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Social Media–Delivered Sexual Health Intervention:

A Cluster Randomized Controlled Trial

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Abstract

Background—Youth are using social media regularly and represent a group facing substantial risk for sexually transmitted infection (STI). Although there is evidence that the Internet can be used effectively in supporting healthy sexual behavior, this hasn't yet extended to social networking sites.

Purpose—To determine whether STI prevention messages delivered via Facebook are efficacious in preventing increases in sexual risk behavior at 2 and 6 months.

Design—Cluster RCT, October 2010–May 2011.

Setting/participants—Individuals (seeds) recruited in multiple settings (online, via newspaper ads and face-to-face) were asked to recruit three friends, who in turn recruited additional friends, extending three waves from the seed. Seeds and waves of friends were considered networks and exposed to either the intervention or control condition.

Intervention—Exposure to Just/Us, a Facebook page developed with youth input, or to control content on 18–24 News, a Facebook page with current events for 2 months.

Main outcome measures—Condom use at last sex and proportion of sex acts protected by condoms. Repeated measures of nested data were used to model main effects of exposure to Just/Us and time by treatment interaction.

Results—1578 participants enrolled, with 14% Latino and 35% African-American; 75% of participants completed at least one study follow-up. Time by treatment effects were observed at 2 months for condom use (intervention 68% vs control 56%, $p=0.04$) and proportion of sex acts protected by condoms (intervention 63% vs control 57%, $p=0.03$) where intervention participation reduced the tendency for condom use to decrease over time. No effects were seen at 6 months.

Conclusions—Social networking sites may be venues for efficacious health education interventions. More work is needed to understand what elements of social media are compelling,

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how network membership influences effects, and whether linking social media to clinical and social services can be beneficial.

Trial registration—This study is registered at www.clinicaltrials.gov NCT00725959.

Background

Poor outcomes related to sexual health (e.g., unplanned pregnancy and sexually transmitted infections (STI), including HIV among people aged <24 years) remain a substantial concern in the U.S.^{1,2} Although the public education system is an obvious venue for educating youth about sexual health, few students receive comprehensive sexuality education.^{3,4} A logical point of contact to educate youth is in clinical settings. However, youth do not regularly access health care,^{5,6} and when they do providers can miss opportunities to assess pregnancy, HIV and other STI risks.⁷ Youth from low-income families and African-American youth access health services less regularly than white children.^{5,6}

Another point of contact to reach large numbers of youth is the Internet, given its popularity among youth nationwide.⁸ Meta-analyses demonstrate that computer- and Internet-based interventions contribute to improved sexual health outcomes for both youth and other groups at risk,^{9–11} and that technology-based initiatives can have effects equivalent to non-technology-based programs for sexual health.¹² These programs were developed and evaluated prior to a substantial increase in popularity of social media or social networking sites such as Facebook and Twitter.

Social media sites are used by an estimated 73% of U.S. teens.¹³ Moreno et al. describe an intervention to alert youth on My Space that their online social networking profile contains information viewed publicly that may place them at risk for STI (e.g., indication of having multiple sex partners; drinking or drug use during sex).¹⁴ To our knowledge, no other research prospectively seeks to influence general sexual health risk, or STI/HIV- and pregnancy-specific behaviors of individuals using social media sites.

This paper presents results from an RCT using Facebook. The purpose of the study was to determine whether STI prevention messages delivered via Facebook are efficacious in promoting condom use at 2 and 6 months. It was hypothesized that exposure to social media content related to sexual health would mitigate typical declines in condom use among adolescents.^{15–19}

Methods

A modified respondent-driven sampling (RDS) approach was used to recruit participants. Data collection occurred between October 2010 and May 2011. RDS is a systematic approach to identification and recruitment of hard-to-reach populations. The approach relies on referrals, where the initial “seed” or index person recruited is invited to identify and recruit others to participate.²⁰

Recruitment occurred in community settings in the Denver CO metropolitan area and in a college community in Louisiana. Methods used were online personal channels and postings on popular blogs and websites, and advertisements in college and local newspapers in U.S. cities with higher than average combined incidence rates for STI and HIV.^{21,22} Recruitment was focused on African-American and Latino youth given the disparity in HIV and STI infection between these youth compared to other groups, although no racial or gender criteria were used in selection of participants.

