



The Journal of Sex Research

ISSN: 0022-4499 (Print) 1559-8519 (Online) Journal homepage: https://www.tandfonline.com/loi/hjsr20

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To cite this article: Laura Widman, Kristyn Kamke, Reina Evans, J. L. Stewart, Sophia Choukas-Bradley & Carol E. Golin (2020) Feasibility, Acceptability, and Preliminary Efficacy of a Brief Online Sexual Health Program for Adolescents, The Journal of Sex Research, 57:2, 145-154, DOI: <u>10.1080/00224499.2019.1630800</u>

To link to this article: <u>https://doi.org/10.1080/00224499.2019.1630800</u>



Published online: 09 Jul 2019.

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Feasibility, Acceptability, and Preliminary Efficacy of a Brief Online Sexual Health Program for Adolescents

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This study evaluated the feasibility, acceptability, and preliminary efficacy of a 45-minute interactive, online sexual health program for adolescents, called Health Education and Relationship Training (HEART). The program was originally developed and evaluated among adolescent girls (HEART for Girls); the current project describes and evaluates a new version of the program that was adapted for boys and girls. Participants were 226 high school students (mean age = 16.3; 58% girls; 46% White; 79% heterosexual). Students were randomized to HEART or an attention-matched control and assessed at pre-test and immediate post-test. Overall, the program was feasible to administer in a school setting and youth found the program highly acceptable (83% liked the program, 87% learned new things, and 93% would use program content in the future). At post-test, students who completed HEART demonstrated improvements on every outcome we examined: sexual communication intentions, condom use intentions, HIV/STD knowledge, condom attitudes, condom norms, self-efficacy to practice safer sex, and sexual assertiveness compared to control participants (effect size ds = .23 to 1.27). Interactions by gender and sexual orientation revealed the program was equally acceptable and worked equally well for boys and girls and for heterosexual and sexual minority youth. We propose several avenues to further adapt and tailor HEART given its promise in promoting adolescent sexual health.

Exploring romantic and sexual relationships during adolescence is developmentally normative. National data indicate that a majority of youth have engaged in some form of partnered sexual contact and 57% of adolescents have engaged in sexual intercourse by the end of high school (Kann et al., 2018). However, as few as half of sexually active youth used a condom the last time they had sex, and 14% did not use any form of contraception at last intercourse (Kann et al., 2018). This risky behavior can have lasting consequences. As many as one in four sexually active girls has a sexually transmitted disease (STD; Centers for Disease Control and Prevention [CDC], 2018c; Forhan et al., 2009), which can increase the risk of HIV and infertility (CDC, 2018b). Further, adolescent boys, particularly young men who have sex with men, are at heightened risk of HIV and other STDs, with recent data showing that 17% of new HIV infections occur among young boys and men under the age of 24 (CDC, 2018a). Overall, half of new STDs occur among youth in the United States aged 15–24, with rates of STDs on the rise (CDC, 2018b).

Many adolescents lack the knowledge, skills, or motivation to make fully-informed and safer sexual decisions (Ritchwood, Penn, Peasant, Albritton, & Corbie-Smith, 2017). Although sex education in public schools is mandatory in most – but not all – states (Guttmacher Institute, 2018), the quality of this programming varies widely. For example, the content that is covered is not always comprehensive, accurate, or inclusive of the most at-risk youth (for discussion, see Arbeit, Fisher, Macapagal, & Mustanski, 2016; Guttmacher Institute, 2018; Kosciw, Greytak, Zongrone, Clark, & Truong, 2018). Further, school-based inperson sex education programs may be costly, time intensive, and delivered with poor fidelity (Bailey, Mann, Wayal, Abraham, & Murray, 2015; Chandra-Mouli, Lane, & Wong, 2015;

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Hall, McDermott Sales, Komro, & Santelli, 2016). For these reasons, there has been a recent push to develop innovative technology-based sexual health promotion programs for youth that can be delivered widely with high fidelity (for reviews, see Badawy & Kuhns, 2017; Chavez, Shearer, & Rosenthal, 2014; Hightow-Weidman, Muessig, Bauermeister, Zhang, & LeGrand, 2015; Wadham, Green, Debattista, Somerset, & Sav, 2019; Widman, Nesi, Kamke, Choukas-Bradley, & Stewart, 2018).

Online, technology-based sexual health programs, also known as eHealth, mHealth, and digital health programs, offer a number of benefits (Brayboy et al., 2018; Lightfoot, 2012; Rapoff, 2013). Technology use is now ubiquitous among youth: 95% of U.S. teens have access to a smartphone and nearly half of these youth report they are online "almost constantly" (Smith & Anderson, 2018). Thus, online sexual health programs may be a particularly relevant way to offer information and teach skills to youth in a way that is readily available, familiar, nonthreatening, and intuitive. Second, these programs can be administered with relative ease and high fidelity, and they have the potential to reach many adolescents at low cost. Further, online programs can offer individually tailored intervention content and opportunities for amplified interactivity, customization, and engagement by the user compared with traditional face-to-face intervention approaches. Finally, there is clear evidence that these programs work: a number of metaanalyses have now demonstrated that eHealth and mHealth HIV/STD prevention interventions reduce sexual risk behavior (Noar, Black, & Pierce, 2009; Noar, Pierce, & Black, 2010; Swanton, Allom, & Mullan, 2015; Widman, Nesi, et al., 2018).

The number of online sexual health programs targeting youth has been steadily increasing for the past decade (for reviews, see Chavez et al., 2014; Swanton et al., 2015; Wadham et al., 2019; Widman, Nesi, et al., 2018). Many of these programs have been developed to address specific subgroups of youth, such as lesbian, gay, and bisexual youth (Mustanski, Greene, Ryan, & Whitton, 2015; Ybarra et al., 2017), racial/ethnic minority youth (Danielson et al., 2016; Shegog et al., 2017; Tebb et al., 2019; Tortolero et al., 2010), youth living with HIV (Markham, Shegog, Leonard, Bui, & Paul, 2009), and adolescent girls (Gaydos et al., 2009; Guse et al., 2012; Widman, Golin, Kamke, Burnette, & Prinstein, 2018). Yet to our knowledge, there are no brief online interventions that provide evidence-based sex education and have been tested and found effective for diverse samples of both boys and girls. Such a program, particularly one shown to be efficacious among diverse samples, could be of significant interest to schools or community programs that would benefit from a general program that is appropriate for a wide audience of youth with diverse identities.

