Enhancing a Teen Pregnancy Prevention Program With Text Messaging: Engaging Minority Youth to Develop TOP® Plus Text

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ABSTRACT

Purpose: To develop and pilot a theory-based, mobile phone texting component attractive to minority youth as a supplement to the Teen Outreach Program®, a youth development program for reducing teen pregnancy and school dropout.

Methods: We conducted iterative formative research with minority youth in multiple focus groups to explore interest in texting and reaction to text messages. We piloted a month-long version of TOP® Plus Text with 96 teens at four sites and conducted a computer-based survey immediately after enrollment and at the end of the pilot that collected information about teens’ values, social support, self-efficacy, and behaviors relating to school performance, trouble with the law, and sexual activity. After each of the first three weekly sessions we collected satisfaction measures. Upon completion of the pilot we conducted exit interviews with twelve purposively selected pilot participants.

Results: We successfully recruited and enrolled minority youth into the pilot. Teens were enthusiastic about text messages complementing TOP®. Results also revealed barriers: access to text-capable mobile phones, retention as measured by completion of the post-pilot survey, and a need to be attentive to teen literacy.

Conclusions: Piloting helped identify improvements for implementation including offering text messages through multiple platforms so youth without access to a mobile phone could receive messages; rewording texts to allow youth to express opinions without feeling judged; and collecting multiple types of contact information to improve follow-up. Thoughtful attention to social and behavioral theory and investment in iterative formative research with extensive consultation with teens can lead to an engaging texting curriculum that enhances and complements TOP®.

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IMPLICATIONS AND CONTRIBUTION

Formative research with a sample of target participants, along with pilot testing to work through program content and the implementation process, improves the program’s cultural competency and chances for success. Adding a texting component to a face-to-face program may increase participant recruitment and retention, particularly minority youth.

Unintended pregnancy affects every community, but has a greater impact on the most vulnerable and marginalized populations [1,2]. In 2009, when we proposed our study, 6,272 females under the age of 20 gave birth in Colorado—one baby born every 84 minutes [3]. Birth rates of African-American and Latina teens in Colorado were approximately 42/1,000 and 75/1,000 respectively, higher than the overall teen birth rate in Colorado (35.1/1,000) or nationally (39.1/1,000) [3]. Latina teen mothers accounted for almost 80% of all babies born to Denver...
theories [4]. Although the national teen birth rate has declined to the lowest since the 1940s [5–8], a significant number of teens give birth in Colorado, the site of our research, and disparities among race and ethnicity remain [9].

Sexually transmitted disease (STD) data also highlight behaviors that contribute to early pregnancy. The Centers for Disease Control and Prevention estimate that nearly half of all new STDs nationally are experienced by 15–24-year-olds [10]. In 2011 the rate of chlamydia infection among Denver teens aged 15–19 years was 5,036.8/100,000; the rate of gonorrhea was 618.5/100,000 [11]. Nationally and in Colorado youth of color are disproportionately affected by STDs [3,12,13].

Although there are numerous efficacious programs to prevent unintended teen pregnancy, many interventions do not effectively target diverse minority youth or fail to enroll and engage them adequately [14]. When minority youth are not engaged, they are less likely to complete programs [15–17]. Moreover, youth exist in a world of rapidly evolving and dynamically changing electronic media. Face-to-face only programs risk becoming outdated or obsolete unless they can adapt and capitalize on youth preferences for communication and connection to services and care [18].

