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ORIGINAL PAPER

Towards an Information Motivation and Behavioral Skills Model for New Sex Partners: Results of a Study of Condom Use as an HIV Prevention Method for Emerging Adults Who Met Partners on Dating and Sex-Seeking Platforms or Offline

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Abstract
The information, motivation, behavioral Skills (IMB) model was used to identify factors that affect condom use with new sex partners that were met offline or online. Mixed methods data were collected from adults between the ages of 18 and 29 years who reported a new sex partner. A model was composed of participants' IMB scale scores to determine the effect of these variables on condom use. A subset of 20 survey participants completed interviews exploring how IMB model elements may have influenced their condom use. Mixed methods results showed condom use skills were influential for condom use during the first sexual encounter between new partners. Qualitative findings suggest the information and motivation may also influence condom use with new sex partners. The IMB model for new partners may be relevant model for the development of interventions that encourage emerging adults to use condoms at first sex with new sex partners.

Keywords Information motivation behavioral skills model · HIV · STI · Online dating

Introduction

Condom use is a hallmark public health strategy to reduce the incidence of unintended pregnancy [1–3] and sexually transmitted infections (STIs) [4], including HIV [5]. In the United States, there are almost two million new cases of chlamydia and gonorrhea and approximately 40,000 new cases of HIV each year—at least 25% of those cases occur from a heterosexual transmission and many of the diagnoses are among emerging adults (ages 18–29 years old) [6–8]. According to findings from the Youth Risk Behavior Surveillance System (YRBSS), approximately 40% of young people did not use condoms during their last sexual encounter [9]. With consistent and correct condom use, a large proportion of cases of unintended pregnancy [2], STIs [5], and HIV [5] could be prevented. Recently, there have been increased concerns about condom use among people who meet sexual partners on dating and sex-seeking platforms (DSPs), because DSPs have been assumed to be associated with rises in cases of STIs [10–12]. If there are concerns that DSPs are contributing to STIs, there is a chance that DSPs may account for some cases of HIV [7] and unintended pregnancy [1, 3].

Emerging adults [13] are increasingly meeting casual and romantic sex partners on DSPs (e.g., Tinder, Bumble, OkCupid, Plenty of Fish) [14]. Research including samples of people who mostly identify as heterosexuals has not indicated that there is an increased likelihood of condomless sex with partners met online compared to offline [15, 16]. However,

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a proportion of sexual encounters that were initiated online are condomless sex encounters [15, 16], which could lead to unintended pregnancy [1], and STIs [8] including HIV [7]. Despite the lack of scientific evidence to substantiate the social concern (or moral panic [17, 18]) about DSPs, there is an opportunity to reduce the likelihood of negative sexual health outcomes by developing public health strategies to promote condom use. There is a critical need to understand better factors influencing condom use behaviors between new sex partners to design effective risk reduction interventions.

The Information, Motivation, Behavioral skills (IMB) model has been previously used to identify determinants that are important for promoting condom use for the prevention of HIV and other STIs [19–29]. Developed in the 1980s, the IMB model posits that people who are knowledgeable, motivated to enact preventive behaviors and perceive themselves as capable of performing necessary skills, will enact preventive behaviors [23]. Misovich et al. [30] suggested, based on a review of the literature, that the IMB model should be used to understand condom use for couples. Later, Harman and Amico [31] adapted the IMB model into the Relationship Oriented-Information Motivation Behavioral skills (RELO-IMB) model that was appropriate for understanding determinants of condom use among established heterosexual couples. The RELO-IMB model addresses condom use at the individual and couple level. Although previous research by Misovich et al. [30] and by the RELO-IMB model [31] provide insights into the determinants of condom use for the prevention of HIV in the context of a sexual relationship, the IMB model has not been applied to understanding the determinants of condom use specifically between new partners. As Harman and Amico [31] highlight, there may be different structural relationships between the IMB model constructs based on relationship types; therefore, the factors that are important for condom use in established relationships may not be the same for new partners.