In community settings, research assistants either approached people directly if they thought they might be eligible, or set up a table and waited for people to approach them. When recruiting online, three websites were accessed to better identify and reach youth of color, including Mi Gente, Black Planet, and Urban Chat. Recruiters posted information about the study to these sites, and responded to requests for more detail about the study. There were no inquiries from youth using the remaining two sites.

Finally, 16 local and school (community college, college and university) newspapers in geographic areas with the highest prevalence of chlamydia, gonorrhea and HIV among those aged 15–19 years were identified, and recruitment ads were placed in these papers. People responding to the ads sent an e-mail or voice-mail to study staff, which then enrolled them and encouraged them to recruit friends as described below. All participants, regardless of recruitment method, were screened using identical eligibility criteria (i.e., aged 16–25 years, a U.S. resident, owner of a Facebook page, willing to complete study behavioral risk assessments, and able to read and write in English).

Additionally, based on formative work for this project, only those people who agreed to sign up to receive news from (i.e., “like”) our Facebook study pages (intervention or control) would be able to see program content and conversations within their own newsfeed without going outside their profile page to engage with the study. Therefore “liking” the intervention or control Facebook page was an eligibility criterion. Once a person “likes” a group on Facebook, they become automatically linked to that groups’ page, and everything posted on the group page is broadcast to every network member’s page in the form of an RSS (rich site summary, one process used to regularly update material online and share it with networks) feed. Those eligible were invited to participate.

Participants recruited by study staff were incentivized to recruit up to three friends to participate (Wave 1); this wave of recruits were incentivized to recruit up to three friends (Wave 2); this wave was incentivized to recruit up to three friends to participate (Wave 3). Each individual recruited by study staff and all people they recruited completed online consent prior to enrollment and then were considered part of the same network. Participants received a gift card valued at \$5 per person for up to three people recruited into the study for a possible total of \$15 for this effort.

All eligible participants, including seeds and all those referred through their networks, completed informed consent. They also completed a baseline behavioral assessment of sexual risk via an online tool generated and delivered through Zoomerang, a commercial online survey software program that allows users to create and publish surveys online. Zoomerang served as a third-party host for the data, and their third-party hosting agreements comply with all current IRB requirements related to privacy and data security.²³

All participants were sent a link via e-mail on their Facebook page that would take them to the informed consent and online survey, which they could self-administer on their own computer. The survey took approximately 15 minutes to complete. Participants were given a gift card valued at \$15 for completion of the baseline assessment. Study procedures were approved by IRBs at the University of Colorado and the Columbia Mailman School of Public Health.

Participants and those they recruited were randomly assigned as a network unit to either intervention or control status. The control page was called “18-24 News” intended as a play on the concept of sharing what was happening between 6 pm until midnight on the 24- hour clock (18:00–24:00) and what was interesting in the news to those aged 18–24 years. The intent of using this page as a control was to specifically avoid sexual health content.

The content for the intervention page, “Just/Us” on Facebook, was developed in concert with all members of the study team. Implementation was led by ISIS, Internet Sexuality Information Services in Oakland CA. Content was based on two fundamental ideas generated during this formative phase: that sexual health is a human right and function of social justice; and that youth need a space to share ideas and concepts with their peers, as well as professional experts. Content for the intervention page included eight broad topics related to sexual health (e.g., communication regarding sexual history; expectations for a healthy relationship; skills building for condom negotiation and condom use; and how to access STI testing). One week was devoted to each topic. The topics provided a framework for interactions between youth facilitators employed by ISIS and participants.

