex earlier than those who are doing well. It is also possible that having sex early affects adolescents' attitudes toward school and the attention they are paying to their studies.

Pubertal status and timing have also been found to be associated with adolescents' sexual activity. Experiencing puberty earlier than one's peers has been found to be associated with earlier sexual initiation (Udry & Billy, 1987) and even teen pregnancy (Udry, 1979). Although pubertal timing plays a role, there are a number of factors associated with puberty that can affect sexual initiation ranging from internal hormones to social pressures. Pubertal timing as well as puberty more generally has been found to be associated with increased parental distance (Paikoff & Brooks-Gunn, 1991; Steinberg, 1987). Relationship status is also associated with sexual behaviors, with dating, going steady, and going steady with an older partner all associated with sexual behavior (Kirby, 2002a).

Familial level. Parental monitoring, which is whether a parent is knowledgeable about the activities, peers, and location of their child (Guilamo-Ramos, Jaccard, & Dittus, 2010), has been found to be a protective factor against negative sexual health outcomes (Wight, Williamson, & Henderson, 2006). In a study of adolescent males, parental monitoring was found to be a protective factor, delaying boys' early sexual debut, risky sexual behaviors, and other problem behaviors (Lohman & Billings, 2008). Other studies

have also found increased parental monitoring to be associated with delayed sexual initiation (Parkes, Henderson, Wight, & Nixon, 2011; Wight et al., 2006). Wight and colleagues (2006) found low parental monitoring predicted more sexual partners and less condom use for adolescent girls.

Another risk factor associated with the family is a lack of parental communication about topics related to sex. Findings about the effects of parental communication about sex have been mixed, with some studies finding no effects, and others even finding negative effects of parental communication (Parkes et al., 2011; Sneed, Strachman, Nguyen, & Morisky, 2009). Such mixed findings could be due to differences in measurement as well as variation in the type of information discussed between parents and teens. In one study, youth who had parents who taught them to say no to sex, talked about delaying sexual intercourse, set clear rules and talked about what is "right" and "wrong" were more likely to not have had sexual intercourse (Aspy et al., 2007). For the adolescents who had already had sex, those who had learned about birth control at home and talked about delaying sex were more likely to have used birth control, and parents who reported talking to their child about STDs and birth control had teens more likely to use birth control.

In addition to parental communication, other family elements are associated with negative sexual health outcomes. Adolescents of lower socioeconomic status are at an increased risk of negative sexual health outcomes, including teen pregnancy (Young et al., 2004). This may come not only from external poverty, such as parents having a lower education and income, but it may also be impacted by what has been called "internal

poverty" – a lack of feelings of control and expectations for the future (Young et al., 2004).

Extra-familial level. A number of factors at the exosystem also influence adolescent sexual risk behaviors. Adolescents' use of mass media that includes depictions of sexual behavior has been found to be associated with sexual activity (Brown et al., 2006; Collins et al., 2004). Adolescents who do not feel a connection to their school are also at an increased risk of negative sexual health outcomes (Kirby, 2002b). In a review of the literature on school-related factors and negative sexual health outcomes, Kirby (2002b) found that involvement in and attachment to school were associated with less sexual risk taking and lower pregnancy rates.

In sum, a number of individual, familial and extra-familial factors are associated with risky adolescent sexual behaviors. A sexual health text message service could be useful for adolescents experiencing these various risk factors, as it could help inform them about resources and provide information to help them keep themselves safe. This study was designed to investigate if adolescents predisposed to negative sexual health outcomes are more likely to use a sexual health text message service than teens who have fewer risk factors. These research questions are addressed:

RQ1: Which adolescents are most likely to use a sexual health text message service?

RQ2: Do service users differ from non-users for negative sexual health outcome risk factors at the individual level (i.e., race, gender, age, school achievement, pubertal status, relationship status)?

RQ3: Do service users differ from non-users for negative sexual health outcome risk factors at the familial level (i.e., parental monitoring, parental communication about sex, SES)?

RQ4: Do service users differ from non-users for negative sexual health outcome risk factors at the extra-familial level (i.e., media use, connection to school)?

These factors were considered important to examine because they often influence an adolescent's risk of early sexual initiation or other risky sexual behaviors (See Kirby, 2002a for a review). Sexual health text message services are designed to provide information to teens who have questions about sexual health. Previous research has found that questions sent to a text service may indicate specific situations in which a teen wants to know about sexual health topics (Willoughby & Jackson, 2013). Relevance of information and context are important factors to examine to determine if teens who are participating in sexual activity are the ones using such services.

RQ5: Does use of a sexual health text message service differ based on sexual experience?

Method

To address the proposed research questions, a three-month promotional campaign for a local sexual health text service, BrdsNBz, which allows teens to text a sexual health question directly to a health educator, was conducted in six middle and high schools in the North Carolina Piedmont. (For more information on BrdsNBz, see Phillips, 2010.) The campaign provided information about how to access the service through promotional posters and items including pens, lip balm, sticky notes, and water bottles. The campaign

was designed to appeal to a wide range of adolescents based on extensive formative research with teens.

After the campaign had been in the schools for three months, students in four of the participating schools (three middle and one high school) completed a questionnaire during school at a time deemed appropriate by administrators. Students completed the questionnaire through Qualtrics, an online survey management program. All students were asked to assent, and parents could opt their student out of participating when forms went home with school information at the beginning of the year. For a chance to win gift cards, teens could provide their name and email address at the end of the otherwise anonymous survey. The University's Institutional Review Board approved all procedures. Of the students in the four schools 2,204 participated in the survey out of 2,782 who would have been able to complete it on any given date for a response rate of 79%. Of those participants, data from 79 cases were discarded due to excessive missing data, participants who declined to participate, or facetious answers,[13] resulting in an analysis sample of 2,125 participants.

Measures

Teens were asked a variety of questions about demographic characteristics, family relationships, media use and connection to school based on previous findings about risk factors.

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[13] All open-ended questions were examined for facetious answers (i.e., when a teen indicated an "other" race response as race of alien). If a participant indicated an answer that was not possibly accurate, other open-ended data were examined. If a case contained more than one facetious write-in response or one facetious write-in response and answers to close-ended questions that indicated a pattern of not taking the questionnaire seriously (i.e., answered 5 to all questions regardless of reverse-worded items), the case was discarded. This occurred in very few cases (6).

Demographics. Demographic questions included age, race, gender, socioeconomic status (whether teens receive free or reduced price lunch) and pubertal timing (whether they felt they developed earlier or later than their peers).

Parental monitoring was measured with five items on a five point Likert-type scale ranging from strongly disagree to strongly agree: "My parents know where I am in my spare time," "My parents know what I am doing at night," "My parents know my friends," "My parents know how I am doing in school," and "My parents and I often eat dinner together." The items formed a reliable scale with the current data (α= .80).

Parental communication about sex was measured with the question, "Which of the following have you ever talked about with a parent or guardian: Sexual intercourse, birth control, HIV/AIDS, sexually transmitted diseases and condoms?" Participants could check all that applied, and the topics were summed to create a total number of topics discussed related to sex.

Connection to schools was measured with two items on a five-point Likert-type scale: "In general, how happy are you to be at your school?" and "How much do you feel that your teachers care about you?" The two items were strongly correlated (r=.43, p<.001).

Media use[14] was measured on a five point scale (1 = never, 5 = very often) by asking teens to indicate how often, in a typical day, they used the following types of media: television, radio, music from other sources, social networking sites, Internet, other than social networking, cell phone, magazines (print or online) and movies (α= .75).

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[14] Media use was measured for students in only three of the four schools. One school agreed to have their students complete only a shortened questionnaire, so the media use question was not included.

Sexual behavior[15] was measured with the question "have you ever had sexual intercourse?" with the options Yes and No.

Use of the service was measured by asking participants how often they used BrdsNBz, a sexual health text message service, with the options ranging from 0 to 10 or more times. This variable was dichotomized to represent whether students had not used the service (0) or used the service (1) when examining differences between users and non users.

Results

Participants ranged in age from 9 to 19 (*M*=13.93, *SD*=1.83). Fifty-two percent of survey respondents were male. Most reported being White (77.8%), Black (8.8%), Latino/a (6.2%) or multi-racial (3.9%). About one-fourth (N= 379, 24%) had had sexual intercourse

To assess RQ1, individual level characteristics of service users (n=144) were assessed. Users ranged in age from 11 to 19 (*M*=14.5, *SD*=1.5). Half of service users from the schools were male (51%). The majority of participants were White (82%), followed by 5% Black, 5% Latino/a or Hispanic, and 5% multi-racial. More than one third (40%) of users had had sexual intercourse.[16] Discussions with parents about sex ranged from talking about 0 of the topics to talking about all 5 (e.g., sex, birth control, condoms, HIV, STDs) (*M*=2.20, *SD*=1.93). See Table 4 for additional demographic information on service users.

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[15] Sexual behavior also was measured for students in only three of the four schools because of a shortened questionnaire.

[16] Students in only three of the four schools were asked about sexual behavior as one of the schools took only an abbreviated questionnaire.