Here we report the initial evaluation of one such program, called Health Education and Relationship Training for Teens (HEART for Teens). This brief online program was adapted from a program we originally developed for adolescent girls, called HEART for Girls (Widman, Golin, Noar, Massey, & Prinstein, 2016). After demonstrating the acceptability and efficacy of the HEART for Girls program (Widman, Golin, et al., 2018; Widman, Golin, Kamke, Massey, & Prinstein, 2017), our team spent one year adapting the program for use with both boys and girls. Although the program was not specifically adapted for transgender and gender non-binary youth, we employed gender inclusive language throughout the program so that all youth could complete the program and offer feedback on its utility. In the study that follows, we describe the adapted HEART for Teens program and present the results of a randomized controlled trial (RCT) that evaluated the feasibility, acceptability, and preliminary efficacy of this program. We examined the acceptability and efficacy of HEART for Teens among all youth in the study, as well as by gender and sexual orientation, to determine if the program is equally effective for boys and girls and for heterosexual and sexual minority youth.

Method

Participants and Procedure

In Spring 2018, participants were recruited from a rural high school in the southeastern United States to take part in a randomized controlled trial (clinical trial registration number NCT03453515). All 10th and 11th graders (n=754) were invited to participate in the study, and the final sample size was determined by the number of students and parents who granted consent. All students were asked to return a parent permission form regardless of whether their parent gave consent for the study (n = 309 forms returned). Among youth who returned their forms, 237 parents granted consent for the study. The final sample included 226 students (132 girls; 90 boys; 4 transgender/gender non-binary students) who completed the baseline assessment and were randomized to study conditions (see Figure 1).

After parental consent and student assent were obtained, pretest data were collected using computerized surveys in a small group classroom setting. Participants were then randomly assigned to either the HEART for Teens online program or to an attention-matched online control program focused on cultivating academic growth mindsets, called Growing Minds (Burnette, Russell, Hoyt, Orvidas, & Widman, 2017). Random assignment to study condition was conducted using random sampling and allocation procedures in SPSS version 24. Participants were stratified based on sexual activity status (ever sexually active versus never sexually active; sexual activity defined as sexual touching, oral sex, or sexual intercourse). Approximately one week after pre-test, participants completed the online intervention on a study-provided netbook computer as well as a computerized post-test survey in a small group classroom setting. Participants used headphones to listen to program content and to control for any outside noise. They were compensated \$10 for the pre-test assessment and \$10 for the intervention and immediate post-test assessment. The

HEART FOR TEENS PROGRAM



Figure 1. Study flow diagram. *Note.* All students enrolled in the 10th and 11th grade were eligible to participate.

University Institutional Review Board approved all study procedures.

Intervention Description

HEART for Teens is an interactive, skills-focused intervention designed for digital delivery in one sitting lasting approximately 45 minutes. A full description of the development, program content, as well as acceptability and efficacy of the original HEART for Girls program can be found elsewhere (Widman, Golin, et al., 2018, 2017, 2016). In short, for both programs, the content is grounded in psychological and health behavior change theories, including the Reasoned Action Model (Fishbein & Ajzen, 2010) and Fuzzy Trace Theory (Reyna, 2008). They each include five modules that target five areas of sexual decision-making: 1) safer sex motivation; 2) HIV/STD knowledge; 3) sexual norms/attitudes; 4) safer sex self-efficacy; and 5) sexual communication skills. Modules are taught within a sexual health paradigm emphasizing personal values, positive aspects of sexuality, and the importance of competent interpersonal skills, as well as risk reduction (Fortenberry, 2013). Inside each module, users receive age-appropriate audio/ video clips, tips from other teens, interactive games/quizzes, infographics, and skill-building exercises with self-feedback given in real-time. Communication skills are emphasized throughout the programs, but particularly in the communication module. In this module, users receive didactic training about sexual assertiveness and negotiation, modeling from same-age peers, and time to practice these skills through text-based roleplays.

In order to adapt the original HEART for Girls program for use with girls and boys, we conducted a round of qualitative usability testing with adolescent boys (n = 25). These youth completed a think-aloud protocol using the original HEART for Girls program and offered suggestions for areas we should change to make it more relevant and useful for boys. We also sought ongoing input from a youth advisory board of boys and girls (n = 8) who reviewed program content as it was changed. Based on this feedback, we made several rounds of iterative changes to the HEART program to make it appropriate for both boys and girls. For example, we changed the color palette, added more male characters, added audio content from boys, and exchanged several of the video clips. Additionally, based on boys' feedback, we included additional content to emphasize sexual consent and adapted the communication role-play activities to include a gender-neutral partner for youth to practice their communication skills. Example images from the HEART for Teens program are included in Figure 2.

Description of Control Program

Growing Minds is an attention-matched online intervention that focuses on cultivating academic and social growth mindsets (Burnette et al., 2017). Growing Minds includes five modules that cover key components typically incorporated into mindset work, such as providing evidence of the malleable nature of academic and social success. In addition, it includes two unique components: 1) teaching about growth mindsets, and 2) incorporating role models to reinforce growth mindset messages and strengthen attitude change. Like HEART, Growing Minds takes approximately 45 minutes to complete and requires a similar degree of active participation.



Figure 2. Sample images from HEART for teens.

Measures

Participant Characteristics. Demographic data were collected on participant gender, age, race/ethnicity, sexual orientation, and receipt of free or reduced-price lunch (a proxy for socioeconomic status). Sexual activity status was assessed with two items: one that inquired if participants had ever engaged in any sexual activity, including sexual touching (defined as touching genitals beneath the clothes), oral sex (defined as contact between mouth and genitals), and/or sexual intercourse (not explicitly defined and so could have included vaginal or anal intercourse); and if they answered "yes" to the first question, a second question that inquired if participants had ever engaged in sexual intercourse. Additionally, among those who reported sexual intercourse, information was gathered about condom use at last sex.

Acceptability. Program acceptability was assessed through a questionnaire that was adapted from prior acceptability surveys (Bauermeister et al., 2015; Widman et al., 2017). Six items were included to assess six aspects of acceptability: 1) how much participants liked the program; 2) how much they learned from the program; 3) how much they felt the program kept their attention; 4) whether they would use information from the program in the future; 5) whether the program would be useful for girls their age; and 6) whether the program would be useful for boys their age. Items were rated on a four-point Likert scale ranging from 0 (*not at all*) to 3 (*a lot*). Additionally, one free-response item was included: "We want to know how we could make the HEART program better. Tell us anything we could change to improve the website for teens like you."