In 2010 the Office of Adolescent Health (OAH) in the Department of Health and Human Services funded Denver Health and Hospital Authority (Denver Health) to test an innovative strategy for preventing pregnancy among high-risk, vulnerable, and culturally under-represented youth populations as part of the Teen Pregnancy Prevention Program research and demonstration cooperative agreements. Denver Health, together with the Boys & Girls Clubs of Metro Denver (BGCMD), Colorado Youth Matter, and the University of Colorado Denver, are conducting a multiyear randomized control trial of a text messaging enhancement to the Teen Outreach Program® (TOP®), an evidence-based teen pregnancy prevention program. TOP® uses youth-development focused programming delivered by a trained facilitator in 25 weekly 1-hour sessions addressing topics on values clarification, relationships, goal-setting, decision-making, human development and sexuality, and community service learning; participants are also asked to complete 20 hours of community service [19]. TOP® has been shown to reduce school dropout and teen pregnancy [19], although not specifically with Latino youth or in nonschool settings. BGCMD will be offering TOP® over 4 years to at least 800 primarily Latino and African-American teens in metro Denver in 32 groups at eight sites. Groups are randomly assigned to receive TOP® only (controls) or TOP® Plus Text (each arm consists of 16 groups, n = 400). The study compares perceived self-efficacy, social support, sexual and educational behavioral outcomes, and self-reported STD and pregnancy rates. Because the project focuses on minority youth, a method for optimizing the recruitment and retention of these youth was a priority. Thus, the aim is to take advantage of mobile phones to explore whether texting enhances or extends TOP® effects through application of social network [20], social capital [21–24], self-efficacy [25,26], and observational learning theories [26].

Because adolescents—particularly minority adolescents—are among the greatest consumers of mobile phones and text messaging [27], we posit that texting offers a unique environmental opportunity to engage, reinforce, facilitate, and sustain norms, attitudes, and healthy behaviors to consider pregnancy prevention from a more macro level perspective [20,21,26,28]. Texts may also boost self-efficacy, confidence in the ability to do something despite barriers, such as resisting peer pressure or setting manageable goals. Texts should enhance the social capital of the texting group with supportive messaging about the topics covered, engaging teens with polls and quizzes about values, gender roles, relationships, and communication, and providing instrumental information about access to STD and pregnancy testing (Figure 1).

Methods

Before implementing the study, we engaged in an iterative combination of formative research and piloting with institutional review board (IRB) approval to ascertain whether we could:

1. Recruit and engage minority youth aged 14–18 years to participate in TOP® Plus Text activities
2. Develop compelling text messages
3. Automate text message delivery
4. Obtain baseline and follow-up surveys.

Formative research

Before the pilot we convened six focus groups with 59 teens from four BGCMD sites to explore their reactions to TOP® and elicit suggestions for the texting component. Sessions were audio-recorded and transcribed. Groups included 30 males and 29 females aged 14–18 years. About one-third of teens identified as African-American and about two-thirds identified as Latino/a. Teens were inclined to participate in TOP® if it was different from other BGCMD programs and school-based sex education. About half were especially interested in the community service component of TOP® for meeting their high school requirement. Teens discussed advantages and disadvantages to mixed gender groups. Girls said boys could be silly about serious things or talk outside the group about what people said. Boys agreed that both boys and girls needed information on the proposed topics, but worried it could be embarrassing for guys to talk about things like condoms with girls present. Nearly all teens were comfortable with gender-specific break-out discussions followed by joint sessions to share perspectives.

About 15% of teens in the focus groups had no mobile phone; among the remainder, there was a positive response to the idea of using texts to supplement TOP®. Teens suggested pairing up with another participant to share texts. Almost all teens with mobile phones texted heavily, typically sending and receiving 50 to over 1,000 texts per day. Text in-boxes held around 300 texts and teens had to clear them frequently. Teens also talked on the phone but less so. Girls could text things they could not say by phone, such as “You are really cute/hot/etc. I like you.” A rejection via text seemed not to be as big a deal as one in person or on the phone. Teens also liked the ability to think about responses before sending them. All teens with text-capable phones had unlimited usage plans. Most did not have phones capable of connecting to the Internet or linking to videos. Teens reported lapses in phone access due to lost phones, phones not working, loaning phones to others, or intentionally breaking a phone to get the newest model. They anticipated it could be challenging for TOP® Plus Text messages to get noticed amid the mass of friends’ text conversations. To make it more likely teens suggested using fun facts, quizzes, games, contests between TOP® groups, links to something interesting, or something humorous. Many said they might delete a message from a number they did not recognize. Nobody wanted the TOP® Plus Text messages to use texting abbreviations, saying these were “too hard to be sure what you mean” and “not for serious information.”
Teens indicated that several messages each day or a few days each week would be acceptable. They preferred interactive messages with polls and true/false questions with feedback reporting the aggregate responses. Nearly all participants also liked the idea of being able to text in a zip code to learn where to get free condoms, free/low cost contraception, or confidential health care.