Youth facilitators would make multiple updates each day to the page in the form of video links, quizzes, and games as well as threaded discussions relevant to that weeks’ topic. At the end of 8 weeks, topics were recycled to ensure those enrolling at different times were exposed to all eight topics. Appendix A (available online at www.ajpmonline.org) shows sample elements from the Just/Us intervention page and a screen shot of the 18-24 News control page.

At the end of 8 weeks, participants were invited to complete a follow-up behavioral risk assessment. After completing this they could remain “friends” with Just/Us or 18-24 News on Facebook, but would be exposed to only the topics now recycling that they had already viewed. At 6 months, they were invited to complete their second follow-up assessment. Participants were offered an online gift card from Amazon, Jamba Juice, Walmart or Target valued at \$15 for each assessment.

Measures

Measures included demographic characteristics of participants: age, gender, race, ethnicity, education, and ZIP code. The primary study outcomes were condom use at last sex (measured as the response to the question: *Last time you had sex was a condom used? Yes or No*) and proportion of sex acts protected by condoms in the past 60 days. (Participants were asked to estimate the number of times they had sex in the past 60 days, and then to estimate the number of times in 60 days they used a condom. Proportion of sex acts protected by condoms is the number of times an individual had sex protected by condoms in the past 60 days divided by the total number of times they had sex in 60 days).

Additional behavioral outcomes assessed were number of sex partners in the past 2 months (dichotomized as two or more partners compared to zero or one partner); intention to use condoms at the next sexual encounter (also dichotomized, *yes* or *no*); and whether the most recent sex partner was considered a “main” or primary partner or a casual partner. There were numerous factors measured on a 5-point scale from “never” to “all of the time” including whether participants were drunk or high during their last sexual experience; whether their friends on Facebook were likely to use condoms (peer norms for condom use); and whether they were confident they could use condoms (self-efficacy for condom use). Finally, at the 6-month follow-up, participants were asked to indicate whether they “liked” numerous Facebook pages, embedding Just/Us among three other choices to assess contamination—if controls “liked” Just/Us in large numbers, there would be a concern that they had been exposed to intervention content.

Data Analysis

Analyses occurred between May 2010 and January 2012. Basic data on engagement with the Facebook pages and study elements were obtained through Google analytics, an open source web statistics site that generates information on how individuals interact with specific sites

on the Internet. Statistical analyses were performed using SAS 9.2. The completed survey data included repeated measures from three time points: (1) a baseline at enrollment; and (2) a 2-month; and (3) a 6-month follow-up. The two study groups were evaluated for equivalency on study outcomes at baseline and demographic measures, including gender, race, ethnicity, U.S. region, age and education at enrollment using student's *t*-test and chi-square comparisons. Equivalency across groups was also assessed by recruitment method (face-to-face or Internet or newspaper) and by type of gift-card incentive chosen.

The unit of analysis was the individual, but observations were potentially non-independent because individuals were nested within networks, and networks were then assigned to treatment groups. Initial power estimates were established based on outcomes from previous work by some of the study team with youth online.²⁴ Sample size estimates of 1156 with 578 per study arm were based on assumptions of baseline condom use of 55% with 90% power to detect differences of 10% between intervention at control groups with a CI of 99% ($\alpha=0.01$), and intra-class correlations (ICC's) for network members of 0.15.

The ICC's at baseline were 0.15 for condom use at last sex and 0.13 for proportion of sex acts protected by condoms demonstrating that behaviors among people who already know each other are related, underscoring the need to account for the non-zero ICCs to avoid overestimating effects from exposure to intervention content. All outcomes among those sexually active were modeled utilizing a nested design with repeated measures techniques. The modeling, adjusted estimates and significance tests were performed using Proc Glimmix for binary outcomes and Proc Mixed for continuous outcomes to account for the nested structure of the data.

All outcomes were modeled in terms of the main effect of changes over time, the main effect of treatment, and the interaction between treatment and time. An interaction between time and treatment was considered evidence of an impact of the intervention and was interpreted in post hoc analyses comparing the adjusted least-squares mean estimates by treatment group at each of the three time points. Potential covariates included age, gender, race, ethnicity, region of the U.S., whether or not the participant was with a primary partner, size of the participant's captured network, method of recruitment, and incentives used to recruit the participant.