Table 4: Demographic characteristics of BrdsNBz users

	Users		Non Users	
	N	**%**	**N**	**%**
Sex (n=144/758)				
Male	73	50.7	349	46.0
Female	71	49.3	409	54.0
Race/Ethnicity (n=138/744)				
White	113	81.9	657	88.3
Black	7	5.1	28	3.8
Latino	7	5.1	20	2.7
Multi-racial	7	5.1	24	3.2
Other	3	2.2	7	.9
Asian	1	.7	8	1.1
Year in school (n=143/755)				
6th grade	4	2.8	73	9.7
7th grade	10	7.0	137	18.1
8th grade	39	27.3	163	21.6
9th grade	39	27.3	108	14.3
10th grade	31	21.7	108	14.3
11th grade	15	10.5	110	14.6
12th grade	5	3.5	56	7.4
What grades do you tend to get in school? (n=144/761)				
Mostly As	26	18.1	160	21.0
Mostly As and some Bs	68	47.2	381	50.1
Mostly Bs	14	9.7	51	6.7
Most Bs and some Cs	29	20.1	118	15.5
Mostly Cs	4	2.8	12	1.6
Mostly Cs and some Ds	2	1.4	26	3.4
Mostly Ds, Mostly Ds and some Fs, Mostly Fs	1	.7	13	1.7
Do you receive free or reduced lunch at school?* (n=143/758)				
Yes, free or reduced lunch	58	40.6	237	31.3
No	85	59.4	521	68.7
In the past three months, how much of the time have you had a boyfriend of girlfriend?* (n=139/737)				
None of the time	32	23.0	263	34.7
A little of the time	18	12.9	103	14.0
Some of the time	27	19.4	120	16.3
Most of the time	26	18.7	109	14.8
All of the time	36	25.9	142	19.3
Do you think your body development is earlier or later than most girls/boys your age? (n=138/731)				
Much earlier	14	10.1	82	11.2
Somewhat earlier	27	19.6	122	16.7
About the same	70	50.7	415	56.8
Somewhat later	18	13.0	86	11.8
Much later	9	6.5	26	3.6

Have you ever had sexual intercourse (n=127/704)*				
Yes	51	40.2	163	23.2
No	76	59.8	541	76.8

*Indicates a significant difference in chi-square tests or T-tests between users and non-users.

To assess RQ2, which asked whether service users and non users differed on individual level risk factors for risky sexual behavior, chi-square tests and t-tests were run using data from all participants who had heard of BrdsNBz (Have you heard of BrdsNBz? Yes or No) and who send text messages (Do you send text messages? Yes or No) (n=918) to assess differences in service use by age, gender, race, school achievement, pubertal timing, and relationship status. There were no significant differences for gender, χ^2 (1, n=893)= .593, *ns* or race, χ^2 (5, n=874)= 6.75, *ns.* There was a significant difference for age, *t* (219) = -2.02, *p=.05*, with users being slightly older (*M=14.53, SD=1.41)* than non-users (*M=14.25, SD=1.84*). There was no significant difference for academic achievement, *t* (894) = .06, *ns* or pubertal timing *t* (858) = 1.25, *ns.* There was a significant difference for relationship status *t* (866) = -2.67, *p<.01*, with users indicating they had been in a relationship more of the time (*M=3.07, SD=1.51*) than non-users (*M=2.68, SD=1.55*).

To assess RQ3, which asked whether service users and non users differed on familial level risk factors for risky sexual behavior, chi-square tests and t-tests were run using data from all participants who had heard of BrdsNBz and who send text messages (n=918) to assess relationships between service use and SES (measured with the proxy variable of whether or not the teen receives a free or reduced price lunch), parental monitoring and parental communication about sex. There was a significant association between SES and service use, χ^2 (1, n=892)= 4.23, *p<.05*, with participants of a lower

SES using the service more than participants of a higher SES. There were no significant differences between users and non users in terms of parental discussion about sex t (865) = -1.09, *ns* or parental monitoring t (864) = 1.13, *ns.*

To assess RQ4, which asked whether service users and non users differed on extra-familial level risk factors for risky sexual behavior, t-tests were run using data from all participants who had heard of BrdsNBz and who send text messages (n=918) to assess relationships between service use and media use and school connection. There were no significant differences between users and non users in terms of media use t (161.23) = -.76, *ns.* Users did differ significantly from non-users on connection to school, t (877) = -2.34, *p<.05*, with users feeling less connected to their school (*M=3.35, SD=.96)* than non users (*M=3.56, SD=.93*).

RQ 5, which asked if participants' use of the service differed based on sexual experience, was examined using a chi-square test and a t-test. The chi-square test was used to examine the relationship of service use (dichotomous) and sexual behavior. A t-test was used to see if the number of times using the service differed by previous sexual behavior. There was a significant difference in use based on sexual behavior, with 21.3% of teens who had had sexual intercourse having used the service compared to 12% of virgin teens, χ^2 (1, n=822)= 10.72, *p<.001*. The t-test indicated that service use was significantly greater for teens who had sexual intercourse (*M=.70 (0-10 scale), SD=1.89*), than teens who had not had sexual intercourse (*M=.40, SD=1.89*), t (292) =2.06, *p<.05*.

Discussion

Sexual health text messaging services are becoming increasingly common as health educators try to use new channels of communication to reach adolescents with

sexual health information. Although this study showed that not all factors that have been found to be associated with risky sexual behaviors are also associated with use of a text message service, a few important factors were associated. Users of a sexual health text message service differed from non-users in terms of age, relationship status, socio-economic status, connection to school and sexual behavior. This study indicates that sexual behavior may influence use of a text service and that use differs by a number of risk factors associated with risky sexual behaviors.

Users of the BrdsNBz service tended to be around 14 years of age, with most of the users in the 8th, 9th, or 10th grade. BrdsNBz users also tended to be in a relationship, from a lower socioeconomic status, and less connected to their school. Thus, risk factors at all three socioecological levels were associated with service use. Individual level factors, such as race, gender, and school achievement were not found to be related to service use, so it is possible that familial factors and extra familiar factors play a greater role related to information seeking than individual level demographic characteristics. Teens in this middle to high school age group may have a greater use for the service because they are further along in their sexual development than younger teens. Approximately a quarter of all teens have had sex by age 15 (Mosher, Chandra, & Jones, 2005), with three-fourths of all teens having sex by their later teenage years (AGI, 2002).

Users also had less of a connection to their school than non-users. After a decade of abstinence-based sex education, in 2011 North Carolina public schools were required to teach comprehensive, medically-accurate sex education, but it is not clear to what extent the new curriculum has been adopted or teachers adequately trained. Students who

do not feel connected to their schools may also be less engaged in their health classes and thus, more likely to seek information elsewhere.

Adolescents who had previously had sex were significantly more likely than teens who had not had sex to use the service. Previous research indicates that teens often have questions about pregnancy. Previous analysis of the questions asked of the BrdsNBz service, in fact, found that one in every five questions was about some aspect of pregnancy, usually asking whether pregnancy were possible in this or that circumstance (i.e., if sex occurred in a pool). Willoughby and Jackson (2013) found that most of the "pregnancy possible" questions were general, so it was not possible to tell if the acts had already happened or were only being contemplated.

The key question, however, may not be whether the act has already happened, but whether factual information matters? For teens who have had or are having sexual intercourse, having accurate information about specific situations in which they have participated or plan to participate could be vital. Users of the service were also more likely to be in a relationship, suggesting that teens may be asking non-hypothetical questions. Being in a relationship or having sex may influence an adolescents' level of uncertainty discrepancy, which is a concept that suggests individuals may not know as much about a topic as they would like (Afifi & Weiner, 2004). Uncertainty discrepancy and the similar topic of information insufficiency—people want more information on a topic than they currently have—have been found to be associated with information seeking behaviors (Afifi & Afifi, 2009; Kahlor, 2007, 2010; Willoughby & Myrick, 2012). In the Theory of Motivated Information Management and the Planned Risk Information Seeking model, two theories of information seeking, this difference between

what one knows and wants to know precedes a series of evaluations and seeking behaviors. Teens who are experiencing or anticipating certain situations may have an increased desire for information, which could motivate them to use a sexual health text message service to find additional information.

A number of limitations of this study need to be taken into consideration. The design was cross sectional, which means that we cannot be sure about directionality. It is unlikely, however, that the factors associated with use were affected by use of the service. Participants completed self-report measures to identify use and sexual behavior, so we do not know the extent to which they are reporting accurately. Although participants were anonymous, social desirability to either under or over report could have reduced validity. The sample was from four North Carolina schools that received a campaign about BrdsNBz. While this was necessary to obtain a sample of service users, future research should use samples that have not received specific promotions in a school setting to examine user demographics and related risk factors and in a setting that may have greater ecological validity.

Conclusions

Sexual health text message services, specifically BrdsNBz, a text service that allows teens to text with a health educator, appear to be reaching adolescents who may most benefit from the information—those in relationships, from lower socioeconomic status backgrounds, and those who are less connected to their schools. All these characteristics are risk factors for early sexual behavior, STDs, and teen pregnancy (Kirby, 2002a). Teens who have had sexual intercourse used the text messaging service

more than virgin teens, indicating that specific sexual situations teens are experiencing or anticipating are stimulating use of the service.

Knowing that teens who are using the service may be asking about situations specific to them has implications for the types of information that should be presented by service providers. This also has implications for the type of prevention efforts such services may want to undertake (i.e., providing information on testing services and contraception in addition to abstinence messages that might be present). Knowing more about the target audience allows text message service providers to target their messages to that specific population. If teens who are having sex or in relationships and considering sex are the ones who are using such services, responses can provide not only basic information but also information on additional resources, such as contraceptive effectiveness and access.

CHAPTER 5:

"How does this whole BrdsNBz thing work?"