Text creation

Based on the pre-pilot focus groups, the research team designed text messages to promote social norms using a positive youth-development approach to match the asset-based TOP® lessons. Specific messages were tested with teens before the pilot. Pilot participants were asked via texts to list musicians and singers as well as other celebrities they follow. Their responses were used to select pop culture text references for the pilot. System specifications limited text content to 160 characters and spaces, so messages were designed to be concise.

To collect additional youth input on texts after the pilot, we convened three additional focus groups of youth who had not been in the pilot but who had similar demographics. Sessions were audio recorded and field notes taken. Ultimately messages for program implementation were designed to link the TOP® curriculum and the theoretical base for TOP® Plus Text using music artists, celebrities, and topics that the teens said were most interesting to them (Table 1).

Pilot

At the request of OAH we conducted a pilot in April 2011. Implementation was planned for August to coincide with the beginning of the school year, so we developed a 4-week pilot to test enrollment, retention, and certain content. We enrolled 96 teens from the four BGCMD sites randomized to receive the treatment condition for the first implementation year to avoid contamination from the pilot. The IRB approved our request to have teens consent for themselves, based on Colorado law that grants minors autonomy to seek reproductive care [29], and the IRB’s interpretation that parental consent subsequently is not required for research about reproductive issues. We conducted a group consent process in each BGCMD location. Members of the research team facilitated the consent process, reading and discussing the informed consent form with teens, responding to questions, and providing each teen a copy of the consent form. All eligible teens invited to participate enrolled in the pilot.

Teens completed a computer-based survey immediately after enrollment and at the end of the pilot that collected information about their values, social support, self-efficacy, and behaviors relating to school performance, trouble with the law, and sexual activity. The complete survey included 84 questions, many with skip patterns for teens who reported not being sexually active. Demographic information was collected only at baseline. Teens without a mobile phone were asked to “buddy” with a fellow pilot participant to read the text messages.

The four pilot TOP® Plus Text sessions covered values, community service, contraception and condoms, and resisting pressure in romantic relationships. We sent an average of 11 messages per week related to that week’s TOP® content between 3:00 P.M. and 9:00 P.M. Twenty-nine of the 44 texts asked for a response. Denver Health’s Patient Relationship Management system was used to automate text delivery [30]. (Patient Relationship Management System is a customized version of Microsoft Customer Relationship Management, developed to incorporate text messaging into clinical care and monitoring by automatically sending text messages to patients and to process text responses.)

An automatic reply was sent to each message received (“Thanks your msg was received” or other appropriate response reflecting the original outbound message). In addition to the types of texts noted in Table 1, we sent text reminders about upcoming pilot sessions. All messages started with a header (“TOP”) to identify the source of the messages (Table 2).

Following each of the first three TOP® sessions teens completed a pencil and paper survey about how useful the TOP® session was that day and how likely they were to think about what they learned over the next week. Response options were a 3-point Likert scale: “not at all,” “somewhat,” “very.” After the pilot, we conducted semi-structured exit interviews lasting 20–30 minutes with 12 purposively selected participants to explore what teens liked and disliked about TOP® Plus Text. Interview participants were selected for age, gender, race/ethnicity, site, frequency of response to texts, and access to a text-capable phone. Interviews were audio-recorded and transcribed.

Results

Reach

The racial and ethnic background of the teens reflected our goal of engaging Latino/a (70.8%) and African-American (24.0%) teens. Males outnumbered females (60.4% vs. 39.6%) and a greater proportion were between the ages of 14 and 15 years (67.8%) compared with those 16–18 years old (32.2%) (Table 3). At baseline, sexually active participants reported multiple risk behaviors including early age of sexual debut, with 63.2% of 14–15-year-olds reporting first sex (oral, anal, or vaginal) at age 13 years or younger compared with 42.1% of the sample as a whole and 21% of teens 16–18 years old. A third of teens (34.4%) reported intentions to have sex in the coming 3 months and fewer than 44% of these teens reported intentions to use contraception or ensuring that their partner would use contraception the next or first time they had sex. Almost one-quarter (23.7%) of teens intending to have sex in the next 3 months reported more than one partner at a time in the past 3 months, with 36.8% of teens 14–15 years of age reporting concurrent sex partners.