Intentions. Intentions to discuss sexual health and to use condoms were assessed with two items developed by our research team based on items from the AIDS Risk Behavior Survey (Donenberg, Emerson, Bryant, Wilson, & Weber-Shifrin, 2001) and our previous work (Widman, Golin, et al., 2018). The first item asked how likely teens were to discuss sexual health issues, including pregnancy and STDs, with their partner(s) prior to sexual activity (communication intentions). The other item asked how likely teens were to use condoms the next time they have sex (condom intentions). Participants were prompted to answer these questions whether or not they had engaged in sexual activity before. Response options ranged from 0 (*not at all likely*) to 4 (*very likely*).

Knowledge. HIV/STD knowledge was assessed with 9 items (e.g., "STDs usually have noticeable symptoms, like itching or burning"). These were adapted from previous sexual health knowledge questionnaires (Brown, DiClemente, & Park, 1992; Morton, Nelson, Walsh, Zimmerman, & Coe, 1996) and were used in our previous work (Widman, Golin, et al., 2018). Participants rated each item as *True, False*, or *Don't Know*. Responses were recoded as 0 (*Incorrect* or *Don't Know*) or 1 (*Correct*). Scores were summed to reflect the total number of correct HIV/STD knowledge questions (possible range = 0-9).

Sexual Self-Efficacy. The Self-Efficacy for HIV Prevention Scale (Brown et al., 2014) was used to assess selfefficacy about communication and condom use. Six items assessed confidence communicating about sexual topics (e.g., "How sure are you that you could talk to your partner about safer sex?"). Two items assessed confidence obtaining and using condoms (e.g., "How sure are you that you could have condoms available when you need them?"). Participants responded from 1 (*Couldn't do it*) to 4 (*Very Sure*), with higher scores indicating greater sexual self-efficacy ($\alpha = .79$).

Condom Attitudes. Participants' attitudes about condoms were assessed with the 3-item effect on sexual

experiences subscale of the Condom Attitudes Scale Adolescent Version (St. Lawrence et al., 1994). An example item is "Condoms take away the pleasure of sex." Responses were on a scale from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*; $\alpha = .77$).

Condom Norms. The 3-item condom norm subscale from the Sexual Risk Behavior Beliefs and Self-Efficacy Scale for adolescents (Basen-Engquist et al., 1999) was used to assess participants' perceptions of their peers' views of condom use. Participants responded from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*) to items such as, "Most teenagers believe condoms should always be used if a person my age has sex" ($\alpha = .89$).

Sexual Assertiveness. Self-reported sexual assertiveness was assessed with 3 items from the Multidimensional Sexual Self-Concept Scale (Snell, 1998). Items such as, "I'm very assertive about the sexual aspects of my life," were rated on a scale from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*; $\alpha = .75$).

Analysis Plan

First, descriptive statistics were utilized to summarize sociodemographic variables and pre-test levels of each outcome variable. To establish pre-test equivalence, differences between groups were assessed using *t*-tests for continuous variables and χ^2 -tests for categorical variables. Second, to assess the efficacy of the HEART intervention from pre-test to immediate post-test, linear regression analyses were utilized to compute adjusted means and mean differences between intervention and control groups. For each outcome, the corresponding pre-test measure was included as a covariate. Third, moderation analyses were conducted to examine if intervention effects were moderated by gender or sexual orientation. Cohen's *d* value was calculated as an indication of effect size, which can be interpreted as small (*d* = .20), medium (*d* = .50), or large (*d* = .80 or above). Complete data were obtained from 224 of the 226 participants. For the two participants missing data, each skipped only one survey item; mean substitution was used for these items so that all participants had complete data on each outcome variable. Analyses were completed using SPSS Version 24.

Results

Descriptive Characteristics

Sample descriptives are included in Table 1. All participants were between the ages of 15 and 18 (M = 16.25; SD = 0.76). The sample was racially/ethnically diverse (46% White, 24% Black, 25% Hispanic, and 5% other ethnic identities). Half of participants (50%) received free or reduced-price lunch. Seventy-nine percent of participants identified as exclusively heterosexual, 8% as mostly heterosexual, 5% as bisexual, 3% as gay/lesbian, and 5% as unsure

 Table 1.
 Sample Characteristics at Pre-Test Assessment

	Full : (<i>n</i> =	Sample = 226)	HEART (n =	for Teens = 113)	Growii (n =	ng Minds = 113)	Difference χ^2 or t	ce Test ^a p
Sociodemographics $-n$ (%)								
Gender - Girls	132	(58.4)	44	(38.9)	46	(40.7)	0.08	.79
Race/Ethnicity – White	103	(45.6)	46	(40.7)	57	(50.4)	2.16	.14
Race/Ethnicity - Black	55	(24.3)	32	(28.3)	23	(20.4)	1.95	.16
Race/Ethnicity - Hispanic	57	(25.2)	28	(24.8)	29	(25.7)	0.02	.88
Free/Reduced Price Lunch	112	(49.6)	59	(52.2)	53	(46.9)	0.64	.43
Heterosexual Sexual Orientation	179	(79.2)	91	(80.5)	88	(77.9)	0.24	.62
Sexual Behaviors $-n$ (%)								
Ever engaged in sexual activity	155	(68.6)	78	(69.0)	77	(68.1)	0.02	.89
Ever had sexual intercourse	111	(49.1)	54	(47.8)	57	(50.4)	0.22	.64
Condom use at last sex ^b	51	(45.9)	25	(46.3)	26	(45.6)	0.01	.94
Outcomes $-M(SD)$								
Communication Intentions ^c	3.77	(1.12)	3.61	(1.32)	3.92	(1.13)	1.89	.06
Condom Intentions ^c	4.12	(1.38)	4.21	(1.33)	4.03	(1.44)	-1.01	.31
HIV/STD Knowledged	5.57	(1.83)	5.51	(1.86)	5.62	(1.81)	0.44	.66
Condom Attitudes ^c	3.33	(1.00)	3.42	(1.01)	3.24	(1.00)	1.42	.16
Condom Norms ^c	3.30	(1.22)	3.32	(1.28)	3.27	(1.16)	-0.25	.80
Self-Efficacy ^e	3.16	(0.59)	3.14	(0.63)	3.18	(0.55)	0.49	.62
Sexual Assertiveness ^e	3.17	(0.91)	3.13	(0.94)	3.21	(0.88)	0.68	.50

Note.