Motivations and barriers for using a sexual health text message service

Teens choose from a variety of sources for sexual health information, including their parents, peers, sexual health educators and health care providers, as well as the Internet, and text message services. Text message services are becoming an increasingly popular way to reach teens with sexual health information, providing information either on request (i.e., SexInfo, BrdsNBz) or providing information on a set schedule (i.e., The Hook-Up). We know little about when and why an adolescent might choose one source of sexual health information rather than another, however.

Few evaluations of sexual health text message services have been conducted to date, and those have focused on text message services that send persuasive messages on a set timeline. In a randomized controlled trial of one such service available to Australian young adults (ages 16 to 29), for example, researchers found that service use increased knowledge about sexual health and resulted in increased monogamy (Gold et al., 2011). The evaluation did not include an option in which participants chose to receive messages about sexual health, however, assessing only the impact of messages sent on a regularly scheduled basis as a form of mobile advertising. In Australia, individuals can agree to receive mobile advertisements in exchange for access to certain Internet sites.

In a study that looked at the reach of the San Francisco-based SexINFO service, surveys were conducted at local clinics to which the service referred texters (Levine et al., 2008). The bulk of the evaluation looked at service awareness and did not include an evaluation of who used the service or impacts of service use. Awareness of the service was highest among the targeted audience – young African Americans with cell phones in the target neighborhoods. The study found that only 10% of people who heard about the service had used it, but no additional information was provided on users.

This mixed-method study will examine one specific text message service in an attempt to better understand why a teen might choose a text service for information about sexual health over other available resources as well as to identify the possible barriers adolescents perceive.

New media for sexual health

Health educators are reaching out in a variety of ways to provide adolescents with sexual health information. Text messaging services have become an increasingly popular option because of teens' ubiquitous access to cell phones and their frequent use of text messaging. Three-fourths of teens have cell phones (Lenhart, Ling, et al., 2010) and nearly 90% of them send text messages. A variety of sexual health text messages services exist. Some services provide teens with information on a regularly scheduled timeline (e.g., The Hook-up). Other services allow teens to access information on demand from an automated system that lets them follow a series of prompts to retrieve the desired information (e.g., SexInfo). A third type that also provides the user with control over getting the information allows teens to text directly with a health educator and receive a personalized response (e.g., BrdsNBz).

In a study of urban adolescents' use of new media for sexual health information, adolescents were provided with a list of ten possible new media tools for sexual health promotion (Boyer et al., 2011). Options included, for example, video games for safer sex promotion and text messaging services. One of the specific options asked teens if they would prefer "texting with an adult about a sexual problem." This option was the least preferred of the ten options, with some teens indicating that such a service would be considered "creepy." Although the teens in that study did not prefer such a hypothetical service, such services exist and are being used (Willoughby & Jackson, 2013). Services that allow for texting between teens and health educators are becoming more popular because they are fairly inexpensive to start and run (R. Adler, 2009; Fogg & Allen, 2009). BrdsNBz, a service begun in North Carolina in 2009 that allows adolescents to text a sexual health educator and receive a response quickly and confidentially, receives a few texts a day. The low frequency of texts is probably due to little promotion of the service since its introduction.

Sexual health text messaging services are just one source of information available to adolescents, however. Adolescents report that when they have questions about sexual health they prefer to turn to peers, parents, or the media, but that embarrassment may often keep them from reaching out to interpersonal resources (Boekeloo et al., 1996; Ogle et al., 2008). Perhaps more interesting than where they turn for information is what they look for in sexual health information sources. Selkie, Benson and Moreno (2011) conducted focus groups with 14- to 19-year olds and found adolescents wanted sexual health information that was accessible, trustworthy and "safe." Trustworthy information was information teens deemed credible and confidential (Selkie, Benson, & Moreno,

2011). "Safe" to the adolescents meant that sexual health information should be presented clearly and in a nonthreatening way, especially since teens often do not go to interpersonal resources such as parents and health care providers for fear of being judged.

Research indicates that adolescents and young adults are receptive to receiving sexual health information via text message (Gold et al., 2010; Wright et al., 2011). Research has yet to examine, however, why these services are chosen as a resource or what may limit their use. Only one study to date has involved talking to adolescents who have used sexual health text messaging services to understand whether they perceived the experience as useful or why they chose such a resource. Perry and colleagues (2012) talked to adolescents who had used The Hookup, a text service that sends messages on a weekly basis with relationship and sexual health information. Adolescents indicated that text messaging was a convenient way to access information and that information was seen as private (Perry et al., 2012). They were not concerned that someone might see the messages and the majority were not concerned about their parents seeing the messages. Most teens were not concerned with the cost of using such a service either, but they did indicate that cost could be a potential barrier to use. Although these findings provide some insight into teens perceptions of a sexual health text service, this specific type of service is one that provides information on a specific timeline on various topics related to sexual health. Perceptions of a service in which teens actively seek sexual health information could differ.

Purpose of information seeking

There are many reasons an adolescent may seek sexual health information—a teen might hear something from friends that she is curious about, or she might be in a

situation in which information on sexual health could be valuable. Adolescents also may want more from their information seeking than just information. For example, in formative research for the development of a sexual health text service that sent HIV prevention messages on a regularly scheduled basis to adolescent and young adult males in Philadelphia, the potential recipients not only wanted sexual health information, they also wanted messages to be empowering and help build social capital (Wright et al., 2011). Social capital is conceptualized as access to social support or community activities that provide interaction and support (P. S. Adler & Kwon, 2002; Brunie, 2009). Thus, the target group wanted information about sexual health and HIV prevention as well as messages that could spark thought and action.

Valkenburg and Peter (2011) presented an integrated model of the attraction, opportunities and risks associated with online communication by adolescents. They found that online activities assisted adolescents with identity development, such as increased self esteem and intimacy development, and had an impact on relationships, friendships, and sexual development, specifically through sexual self-exploration (Valkenburg & Peter, 2011). Valkenburg and Peter's (2011) work helps support the work of other scholars who have looked at the impact of information seeking and information acquisition. A growing literature indicates that the everyday information-seeking adolescents engage in is related to the various developmental tasks and stages the adolescent may be experiencing (Agosto & Hughes-Hassell, 2005, 2006). Agosto and Hughes-Hassell used interviews, photographs, journal logs and surveys to construct a theoretical model of youth's everyday information seeking. They determined that an adolescent must seek out information for a number of "selves," such as the emotional

self, the physical self, and the sexual self. From this perspective, teens seek information based on their self-concepts to try to adjust and manage their different identities. Thus, information seeking may provide more than sexual health information. Information seeking may play a role in identity formation and development, which is an important part of adolescence (Marcia, 1980).

Methods

This study used both quantitative and qualitative data to better understand why teens may actively search for sexual health information from a text message service and what potential barriers may keep teens from using such a service.

The service that was examined in this study was a North Carolina based text message service called BrdsNBz that allows teens to text a sexual health question directly to a health educator (Phillips, 2010). The service had been available to North Carolina teens since 2009, but many areas of North Carolina had received only limited promotion of the service. A three-month long promotional campaign was run in Fall 2012 in six middle and high schools. The campaign provided information on the service through promotional posters and items including pens, lip balm, sticky notes, and water bottles. The campaign was designed to appeal to a wide range of adolescents based on formative research with teens in the target audience.

After the campaign had been in the schools for three months, students in four schools completed a questionnaire that assessed individual information, service awareness, and service use. The survey was completed during school at a time deemed appropriate by administrators. Students in four of the schools (three middle and one high school) completed the questionnaire through Qualtrics, an online survey management

program. All students were asked to assent before completing the survey, and parents could opt their student out of participating when forms went home with school information at the beginning of the year. For a chance to win gift cards, teens could provide their name and email address at the end of the otherwise anonymous survey. The University's Institutional Review Board approved all procedures.

Measures

The questionnaire asked teens about their use of the service, including why they chose to use the text service BrdsNBz over other information sources. People who had not used the service were asked the question "Why did you not use the BrdsNBz service (check all that apply)" with the options "Did not have a sexual health question," "Did not have a cell phone," "Cost of text messaging," "Worried that the service cost money," "Worried about parents seeing it," "Did not think it was useful" and "Other." A preliminary analysis of the "other" responses resulted in four new categories of "Unsure how to use it," "Did not think of it," "Went elsewhere," and "Did not like the idea of texting a stranger" that were coded.

Qualitative data collection

After the quantitative data was collected and preliminary analyses had been conducted, in-depth interviews and focus groups were held with teens who had heard about the BrdsNBz service. Teens were recruited in two ways. After completing the online questionnaire in school, teens in the high school were able to indicate whether they were interested in participating in a follow-up discussion about the service. They were then contacted and met on a weekend at the local public library in a private meeting room and provided with $25 gift cards for their participation.

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Middle school students in a school-related health program who had created commercials promoting the BrdsNBz service were also asked to participate. The focus group was conducted during the school lunch hour in a classroom. Participants received $15 gift cards. Three focus groups were held, two with high school females and one with middle school males and females. Two in-depth interviews were held with high school males because of recruitment challenges with that demographic category. Teens in these populations were chosen because they had heard of the BrdsNBz service, giving them the opportunity to use the service if they had been interested. The University's Institutional Review Board approved all of these procedures as well.