The premise for this study was based on claims that DSPs were fueling increased incidences of STIs [10–12, 32]. Utilization of the IMB model for elicitation research can serve as the basis for the design and implementation of interventions to increase condom use behaviors among people who use DSPs to find new sex partners. The current study used mixed methods to determine what role venue (e.g., DSPs vs. offline venues), and the IMB constructs play in the decision to use condoms with new sex partners. We hypothesized that participants who met their partners through DSPs would be more likely to use a condom because they would have higher IMB scores than participants who met their new sex partner's offline. The findings of this study may help with designing interventions that address information, motivation, behavioral skills, and behavior deficits to promote condom use between new sex partners.

Methods

All study procedures and data collection instruments were reviewed and approved by the lead author's institutional review board (blinded for review).

Study Design

A sequential explanatory mixed methods [33] design was used, which included quantitative data collected through an online survey followed by in-depth online qualitative interviews with a sub-sample of survey participants. A mixed-methods design benefits from the strengths of both quantitative and qualitative methodologies [34]. In this case, quantitative analyses were used to estimate frequencies and identify factors associated with condom use with new sex partners. Qualitative methods were used to enhance the understanding of the quantitative findings. These strategies are described further and in detail below.

Phase One: Quantitative Methods

Participant Selection

From February to November 2016 a national sample was recruited for this study using four online strategies. Participants were recruited from Facebook, Match Media Group, Craigslist, and BackPage using ads that briefly described the study, eligibility criteria, and incentives for participation and included a link to the survey. Details about recruitment are illustrated in Fig. 1. Men and women were eligible to participate in this research if they: (a) were between the ages of 18 and 29 years; (b) had penetrative (anal or vaginal) sex with a new sexual partner of the opposite sex within the last 6 months; (c) were not currently pregnant; (d) had no intention of becoming pregnant or impregnating someone within the next 12 months; (e) read and spoke English; and (f) resided in the U.S.

People interested in the study accessed the informed consent, eligibility screener, and survey through an anonymous Qualtrics link [35]. A feature on Qualtrics was enabled to prevent repeated participation attempts from the same internet protocol (IP) address. Of the 1158, people who responded to the informed consent, 1134 (97.9%) consented to participate in the study and 859 completed all eligibility questions. About half of those who completed the eligibility screener (n = 421; 49.0%) were eligible for the study. Responses from participants (N = 253; 21.8% of site visitors) who reported on their condom use behaviors with at least one new partner 6 months before survey administration were analyzed for this study. Since data on