^aDifference test was χ^2 for categorical variables and *t*-test for continuous variables.

^bPercentage based on sexually active teens.

- ^cRange: 1–5
- ^dRange: 0-9

eRange: 1-4

or other sexual orientation. To facilitate analyses, we dichotomized sexual orientation, with only exclusively heterosexual participants classified as heterosexual, and all other sexual orientation groups, including mostly heterosexual, classified as sexual minority. This is in line with research that suggests "mostly heterosexual" is a distinct sexual minority group (Vrangalova & Savin-Williams, 2012). Sixty-six percent of participants were sexually active and nearly half (49%) had engaged in sexual intercourse.

Pre-Test Differences

As indicated in Table 1, at pre-test there were no statistically significant differences between treatment and control groups on any demographic variable (e.g., gender, age, race/ ethnicity, sexual activity status, sexual orientation, and receipt of free or reduced-price lunch). There were also no statistically significant differences between groups on the pre-test level of any outcome variable, suggesting the randomization protocol was successful in creating balanced groups.

Feasibility

In general, the program was highly feasible to administer, though it is worth noting that our consent rate was low. This was due to delays in receiving school approval to start the study and a consequentially restricted recruitment schedule (approximately 2 weeks instead of the 6–8 weeks we typically allow to ensure adequate time for more forms to be returned). Once recruitment was complete, our study team worked closely with school personnel to reserve classrooms for data collection and arrange data collection during elective courses. All but one participant completed the full program dose, with the majority completing it in 30–45 minutes (average time = 39 minutes; range = 25–62 minutes). The one participant who did not complete the full program dose encountered technical problems in the last module and did not complete the communication practice activities. No other technical

problems or known issues with user error were encountered during data collection.

Program Acceptability

Overall, participants found the program to be highly acceptable (see Table 2). Specifically, 83% liked the program, 87% learned new things from the program, 79% felt the program kept their attention, and 93% reported they would use the content from the program in the future. Additionally, the majority of youth felt the program would be useful for girls their age (93%) and boys their age (91%). There were no differences in any aspect of program acceptability between boys and girls (Table 2).

Eighty-six participants provided responses to the freeresponse item that asked how we could improve HEART. Fifty participants provided only positive comments and/or indicated there should be no changes to the program. For example, one 16-year-old Hispanic girl wrote, "I honestly wouldn't change a thing about it because it was really interesting and helped me learn a lot more." Among the participants who suggested changes to the program, common themes were to add more information about topics such as pregnancy, birth control, consent, and parent communication. For example, one 15-year-old Black girl wrote, "I definitely thought it was good but maybe going a little deeper in certain topics like pregnancy and talking to parents." Also, a 15-year-old Hispanic boy wrote, "Give more advice about giving consent and respecting others choices." Finally, because "Program Kept Attention" was the lowest scoring acceptability component, we examined the free-response options for the 23 students who reported the program had not kept their attention. Some of the most helpful comments from these students were as follows: "I think it should be shorter and have more interactive parts"-15-year-old White girl; "Use a video that students can relate to like a song or something" - 17-year-old Black girl; "I believe that it should have a little less about STDs and such and more about pregnancy" - 17-year-old White boy.

	Full Sample n = 106	Boys $n = 42$	Girls n = 62	Between-Group Comparison ^a		Heterosexual n = 85	Sexual Minority $n = 21$	Between-Group Comparison	
	% (<i>n</i>)	% (n)	% (n)	χ ²	р	% (<i>n</i>)	% (n)	χ ²	р
Liked Program	83.0 (88)	88.1 (37)	80.6 (50)	1.01	.31	83.5 (71)	81.0 (17)	0.08	.79
Learned New Things	86.8 (92)	90.5 (38)	85.5 (53)	0.57	.45	89.4 (76)	76.2 (16)	2.57	.11
Program Kept Attention	78.3 (83)	78.6 (33)	79.0 (49)	0.003	.96	76.5 (65)	85.7 (18)	0.85	.36
Will Use Information in Future	92.5 (98)	95.2 (40)	90.3 (56)	0.85	.36	92.9 (79)	90.5 (19)	0.15	.70
Useful for Girls My Age	93.4 (99)	97.6 (41)	90.3 (56)	2.12	.15	94.1 (80)	90.5 (19)	0.36	.55
Useful for Boys My Age	90.6 (96)	95.2 (40)	87.1 (54)	1.91	.17	90.6 (77)	90.5 (19)	0.00	.99

Table 2. Acceptability of HEART for Teens in Intervention Group in Full Sample and Compared by Gender and Sexual Orientation

Note. For each group, the % (n) refers to the number of students who reported "some" or "a lot" to that item. One student did not complete the intervention acceptability survey and was missing from all analyses.

^aData from the two transgender/gender non-binary students who completed HEART for Teens were removed from the chi-square analyses testing gender differences between boys and girls. These students were included with the full sample data in the first column of this table.

Efficacy of HEART Intervention

As shown in Table 3, immediately following the intervention, participants who completed HEART reported higher sexual communication intentions, condom use intentions, HIV/STD knowledge, condom attitudes, condom norms, safer sex self-efficacy, and sexual assertiveness compared to control participants (all ps < .05). Effect sizes ranged from d = .23 to 1.27.

Next, moderation analyses were conducted to examine if intervention effects differed by gender or sexual orientation. Analyses by gender were conducted among youth who identified as a boy or girl. Four transgender participants were removed from this analysis. For all outcomes but one, intervention effects were similar across boys and girls: the only difference was in condom norms. Girls who completed HEART showed greater improvement in condom norms from pre-test (M = 3.28, SD = 1.39) to post-test (M = 3.88, SD = 1.08) than boys (pre-test M = 3.40, SD = 1.07; post-test M = 3.49, SD = 0.93; b = -.65, SE = 0.28, p = .021). There were no differences in sexual communication or condom use intentions, HIV/STD knowl-edge, sexual attitudes, self-efficacy, or sexual assertiveness by gender (ps = .14-.75).

