Feasibility of bidirectional text messages in evaluating a text-based nutrition education program for low-income parents: Results from the Text2BHealthy program

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ARTICLE INFO

Keywords:
Mobile health
Text messages
Program evaluation
Nutrition education
Response rates
Parent engagement
SNAP-Ed

ABSTRACT

Text messages are increasingly used in the delivery of health education programs. One appealing aspect of this approach is the possibility of remotely collecting participant data to use in program tailoring or evaluation. The purpose of the present study is to test the feasibility of using text messages to collect participant data. Using data from 33 texted evaluation questions sent through the Text2BHealthy nutrition education program for low-income parents (n = 108–1521) response rates under different incentive and prompting strategies were examined. Response rates are generally low across a pilot year and three program years, ranging from 10–55%. While incentives seemed to be ineffective at improving response rates, results indicate that prompting participants to respond may increase response rates. Individuals who respond to an initial question are highly likely to respond to a follow-up question (88–99%) and to report positive behaviors (68–100%). Responses received through text may be unrepresentative and positively biased. Text messages may be a supplemental data collection strategy in nutrition education programs, but low response rates and response bias undermine data quality.

1. Introduction

In recent years, there has been a proliferation of text messaging programs in health education and promotion. Within these programs, text messaging, otherwise known as short message service or SMS, has been used both as the exclusive method of program delivery and as a complement to face-to-face programs. Broadly speaking, text messages can be used in a unidirectional (information is delivered exclusively from programmers to participants) or bidirectional way (information is exchanged between the programmers and participants). Unidirectional uses can include delivering information to participants about health issues, reminding participants to attend appointments, encouraging participants to engage in healthful or disease management behaviors, or challenging participants to persist with health behaviors and reach goals.

Bidirectional texts may serve logistical functions. They may be used to confirm that messages have been received (e.g., “Reply ‘Yes’ if you’ve received this message.”) or that participants plan to attend educational sessions, as well as help to tailor program content based on participant responses. Bidirectional texts can also serve as a tool for evaluation by tracking and monitoring target health behaviors or metrics as participants report that information via text (e.g., blood pressure, number of fruits and vegetables consumed, number of steps taken), assessing variables of interest [e.g., “What’s the main reason U drink? A. It’s a habit; B. To feel better; C. To have fun; D. To cope. Text me your answer.” (Irvine et al., 2012)], or receiving feedback concerning how participants feel about aspects of the program.

Used for evaluation, bidirectional text messages have the potential to connect participants to researchers, or clients to practitioners, in real-time, without necessitating face-to-face interaction. This can result in
less reliance on retrospective reports in evaluation and more responsiveness in regularly providing key information. For example, Anthony et al. (2015) found that using bidirectional text messages resulted in 42 of 43 (98%) participants submitting the desired blood pressure measurements over 15 days. These researchers saw more responsiveness among patients enrolled in the bidirectional texting group than in patients who were asked to enter their blood pressure into an electronic medical record portal. The researchers concluded that bidirectional texts were an effective way to obtain blood pressure measurements (Anthony et al., 2015).

While some programs have successfully collected data via text message, the response rates vary widely. Whitford et al. (2012) reviewed literature reporting text response rates ranging from 15 to 58% (Anhøj & Møldrup, 2004; Bexelius et al., 2009), generally attributing higher response rates to programs in which researchers had met participants and used persistent reminders. One study of a brief text-based alcohol intervention for disadvantaged men reported that 88% of participants responded to at least one of nine texted evaluation questions, and 53% responded to at least seven of the nine questions (Irvine et al., 2012). Another study of 10 low-income clinic patients receiving text messages as an enhancement to short-term Cognitive Behavioral Therapy for depression reported an average response rate of 65% (SD = 25%, range 27–99%) (Aguilera & Munoz, 2011). The wide variability in both response rates and the techniques used to obtain these responses suggest the use of bidirectional text messages merits additional examination.