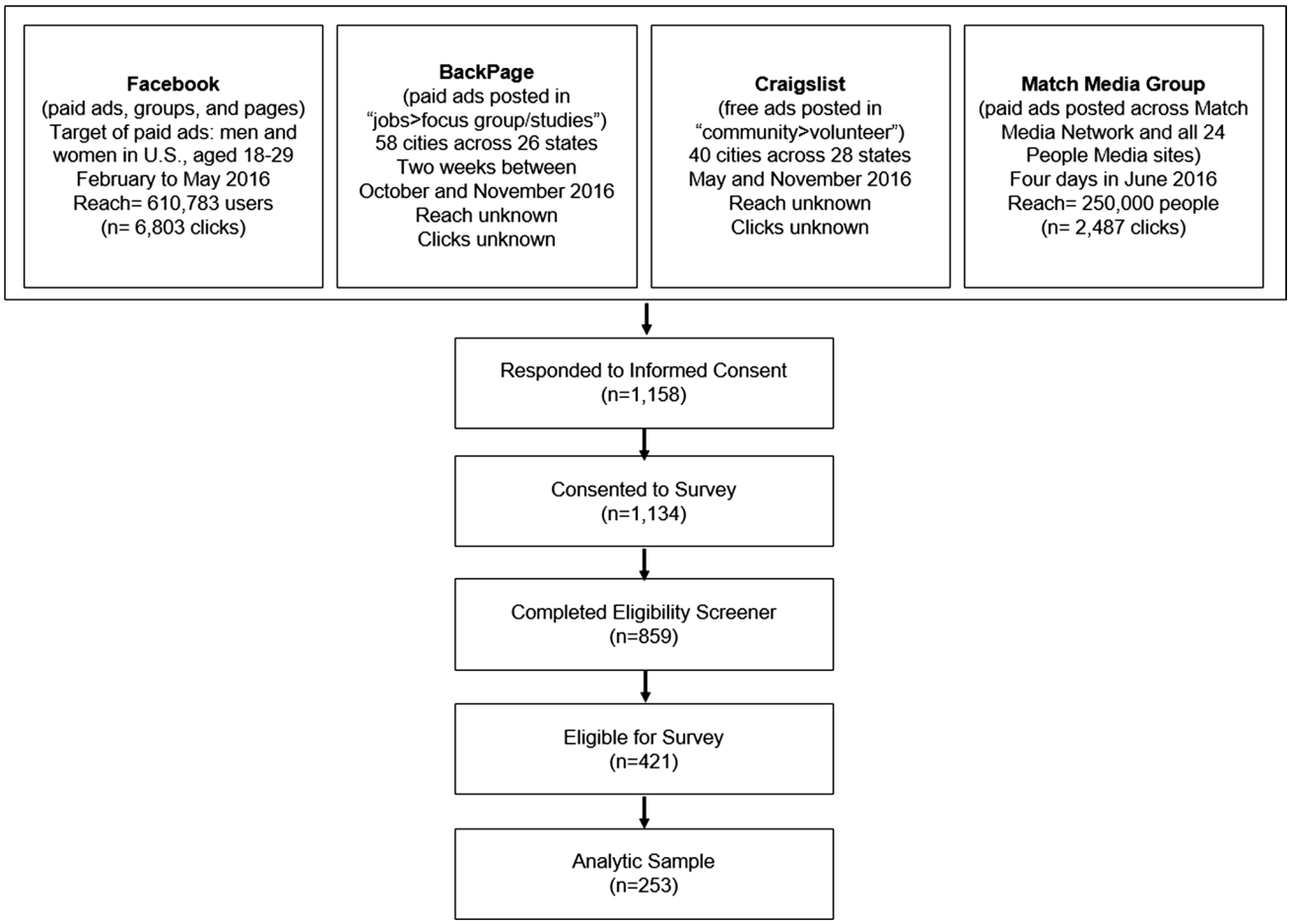

Fig. 1 Recruitment flow diagram

non-respondents were not collected, no analysis of non-respondents was conducted.

Data Collection

Survey participants were asked to report condom use behaviors with up to three new sexual partners they initially met on a DSP and/or offline within 6 months before survey administration [36]. Repeated measurements of sexual behavior, including condom use, and associated contextual variables were nested within participants [37]. Questions were posed both in formal language and vernacular to increase comprehension. Participants were allowed to skip questions without penalty if they felt uncomfortable for any reason. The survey took on average 30 min to complete. Survey participants were welcome to register a unique contact email and postal address to enter a raffle for a chance to win one of three gift cards (two $25 e-gift cards or one $50 e-gift card grand prize).

Measures

Condom Use

Condom use was chosen as the outcome variable because condoms are the most effective method for reducing STIs [38] and HIV [5] among sexually active people and they can also prevent pregnancy [4]. Additionally, the IMB model specifies an HIV preventive behavior (e.g., condom use) as the outcome of the model. Participants were asked whether they engaged in vaginal or anal sex with a new partner of the opposite sex within 6 months before survey administration. Next, participants were asked if they "used a condom from start to finish" during the first vaginal and/or anal sexual encounter [16]. The condom use variable was created by dichotomizing responses into "yes" condom use or "no" condom use. A sexual episode was considered sex without a condom if the participant responded, "I used a condom part of the time," "I did not use a condom" or "I don't know [16]. The first sexual encounter was of interest because it

represents a new opportunity for risk and new sexual relationships may not last longer than one sexual encounter.