Finally, we conducted an additional set of moderation analyses to determine if there were any differences in program efficacy between heterosexual youth and sexual minority youth. There were no statistically significant differences in any program outcome based on sexual orientation (ps = .27-.84).

Discussion

Given the alarming rates of HIV, STDs, and unintended pregnancy among youth (CDC, 2018c; Kann et al., 2018), we need effective sexual health interventions that can be broadly disseminated to reach adolescents most in need. HEART for Teens is a brief new online intervention that may improve the sexual health of adolescents. Results from the current study show that participants generally enjoyed the HEART for Teens program, learned new information from the program, and found it to be highly useful. Further, compared to a control program, HEART increased adolescents' intentions to communicate about safer sex with their partners, intentions to use condoms the next time they have sex, knowledge about HIV and other STDs, condom beliefs, safer sex self-efficacy, and self-reported sexual assertiveness skills at immediate post-test. Importantly, the strength of these findings was largely consistent between boys and girls and heterosexual and sexual minority youth.

One strength of the HEART for Teens program is the use of an online platform. Given the ubiquitous use of technology among youth (Smith & Anderson, 2018), eHealth and mHealth approaches offer a particularly relevant way to reach youth with interactive and engaging content. Online programs also may be less threatening, awkward, or embarrassing than sexual health programs that are delivered in person, where comfort with program material may be highly dependent on the skill of the in-person educator and the supportiveness of the classroom environment (Borawski et al., 2015). Online approaches can also increase standardization and fidelity of program delivery (Bailey et al., 2015; Eaton, Doorenbos, Schmitz, Carpenter, & McGregor, 2011). In the current study, all but one teen received the full program dose as intended, and the one youth who did not receive the full dose due to a technical problem received more than 95% of the intended program content. These rates exceed those of other more time-intensive interventions in which participant attrition is a serious concern and the full program dose is not achieved for many youth (e.g., Coyle et al., 2006; Gelfond, Dierschke, Lowe, & Plastino, 2016). Additionally, while we tested the efficacy of the HEART for Teens program in a school setting, the online platform allows for flexibility in where the program is ultimately delivered, which could be at home, in a clinic setting, or via smartphone on the go.

We were encouraged to find immediate differences in attitudes, self-efficacy, and assertiveness skills after a brief online intervention, with most effect sizes in the medium to large range. These effects are comparable to or even exceed more time-intensive in-person interventions (Johnson, Scott-Sheldon, Huedo-Medina, & Carey, 2011; Morales et al., 2018) and other online sexual health programs (Widman, Golin,

Table 3. Efficacy of HEART for Teens Intervention at Post-Test

	Intervention	Control	Effects at Post-Test ^a			
	M (SD)	M (SD)	b (SE)	р	Effect Size ^b	
Communication Intentions	4.43 (0.83)	3.97 (1.15)	0.55 (0.13)	<.001	.57	
Condom Intentions	4.38 (1.15)	3.96 (1.43)	0.30 (0.13)	.020	.24	
HIV/STD Knowledge	7.68 (1.79)	5.74 (1.86)	1.95 (0.21)	<.001	1.27	
Condom Attitudes	3.85 (0.96)	3.22 (0.94)	0.50 (0.11)	<.001	.55	
Condom Norms	3.74 (1.03)	3.28 (1.13)	0.44 (0.14)	.001	.41	
Self-Efficacy	3.30 (0.66)	3.21 (0.56)	0.14 (0.06)	.031	.23	
Sexual Assertiveness	3.88 (0.98)	3.68 (0.75)	0.25 (0.11)	.023	.29	

Note.^aLinear regression results, controlling for pre-test level of each variable

^bCohen's *d* standardized difference in covariance adjusted means between treatment group and control group.

et al., 2018). Further, effects were similar in size for youth in the current study compared to the original test of the HEART for Girls program (Widman, Golin, et al., 2018). However, it is worth noting that we only investigated intervention effects at immediate post-test in this initial evaluation. HEART for Teens may be useful, either as a stand-alone intervention or as a supplement to existing evidence-based sexual health curricula that are more time- and resource-intensive. However, an important next step will be to evaluate this program over time to determine the duration of effects and any impacts the program might have on increasing safer sex behavior— a clear goal of sexual health promotion efforts.

A primary purpose of this work was to adapt a program that was initially developed for girls to make it applicable to a broader audience of youth. We found the program was liked equally well and worked equally well at changing safer sex knowledge, beliefs, and intentions for both boys and girls and also for heterosexual and sexual minority youth. We found no differences between heterosexual and sexual minority youth, and there was only one statistically significant difference by gender. Specifically, the HEART for Teens program produced stronger changes in condom norms for girls than for boys. It is perhaps not surprising that changing boys' normative perceptions of condom use is difficult in a brief individual-level intervention. Targeting boys with a peer-based program may be particularly useful for influencing norms on this topic (Kapadia et al., 2012). Boys may also need more focused information about how condoms can improve their sexual experience in addition to protect them from pregnancy and disease. For example, additional information about condom types and fits, as well as strategies for incorporating condoms into sexual encounters without "ruining the mood," could be included in future iterations of HEART (Stone et al., 2018). We remain encouraged that the other outcomes we examined were improved for both boys and girls, suggesting HEART can be used in settings where both boys and girls are the target audience.

In a continued effort to make HEART more inclusive, more could be done to tailor the program to the unique needs of LGBTQ+ youth. It is notable that we found no differences between heterosexual and sexual minority youth in the perceived acceptability of the HEART program or in any of the intervention outcomes we examined. However, the program was not specially designed to meet the unique needs that transgender or sexual minority youth might encounter. For example, future adaptations could explicitly address sexual behavior for transgender teens (e.g., discussing pregnancy risk among transgender boys assigned female at birth) and allow participants to select the preferred pronouns of their partners throughout the program to feel more relevant. Sexual minority youth experience disproportionate rates of sexual risk (Poteat, Russell, & Dewaele, 2017), and face many stressors that may impact their overall sexual health. Inclusive and targeted sexual education for LGBTQ+ youth is important for those adolescents and also important for their heterosexual and cisgender peers: providing LGBTQ+ inclusive education can reduce the prevalence of homophobic and/or transphobic remarks in school and make schools safer for all students (Kosciw et al., 2018).