Though bidirectional text messages used for evaluation (i.e., evaluation texts) may have considerable utility in text message programs, an inherent risk is that participants may not respond to messages (Arora, Peters, Agy, & Menchine, 2012). Low response rates may be particularly problematic if a program is relying solely on such data for message tailoring and evaluation.

1.1. Purpose

The purpose of the present study is to explore the feasibility of using text messages to collect program utilization data. Data reported are part of ancillary results from a larger study of the Text2BHealthy program (Speirs, Grutzmacher, Munger, & Messina, 2015). Text2BHealthy is a University of Maryland Extension Supplemental Nutrition Assistance Program Education (SNAP-Ed) nutrition education program aimed at low-income parents of children in Title I elementary schools in Maryland. The goal of Text2BHealthy is to engage parents in reinforcing positive dietary and physical activity behaviors by providing them with behaviorally focused and locally targeted text messages. Parents receive two text messages per week that are targeted to their child’s elementary school and surrounding community.

2. Methods

2.1. School and participant recruitment

Participating schools were selected from a complete list of Title I elementary schools with SNAP-Ed programming. Inclusion criteria were existing school-wide SNAP-Ed programs over multiple years and evidence of collaboration with local SNAP-Ed educators. Selected schools included rural, suburban, and urban areas with racially diverse populations.

Parents in eligible schools opt in to Text2BHealthy by providing their phone number to program staff. Enrollment in the program is continuous; parents whose children attend eligible schools can participate for an unlimited period of time. (See Speirs et al., 2016 for more details about recruitment.) Parents are informed at enrollment that they will occasionally receive evaluation questions. Demographic data for individual participants were not collected.

Participant enrollment, tracking, message delivery, and message replies are managed in an established web-based mobile platform that ensures all active participants receive programmed messages at the same time. Additionally, participants who unenroll from Text2BHealthy or whose phone service becomes inactive or disabled are tracked.

2.2. Procedures

Program messages were drafted by two Registered Dieticians and reviewed by the larger project team, which includes several PhD-level researchers and Registered Dieticians. Evaluation messages were drafted by evaluation team members and reviewed by the larger project team. Evaluation questions provided two to three closed-ended, numeric response choices paired with words (e.g., 1 = yes, 0 = no). Program and evaluation text messages were consistently sent in the late afternoon or early evening, a time of day reported to be preferred by most parents during the formative stages of the project.

Bidirectional messages were used to determine if participants acted on the information they received from a program text message. For example, a week after receiving a message encouraging them to eat fruits and vegetables in front of their children, participants received a message asking if their child saw them eat a fruit or vegetable in the past week. In order to describe trends in responses, we computed response rates from 23 brief evaluation questions and 10 follow-up questions sent to participants over four years in the Text2BHealthy program (see Table 1).

Over the course of the program, different strategies were attempted to increase response rates, including various incentives and text messages prompting participants to respond to evaluation questions (see Table 2). During the pilot year and year one, participants did not receive any prompts to respond to evaluation questions and did not receive any incentives to respond.

In year two, participants at five randomly selected schools received one entry per evaluation question response into a drawing for a lunchbox kit; there were five lunchbox kits per school. Kits consisted of a Text2BHealthy lunch bag, ice packs, sandwich keeper, mini Tupperware, an apple slicer, a children’s cookbook, and educational materials; lunchbox kits were valued at $35. Participants from the remaining 14 schools received no incentive to respond. Independent samples t-tests were used to determine differences in response rates between the two incentive conditions.

In year three, participants received a small monetary incentive for each evaluation question they answered, delivered in a cumulative sum.