Venue

Participants answered questions about where they initially met each new sex partner—either offline (i.e., in-person) or through a dating and sex-seeking platforms (DSPs) (e.g., Tinder, Bumble, OkCupid, Plenty of Fish). A list of popular DSPs was provided for the participant to select the exact DSP used to meet their new sex partner. DSPs were defined as online platforms that allow people to find and contact each other to arrange a date, usually with the objective of developing a romantic or sexual relationship. Participants are also described by their venue-based strategy for meeting partners during the 6 months prior to the survey—DSP only, offline only, or both (e.g. met at least one partner on a DSP and at least one partner offline). Participants classified as meeting partners in both venues reported a minimum of two partners on the survey.

Information Motivation Behavioral Skills Model

Information An information variable was created based on two subscales of HIV knowledge and partner-specific risk information ($\alpha = 0.874$). More information about the subscales are detailed below. The assumption is that the information a person knows about how to prevent HIV transmission and about their partner will shape their decisions to use condoms. Information scores ranged from 0 to 17.

A Brief HIV Knowledge scale was used to measure knowledge about HIV and condom use (adapted from the HIV-KQ 18 [39]). Items from the original scale that were not related to the sexual (vaginal or anal) transmission of HIV were not used (e.g., a *person can get HIV by sharing a glass of water with someone who has HIV*). Additionally, factor analysis was used to remove items that would improve the reliability of the scale. The adapted scale included 6 items related to knowledge about HIV and condom use (e.g., *pulling out the penis before a man climaxes/cums keeps a woman from getting HIV during sex, using Vaseline or baby oil with condoms lowers the chance of getting HIV*) ($\alpha = 0.858$). Participants could respond "true" or "false" to each item. Items were dichotomized as correct (1) or incorrect (0) and then the values were summed. The total possible score for the Brief HIV Knowledge Scale was 6 (high scores = 5–6, moderate scores = 2–4, low scores = 0–1).

A partner-specific risk information scale consisting of nine items was created by the lead author to assess whether participants obtained information about their partner's past sexual partner, HIV status, current and past STI status, and current injection drug use behaviors ($\alpha = 0.917$). Participants indicated "yes" or "no" to whether they obtained partner-specific information before the first sexual encounter. Responses of "yes" received a value of one, and "no" responses were valued at zero. The values of the items were summed. The total possible score for partner-specific risk information was nine (high scores = 9–11, moderate scores = 4–8, low scores = 0–3).

Motivation Motivation to engage in condom use was determined by attitudes, social norms related to the preventive behavior, and perceptions of personal susceptibility to STIs and HIV. The assumption of the IMB model is that well-informed individuals are inclined to act on their knowledge about prevention. The motivation construct was modeled using three measured variables: the sum of items on the attitude scale, the social normative items, and the perceived risk items ($\alpha = 0.813$). Details about the subscales follow. Motivation ranged from 8 to 32 (high scores = 25–32, moderate scores = 16–31, low scores = 8–15). High scores indicate greater motivation to use condoms [31].

Attitudes towards condom use with intimate partners were assessed with four items [31]. One item from the original scale was deleted because it improved the reliability of the scale [e.g. using condoms with my partner would be harmful (1) to beneficial (5)]. Each item began with the statement, "Using condoms with my partner would be…" and was rated using a 5-point semantic differential scale using adjective pairs such as unpleasant (1) and pleasant (5) at each end ($\alpha = 0.862$).

Subjective norms were measured using two items about using condoms with their last partner (i.e., My partner thinks we should always use condoms when we have sex; Most people important to me think I should always use a condom during sex) [31]. Each item was rated using a 5-point semantic differential scale with strongly disagree (1) and strongly agree (5) serving as anchors ($\alpha = 0.639$).

Perceived risk of HIV and STI infection was measured by two items ($\alpha = 0.845$) [40]. Participants were asked to indicate how great a risk for transmission of a) HIV and b) other STIs they thought their partner(s) posed for them. Response options were on a 5-point scale ranging from no risk at all (1) to very significant risk (5).