A focus group guide was developed to elicit responses about why teens would use a text service over other resources and why teens might not want to use a text service (See Appendix E). Questions were open-ended to allow for respondents to provide unprompted responses, then probes were used to follow up on patterns and themes that had emerged in the online survey. The author, who has extensive experience moderating focus groups, led all discussions. Discussions were based on a semi-structured guide (Lindlof & Taylor, 2010).

The facilitator took notes during the discussions, and discussions were recorded and transcribed. The transcripts were then analyzed using the constant comparative method, also known as grounded theory. The constant comparative method allows the researcher to examine trends and relationships based on the ideas presented from participants (Charmaz, 2007; Corbin & Strauss, 1990). Results were analyzed after each discussion, with the results informing future discussion guide probes and questions. Discussions were conducted until saturation was reached.

Results

Participants

The total number of students surveyed was 2,204. The four schools had 2,980 students enrolled as of Jan. 1, 2013 with an average daily attendance rate of 95% across the four schools. Based on attendance rates and the 48 parental opt outs collected, the possible number of participants on any given day in the schools was 2,782. The survey response rate was 79% (See Appendix B for a table of the response rate by school). Of the 2,204 surveys completed, 2,125 cases were retained after data were cleaned.

Half of teens who completed the survey had heard of the BrdsNBz service (n=1,040). Data from only the individuals who had heard of BrdsNBz were used in these analyses, as only those aware of the service would have the option to use it. Participants ranged in age from 9-19 years old (*M*=14.15, *SD*=1.82). Gender was evenly split, with 48.9% (n=506) male. The majority of participants were White (86.5%), followed by Black (4%), multi-racial (3.9%), Latino/a (3.1%), Asian (1.4%) and other (1.1%). These demographic distributions are similar to those of the counties in which the students lived (Proximity, 2013; United States Census Bureau, 2010). The majority of teens had not used the BrdsNBz service (85.9%, n=876).

Participants in the focus groups came from two of the four schools that were surveyed. The majority (72%) of the focus group participants also had not used BrdsNBz. See Table 4 for qualitative research participants' demographic characteristics.

Table 5: Demographic Characteristics of Research Participants

	N	%
Sex (n=18)		
Female	12	67
Male	6	33
Race/Ethnicity (n=18)		
White, non Hispanic	10	56
Hispanic/Latino(a)	4	22
Black/African American	3	17
Asian/Asian American/Pacific Islander	1	6
Year in school (n=18)		
8th	10	55
9th	1	6
11th	5	28
12th	2	11
Do you receive free or reduced lunch at school (n=18)		
Yes, free lunch	10	56
Yes, reduced lunch	1	6
No	7	39
Have you ever used a sexual health text message service (i.e. BrdsNBz?) (n=18)		
Yes	5	28
No	13	72

Text messaging for information

The majority of teens surveyed indicated that they sent text messages (85%, n=1807), with the median of 100 texts a day. Qualitative findings indicated that teens often use their cell phones—and specifically text messaging—as a way to get information. Although this did not apply to health information, teens often sent text messages to get information on homework assignments they had missed or clarification on other things at school. As one high school female said, "One time I needed to know what homework was, and I called pretty much my whole class and nobody answered the phone but they would text me back and say I can't talk on the phone right now." A high school male said that he sent text messages whenever he needed something. When asked

to whom he sent texts, he said, "Anybody in my school that I need something from. Everybody that I need to communicate with has a cell phone." Middle school students also indicated that text messaging was popular, although a few said they no longer had phones: "I did used to text, but then I broke my phone."

Although teens perceived text messaging as a way to get information or to get questions answered, it seemed that some felt teens do not have questions about sexual health, at least not questions in the traditional sense of the word: "I guess most kids don't have questions. Or they think they don't." When asked to clarify, the high school male talked about how teens might wonder about something, but "they just don't think to ask." Other teens also indicated that teens often do not realize that they can get answers to their questions: "Sometimes you just don't know something, but you don't think to ask it."

These findings were supported by the quantitative survey. When asked if in the last three months they had questions related to sexual health (e.g., body changes, sex, pregnancy), almost three-fourths (73.2%) of participants indicated that they did not have a question about such topics. Nevertheless, 85 (11%) of the teens who indicated they had not had a sexual health related question had used the BrdsNBz service.

Motivations for using a sexual health text message service

Qualitative responses (n=39) in the questionnaire to the question: "Why did you text BrdsNBz instead of going to another source for information (like your parents, media, a doctor, etc.)?" were examined. Teens indicated a number of reasons they used the BrdsNBz service, but the main themes that emerged were that such a service was less awkward or embarrassing than using other resources, making it an easy option for information, and that they trusted the information. A few (2) teens also mentioned that

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the service was used because "your responses make us laugh," indicating that they were using the service for entertainment.

Anonymity leads to less embarrassment

In the questionnaire, teens said they used BrdsNBz because it was "anonymous." One teen said he used BrdsNBz because "BrdsNBz is better than just talking to your parents because it might be strange." Some referred to the fact that they felt weird talking to their mother, so BrdsNBz was a good option, which allowed them to feel "more comfortable" and was "less awkward not having to be face to face with the person." One teen said that she used BrdsNBz because "my parents would laugh in my face." Another teen used BrdsNBz because "if I had asked my parents, they would think I asked because I was having sex."

Teens in the focus groups indicated similarly that a sexual health text message service was a good idea, especially for teens who do not feel comfortable going to other resources: "They're helpful for kids who don't have that relationship with their parents." A high school male said, "I think if they did need an answer, beyond their friends, that [BrdsNBz] would be their first choice because it is anonymous, there's no judging of it."

Middle school students expressed similar opinions:

> "I think it's a place where like if you don't feel comfortable asking anybody else you could just message them, and it's like they, I mean I don't think they would tell anybody. It's like private and confidential." –Middle school female

Perceived as accurate source of information

Teens indicated in the survey that they trusted BrdsNBz, saying that they used it "because I can trust it" or because they "trust them more." One teen explained that she asked BrdsNBz because someone she could have gone to didn't know the answer:

"because my dad didn't know and I didn't go to the doctor or anything around that time and I wasn't going to just go and ask a question like that to a doctor." Another teen said he used BrdsNBz "because it is easier and they probably know more." These comparisons were often vague, however, as teens did not specify to whom or what they were comparing BrdsNBz.

In the focus groups, teens expressed a similar perception, indicating that BrdsNBz was more likely than other resources to provide "real" or accurate information:

> "I think it was a good idea because you could get like not real information from being on the Internet, or people could start talking if you asked a question. But like this, it's real information and they won't tell anybody." –Middle school female

Barriers to use of a sexual health text message service

Although teens mentioned a number of reasons they might use BrdsNBz, they also had a number of reasons why teens might not use BrdsNBz. Of teens who completed the survey who did not use the BrdsNBz service, the majority reported that they did not use the service because they did not have a sexual health question (65.2%). About one-fifth (22%) of teens who did not use the service reported they did not think the service was useful. (See Table 5 for all reasons for lack of use of the BrdsNBz service.)

Table 6. Reasons for non-use of the BrdsNBz service (n=876)

	N	%
Did not have sexual health question	571	65.2
Did not think BrdsNBz useful	195	22.3
Worried about parents seeing it	83	9.5
Did not have cell phone	71	8.1
Worried service cost money	65	7.4
Worried about cost of text messaging	40	4.6
Did not know how to use it*	36	4.1
Went elsewhere*	19	2.2
Uncomfortable talking to a stranger*	14	1.6
Did not think of it*	13	1.5

*Responses were listed as "other" options that were then coded

Concerns related to parents

In the focus groups, teens said that one reason they might be hesitant to use the service was parent oversight: "…My parents are really nosey and go and look through every text message I've sent so if it comes up a weird number they'll be like, 'Who is that?'" Another teen said, "Well sometimes my parents threaten to check my texting history—like go online and check my text messages so that would probably be a worry for me if my parents get on that and are wondering why I'm texting some sexual forum." A middle school female echoed that sentiment: "…maybe their parents have that thing where the messages show up on their bill and then the BrdsNBz come to me—they won't tell anybody, but the bill, it says stuff."

Teens felt concerned that parents might see the questions, which could make the parents upset that they were not confided in or cause problems for the teen because the parent would think the teen was having sex. This related to one of the comments in the survey as well, in which a teen reported that asking a question about sex makes parents think the teen is having sex. One high school female said that "if you ask, you have, that's what parents think…like, if you ask questions, it's like 'Oh my goodness. She done did whatever.'" Other teens expressed a similar sentiment:

> "…If I asked them [my parents or friends] a question about sexual health, they would assume that it was happening to me or a friend and then they'd be like what kind of friends are you hanging out with and it would just—it's not worth the trouble for me personally." --High school female

Teens were also concerned that parents might be upset to find out that their child is going somewhere else for information: "Parents might take it offensively, especially if you're supposed to have a really open relationship with them and they find out that you were asking some random sexual health kind of site." Another said, "Parents, they take it

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very personally when you don't ask them certain stuff and you're supposed to have an open relationship."

Credibility concerns

Some teens were concerned with the credibility of BrdsNBz. Some teens were unsure of who answered the questions and felt knowing more about the credentials of the responders would be helpful. One high school female said that "they could let people know that they're legit people and, like, they're not going to give you fake answers and stuff like that." Two of the focus groups brought up the idea of having a website that provided information on BrdsNBz and the people who respond to the texted questions: "Maybe on their website or something they could put what they're trained in and how serious their degree is."