<table>
<thead>
<tr>
<th>Question Format</th>
<th>Example Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluation Text Only</td>
<td>The Farmers’ Market is a great place to get fresh fruits &amp; veggies! Have you had a chance to visit the Farmers’ Market yet? Reply Yes or No.</td>
</tr>
<tr>
<td>Evaluation Text Follow-Up Text</td>
<td>Last week, we texted about eating healthy foods in front of your child. Did your child see you eat a fruit or vegetable in the past week? Reply with Yes or No. That’s great! How many times a week? Reply: A. Every day B. Most days C. Some days</td>
</tr>
<tr>
<td>Evaluation Text Follow-Up Text</td>
<td>Text2BHealthy checking in again! We will be texting you a question in about 10 min. We want to hear from you! Kids love having a variety of veggies to choose from at mealtime. Did your child eat veggies at his/her main meal yesterday? Reply with Yes or No. That’s great! How many veggies did your child eat at the main meal yesterday? A. 1 B. 2 C. 3 D. 4 or more Reply back with the letter.</td>
</tr>
</tbody>
</table>
at the end of the program year. Additionally, for evaluation questions 2–10, participants received a prompt text message 10 min before receiving the message that alerted them to the coming message and encouraged them to respond. All initial evaluation messages sent in Year 3 had dichotomous response choices (i.e., Yes/No). Follow-up questions to request more nuanced information were sent to participants who responded “Yes” to each of the questions in year three, but no additional incentive was provided. In all years, participants only received each evaluation text one time. Frequencies of responses to follow-up questions were calculated. An evaluation study of Text2BHealthy, including the data described above, was approved by the University of Maryland IRB under an expedited protocol.

3. Results

In the pilot year, the response rate for the initial texted evaluation question was 46%. Subsequent response rates in the pilot year and year one were substantially lower, ranging from 17% to 31% (see Table 3, columns a and b). In year two, response rates for participants who received drawing entries for each response ranged from 10.6% to 21.7% (see Table 3, column c). Response rates for participants who did not receive an incentive ranged from 13.3% to 20.7% (see Table 3, column d). Independent samples t-tests were used to compare response rates between the two conditions. In this year, no statistically significant differences were found in response rates between participants who did and did not receive an incentive for answering any question.

In year three, the response rate to question one, which was unprompted, was 33%. Response rates to the subsequent nine prompted questions ranged from 42% to 55% (see Table 3, column e). Of those who responded to the initial evaluation questions, most (68–100%) responded affirmatively to questions (see Table 3, column f), indicating engagement in a targeted nutrition behavior or utilization of community or school resources. Response rates to follow-up questions ranged from 88% to 99% (see Table 3, column g). Comparing across all program years, response rates were highest in year three when questions were preceded by a prompt to respond (see Fig. 1).

4. Discussion

Although there are many potential benefits of using text messaging in nutrition education programming, there are also challenges, such as low response rates and response bias. In order to address these challenges, Text2BHealthy employed multiple strategies, such as direct incentives and reminder texts, to increase response rates to texted evaluation questions. The trends reported here represent an initial attempt to explore the use of bidirectional messages in a community-based nutrition education program and compare different strategies for increasing response rates and decreasing response bias. The trends presented here should be used to inform the development of experimental studies that could more rigorously compare these strategies.

During the pilot and Year 1, participants did not receive any incentives or prompts to answer texted evaluation questions. After the first question, which received the highest response in these program years, response rates dropped and remained low. Researchers may expect that over time, without strategies to increase them, response rates may drop (Centers for Disease Control and Prevention, 2016).

In Year 2, a modest incentive of drawing entries was used in an attempt to increase response rates. However, response rates appeared similar to rates from years that were not incentivized, indicating that the modest incentive was also not sufficient to increase response rates. Possible explanations for this may be that incentives generally may be limited in effectively increasing response rates or that the specific incentive offered was not sufficiently desirable, because it was small, not of interest, or not guaranteed.

In Year 3, small, individual monetary incentives were used with the intention of increasing response rates. The response rates for this year were higher than previous years. Having an individual guaranteed incentive may be more appealing than a potential incentive. In addition,
the prompts that notify participants of an impending evaluation text may increase participants’ attention to texts or enable them to attend to the text when they have the opportunity to respond fully. Findings concerning the impact of prenotification on survey response rates have been generally favorable (e.g., Cook, Heath, & Thompson, 2000). Lastly, in the third program year, participants who responded to the evaluation messages were those who agreed to participate in the evaluation, and therefore may be different from the rest of the population in important ways (e.g., more engaged or willing to respond).