Behavioral Skills Behavioral skills ($\alpha = 0.766$) was measured based on a sum of scores from two subscales about condom use communication skills and condom use skills. Participants were asked to report on their "enacted" skills, rather than self-efficacy to perform a skill. Although measuring enacted skills has advantages [41, 42], enacted skills are still a proxy for measuring actual skills, because participants may not objectively assess their enacted skills. Condom use communication skills were measured with five items ("yes" or "no") (e.g., I talked with my partner about using condoms; I talked with my partner about HIV) ($\alpha = 0.801$).

Condom use skills were measured with two items ("yes" or "no") (i.e., "I had condoms immediately available," "I used a condom correctly") ($\alpha = 0.796$). The items were adapted from Anderson et al. [41], and Harman and Amico [31] to measure enacted communication and condom use skills. Behavioral skills scores ranged from 0 to 7 (high scores = 6–7, moderate scores = 3–5, low scores = 0–2).

Demographic Variables

Participants were asked to report their age (in years), gender, race/ethnicity, and sexual identity. Participants could identify their race and ethnicity by selecting from one or more of the following classifications: White or Caucasian, Black or African American, Asian, Native Hawaiian, or Pacific Islander, American Indian or Alaska Native or Latino or Hispanic. For the purposes of analysis, the race/ethnicity variable was categorized into five categories: White or Caucasian, Black or African American, Asian, Latino or Hispanic, and Other.

Data Analysis

Descriptive and multilevel model analyses were conducted using IBM SPSS Statistics for Macintosh [43]. χ^2 tests of association and t-tests were conducted to compare groups (e.g., DSPs vs. offline, and survey participants vs. interview participants). A generalized estimating equation (GEE) was used to assess the impact of both within-persons and between-persons factors on condom use during the first vaginal or anal sexual encounter [36]. Adjusted odds ratios at a significance level of p less than 0.05 were reported. The independent variables in this analysis were venue, information, motivation, and behavioral skills. The outcome variable was condom use. Gender, race/ethnicity and age were covariates. Interactions between venue and each of the IMB variables were also included in the model.

Phase Two: Qualitative Methods

Participant Selection

A subset of men and women who (a) completed the online survey and (b) agreed to future contact were eligible to participate in semi-structured interviews. Eligible Phase One participants were contacted via email with an invitation to participate in Phase Two in following a quota sampling scheme [44] to select diverse participants (n = 20). The aim was to collect data from at least three people for each subgroup (i.e., gender (male or female) and venue in which they met their partner (DSP or offline) [45]. Some participants met at least one partner in each venue (i.e., venue-based strategy of meeting partners) and were classified as "both." These participants could share perspectives about condom use behaviors with partners in both venues. The goal was to have equal numbers of Black, White and Hispanic interview participants; however, a lower proportion of Hispanics expressed willingness to be contacted, resulting in fewer Hispanics being recruited for participation in interviews. Recruitment began in March 2016 and continued until December 2016—when the desired sample size was achieved.

Data Collection

Interviews were conducted using the Zoom web conferencing software. Participants could choose whether to connect to the interview by audio only or to connect using both audio and video. Interviews lasted approximately 37 min (range = 17–82 min) and were conducted by the lead author. A waiver of documentation of informed consent was requested and received from the IRB to maintain the confidentiality of participants. Each interview began with a verbal consent to participate in an online audio-recorded interview. Interviews took place on average 35 days (range = 0–130 days) after the participation in the online survey.

Consistent with the sequential mixed methods study design [33], the interview guide was developed to explain the quantitative results. Interview questions were devised to further (a) explain how information, motivation and behavioral skills contributed to condom use and (b) understand how information, motivation, and behavioral skills may differ based on where participants met their partner(s) and how those differences contributed to condom use. Content and face validity were established by eliciting feedback from colleagues with expertise in qualitative research methods on the degree to which the questions were appropriate to explain the survey results. The interview guide was pre-tested by colleagues to identify problems with comprehension of the questions and to determine whether the questions were addressing the objectives of the study. The interview guide was revised until it was easy to comprehend and all the questions reflected the study research questions. The final interview guide covered the following topics: HIV information, partner-specific information, motivation to use condoms, communication skills, and condom use skills.