Lack of knowledge on how to use BrdsNBz

An additional barrier that came up was a lack of knowledge about how to use the service. One middle school male who had created a commercial as part of a class project promoting BrdsNBz asked how to use the service: "I have a question. How does this whole BrdsNBz thing work? Like, do you just get the number, you get it to them or something, text the question?" A female in the group asked whether you "have to text NCTEEN [the codeword to opt in] first and then wait, or can you just send the message?" A high school male mentioned that teens who did not receive promotional items "wouldn't know to just save it [the number] and text it just like some other text messaging service." His health educator encouraged teens to save the number directly in their phone so they would have it if they wanted to use it. Additionally, a high school male brought up ChaCha, another text messaging service that teens can use to answer any

question. When asked what ChaCha was, the male replied "ChaCha is 242242, that's the number," indicating that he had used ChaCha previously and was familiar with it.

The lack of familiarity with the service relates to another barrier—teens just "didn't think about it." One male said that texting BrdsNBz for sexual health information just wasn't something teens were used to: "It's just not one of those habits that people do all the time, so I am assuming they forget about it." Others felt the same way. Teens in the middle school focus group indicated that using such a service was far from the norm.

> "I mean, if maybe they had something like pounding [BrdsNBz] into their head…I think it needs to be put out there more, like you need to hear about it a lot. Like how you hear about cars, you hear about cars all the time. So, maybe put BrdsNBz out there a lot more than what it is." –Middle school male

Another male said, "I think if they put more advertising and stuff out there, then more people would think of it and prevent stuff from happening."

> One middle school male told the story of how he and some friends used BrdsNBz:

> "One of my friends, he had this really serious question. Me and [a friend], we didn't know how to answer it. So we told him to text it and see what he could get from it. And he did. He got an answer…He said he understood what he shouldn't do since he got the answer from them." –Middle school male

Without the friend's encouragement, that teen may never have attempted to use the service. In another example, a middle school female said she decided to use the service, and when she told her boyfriend who she was texting, he decided to text also. Both sent the service messages and then discussed the answers.

Discussion

The young adolescents who were in this study indicated that the BrdsNBz sexual health text service was perceived as useful, especially for teens who do not feel comfortable talking to a parent or another adult. Findings from the quantitative survey

support this, with users of the service indicating that they chose to use BrdsNBz because they were uncomfortable using other resources.

Both the survey and the qualitative feedback showed that a number of barriers to using a sexual health text message service still exist. The majority of teens said that they did not use the BrdsNBz service because they did not have a question. While this could be true, adolescence is a time of physical, emotional, cognitive and social changes (Archibald et al., 2008), many of which are associated with sexual health, and previous research has shown that adolescents want and often seek sexual health information (Boekeloo et al., 1996; Kang et al., 2009; Vickberg et al., 2003). It seems likely that, rather than not having questions, teens do not often realize that they have a question, or they may not realize that if they do have a question, they can and should seek an answer.

Teens also may not turn to a text service for sexual health information due to lack of interest in such a service, lack of perceived credibility, or lack of perceived usefulness. Cost barriers may also be present, as evidenced by the 5% of survey respondents who were concerned about the cost of text messaging, although a concern about cost was not brought up in the focus group discussions. The small proportion of teens who were concerned about the cost of text messaging supports Perry and colleagues (2012) work that found that most teens were not worried about the cost of receiving messages from the Hookup text service, often because they had unlimited texting plans. A more relevant and problematic cost barrier appears to be adolescents' concerns about the cost of the service. Although the BrdsNBz service is free as noted on the promotional materials, nearly 8% of non-users said that cost of the service was one of the reasons they did not use it. Teens need to understand that the service is free of charges other than standard text messaging

rates that may apply. This confusion could be because marketing materials for mobile services, including BrdsNBz, often include a disclaimer that indicates the service is free except for standard text messaging rates so that promotions are not considered deceptive. Perhaps adolescents do not have a clear understanding of text message fees.

Teens do appear to be concerned about their parents finding the messages and being either upset they were not consulted or concerned that their teen is having sex. Other studies have found that teens are often hesitant to discuss sexual health information with parents, although parents perceive themselves as wanting to have those conversations (Ogle et al., 2008), as the teens in this study suggest.

Finally, a major barrier is lack of familiarity with using such services. Teens wrote that they just "didn't think of it" when asked why they did not use BrdNBz. Focus groups and in-depth interviews confirmed that for some teens, using a text message service to get sexual health information still was not the norm. Teens felt that additional promotion could help.

Some teens also just did not know how to use the service. While promotional materials explained the process of using BrdsNBz, it is a bit complex since teens must first opt in, which is different from how they traditionally text. Services such as ChaCha also may be remembered more readily since they often have text numbers that are representative of their name. The BrdsNBz number does not spell anything, so a teen may quickly forget the number. Future work needs to look at what is necessary to make sexual health text message services more memorable as information options.

Conclusions

Sexual health text messaging services are becoming an increasingly popular way to provide sexual health information to adolescents. Teens who are using sexual health text message services believe that they are a good option because they reduce the awkwardness associated with face-to-face discussions and are easy to use. Some teens, however, are not yet familiar enough with such information sources to see them as a viable option. Adolescents also may face other barriers to using sexual health text message services such as parent oversight, misperceptions related to cost, and lack of awareness that their questions about sex can actually be answered. Increased promotion of such services that include clear statements about costs and clear directions on use could help address some barriers that may be keeping teens from using sexual health text messaging services. Services should also consider creating numbers or processes for use that are memorable (like ChaCha does through their name and number). Addressing such barriers to access will help service providers offer teens accurate information in a timely manner in a medium that teens are already using frequentl

CHAPTER 6:

Discussion and Conclusions

Sexual health text messaging services are becoming increasingly popular as a way for practitioners to provide adolescents with sexual health information, but little is known about who uses such services and why. This project examined one sexual health text message service, the North Carolina BrdsNBz service, considering a number of factors associated with use of the service for information seeking by adolescents.

In Chapter 1, I provided an overview of the limited evaluations of sexual health text message services and background on why such services might be an important way to reach adolescents with sexual health information.

In Chapter 2, I described and evaluated the social marketing campaign I designed and conducted in six public schools in the North Carolina Piedmont region. The evaluation showed that although promotions were extensive and use of the BrdsNBz service did increase, the campaign did not motivate many teens toward use of the service.

In Chapter 3, I developed and tested a model of sexual health information seeking to better understand the factors that influence use of a text service. The SEM analyses showed that uncertainty discrepancy influenced affect, which led to attitudes, efficacy and credibility that eventually influenced intentions to use the service for sexual health information, with attitudes and credibility directly associated with seeking intent.

In Chapter 4, I explored which adolescents used the service and found that users were higher on some of the factors (e.g., lower socioeconomic status, in a relationship) that predispose them to suffer negative sexual health outcomes. The analyses suggested also that teens at higher risk may be seeking information related to specific sexual experiences rather than hypotheticals.

In Chapter 5, I looked more closely at the motivations for use of a sexual health text service as well as the barriers that may have kept teens from using the service. These qualitative analyses showed that fear of parents seeing messages and a lack of awareness about how the service worked may have limited use by teens.

Overall, there are a few key insights we can glean from this study. We know teens have questions about sexual health, and that they are using new media resources to access information. Teens are interested in sexual health text message services and see them as a viable option for information (Perry et al., 2012; Wright et al., 2011). Text messaging services, however, may still be "new" and not yet the first thing that comes to mind when teens are assessing their information options.

The diffusion of innovations model may be helpful in understanding why only a relatively few adolescents in this study made use of the BrdsNBz service. The diffusion of innovations model suggests that new ideas and technologies are communicated through a social system in different channels over time (Rogers, 1995) and that diffusion itself is a type of social change that occurs when new ideas or technologies are invented, shared, and then adopted or rejected. The diffusion approach has been used to examine the dissemination and diffusion of public health efforts for decades (Oldenburg & Glanz, 2008).

Perhaps there has not yet been enough time or enough communication about sexual health text messaging services to move these interventions beyond the "innovators" and "early adopters." Innovators and early adopters are the two kinds of people who typically adopt innovations and new technologies before the majority of society, often leading the way in the future diffusion of the idea or product. Diffusion research suggests that adoption tends to follow a normal distribution, with approximately 2.5% of people considered "innovators," who adopt new technologies and innovations early on, and 13.5% of people considered "early adopters," who also adopt fairly early in the process (Rogers & Shoemaker, 1971). These numbers are somewhat similar to the number of BrdsNBz users found in this study. Fourteen percent of teens who were aware of the service used the BrdsNBz service, thus suggesting that the majority have not yet been motivated to adopt the innovation.

The findings of this study also suggest that context may influence service use. The teens who used the sexual health text message service had a need for information. The first variable in the information seeking model tested here was uncertainty discrepancy. Sexual health uncertainty discrepancy led to an affective response that influenced intentions to use the service after evaluating the service as an information option. The analyses of users' sexual health risk factors also showed that teens who had had sex and were in relationships were more likely to be users of the BrdsNBz service than teens who had not had sex or were not in a relationship. While it is not yet clear that sexual activity is associated with uncertainty discrepancy, teens who feel they would like additional sexual health information could be in situations or preparing to put themselves in situations where that information may be important. This shows that the situation in

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which the adolescent is present (i.e., in a relationship, participating in sexual activity, etc.) can influence their use of various information options.