Results

Enrollment and participation in the study is shown in Figure 1. There were 1017 people screened in the three settings described above (698 in community settings; 127 through the Internet and 192 through newspaper advertisements), and 828 were eligible for participation. Those not eligible were outside the age range (112); didn't have a Facebook page (43); or didn't agree to "like" the Just/Us or 18-24 News Facebook page (34). Of the 828 eligible, 652 (79%) agreed to participate.

These participants were considered seeds and assigned at random to the 18-24 News page (control, $n=312$) or the Just/Us page (intervention, $n=340$) and asked to recruit their Facebook friends to participate. Controls recruited an average of 1.04 people each ($n=324$, range 0–4, SD 1.06) and intervention participants an average of 1.79 participants each ($n=602$, range 0–12, SD 2.44) for a total of 636 people in the control condition and 942 in the intervention condition and 1578 in the study overall. Because assignment of study seeds was random, recruitment of seeds and their network friends continued until adequate numbers were enrolled in each study arm for appropriately powered statistical comparisons.

Just under 70% of the sample completed a 2-month follow-up (439 controls, 69% and 653 intervention, 69%) and retention declined to 59% for controls at 6 months ($n=377$) and 45%

for intervention participants ($n=427$). A total of 75% of participants completed any follow-up (i.e., either 2 or 6 months (484 control participants and 711 intervention participants). Full information maximum likelihood estimation was used in model estimation, which makes use of all available follow-up data (i.e., participants who completed just one of the follow-ups are still included in the repeated measures analyses) and performs well when data are missing at random.²⁵

Demographics and risk behaviors of participants in both study groups at baseline are shown in Table 1. There was a lower than expected enrollment of Latino/Hispanic participants, and the highest proportion of the sample was from the southern U.S. (39%) followed by the western U.S. (35%) with the greatest representation from Louisiana, Georgia and Colorado, most likely due to face-to-face efforts, and from Georgia, due to newspaper advertising. Fewer intervention group members had ever had sex compared to controls.

At 2 and 6 months, participants recruited by face-to-face methods, those receiving Amazon gift certificates, those who were female, those who were African-American, and those who used condoms at last sex or who had not had sex were more likely to complete a follow-up regardless of whether they were in the Just/Us or 18-24 News group. The number completing a 6-month assessment in the 18-24 News group was significantly greater than those from Just/Us at 6 months. There were 43 participants in the control group (6.8%) who reported “liking” Just/Us; this should be compared to 100% of the participants in the intervention arm who “liked” Just/Us (because liking the page was a condition of eligibility as noted above).

Data on engagement with the Just/Us Facebook page indicates that there were an average of 43 unique visitors per week with a range of 37–101. The topic during the week with 101 unique visitors was that of multiple sex partners and concurrent sex partners, suggesting this was likely a topic that best engaged participants. Average time spent on the Facebook page was 3.16 minutes with a range of <1 minute to a high of 7.3 minutes. These data from Google analytics are available in the aggregate only, so it is not possible to identify who individuals are unless they specifically post to the Facebook page.

There were 93 individuals identified as “loyal” visitors to Just/Us from intervention participants; this number represents 10% of those enrolled. A loyal visitor is someone who posts regularly to the page; there were a total of 277 posts by visitors to the page during the study period. This suggests that most participants viewed content on their own home page, and that few left their page to come to the study page to review content.

Table 2 depicts the adjusted means and 95% CIs by condition and wave for all primary and secondary outcomes and the results of the treatment by time interaction. Age, gender, race, ethnicity, and having a partner considered to be casual were included as covariates in modeling testing based on evidence that these variables were related to study outcomes. Other potential covariates including size of the network, region of recruitment, method of recruitment, and incentives used for recruitment were not predictors of outcomes and were thus not included in the analyses.