We planned to recruit 25 teens at each of the four BGCMD sites and to have everyone attend all four sessions. An average of 24 participants enrolled per site (range 19–31), and aggregate attendance at each session ranged from 51.0% to 62.5%, with attendance increasing each week (51.0%, 55.2%, 59.4%, 62.5%). For purposes of the pilot, retention was measured as the percentage of those completing the post-pilot survey after the last pilot session (62.5%).

More teens than expected did not have a mobile phone, especially teens age 14–15 years. The “buddy” system to share texts did not work uniformly. Some teens without a mobile phone did not connect with their buddy to read the messages and some who did connect found their buddy had already deleted the message because they received many texts and needed to clear their inbox to receive more. The failure of the buddy system indicated a need to provide a different way to access texts in the implementation phase for those without a mobile phone.
Satisfaction

All teens attending the first three sessions were asked to answer the satisfaction questions. Of those who responded (58% of teens enrolled), 94% found sessions “somewhat” or “very” useful. Similarly, 91% were “somewhat” or “very” likely to think about what they learned in the pilot during the next week.

We reached thematic saturation in the exit interviews. Teens consistently expressed enthusiasm for the pilot and the text component. They particularly liked texts that included quotes of celebrities, fun facts, and quizzes, although there was no unanimity about the celebrities teens preferred. Some teens, but not all, also noted that some of the texts seemed to ask for personal opinions, which made them feel judged. In the post-pilot focus groups teens mentioned confusion with certain language such as “contraception” and “assertive.”

- “I really liked the one that asked what you want your career to be—I said architecture… I would respond when they were asking me personal questions like about sex or about jobs. One of them was asking me what you preferred to be in your career or something like that? Messages that I feel weren’t that personal. I feel okay answering them.” (17 year old male)
- “Some text messages, I really liked…and the condoms—like one question was whether two condoms are better than one—most people would think that is a fact…I liked questions where it would ask you your opinion about something. Like do you think most celebrities smoke or like the questions about that.” (16 year old male)
- “I learned from one of the quotes that your first love isn’t going to be your last one—you’re gonna have more. And the condoms. The STD one.” (17 year old male)
- “I liked when they asked the questions. Like, for example, who helps the Boys & Girls Clubs? I like that when you answer it they give the right answer…When we would get text messages like when we were in the club like TOP®—like we were heading to a volleyball game—some of the girls are in volleyball—they’d be like “I answered this but is it right?” They would like just discuss it.” (15 year old female)