Trustworthiness is a measure of rigor in qualitative research that ensures credibility, transferability, dependability, and confirmability [46, 47]. Credibility was achieved through triangulation (e.g., different methods (quantitative and qualitative data), different types of informants (different participants based on venue and gender)), tactics to help ensure honesty in informants, iterative questioning during the interviews, noting thoughts and observations at the end of every interview session, and tracking data

saturation. Data saturation was tracked during the interview process by noting after each interview whether new concepts emerged about each of the a priori codes based on IMB model elements and its relationship to condom use [48, 49]. Data saturation was reached after 12 interviews. Transferability was met by clearly describing and applying the IMB model theory, and providing detailed descriptions of the data collection, data analysis, and verbatim excerpts from the participants' interviews within this manuscript. For dependability, an external audit was conducted by a senior researcher. Confirmability was maintained by portraying the subjective experience of the participants, audit trail and triangulation.

Instrument Informed by the Information Motivation Behavioral Skills Model

The semi-structured interview guide covered three domains related to *information, motivation, and behavioral skills*. The questions related to *information* were focused on understanding the information they knew about STIs (including HIV) and their partner(s). The participants were asked what information they knew about HIV and STIs and how that information influenced their condom use behaviors with their partner(s). The partner-specific information questions sought to understand what type of information the participant knew about their partner and how that information influenced their condom use behaviors. The questions in the *motivation* domain were related to condom attitudes, subjective norms, perceived risks of HIV, STIs, and pregnancy. Questions about *behavioral skills* focused on factors that enabled or prohibited their enactment of behavioral skills (e.g., conversations and behaviors related to condom use and testing). Participants who had partners from both DSPs and offline were asked about their perceived risk of meeting partners on DSPs compared to offline—and how that influenced their decisions to use condoms.

Questions related to each IMB domain were asked about each partner the participant reported as a new sex partner on the survey. Therefore, interview participants who reported more than one new sex partner were asked certain questions multiple times to get responses specific to each partner. Participants were reminded about each partner they reported data for on the survey by telling them the nickname they used to identify that partner on the survey. If that was not enough to help the participant recall their partner, additional details that were reported on the survey about the sexual encounter with that partner were given. These strategies successfully helped with the recall because there were no instances where a participant did not remember. This manner of questioning assisted with the use of the IMB for multiple partners during the qualitative interviews.

Analysis

Audio recordings from all the interviews were professionally transcribed verbatim and checked for accuracy before entry into MAXQDA [50] for qualitative thematic analysis [51]. Each transcript was segmented by a question to ensure consistency in coding. Two coders trained in qualitative data analysis were responsible for coding. A deductive codebook was developed based on the theoretical constructs: information, motivation, and behavioral skills. To refine the codebook, each coder coded a random sample of four transcripts. After several rounds of coding the four transcripts, debriefing meetings were held to resolve discrepancies between coders. With each round of coding and the debriefing meeting, the codebook was revised. The codebook was finalized after there were no more discrepancies in coding the four transcripts. Then, each coder independently coded n = 8 transcripts. An inter-rater reliability score of $\kappa = 0.83$ of was achieved, indicating good inter-rater agreement.

χ^2 tests of independence and independent samples *t*-tests were conducted to determine if any differences between the interview participants and the rest of the sample were statistically significant on the categorical and continuous variables, respectively.

Summaries of coded data from each interview participant were written. Next, a summary was written for each code based on a synopsis of the summaries written for each interview participant. Then all the summaries were grouped by the strategy participants used to meet partners (i.e., DSP only, offline, and both) and a "meta-synthesis" was created for each group. Finally, the meta-synthesis for each group was compared to determine if there were any notable differences. Themes that were apparent in over 50% of transcripts for each code were considered as "most."