An interaction was observed for condom use ($F=3.30$, $p=0.037$) and proportion of protected acts ($F=3.63$, $p<0.027$). The interaction indicates that changes in scores over time depended on condition. Simple effects analyses for condom use showed that there was a difference between the intervention and control groups at the 2-month follow-up ($F=5.37$, $p=0.02$) but that groups did not differ at baseline ($F=0.01$, $p=0.94$) or the 6-month follow-up ($F=0.03$, $p=0.86$). As shown in Figure 2, condom use remained stable from baseline to 2 months in the intervention group but decreased in the control group with a small to medium effect size (Cohen's $d=0.18$).

For proportion of protected acts, simple effects analysis did not show condition differences at any individual time point; changes over time within condition were thus examined to interpret this interaction. Proportion of protected acts significantly decreased from baseline to 2 months in the control group (and the subsequent increase at 6 months was not significant), whereas proportion of protected acts remained stable from baseline to 2 months in the intervention group and decreased by the 6-month follow-up.

No time by treatment interactions were observed for additional behavioral outcomes as noted in Table 2. Moderator analyses were conducted that examined the effect of the interaction between each demographic variable and condition on each outcome; these were nonsignificant, indicating that although there are mean baseline differences in risk behavior among demographic groups that can be addressed by including these demographics as covariates, there was not any evidence that demographic characteristics influenced response to the intervention.

Discussion

Data from this study show that social media can be used to facilitate prevention of declines in condom use among high-risk youth in the short term. This finding replicates STI and HIV prevention research conducted with other populations.^{15,31} The effect size from the current short-term outcomes match or exceed those observed in a meta-analysis of Internet interventions, suggesting using Facebook for sexual health intervention is at least equally effective as using other technology-based mechanisms, and these effects match those observed for more traditional HIV prevention programs delivered in real-world settings.³² To our knowledge, this paper is the first RCT that uses a social networking site to deliver HIV and STI prevention messages.

Results also show success in recruitment of youth of color and youth living in geographic regions with high STI and HIV prevalence and success in reaching large numbers of people with STI- and HIV-related content through Facebook. Methods employed in this work addressed the ICCs between friends in networks. These data are critical for understanding the difference between the influence of relationships versus an intervention in this environment.

Data from the study show people will return to complete a follow-up in the short term but retention drops substantially in the longer term. Retention rates shown here are equivalent or higher than those seen in other technology based studies²⁶⁻²⁹ and match what is expected for rigorous evaluation in scientific research in the short term.

Data suggest that engagement with the Just/Us content occurred almost exclusively on individuals' own pages, and they left their own page rarely to go directly to the Just/Us page. This appears to be consistent with the way that youth use social media. According to PEW Internet and American life, the primary activities among youth using social media are posting comments on friends' photos'; posting messages to a friend's wall; and sending private e-mails to their friends.³⁰

There is little evidence to suggest a majority of youth actively seek out and engage with organizations on Facebook. Thus, approaches like that of Just/Us to "push" messages out through RSS feed offer one way to get messages in front of a large number of youth. However, ultimately, a limitation for this and other work using social media is an incomplete understanding of motivations for engagement with content on social media and motivations for sharing material within networks. It is somewhat surprising that the intervention did not affect self-efficacy or norms given that both of these constructs have emerged as powerful mediators in other sexual risk-reduction interventions.²⁴ A possible

explanation is that the traditional mediators do not function the same when the intervention has been delivered through social media, compared to other computer-mediated and in-person sexual risk interventions as through in-person interventions.³²

The use of social media to influence sexual risk behavior in the short term is novel, and is an important first step in considering how to reach the overwhelming numbers of youth online and how to maximize approaches to technology-based interventions. Because there is ample evidence that youth condom use declines with age and fluctuates with other factors such as relationship status.^{16–19,33} Facebook may provide a simple, easy to implement and adopt approach to prevent condom use decline for the short-term. It may be valuable to consider whether clinics providing sexual health services to youth might benefit from having a presence on Facebook, and whether having such a presence can intensify, supplement or extend the efficacy of their own sexual health promotion efforts.