Table 1
Text topics and relationship to theoretical model

<table>
<thead>
<tr>
<th>Curriculum element</th>
<th>Text content and theoretical base</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volunteering</td>
<td>Tips on professional conduct, appropriate dress, success in the workplace. [supportive relationships, community engagement, future aspirations]</td>
</tr>
<tr>
<td>Values</td>
<td>“What’s important to you?” Poll: What are your top five values? [supportive relationships, self-efficacy, future aspirations, contraceptive use]</td>
</tr>
<tr>
<td>Gender roles</td>
<td>Polls: Who should be responsible for childcare? Housekeeping? Contraception? Name your favorite male/female role model. [social network reinforcement of social support, supportive relationships, contraceptive use]</td>
</tr>
<tr>
<td>Health and hygiene</td>
<td>Messages about daily hygiene, seeking medical care, locations of contraceptive and STD care. [increased referrals to care, contraceptive use, STD prevention]</td>
</tr>
<tr>
<td>Development</td>
<td>Testimonial requests: What is life like as a teen? What is your greatest fear about growing up? What are you looking forward to? [future aspirations, social support, self-efficacy, refusal of sex, delay of sex debut]</td>
</tr>
<tr>
<td>Relationships</td>
<td>Poll: What are the qualities of a good friend and a good romantic partner? Polls: What are your best strategies to keep your romantic relationships healthy? What are your best strategies for ending an unhealthy relationship? Messages: Reinforcing negotiation skills in a relationship around sexual behavior, waiting for first sex, where to get contraception and STD care, visiting clinics when you are ready for sexual activity. [supportive relationships, self-efficacy, contraceptive use, refusal of sex]</td>
</tr>
<tr>
<td>Influence</td>
<td>Messages about resisting peer and social pressure. Testimonial request: When have you been most proud of your ability to say no to a friend? [self-efficacy for contraceptive and condom use and refusal of sex]</td>
</tr>
<tr>
<td>Sexuality</td>
<td>Polls: Myths and facts about sex. Quiz: True or False questions about STDs, contraception. Testimonial request: Best ways to support someone who is GLBTQ. Messages: How to seek medical care, regular checkup for contraceptive care. [increased social support, increased self-efficacy for contraceptive use, refusal of sex]</td>
</tr>
<tr>
<td>Communication and assertiveness</td>
<td>Messages about using technology (Internet and mobile phones) safely and appropriately. Testimonial request: Tell us your story about how you were assertive but not aggressive in communicating. Poll: How many times have you successfully refused sex when pressured? [increased social support, self-efficacy for contraceptive use and refusal of sex]</td>
</tr>
<tr>
<td>Goal setting</td>
<td>Poll: Name three short-term goals, three long-term goals. Testimonial request: Share experience of achieving a goal.</td>
</tr>
<tr>
<td>Decision-making</td>
<td>Testimonial request: What have been your biggest challenges in life and how did you address them? Poll: Which strategies do you employ to help you with tough decisions? [increased social support, future aspirations, self-efficacy]</td>
</tr>
</tbody>
</table>

Table 2
Examples of text messages

<table>
<thead>
<tr>
<th>TOP®</th>
<th>Myth or Fact: Teens who volunteer are less likely to become pregnant or use drugs. Reply 1 = myth, 2 = fact, 3 = unsure.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOP®</td>
<td>Which celebrity volunteers with Boys &amp; Girls Clubs of America? Reply 1 = Jennifer Lopez, 2 = Mary J. Blige, 3 = Pink, 4 = unsure.</td>
</tr>
<tr>
<td>TOP®</td>
<td>Check out Chris Brown’s apology: <a href="http://tinyurl.com/apologychyc">http://tinyurl.com/apologychyc</a>. Do you think he means it? 1 = yes, 2 = no, 3 = maybe.</td>
</tr>
<tr>
<td>TOP®</td>
<td>Did your feelings/opinions about trust &amp; teamwork change after this week’s TOP® session? Reply 1 = yes, 2 = no, 3 = unsure.</td>
</tr>
<tr>
<td>TOP®</td>
<td>Just like food, condoms have an expiration date. Be sure to check the date before use to be sure it’s good!</td>
</tr>
<tr>
<td>TOP®</td>
<td>Denver has lots of resources. For FREE STD tests &amp; birth control, set up an apt @ Denver Health’s teen clinic: 303-692-3540.</td>
</tr>
</tbody>
</table>
Table 3
Gender, age, and race/ethnicity of teens in pilot (N = 96)

<table>
<thead>
<tr>
<th>Demographic</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>58 (60.4)</td>
</tr>
<tr>
<td>Female</td>
<td>38 (39.6)</td>
</tr>
<tr>
<td>African-American</td>
<td>23 (24.0)</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>66 (70.8)</td>
</tr>
<tr>
<td>14–15 years old</td>
<td>65 (67.8)</td>
</tr>
<tr>
<td>16–18 years old</td>
<td>31 (32.2)</td>
</tr>
</tbody>
</table>

During the baseline survey, some teens, especially 14–15-year-olds, were impatient with its length, asking, “How many questions are there?” and “How much longer?”

Texts

Text message response rates varied among sites. Based on the number of incoming messages received from each youth, participants were classified as “frequent” (25+ replies), “moderate” (10–24 replies), “infrequent” (1–9 replies), or “non” responders (0 replies). Each site had teens in each category. Males and females responded to texts similarly (11.4 vs. 11.0 messages respectively); the average number of responses by age varied from 9.5 for 15-year-olds to 19.2 for 17-year-olds. Analysis showed a 49% response rate to messages that requested a response and a decrease in response rate over time. In the exit interviews, some teens suggested that no more than one text per day was ideal.