Mixed Methods Interpretation

A quote matrix in MAXQDA was utilized to summarize data in a grid format to interpret quantitative and qualitative results simultaneously. Quote matrices were used to interpret mixed data types to provide a richer understanding.

Results

Analysis One: Quantitative

Survey participants' characteristics

Participants' (N = 253) ages ranged from 18 to 29 years ($M = 23.88$, $SD = 3.27$), and more than half of participants were women ($n = 150$, 59.3%). The largest proportion of participants identified as White/Caucasian ($n = 104$, 41.1%)

and 33 participants indicated that they were Hispanic/Latino (13.0%). Many of the participants in the sample identified as heterosexual ($n = 158$, 86.3%). Many participants indicated that they had been tested for HIV in the past 12 months ($n = 126$, 49.8%). Three participants reported they were living with HIV (0.7%). Participant characteristics are reported in Table 1.

Venue

More participants reported meeting their partners offline only ($n = 152$, 60.1%) compared to on DSPs only ($n = 67$, 26.5%), while 34 participants reported meeting partners in both settings (13.4%). Of those who met a partner on a DSP, 84 participants (83.2%) met at least one partner using a mobile device, all of which included geolocation features. χ^2 tests of independence revealed some statistically significant demographic differences based on the venue through which participants met their partners. Specifically, a greater proportion of participants who met their partners online reported their race as White/Caucasian than those who did not ($p = 0.029$).

Condom Use

Less than half of participants (n = 108, 51.9%) indicated that they used a condom from start to finish when they had vaginal or anal sex with their partners for the first time, while a similar number reported not using a condom at all (n = 100, 48.1%) (p = 0.771). Of the participants who met partners offline, 48% reported using a condom during the first vaginal or anal sex encounter, whereas 68% of those who met online and 31% of those who met in both venues reported using a condom (p = 0.001). Of the participants who did not use condoms, 39% indicated they were at least somewhat concerned that pregnancy could occur. Of the participants who did not use condoms, 44% reported using another form of birth control, and 12% reported using emergency contraceptives. A greater proportion of participants who met their partners online reported using condoms compared with those who met their partners offline ($p = 0.003$).

Information Motivation Behavioral Skills

Based on the IMB model, participant scores reflected low HIV knowledge, moderate partner-specific information,

Table 1 Survey participants' characteristics

Characteristic	M	SD
Age	23.88	3.3
Characteristic	n	Percent
Gender		
Male	103	40.7
Female	150	59.3
Race/ethnicity[a]		
Asian	21	8.3
Black/African American	68	26.9
Hispanic/Latino	33	13.0
Other	8	3.2
White/caucasian	104	41.1
Sexual identity		
Heterosexual/straight	158	86.3
Homosexual/gay	2	1.1
Bisexual	18	9.8
Other	5	2.7
Condom use		
No condom use	100	48.1
Condom use	108	51.9
Venue of meeting[b]		
DSP	76	35.2
Offline	140	64.8

[a]Percentages for race/ethnicity may not total 100% because participants were allowed to select more than one option

[b]Venue of meeting does not match the n because this value represents the number of partners reported by all participants

Table 2 Descriptive statistics for information, motivation, and behavioral skills scores

Variable	M	SD	Range
Information	5.96	3.96	0–17
HIV knowledge	0.32	0.96	0–6
Partner-specific information	5.78	3.80	0–11
Motivation	21.10	3.36	8–32
Subjective norms	5.60	1.65	2–8
Attitudes	12.22	3.26	4–20
Perceived vulnerability to HIV	3.27	1.35	2–8
Behavioral skills	3.62	2.07	0–7
Communication skills	2.30	1.74	0–5
Condom use skills	1.34	0.86	0–2