Since sexual health text message services often are designed to help populations at greater risk for negative sexual health outcomes, provide resources such as testing services, or provide information on access to contraceptives, having an understanding of the type of situation a teen may be in could be useful to service providers when answering questions. A content analysis of the messages sent to the BrdsNBz service in its first two years indicated that users often sent questions related to specific situations, but it was not clear if the teens themselves were engaged in the specific situations they were asking about (Willoughby & Jackson, 2013). While it still is not clear from this project that teens are describing situations based on their own experience, the fact that teens who are sexually active use the service more than teens who are not sexually active could indicate that the information may be used for more than just satisfying their curiosity. It is likely that many of the texters are facing situations in which they need additional information that may allow them to practice less risky sexual behavior.

Given the relatively low use of the service despite the intensive social marketing campaign, it is important to recognize the barriers that may keep teens from using such a service. In diffusion of innovations language, it is important to understand what may help further diffusion in the social system. Modeling of use of the service by opinion leaders may reduce lack of understanding about how to use the BrdsNBz service, and reduce concerns about costs of use, and fear of parents seeing that they are asking questions about sex. Such modeling relates to the diffusion of innovations characteristic of trialability, which is whether one can try the innovation before adopting it (Oldenburg &

Glanz, 2008). Perhaps the health educator who had teens opt in to the service had the right idea by making the process not only easy for the teens, but also something they were able to test out before actually using it for specific information.

The context of the information environment also needs to be considered. The significant majority of students in this sample had cell phones and used them to send text messages, but text messaging may not yet be seen as a way to get information, particularly sexual health information. Talking to peers, paying attention to the media and conducting Google searches may be ways that teens are more used to getting such information (Boyer et. al., 2011), making the idea of a text message service too new to come to mind when a teen does want information or even unnecessary because of the other information options available. The qualitative work supported this finding, with some teens indicating they just did not think to use the service. The participants in this project also came from schools that had highly involved health educators, which could mean the teens are receiving information about sexual health without even asking in some cases, making their need to seek for information less urgent.

Limitations

Although this mixed-methods study takes an important step in examining the use of one type of a sexual health text message service—a two way text message service that allows teens to text with a health educator—a number of limitations restrict the conclusions that can be drawn. Some of these limitations are associated with the design of the study. Since the study is cross-sectional rather than longitudinal, the results from this study cannot establish causation. This means that although a model of information seeking was developed, only associations between variables but not causal paths could be

established. Additionally, there were no control schools, which would have allowed for a stronger campaign evaluation. Such designs were not possible for a number of reasons. Specifically, teachers and administrators have a finite amount of class time and completing a pretest and posttest with all students in the school was asking for too much of their time. The lack of control schools was necessary because it was unclear how many teens might hear about BrdsNBz through the campaign and how many might choose to use the BrdsNBz service. A substantial population of users was needed to look at characteristics of service users.

This study was conducted with teens in rural and suburban areas of the North Carolina Piedmont in only two counties so the results obtained here may be different from those that would be obtained in another state or even another set of schools within the state. In part, this is due to the difficulty associated with recruiting for such projects. Recruitment of schools for the project began more than two years before the social marketing campaign was launched. Schools were solicited through health educator meetings, and even once schools expressed interest, a number backed out as administrators were reluctant to promote a sexual health service or were concerned about using students' time. Having a champion in the schools was especially important in getting administration and community buy-in. All schools, however, do not have in-school health educators who will take the time and effort to promote such a service so the schools in this study may not be representative of other schools in North Carolina or in other states.

Another set of limitations is associated with data collection for the study. The bulk of the data was collected in an online survey three months after the start of the

promotional campaign for the online sexual health text message service. Three months may not have been enough time for the campaign to have strong effects, especially since teens may not have questions within that period of time. Additionally, teens who used the service at the beginning of the campaign may have had trouble recalling why they used the service. The anonymity of the students who completed the surveys could also be considered a limitation. Although ensuring anonymity should increase responsiveness (especially to questions about sexual behaviors), lack of identification precluded following up with respondents. In studies using the sequential explanatory mixed methods design in which participants are identified, participants can expound on interesting or unclear quantitative results in the qualitative portion of the study (Creswell, 2003). In future studies it could be useful to identify participants so that focus groups could be conducted specifically with adolescents who have been identified as frequent users, and/ or early maturing teens or those with higher levels of cognitive susceptibility.

Having schools administer the anonymous surveys was beneficial because it allowed for a large number of surveys to be collected from each of the schools. The high response rates indicate that having schools oversee the survey process was successful. School personnel administered the surveys, however, which meant that in some cases there might have been little oversight of the survey experience and this was one of the reasons why only four of the schools who received promotions were surveyed. The alternative school was hard to coordinate because the champion for the county worked mainly at the middle school and had trouble getting the necessary approvals from school administrators. Another middle school was not included in the follow-up survey because

the school misplaced the parental opt out forms, making it unethical to survey students since it was not clear who should not be included.

Despite these limitations, this study has a number of strengths as well. This study provides a first look at a type of sexual health text messaging service—two-way text message services—that have yet to be examined. The research conducted on sexual health text message services to date has focused primarily on services that send out persuasive messages on a specific timeline, and often these studies do not require teens to express a desire to receive such information. To my knowledge, this is the first study that looks at who chooses to use a sexual health text message service. This study uses a population for which such a service may be particularly useful—teens in a rural and suburban setting in the North Carolina Piedmont where the number of teen pregnancies each year is similar to the state average. Recent research has indicated that teens in rural areas are at increased risk for teen pregnancy (Ng & Kaye, 2013).

Future research

While this study moves the field of mobile health forward by providing a more complete picture of the users and processes associated with decisions to use a sexual health text message service, much work still remains to be done. This project examined only one type of sexual health text message service. Some of the findings (i.e., that teens were afraid parents would see their messages) have not been an issue for other types of text services (Perry et al., 2012). Future research needs to examine the benefits and drawbacks of the various types of text messaging services.

Given differences in price and staffing needs, it would be beneficial to see which types of text messaging services are viewed as most useful by teens and which are better

positioned to result in positive sexual health outcomes. From a theoretical side, we need to do a better job of understanding when and why a teen might use one resource rather than another. Perhaps a service that allows for direct interaction with a health educator is especially useful for teens who have situation specific questions, but a service that provides general information through automated service menus is especially useful for teens who are just curious and interested in gathering more information on sexual health topics.

Conclusions

Sexual health text messaging services are growing in popularity, at least among sexual health educators, but little is known about who uses the services and in what contexts. This project provides empirical evidence about one type of sexual health text message service—two-way text messaging—about which adolescents use such services and why. This project found that teens are interested in receiving sexual health information via text, that users come from lower socioeconomic status backgrounds, are more likely to be in a relationship than non-users, and are more likely to have engaged in sexual behaviors. Factors found to be associated with information seeking in interpersonal communication contexts have similar associations with intentions to use a mediated service, with efficacy playing less of a role and affect motivating much of the process. This project increases our understanding of who uses, why they use, and barriers that may limit use for some adolescents.

Appendix A: Promotion Materials

What is the best way to prevent pregnancy?

Everyone has questions. **Text BrdsNBz** for free, factual and confidential answers to your sexual health questions.

1) Text "NCTEEN" to 66746
2) Text your question
3) Get answers from a trained sexual health educator

BrdsNBz
appcnc

appcnc
Adolescent Pregnancy Prevention
Campaign of North Carolina

There is no cost for using BrdsNBz, but standard text messaging rates still apply

I love my boyfriend, but I don't think I'm ready for sex...

Everyone has questions. **Text BrdsNBz** for free, factual and confidential answers to your sexual health questions.

1) Text "NCTEEN" to 66746
2) Text your sexual health question
3) Get answers from a trained sexual health educator
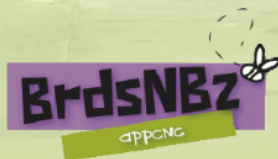
BrdsNBz
appcnc

appcnc
Adolescent Pregnancy Prevention
Campaign of North Carolina

There is no cost for using BrdsNBz, but standard text messaging rates still apply

School	Total students enrolled[1]	Average daily attendance[2]	Possible number of students in attendance[3]	Opt-outs	Total possible participants	Surveys taken	Response rate	Decline to participate	Number discarded[4]	Final count
Southeastern Stokes MS	441	95.05	419	25	394	323	81.98%	5	7	311
Chestnut Grove MS	791	95.05	752	--[5]	752	614	81.64%	9	9	596
West Stokes HS	965	95.05	917	23	894	831	92.95%	5	24	802
Kannapolis MS	783	94.79	742	0	742	436	58.76%	6	14	416
TOTAL	2,980	94.99	2,830	48	2,782	2,204	79.22%	25	54	2,125

1. Data is based on number of students enrolled as of Jan. 1, 2013 as reported in the Principal's Report, ncpublicschools.org/fbs/accounting/data.

2. Data is based on the average daily attendance of the county as averaged across the last three school years (2010, 2011, 2012), ncpublicschools.org/fbs/accounting/data.

3. Possible number of students is calculated based on the total enrollment of the school and the attendance data for the specific county. This is an approximate number for how many students are at the school on any given day.

4. Surveys were discarded if they had excessive missing data (no responses past consent and basic demographic variables) or if they included information that appeared to be inauthentic (all open-ended questions were examined for facetious responses (i.e. race of alien)). If multiple open-ended response items were facetious or if there was one facetious response and a number of questions that were answered with the same number (i.e. all questions on page 3 were answered 5 regardless of reverse worded items), the case was discarded.