Response rates to follow-up questions in Year 3 were very high (88–99%), suggesting that participants who respond to texted questions may be more apt to respond generally. This pattern is similar to Anhøj and Møldrup’s (2004) finding that participants can be classified as high compliers and low compliers. Furthermore, those who responded largely reported positive behavior (68–100%), indicating that responses received through text may be positively biased. Respondents may answer affirmatively because of social desirability bias or because they are engaging in the suggested behaviors.

Our cautions concerning evaluation texts may be particularly applicable for more diffuse health promotion programming. During initial program years for Text2BHealthy, our response rates for evaluation texts were lower than those cited in the literature. However, this is likely because other programs reporting response rates were smaller and time-limited and also had face-to-face contact with participants, whereas Text2BHealthy is an ongoing program that serves as a stand-alone complement to ongoing nutrition programming for students in SNAP-Ed schools. As such, there are no defined inclusion criteria for participation and no guaranteed or ongoing in-person contact with parents. Health educators may face similar dilemmas when using text messages to collect data from participants in large, ongoing programs open to the community.

4.1. Limitations

This paper reports observations of response rates over multiple program years without systematically testing the impact of various strategies to increase response rates. The continuous enrollment of participants over the years examined, lack of comparison group, and use of multiple strategies simultaneously all limit the ability to draw conclusions about specific impacts of each strategy in improving response rates. As with all self-report data, response bias may be an issue. Furthermore, given program constraints, we were not able to collect individual-level demographic data, so we are unable to examine variations in response rates by demographic characteristics. Our findings should be used to develop future research using more systematic comparisons.

5. Lessons learned

In theory, bidirectional text messages may be used to collect evaluation data, tailor program content, and help participants set goals and track progress. The possibility of obtaining these data via text message may be appealing, but low response rates and response bias may undermine the quality, accuracy, and usefulness of these data. Challenges may be particularly salient for ongoing programs with numerous contacts like many of those conducted through community-based education programs. It may be prudent for those designing programs to conduct formative evaluations with their target population to determine which incentives are desirable and the conditions under which participants would be most likely to respond.

Our findings suggest that providing participants with time-sensitive reminders to engage in the texting program might increase response rates to these evaluation text messages. Further studies, particularly those using experimental designs, are needed to determine the effectiveness of prompts or reminders in increasing response rates. For example, an area for further investigation is whether prompts to respond before evaluation text messages result in higher response rates than those coming after evaluation texts. Another area for systematic investigation is whether features of incentives for message responses, such as the span of time between when the message is sent and the incentive is received, the incentive type, and the incentive value, influence response rates. Furthermore, though the current study was not able to analyze response rates by demographic characteristics, whether response rates vary by demographic factors is also an important area for future research. Text messages can serve as a supplement to other data collection tools, but researchers should be aware of the challenges of using such messages as the sole means of data collection.

Funding

Funding for the SNAP-Ed program is provided by USDA in cooperation with the Maryland Department of Human Resources and the
Acknowledgements

The authors wish to acknowledge the contributions of Lisa Lachenmayr and Erin Braunscheidel Duru in designing and administering the program, Kaitlyn Moberly, Lauren Messina, and Nicole Finkbeiner in evaluating the Text2BHealthy program, Amy Bortnick and Sally Kamen in implementing the program, and Lisa Gonzales, Quinney Harris, Tammy Humberson, Jane Kostenko, Mary Rooks, Kristin Spiker, Haylee Staruk, Karen Turner, Joi Vogin, Lauren Williams, Michelle Wilson, Amy Wolpert, and Virgilia Zabala in supporting recruitment and evaluation activities and facilitating relationships with participating schools.

References