Limitations and Future Directions

This study was conducted among a sample of high school students from the southeastern United States; results may not generalize to out-of-school adolescents or youth in other parts of the country. Replicating this work in diverse samples from other locations will be important to determine the robustness of the program or to identify areas where the program may need to be adapted for a local context. Of note, HEART for Girls was recently evaluated in a sample of adolescent girls with emotional and behavioral difficulties in an urban community-based setting and was found to be highly acceptable and efficacious in reducing sexual risk outcomes (Kamke, Stewart, Evans, & Widman, 2018).

Although it is promising that HEART for Teens changed adolescents' knowledge, attitudes, and behavioral intentions, currently, we only know that these changes are immediate to program completion. Additionally, although we only found one significant difference in program acceptability and efficacy by gender and sexual orientation (between boys and girls on condom norms), it is possible that we failed to detect other significant differences due to small sample sizes. A larger study is needed to better understand program outcomes among demographic groups and to assess long-term effectiveness of the program using behavioral and biological outcomes. Moving from efficacy trials to real-world implementation studies is also urgently needed, both for HEART and for other online interventions. These implementation studies would help us understand adolescents' engagement with the intervention outside a controlled research environment, feasibility of program administration by individuals other than the research team, and potential barriers to wider dissemination and implementation of HEART in other school districts and/or additional settings (e.g., health clinics). One of the most appealing aspects of online education programs is their ability to be disseminated to diverse populations, but many questions still remain about the best settings for their implementation, their ability to produce behavioral change, and their potential to impact biological outcomes, such as STI/HIV incidence (Bull, 2018).

Conclusion

This study demonstrates the promise of HEART – a 45minute, interactive, online program for adolescents. The program is feasible to administer, highly acceptable, and can promote several aspects of sexual health for both boys and girls. These findings add to a growing body of literature that demonstrates the value of implementing online sexual health interventions for youth.

Funding

This work was supported by the National Institutes of Health under grant numbers R00 HD075654 and K24 HD069204. Further, web design and programming support was provided by grants from the National Institutes of Health (DK056350 and P30-CA16086).

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References

- Arbeit, M. R., Fisher, C. B., Macapagal, K., & Mustanski, B. (2016). Bisexual invisibility and the sexual health needs of adolescent girls. *LGBT Health*, 3, 342–349. doi:10.1089/lgbt.2016.0035
- Badawy, S. M., & Kuhns, L. M. (2017). Texting and mobile phone app interventions for improving adherence to preventive behavior in adolescents: A systematic review. *JMIR mHealth and uHealth*, 5, e50. doi:10.2196/mhealth.6837
- Bailey, J., Mann, S., Wayal, S., Abraham, C., & Murray, E. (2015). Digital media interventions for sexual health promotion—opportunities and challenges. *BMJ*, 350, h1099. doi:10.1136/bmj.h1099
- Basen-Engquist, K., Mâsse, L. C., Coyle, K., Kirby, D., Parcel, G. S., Banspach, S., & Nodora, J. (1999). Validity of scales measuring the psychosocial determinants of HIV/STD-related risk behavior in adolescents. *Health Education Research*, 14, 25–38. doi:10.1093/ her/14.1.25
- Bauermeister, J. A., Pingel, E. S., Jadwin-Cakmak, L., Harper, G. W., Horvath, K., Weiss, G., & Dittus, P. (2015). Acceptability and preliminary efficacy of a tailored online HIV/STI testing intervention for young men who have sex with men: The get connected! program. *AIDS and Behavior*, 19, 1860–1874. doi:10.1007/s10461-015-1009-y
- Borawski, E. A., Tufts, K. A., Trapl, E. S., Hayman, L. L., Yoder, L. D., & Lovegreen, L. D. (2015). Effectiveness of health education teachers and school nurses teaching sexually transmitted infections/human immunodeficiency virus prevention knowledge and skills in high school. *Journal of School Health*, 85, 189–196. doi:10.1111/josh.12234
- Brayboy, L. M., McCoy, K., Thamotharan, S., Zhu, E., Gil, G., & Houck, C. (2018). The use of technology in the sexual health education especially among minority adolescent girls in the United States. *Current Opinions in Obstetrics & Gynecololgy*, 30, 305–309. doi:10.1097/GCO.000000000000485
- Brown, L. K., DiClemente, R. J., & Park, T. (1992). Predictors of condom use in sexually active adolescents. *Journal Of Adolescent Health*, 13, 651–657.
- Brown, L. K., Hadley, W., Donenberg, G. R., DiClemente, R. J., Lescano, C., Lang, D. M., ... Oster, D. (2014). Project STYLE: A multisite RCT for HIV prevention among youths in mental health treatment. *Psychiatric Services*, 65, 338–344. doi:10.1176/appi.ps.201300095
- Bull, S. S. (2018). Sexual assertiveness skills and decision-making in adolescent girls: Moving to replication, scale, and digital health

impact. American Journal of Public Health, 108, 18–19. doi:10.2105/AJPH.2017.304170