5. A number of opt-outs for Chestnut Grove was not able to be obtained.

APPENDIX C: Text Message Questionnaire

Text based questionnaire:

Thanks for using BrdsNBz. It'll help us to know who is using the service. It's anonymous, so we won't know your name. Just 5 Qs. You can text STOP to quit.

How old are you? Text back a number, example: "14"

Are you male (Text M) or female (Text F)?

Almost done. Thanks for your help! Are you White (Text W), Black (Text B), Asian (Text A), Hispanic/Latino (Text H) or Other (Text O).

Where did you hear about BrdsNBz? Text your response (example: saw poster @ school; health class; friend)

Last question: Would you tell a friend to use BrdsNBz? Text 5=definitely, 4=probably, 3=maybe, 2=probably not, 1=definitely not. Many Thanks!

APPENDIX D: Questionnaire

Teens and text service perceptions - West Stokes HS

Q1 Hello! My name is Jessica Willoughby, and I'm a graduate student at University of North Carolina Chapel Hill. You are being asked to complete a survey and be a part of a research project. Your participation is completely voluntary, so you can choose if you want to participate or not. It is also anonymous, meaning your name will never be associated with any of your answers.   This survey will ask about your use of new media for sexual health information. It may ask questions that are sensitive. You do not need to answer any questions you do not want to, and you can stop participating at any time.   We really appreciate it if you do answer the questions, as it will help us get a better understanding of where adolescents go for information and what might be useful. There are no right or wrong answers. We just want to hear your opinions.   This survey should take 10-15 minutes of your time. Once you complete the survey, you will have a chance to enter your name into a drawing for one of four $50 gift cards that will be given to students in your area. Your name will never be connected to your survey answers. If you have questions, email Jessica Willoughby at jwillo@live.unc.edu or call 360-580-2307.   If you agree to participate in the survey, please answer the question below and click the next button.   I agree to participate:
❍ Yes (1)
❍ No (2)

If No Is Selected, Then Skip To End of Survey

Q2 This first set of questions asks for some background information on you. How old are you? (Please enter a number--example: 14)

Q6 What is your gender?
○ Male (1)
○ Female (2)

Q7 Which of the following describes you? (Check all that apply)
❑ White (1)
❑ Black (2)
❑ Asian (3)
❑ Latino/a or Hispanic (4)
❑ American Indian (5)
❑ Other (please specify) (6) _____

Q8 What grade are you in?
○ 6th (1)
○ 7th (2)
○ 8th (3)
○ 9th (4)
○ 10th (5)
○ 11th (6)
○ 12th (7)

Q9 Is English the language you speak at home?
- ○ Yes (1)
- ○ No (2)

Q10 What grades do you tend to get in school?
- ○ Mostly As (1)
- ○ Mostly As and some Bs (2)
- ○ Mostly Bs (3)
- ○ Mostly Bs and some Cs (4)
- ○ Mostly Cs (5)
- ○ Mostly Cs and some Ds (6)
- ○ Mostly Ds (7)
- ○ Mostly Ds and some Fs (8)
- ○ Mostly Fs (9)

Q11 Do you receive a free or reduced price breakfast or lunch at school this year?
- ○ Yes (1)
- ○ No (2)

Q12 What is the highest level of education completed by your mother or father?
- ○ Some high school but did not graduate (1)
- ○ Finished high school (2)
- ○ Some college, but did not graduate (3)
- ○ Finished college (4)
- ○ School beyond college (like doctor, lawyer, professor, social worker, or scientist) (5)
- ○ I don't know (6)
- ○ No one fills this role (7)

Q15 Do you text/SMS?
- ○ Yes (1)
- ○ No (2)

Answer If Do you text or SMS? Yes Is Selected

Q16 About how many text messages do you SEND in a typical day?

Q82 Which of the following statements best describes you:

❍ I know everything I want to about sexual health. (1)

❍ I know a lot about sexual health, but I would like to know a little more. (2)

❍ I know some about sexual health, but there is still some I would like to know. (3)

❍ I know a little about sexual health, but there is still a lot I would like to know. (4)

❍ I know nothing about sexual health, but I would like to know everything. (5)

Q22 How much do you disagree or agree with the following statements?

	Completely disagree (1)	Disagree somewhat (2)	Neither agree nor disagree (3)	Agree somewhat (4)	Completely agree (5)
I want to know more about sexual health topics than I do (2)	❍	❍	❍	❍	❍
When I am unsure about something related to sex, it makes me feel curious (5)	❍	❍	❍	❍	❍
When I am unsure about something related to sex, it makes me feel nervous (6)	❍	❍	❍	❍	❍
When I am unsure about something related to sex, it makes me feel worried (7)	❍	❍	❍	❍	❍
I wish I knew more about sexual health (8)	❍	❍	❍	❍	❍

Q72 Please indicate on the scale how you feel about sexual health information. I think sexual health information is....

	Completely disagree (1)	Disagree somewhat (2)	Neither agree nor disagree (3)	Agree somewhat (4)	Completely agree (5)
Interesting (1)	❍	❍	❍	❍	❍
Boring (2)	❍	❍	❍	❍	❍
Confusing (3)	❍	❍	❍	❍	❍
Embarrassing (4)	❍	❍	❍	❍	❍
Difficult to find (5)	❍	❍	❍	❍	❍

Q86 In the last three months, have you had any questions about sexual health (body changes, sex, pregnancy, sexually transmitted diseases, or other topics)?
❍ Yes (1)
❍ No (2)

Q87 When you last had a question about sexual health, where did you go for answers? (Check all that apply).
❑ Internet search (like Google, Yahoo, or Bing) (1)
❑ Medical website (like WebMD, health department, or medical sites) (2)
❑ Sexual health website (Iwannaknow, Ask Alice, or other sexual health sites) (3)
❑ Other internet site (4)
❑ Parents (5)
❑ Sibling (like a brother or sister) (6)
❑ Friends (7)
❑ Doctor/nurse (8)
❑ Television (9)
❑ Magazines (10)
❑ Health teacher (11)
❑ Text message service (13)
❑ Other (please specify) (14) _____
❑ I have not had a question about sexual health (15)

Q75 Have you seen, read or heard about any messages or advertising about a sexual health text message service?
○ Yes (1)
○ No (2)

Q76 What is the name of the service?

Q77 Please write, in your own words, what you think the service does:

Q23 Have you ever heard of a sexual health text message service called BrdsNBz?
○ Yes (1)
○ No (2)

Q25 Have you heard about BrdsNBz or seen any messages or advertising in the last three months that promote the BrdsNBz service?
○ Yes (1)
○ No (2)

Q26 The next questions ask about ads and items promoting BrdsNBz. Please select the statement that best describes you.
○ I haven't seen any posters promoting BrdsNBz. (1)
○ I saw some posters promoting BrdsNBz but didn't pay much attention. (2)
○ I saw posters promoting BrdsNBz and read them. (3)
○ I saw posters promoting BrdsNBz and read them more than once. (4)

Q78 What give-away items did you get promoting BrdsNBz? Check all that apply.
- ❏ Pens (1)
- ❏ Wallet cards (2)
- ❏ Chapstick or lip balm (3)
- ❏ Water bottles (4)
- ❏ Sticky notepads (5)
- ❏ Handouts/flyers (6)
- ❏ Key chains (7)
- ❏ None of the above (8)

Q27 Where did you hear about or see messages about the service? Check all that apply.
- ❏ Internet (1)
- ❏ Posters in school (2)
- ❏ Peers/friends (3)
- ❏ Boyfriend/girlfriend (4)
- ❏ Family members (5)
- ❏ Give-away items (pens, lip balm or other items) (9)
- ❏ Flyers or handouts at school (6)
- ❏ In a class (7)
- ❏ Other (please describe) (8) _____

Q28 How much do you disagree or agree with the following statements?

	Completely disagree (1)	Disagree somewhat (2)	Neither agree nor disagree (3)	Agree somewhat (4)	Completely agree (5)
Using a sexual health text message service (like BrdsNBz) is easy (1)	○	○	○	○	○
I am confident I know how to use the BrdsNBz service (2)	○	○	○	○	○
I am confident I can send a question to BrdsNBz if I want (3)	○	○	○	○	○
I am confident I could use BrdsNBz to get information if I wanted to (4)	○	○	○	○	○
Information from BrdsNBz is believeable (5)	○	○	○	○	○
I can trust information from BrdsNBz (6)	○	○	○	○	○
Information from BrdsNBz is	○	○	○	○	○

	accurate (7)					

Q83 Services that let you text a sexual health question to a health educator can be...