In this example, Just/Us is a stand-alone entity online, and data show the page has efficacy for supporting healthy sexual behavior. An interesting question to consider for future work is whether a network of clinics or organizations can simultaneously build on these findings by integrating Just/Us content into their programs that they can market to their clients, and whether clients may be more likely to engage with a Facebook or other social media page when they have a real-world connection to an organization. The widespread adoption of social media suggests these results have important implications beyond HIV and STI prevention. Methods described here can be applied to interventions for other critical health behaviors such as healthy eating and physical activity, mental wellness, and prevention of substance use, all areas of importance for adolescent health.

Limitations to this work include reliance on self-report for primary outcomes, a perennial concern for STI and HIV prevention research. Linking a Facebook or other social media page to a clinic delivery of sexual health services may offer the opportunity to validate self-reported sexual risk behavior with clinic outcomes such as STI incidence. Another limitation is the rapid decay in intervention effects in the longer term (i.e., 6 months).

Likewise, although there was strong retention in the short-term (2 months), retention over time declined. Of concern is the attrition among higher-risk youth from the study. Although this type of attrition has been documented in other online STI-related research^{34,35} it underscores the need to redouble efforts to attract and engage higher-risk youth in prevention efforts using social media. Future work should explore approaches to keep audiences engaged in social media content related to sexual health.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Figure 1.
Study Enrollment

Figure 2.
Primary sexual health outcomes

Table 1

Demographics of study sample^a (N=1578), % (n)

Characteristic	Intervention		Control		Intervention		Control		Intervention		Control	
	Men/boys		Men/boys		Women/girls		Women/girls		Total		Total	
Age, years, M (SD)	19.7 (2.0)		20.2(2.4)	*	19.9 (2.1)		20.2 (2.3)		19.8(2.1)		20.2(2.4)	*
ETHNICITY AND RACE												
Hispanic	11.0 (46)		13.1 (32)		13.0 (68)		17.9 (70)	*	12.1 (114)		16.0 (102)	*
African-American	25.7 (108)		45.9 (112)	*	30.1(157)		44.4(174)	*	28.1 (286)		45.0 (265)	*
American Indian/Alaska Native	1.0 (4)		0.8 (2)		0.6(3)		0.8(3)		0.7 (7)		0.8 (5)	
Asian	31.4 (132)		10.7 (26)	*	24.3 (127)		5.4 (21)	*	27.5 (259)		7.4 (47)	*
Pacific Islander/Hawaiian	1.4 (6)		0.8 (2)		0.8(4)		0.3(1)		1.1 (10)		0.5 (3)	
White	30.7 (129)		27.9 (68)		30.1 (121)		30.9 (157)		29.7 (286)		30.4 (189)	
Other Race	7.1 (30)		9.4 (23)		11.5 (60)		13.6 (53)		9.6 (90)		12.0 (76)	
U.S. GEOGRAPHIC REGION												
Mid-Atlantic	16.9 (88)		12.2 (48)		16.9 (88)		12.2 (48)		21.2 (200)		12.4 (79)	*
Midwest	4.4 (23)		5.6 (22)		4.4 (23)		5.6 (22)		3.8 (36)		7.4 (47)	*
New England	1.0 (5)		0.8 (3)		1.0 (5)		0.8 (3)		0.7 (7)		0.8 (5)	
South	38.3 (200)		38.5 (151)		38.3 (200)		38.5 (151)		39.6 (373)		37.0 (235)	
Southwest	2.7 (14)		1.8 (7)		2.7 (14)		1.8 (7)		2.6 (24)		1.7 (11)	
West	36.6 (191)		40.8 (160)		36.6 (191)		40.8 (160)		32.0 (301)		40.6 (258)	*
SEXUAL HISTORY AT BASELINE												
Ever had sex	63.8 (245)		77.7 (178)	*	73.7 (369)		77.8 (291)		69.4 (614)		77.8 (469)	*