- Burnette, J. L., Russell, M. V., Hoyt, C. L., Orvidas, K., & Widman, L. (2017). An online growth mindset intervention in a sample of rural adolescent girls. *British Journal of Educational Psychology*, 88, 428–445. doi:10.1111/bjep.12192
- Centers for Disease Control and Prevention. (2018a). *HIV and youth*. Retrieved from Atlanta, GA: https://www.cdc.gov/hiv/pdf/group/age/ youth/cdc-hiv-youth.pdf
- Centers for Disease Control and Prevention. (2018b). Reported STDs in the United States: High burden of STDs threatens millions. Retrieved from Atlanta, GA: https://www.cdc.gov/nchhstp/newsroom/docs/fact sheets/std-trends-508.pdf
- Centers for Disease Control and Prevention. (2018c). STDs in adolescents and young adults. Retrieved from https://www.cdc.gov/std/stats17/ adolescents.htm
- Chandra-Mouli, V., Lane, C., & Wong, S. (2015). What does not work in adolescent sexual and reproductive health: A review of evidence on interventions commonly accepted as best practices. *Global Health Science and Practice*, *3*, 333–340. doi:10.9745/GHSP-D-15-00126
- Chavez, N. R., Shearer, L. S., & Rosenthal, S. L. (2014). Use of digital media technology for primary prevention of STIs/HIV in youth. *Journal of Pediatric and Adolescent Gynecology*, 27, 244–257. doi:10.1016/j.jpag.2013.07.008
- Coyle, K. K., Kirby, D. B., Robin, L. E., Banspach, S. W., Baumler, E., & Glassman, J. R. (2006). ALL4YOU: A randomized trial of an HIV, other STDs, and pregnancy prevention intervention for alternative school students. *AIDS Education and Prevention*, 18, 187–203. doi:10.1521/aeap.2006.18.3.187
- Danielson, C. K., McCauley, J. L., Gros, K. S., Jones, A. M., Barr, S. C., Borkman, A. L., ... Ruggiero, K. J. (2016). SiHLEWeb.com: Development and usability testing of an evidence-based HIV prevention website for female African-American adolescents. *Health Informatics Journal*, 22, 194–208. doi:10.1177/1460458214544048
- Donenberg, G. R., Emerson, E., Bryant, F. B., Wilson, H., & Weber-Shifrin, E. (2001). Understanding AIDS-risk behavior among adolescents in psychiatric care: Links to psychopathology and peer relationships. *Journal of the American Academy of Child and Adolescent Psychiatry*, 40, 642–653. doi:10.1097/00004583-200106000-00008
- Eaton, L. H., Doorenbos, A. Z., Schmitz, K. L., Carpenter, K. M., & McGregor, B. A. (2011). Establishing treatment fidelity in a web-based behavioral intervention study. *Nursing Research*, 60, 430–435. doi:10.1097/NNR.0b013e31823386aa
- Fishbein, M., & Ajzen, I. (2010). Predicting and changing behavior: The reasoned action approach. New York, NY: Psychology Press.
- Forhan, S. E., Gottlieb, S. L., Sternberg, M. R., Xu, F., Datta, S. D., McQuillan, G. M., ... Markowitz, L. E. (2009). Prevalence of sexually transmitted infections among female adolescents aged 14 to 19 in the United States. *Pediatrics*, 124, 1505–1512. doi:10.1542/peds.2009-0674
- Fortenberry, J. D. (2013). The evolving sexual health paradigm: Transforming definitions into sexual health practices. *AIDS*, 27, S127–133. doi:10.1097/QAD.00000000000048
- Gaydos, C. A., Barnes, M., Aumakhan, B., Quinn, N., Agreda, P., Whittle, P., & Hogan, T. (2009). Can e-technology through the Internet be used as a new tool to address the Chlamydia trachomatis epidemic by home sampling and vaginal swabs? *Sexually Transmitted Diseases*, 36, 577–580. doi:10.1097/OLQ.0b013e3181a7482f
- Gelfond, J., Dierschke, N., Lowe, D., & Plastino, K. (2016). Preventing pregnancy in high school students: Observations from a 3-year longitudinal, quasi-experimental study. *American Journal of Public Health*, 106, S97–S102. doi:10.2105/AJPH.2016.303379
- Guse, K., Levine, D., Martins, S., Lira, A., Gaarde, J., Westmorland, W., & Gilliam, M. (2012). Interventions using new digital media to improve adolescent sexual health: A systematic review. *Journal of Adolescent Health*, 51, 535–543. doi:10.1016/j.jadohealth.2012.03.014
- Guttmacher Institute. (2018). State Policies in Brief: Sex and HIV Education. Retrieved from https://www.guttmacher.org/state-policy/explore/ sex-and-hiv-education

- Hall, K. S., McDermott Sales, J., Komro, K. A., & Santelli, J. (2016). The state of sex education in the United States. *Journal of Adolescent Health*, 58, 595–597. doi:10.1016/j.jadohealth.2016.03.032
- Hightow-Weidman, L. B., Muessig, K. E., Bauermeister, J., Zhang, C., & LeGrand, S. (2015). Youth, technology, and HIV: Recent advances and future directions. *Current HIV/AIDS Reports*, 12, 500–515. doi:10.1007/s11904-015-0280-x
- Johnson, B. T., Scott-Sheldon, L. J., Huedo-Medina, T. B., & Carey, M. P. (2011). Interventions to reduce sexual risk for human immunodeficiency virus in adolescents: A meta-analysis of trials, 1985-2008. *Archives of Pediatrics & Adolescent Medicine*, 165, 77–84. doi:10.1001/archpediatrics.2010.251
- Kamke, K., Stewart, J. L., Evans, R., & Widman, L. (2018). Replicating efficacy of a web-based sexual communication intervention in a sample of high-risk adolescent girls. Talk presented at the Society for the Scientific Study of Sexuality conference, Montreal, Canada.
- Kann, L., McManus, T., Harris, W. A., Shanklin, S. L., Flint, K. H., Queen, B., ... Ethier, K. A. (2018). Youth risk behavior surveillance - United States, 2017. *MMWR Surveillance Summary*, 67, 1–114. doi:10.15585/mmwr.ss6708a1
- Kapadia, F., Frye, V., Bonner, S., Emmanuel, P. J., Samples, C. L., & Latka, M. H. (2012). Perceived peer safer sex norms and sexual risk behaviors among substance-using Latino adolescents. *AIDS Education and Prevention*, 24, 27–40. doi:10.1521/aeap.2012.24.1.27
- Kosciw, J. G., Greytak, E. A., Zongrone, A. D., Clark, C. M., & Truong, N. L. (2018). The 2017 national school climate survey: The experiences of lesbian, gay, bisexual, transgender, and queer youth in our nation's schools. Retrieved from https://www.glsen.org/article/ 2017-national-school-climate-survey-1
- Lightfoot, M. (2012). HIV prevention for adolescents: Where do we go from here? *American Psychologist*, 67, 661–671. doi:10.1037/ a0029831
- Markham, C. M., Shegog, R., Leonard, A. D., Bui, T. C., & Paul, M. E. (2009). +CLICK: Harnessing web-based training to reduce secondary transmission among HIV-positive youth. *AIDS Care*, 21, 622–631. doi:10.1080/09540120802385637
- Morales, A., Espada, J. P., Orgiles, M., Escribano, S., Johnson, B. T., & Lightfoot, M. (2018). Interventions to reduce risk for sexually transmitted infections in adolescents: A meta-analysis of trials, 2008-2016. *PLoS ONE*, 13, e0199421. doi:10.1371/journal.pone.0199421
- Morton, M., Nelson, L., Walsh, C., Zimmerman, S., & Coe, R. (1996). Evaluation of a HIV/AIDS education program for adolescents. *Journal of Community Health*, 21, 24–35. doi:10.1007/BF01682761
- Mustanski, B., Greene, G. J., Ryan, D., & Whitton, S. W. (2015). Feasibility, acceptability, and initial efficacy of an online sexual health promotion program for LGBT youth: The Queer Sex Ed intervention. *Journal of Sex Research*, 52, 220–230. doi:10.1080/00224499. 2013.867924
- Noar, S. M., Black, H. G., & Pierce, L. B. (2009). Efficacy of computer technology-based HIV prevention interventions: A meta-analysis. *AIDS*, 23, 107–115. doi:10.1097/QAD.0b013e32831c5500
- Noar, S. M., Pierce, L. B., & Black, H. G. (2010). Can computer-mediated interventions change theoretical mediators of safer sex? A meta-analysis. *Human Communication Research*, 36, 261–297. doi:10.1111/j.1468-2958.2010.01376.x
- Poteat, V. P., Russell, S. T., & Dewaele, A. (2017). Sexual health risk behavior disparities among male and female adolescents using identity and behavior indicators of sexual orientation. *Archives of Sexual Behavior*, 48, 1087–1097. doi:10.1007/s10508-017-1082-6
- Rapoff, M. A. (2013). E-health interventions in pediatrics. Clinical Practice in Pediatric Psychology, 1, 309–313. doi:10.1037/cpp0000038
- Reyna, V. F. (2008). A theory of medical decision making and health: Fuzzy trace theory. *Medical Decision Making*, 28, 850–865. doi:10.1177/0272989X08327066
- Ritchwood, T. D., Penn, D., Peasant, C., Albritton, T., & Corbie-Smith, G. (2017). Condom use self-efficacy among younger rural adolescents: The influence of parent-teen communication, and knowledge of and