	Completely disagree (1)	Disagree somewhat (2)	Neither agree nor disagree (3)	Agree somewhat (4)	Completely agree (5)
Creepy (1)	○	○	○	○	○
Helpful (2)	○	○	○	○	○
Good (3)	○	○	○	○	○
Useful (4)	○	○	○	○	○

Q90 Suppose you had a question about a sexual health topic. How likely is it that you would use the BrdsNBz service?
- ○ Very unlikely (1)
- ○ Somewhat unlikely (2)
- ○ Somewhat likely (3)
- ○ Very likely (4)

Q30 How many times have you sent a question to the BrdsNBz text message service?
- ○ 0 (1)
- ○ 1 (2)
- ○ 2 (3)
- ○ 3 (4)
- ○ 4 (5)
- ○ 5 (6)
- ○ 6 (7)
- ○ 7 (8)
- ○ 8 (9)
- ○ 9 (10)
- ○ 10 or more (11)

Q88 Why did you not use the BrdsNBz service (please check all that apply)
- ❑ Did not have a sexual health question (1)
- ❑ Did not have a cell phone (2)
- ❑ Cost of text messaging (3)
- ❑ Worried that the service cost money (4)
- ❑ Worried about parents seeing it (5)
- ❑ Did not think it was useful (6)
- ❑ Other (please describe) (7) _____

Q32 What topics have you asked the BrdsNBz service about? Check all that apply.
- ❑ Physical development or growth (like hair growth, breast size, etc.) (1)
- ❑ Relationships (2)
- ❑ Pregnancy (3)
- ❑ Sexually transmitted diseases (4)
- ❑ Contraception (condoms, the pill, etc.) (5)
- ❑ HIV/AIDS (6)
- ❑ Other (7) _____

Q30 Think back to the most recent message you sent to BrdsNBz. Please briefly describe why you decided to text BrdsNBz. We aren't asking what your question was, but we are asking what made you want to ask the question.

Q31 Why did you text BrdsNBz instead of going to another source for information (like your parents, media, a doctor, etc.)

Q74 Would you tell a friend to use BrdsNBz?
- ○ Definitely (1)
- ○ Probably (2)
- ○ Maybe (3)
- ○ Probably not (4)
- ○ Definitely not (5)

Q84 Why or why not?

Q34 How useful was the information for you?
O Not at all useful (1)
O Only a little useful (2)
O Somewhat useful (3)
O Very useful (4)

Q38 Did you tell anyone about BrdsNBz?
O Yes (1)
O No (2)

Q73 Please indicate how much you agree with the following statements.

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
I was able to ask BrdsNBz a question when I wanted to. (1)	O	O	O	O	O
BrdsNBz' answer related to my question. (2)	O	O	O	O	O
BrdsNBz was able to respond to my specific questions. (5)	O	O	O	O	O
Using BrdsNBz is like having a conversation. (6)	O	O	O	O	O

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Q39 These next questions ask about your school and parents/guardians.

Q40 In general, how happy are you to be at your school?
○ Not at all happy (1)
○ Not very happy (2)
○ Somewhat happy (3)
○ Quite happy (4)
○ Extremely happy (5)

Q41 How much do you feel that your teachers care about you?
○ Not at all (1)
○ Very little (2)
○ Somewhat (3)
○ Quite a bit (4)
○ Very much (5)

Q47 Please indicate how much you disagree or agree with the following statements.

	Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree (5)
My parents know where I am in my spare time (1)	○	○	○	○	○
My parents know what I am doing at night (2)	○	○	○	○	○
My parents know my friends (3)	○	○	○	○	○
My parents know how I am doing in school (4)	○	○	○	○	○
My parents and I often eat dinner together (5)	○	○	○	○	○

Q48 Which of the following have you ever talked about with a parent/guardian? Please check all that apply.
- ❑ Sexual intercourse (1)
- ❑ Birth control (2)
- ❑ HIV/AIDS (3)
- ❑ Sexually transmitted diseases (STDs) (4)
- ❑ Condoms (5)
- ❑ None of the above (6)

Q85 These next questions ask about your opinions related to sex and development. Remember, ALL your answers are confidential.

Q51 If you had a boyfriend/girlfriend, how sure are you that you could refuse to have sex with him/her if you didn't feel ready?
- ⭘ Extremely sure (1)
- ⭘ Mostly sure (2)
- ⭘ Not really sure or unsure (3)
- ⭘ Mostly unsure (4)
- ⭘ Not at all sure (5)

Q52 How much do you disagree or agree with the following?

	Strongly disagree (1)	Disagree somewhat (2)	Neither agree nor disagree (3)	Agree somewhat (4)	Strongly agree (5)
I think I'm ready to have sex. (1)	⭘	⭘	⭘	⭘	⭘
People should wait to have sex until they are married. (2)	⭘	⭘	⭘	⭘	⭘
I believe it is OK for people to have sex before marriage if they are in love. (3)	⭘	⭘	⭘	⭘	⭘

Q53 How likely is it that you will have sex while in high school?
- ○ Very unlikely (1)
- ○ Somewhat unlikely (2)
- ○ Somewhat likely (3)
- ○ Very likely (4)

Q54 How likely is it that you will have sex in the next year?
- ○ Very unlikely (1)
- ○ Somewhat unlikely (2)
- ○ Somewhat likely (3)
- ○ Very likely (4)

Q55 Do you think your body development is earlier or later than most girls/boys your age?
- ○ Much earlier (1)
- ○ Somewhat earlier (2)
- ○ About the same (3)
- ○ Somewhat later (4)
- ○ Much later (5)

Q58 Please indicate whether you think each statement is true or false.

	True (1)	False (2)
You can get pregnant from oral sex (1)	○	○
Having sex underwater prevents pregnancy (2)	○	○
A girl can get pregnant while she is on her period (3)	○	○
You can get STDs through oral sex (4)	○	○
Condoms prevent the transmission of all STDs (5)	○	○

Q59 Have you ever had sexual intercourse?
❍ Yes (1)
❍ No (2)

Q69 How old were you when you had sexual intercourse for the first time?
❍ 11 years old or younger (1)
❍ 12 years old (2)
❍ 13 years old (3)
❍ 14 years old (4)
❍ 15 years old (5)
❍ 16 years old (6)
❍ 17 years old (7)
❍ 18 years old or older (8)

Q70 In your life, with how many people have you had sexual intercourse?
❍ 1 person (1)
❍ 2 people (2)
❍ 3 people (3)
❍ 4 people (4)
❍ 5 people or more (5)

Q63 In the past three months, how much of the time have you had a boyfriend or girlfriend?
❍ None of the time (1)
❍ A little of the time (2)
❍ Some of the time (3)
❍ Most of the time (4)
❍ All of the time (5)

Q81 This last question asks about your media use. In a typical day, how often do you use the following types of media?

	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Very often (5)
Television (1)	○	○	○	○	○
Radio (2)	○	○	○	○	○
Music from other sources (Pandora, iTunes, iPod, etc.) (3)	○	○	○	○	○
Social networking sites (like Facebook, MySpace, Twitter, or other sites) (4)	○	○	○	○	○
Internet, other than social networking sites (5)	○	○	○	○	○
Cell phone (6)	○	○	○	○	○
Magazines (print or online) (7)	○	○	○	○	○
Movies (8)	○	○	○	○	○

Q94 What device did you take this survey on?
○ Desktop computer (1)
○ Laptop computer (2)
○ Cell phone (3)
○ iPod (4)
○ Other (please specify) (5) _____

APPENDIX E: Focus Group Guide

Hello. My name is Jessica Willoughby and I am a graduate student at the University of North Carolina Chapel Hill. Today we are going to talk about a sexual health text message service called BrdsNBz. There are no right or wrong answers; I just want to hear your opinions on the service. I do not work for BrdsNBz, so you can be completely honest.

Before we begin, I want to let you know a few things. This project is anonymous, so your name will never be associated with anything you say in this discussion. I will be recording the discussion so I can make sure I have all your comments down, but after the discussion is typed up, the recording will be destroyed. Although I will not tell anyone what you say specifically, we are in a group of people, and I can't guarantee that they won't say something to someone else. Can we all agree that what gets said in this room stays in this room? Great. And keep in mind that you don't have to answer any question you don't want to.

Before we get started with the discussion, there is something I would like you to do. Each of you has a piece of paper and a pencil (hand out if they don't already have it). Before we start talking, I would like you to take a few minutes, and write down your general thoughts related to BrdsNBz. Basically, write down what you think of the service. We will talk about this generally, but no one else in the group will see your written information, although I would like to collect it at the end if it's ok, so please don't put your name on it.

(wait 3-5 minutes). Ok. Great. Now let's go ahead and get started. How many of you have been in a focus group before? Ok. Good. Well, a focus group is a group discussion. I will go ahead and lead the discussion by asking questions, but if someone says something that you want to reply to, please do. We do want to keep it to one conversation at a time so that I can hear all your thoughts, but please feel free to build off of each other's comments and ask each other questions or follow up. Does anyone have any questions? Let's go ahead and get started.

INTRO QUESTIONS
- Since I don't know all of you, how about we go around the room and say your name and what type of media is most important to you and why.
- So a lot of you mentioned X. What about cell phones? Can you tell me more about that?
- Do you send text messages? Can you tell me more about that? (Who do you send them to? What do you send texts about?)
- Do you receive messages or send messages to anyone outside your circle of family and friends?
- Have you ever sent a text message to get health information? Can you walk me through that?
- Where do you usually go to get health information?

- Are there any topics that you wouldn't go to those sources for? Where would you go then?

SEXUAL HEALTH TEXT MESSAGE SERVICES--GENERALLY
- What might be useful about texting for sexual health information?
- Why might it not be useful?
- Do you believe the information you can get from a text service? What makes you believe it?

BRDSNBZ
- Can you tell me where you first heard about BrdsNBz?
- What were your first impressions?
- Why do you think someone might use the BrdsNBz service?
- Why do you think someone might not use the BrdsNBz service? (What would keep someone from using the service?)
    - o Prompt if necessary: Not interested, no question, unsure how, parents seeing it, costs
- Do you think BrdsNBz should not be free? Why or why not? Would having it cost something, like 50 cents each time you use it, make it seem more credible?
- What did you like most about the service?

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