Discussion

Given the ethnic and racial disparities in unintended teen pregnancy and STDs in Denver, our goals were to develop an engaging text enhancement and recruit high proportions of minority youth into the pilot. Teens were enthusiastic about the texts. We successfully recruited 96 teens, with 70.8% identifying as Latino/a and 24.0% as African-American. The teens recruited also represented a more at-risk group, consisting of younger teens (67.8% were 14–15 years old) who reported earlier sexual debut (63.2%) and concurrent sex partners (36.8%). If enrollment of teens continues similarly during full program implementation, we will have enrolled the target risk profile for program participation, young teens with early sexual debut and more concurrent partners.

The focus groups suggested that 15% of teens would not have access to a mobile phone with texting capabilities. A larger percentage of pilot participants than anticipated did not have access to a mobile phone (12%–45% depending on the site). Younger teens (14–15 years old) were less likely to have a phone than older teens. The process of “buddying” with another teen to read the texts did not work for all. Although the reasons behind the failure of the buddy system were not systematically assessed, we speculate that teens may have been uncomfortable sharing with another teen they may not have known well. In the exit interviews some teens said that their buddy deleted the text before it could be shared. Moreover, although text messaging is widespread among teens, it may be interrupted by lost and broken phones, loss of phone privileges, or not having a text-capable phone. Therefore, in implementation we offer a free Web-based texting platform, Textfree for Web, for teens without a phone at enrollment and for those who lose access to a phone during the program. Teens are assigned a telephone number and use a computer to access texts instead of receiving them on a mobile phone. Teens have regular access to the Internet at BGCMC. During the course of the study it is possible that Smartphones will become ubiquitous, in which case we would consider adjusting text content to include images and videos.

Finding appropriate role models who engage youth and are wholly positive was a challenge. In general we looked for celebrities who are positive and relevant; however, it was not always possible to find role models who were both relatable to the youth and wholly positive. There are some references in the form of quotes or YouTube videos of celebrities whom the teens like, but who have negative traits (e.g., Eminem, Lil Wayne) and some inspirational figures who, according to our teen focus group participants, may not be familiar to youth (e.g., Maya Angelou, Gandhi).

In response to feedback from pilot participants, we have revised the texting curriculum to send fewer texts—between three and seven texts per week (no more than one/day) and to format personal questions as “opinion,” “myth/fact,” or “agree/disagree” questions to allow youth to express their opinions without feeling judged or uncomfortable that texts are asking for personal information. Feedback from the post-pilot focus groups was also valuable in revising messages for clarity and appeal to youth. Teens suggested more clearly “marketing” Web sites and videos so youth who had Internet-capable phones would visit them, simplifying statistics, and clarifying words such as “assertiveness” and “contraceptives,” which increased our attention to literacy and teen language concerns. Additional adjustments included adding texts reinforcing that most kids at BGCMC want to stay in school and go to college, specifically addressing strategies for managing the school system—whom to contact if you are failing a class, and making explicit connections between volunteering and staying in school. We also added texts

![Theoretical model](image-url)
stating it’s okay to wait for sex and reporting aggregate poll results showing not everyone is having sex.

Although some may be tempted to rely on common sense and skip a formative stage prior to implementation of interventions, the process of iterative formative research to develop the content and logistics for delivering this program and conducting a short pilot was indispensable to identify challenges to be addressed before implementation. It was key to learn that we needed an alternative platform for text delivery to accommodate teens without a mobile phone or who might lose access to it over a 9-month program. Because all teens didn’t like the same types of messages, we developed a variety of message types and role models. Finally, our extensive investment in the iterative process with multiple groups of teens was worth the effort to develop and test text messages consonant with minority youth interest and a teen voice. We believe that, with thoughtful attention to social and behavioral theory and advice and consultation with teens, face-to-face programs designed for teens may be enhanced with text messaging.

**Funding Source**

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