attitudes toward condoms. Journal of Early Adolescence, 37, 267–283. doi:10.1177/0272431615599065

- Shegog, R., Craig Rushing, S., Gorman, G., Jessen, C., Torres, J., Lane, T. L., ... Markham, C. M. (2017). NATIVE-it's your game: Adapting a technology-based sexual health curriculum for American Indian and Alaska Native youth. *Journal of Primary Prevention*, 38, 27–48. doi:10.1007/s10935-016-0440-9
- Smith, A., & Anderson, M. (2018). Social media use in 2018. Retrieved from Washington, DC: http://www.pewinternet.org/2018/03/01/ social-media-use-in-2018/
- Snell, W. E., Jr. (1998). The Multidimensional Sexual Self-Concept Questionnaire. In C. M. Davis, W. L. Yarber, R. Baurerman, G. Schreer, & S. L. Davis (Eds.), *Sexuality-related measures: A compendium* (2nd ed., pp. 521–524). Thousand Oaks, CA: Sage.
- St. Lawrence, J. S., Reitman, D., Jefferson, K. W., Alleyne, E., Brasfield, T. L., & Shirley, A. (1994). Factor structure and validation of an adolescent version of the Condom Attitude Scale: An instrument for measuring adolescents' attitudes toward condoms. *Psychological Assessment*, 6, 352–359. doi:10.1037/1040-3590.6.4.352
- Stone, N., Graham, C., Anstee, S., Brown, K., Newby, K., & Ingham, R. (2018). Enhancing condom use experiences among young men to improve correct and consistent condom use: Feasibility of a home-based intervention strategy (HIS-UK). *Pilot and Feasibility Studies*, 4, 63. doi:10.1186/s40814-018-0257-9
- Swanton, R., Allom, V., & Mullan, B. (2015). A meta-analysis of the effect of new-media interventions on sexual-health behaviours. *Sexually Transmitted Infections*, 91, 14–20. doi:10.1136/sextrans-2014-051743
- Tebb, K. P., Leng Trieu, S., Rico, R., Renteria, R., Rodriguez, F., & Puffer, M. (2019). A mobile health contraception decision support intervention for Latina adolescents: Implementation evaluation for use in school-based health centers. *JMIR Mhealth Uhealth*, 7, e11163. doi:10.2196/11163
- Tortolero, S. R., Markham, C. M., Peskin, M. F., Shegog, R., Addy, R. C., Escobar-Chaves, S. L., & Baumler, E. R. (2010). It's Your Game: Keep It Real: Delaying sexual behavior with an effective middle school program. *Journal of Adolescent Health*, 46, 169–179. doi:10.1016/j. jadohealth.2009.06.008
- Vrangalova, Z., & Savin-Williams, R. C. (2012). Mostly heterosexual and mostly gay/lesbian: Evidence for new sexual orientation identities. *Archives of Sexual Behavior*, 41, 85–101. doi:10.1007/s10508-012-9921-y
- Wadham, E., Green, C., Debattista, J., Somerset, S., & Sav, A. (2019). New digital media interventions for sexual health promotion among young people: Systematic review. *Sexual Health*, 16, 101–123. doi:10.1071/ SH18127
- Widman, L., Golin, C. E., Kamke, K., Burnette, J. L., & Prinstein, M. J. (2018). Sexual assertiveness skills and sexual decision-making in adolescent girls: Randomized controlled trial of an online program. *American Journal of Public Health*, 108, 96–102. doi:10.2105/ AJPH.2017.304106
- Widman, L., Golin, C. E., Kamke, K., Massey, J., & Prinstein, M. P. (2017). Feasibility and acceptability of a web-based HIV/STD prevention program for adolescent girls targeting sexual communication skills. *Health Education Research*, 32, 343–352. doi:10.1093/her/cyx048
- Widman, L., Golin, C. E., Noar, S. M., Massey, J., & Prinstein, M. P. (2016). ProjectHeartForGirls.com: Development of a web-based HIV/ STD prevention program for adolescent girls emphasizing sexual communication skills. *AIDS Education and Prevention*, 28, 365–377. doi:10.1521/aeap.2016.28.5.365
- Widman, L., Nesi, J., Kamke, K., Choukas-Bradley, S., & Stewart, J. L. (2018). Technology-based interventions to reduce sexually transmitted infections and unintended pregnancy among youth. *Journal of Adolescent Health*, 62, 651–660. doi:10.1016/j.jadohealth.2018.02.007
- Ybarra, M. L., Prescott, T. L., Phillips, G. L., 2nd, Bull, S. S., Parsons, J. T., & Mustanski, B. (2017). Pilot RCT results of an mHealth HIV prevention program for sexual minority male adolescents. *Pediatrics*, 140, e20162999. doi:10.1542/peds.2016-2999