Characteristic	Intervention		Control		Intervention		Control	
	Men/boys	Women/girls	Men/boys	Women/girls	Men/boys	Women/girls	Men/boys	Women/girls
Age at 1 st sex								
<15	22.4 (54)	15.5 (56)	23.2 (41)	13.2 (38)	18.3 (110)	17.0 (79)		
15–17	39.0 (94)	47.1 (170)	45.8 (81)	47.6 (137)	43.9 (264)	46.9 (218)		
18–19	28.6 (69)	27.7 (100)	25.4 (45)	30.6 (88)	28.1 (169)	28.6 (133)		
>19	10.0 (24)	9.7 (35)	5.7 (10)	8.7 (25)	9.8 (59)	7.5 (35)		
Mean lifetime number of partners (SD)	9.9 (16.9)	5.9 (8.5)	8.9 (16.4)	5.3 (6.1)	7.5 (12.6)	6.7 (11.2)		
Experienced coercion	40.3 (97)	52.2 (191)	44.1 (78)	53.3 (154)	47.5 (288)	49.8 (232)		

* Significant differences between intervention and control, *p* 0.05

^a <0.1% respondents were missing responses or did not want to answer region, race or ethnicity (of 1578 baseline participants, two were missing responses for region and race, five for ethnicity. 53 did not want to answer race, 68 for ethnicity)

Table 2

Theoretic and behavioral outcomes at baseline, 2 months, and 6 months

Variable	Condition	Time Point			Time*condition interaction	
		Baseline	2-month	6-month		
Condom use last sex (% yes)	Intervention	0.65 (0.59, 0.71)	0.68 (0.61, 0.74)	0.60 (0.52, 0.68)	F=3.30, <i>p</i>=0.037	
	Control	0.65 (0.58, 0.72)	0.56 (0.48, 0.64)	0.61 (0.52, 0.69)		
Proportion of protected sex acts	Intervention	0.63 (0.57, 0.68)	0.62 (0.57, 0.68)	0.55 (0.49, 0.62)	F=3.63, <i>p</i>=0.027	
	Control	0.63 (0.58, 0.69)	0.57 (0.51, 0.63)	0.60 (0.54, 0.67)		
Condom Self-efficacy	Intervention	3.38 (3.30, 3.46)	3.42 (3.34, 3.50)	3.41 (3.31, 3.50)	F=0.95, <i>p</i>=0.39	
	Control	3.40 (3.31, 3.49)	3.43 (3.33, 3.53)	3.51 (3.42, 3.61)		
Condom norms	Intervention	5.55 (5.36, 5.74)	5.70 (5.49, 5.90)	5.70 (5.47, 5.93)	F=0.69, <i>p</i>=0.50	
	Control	5.49 (5.28, 5.70)	5.75 (5.52, 5.97)	5.83 (5.60, 6.06)		
Condom Intentions (% yes)	Intervention	0.87 (0.83, 0.90)	0.87 (0.83, 0.91)	0.85 (0.79, 0.90)	F=1.27, <i>p</i>=0.28	
	Control	0.87 (0.83, 0.91)	0.83 (0.77, 0.88)	0.82 (0.75, 0.87)		
>=2 sex partners in 2 months (% yes)	Intervention	0.18 (0.14, 0.24)	0.21 (0.16, 0.28)	0.25 (0.18, 0.34)	F=1.05, <i>p</i>=0.35	
	Control	0.15 (0.11, 0.20)	0.12 (0.08, 0.17)	0.17 (0.12, 0.24)		
Drunk or high during sex	Intervention	1.85 (1.77, 1.92)	1.77 (1.70, 1.85)	1.86 (1.77, 1.94)	F=0.87, <i>p</i>=0.42	
	Control	1.82 (1.73, 1.91)	1.81 (1.72, 1.89)	1.85 (1.75, 1.94)		

Note: Models are adjusted for age, race, ethnicity, gender, and partner type (main versus casual). Estimates are adjusted M (95% CI). Significant *p*-values are bolded.