Table 3 Information, motivation, and behavioral skills scores by venue

Variable	DSP		Offline		Sig. (*t* test)
	Mean	*SD*	Mean	*SD*	
Information	5.57	4.25	5.66	4.25	0.86
HIV information	0.49	1.25	0.34	1.04	0.28*
Partner-specific information	5.18	3.87	5.49	3.99	0.49*
Motivation	21.52	3.72	21.27	3.67	0.55
Subjective norms	5.89	1.64	5.76	1.55	0.48*
Attitudes	12.19	3.40	12.17	3.37	0.95
Perceived vulnerability to HIV	3.33	1.48	3.39	1.44	0.73
Behavioral skills	3.84	2.13	3.40	2.19	0.08*
Communication skills	2.37	1.73	2.12	1.87	0.24*
Condom use skills	1.44	0.81	1.28	0.89	0.09*

*$p < 0.05$

moderate motivation, and moderate behavioral skills. A series of t-tests revealed no significant difference in scores based on the venue in which participants met their partner (see Tables 2 and 3).

Results of the GEE are presented in Table 4. The model included information, motivation and behavioral skills, controlled by race, age, gender, and venue. Information and behavioral skills were the only two significant variables in the model. Information was significantly associated with condom use. For every single point increase in information scores, participants are 1.28 times more likely to engage in condomless sex ($p < 0.050$). Behavioral skills scores were statistically significant, indicating that every unit increase in behavioral skills scores, participants are 2.07 times more like to use a condom during sex with a new sex partner ($p < 0.000$). No other variables and none of the interactions were statistically significant.

Analysis Two: Qualitative

Interview participants' characteristics

The ages of interview participants (n = 20) ranged from 19 to 29 years (M = 23.93, *SD* = 3.31). Interview participants mostly identified as White/Caucasian ($n = 9$, 45.0%) or Black/African American ($n = 8$, 40.0%). Almost all interview participants identified as heterosexual ($n = 18$, 90.0%). A large majority of interview participants ($n = 15$, 75.0%) indicated they used a condom from start to finish when they had vaginal or anal sex with their partners for the first time, which differed significantly from the rest of the sample ($p = 0.013$) (see Table 5). The largest proportion of interview participants met their partners offline only ($n = 9$, 45.0%). Finally, interview participants had significantly higher motivation scores ($M = 26.63$, $SD = 3.41$) compared to the broader sample (see Table 6).

Information

Information About HIV and STIs In the qualitative interviews, people seemed to underestimate their HIV knowledge compared to their score on the Brief HIV Knowledge scale. Overall, participants knew that HIV is an incurable sexually transmitted virus. However, few people could provide detailed information about the mechanisms of the disease. Statistically HIV knowledge and condom use were not significantly associated, nevertheless, most people said in their interviews that HIV knowledge *did* influence their condom use behaviors. Knowledge of the how the disease is transmitted, the severity of the illness and methods of transmission prevention (e.g., condom use) seemed to have some bearing on their decisions to use condoms.

> I think [knowledge about HIV] affects [using a condom] a lot because knowing more about it really puts it into perspective…All that knowledge is a really big factor in using condoms because I'm not about to get [HIV]. The fact that it is deadly. It usually ends up in somebody dead. It's not really a fun disease. It wasn't something that I needed. I'm only twenty. I'm just getting started. I don't need to be going anywhere anytime soon." —11, F, age 20, Offline only
>
> I basically know enough to know that I don't want [HIV] and I know how [HIV] works, and how it's spread, and I would do my due diligence and my best to not get it. —01, M, age 27, DSP only

Most people reported some knowledge about STIs. People seemed to know that STIs, for the most part, are curable. However, they could not distinguish the symptoms of various STIs.

Table 4 Generalized estimating equation of factors associated with condom use between new sex partners including interaction effects of venue

Variable	β	SE	Odds ratio	Lower bound	Upper bound	Sig.
Intercept	− 0.87	1.72	0.42	0.01	12.24	0.61
Venue of meeting (Offline)	2.28	2.25	9.73	0.12	798.61	0.31
Gender (male)	0.55	0.32	1.72	0.92	3.24	0.09
Age (25–29)	− 0.05	0.35	0.96	0.49	1.88	0.90
Race/ethnicity [White (non-Hispanic)]						
Asian	− 0.03	0.40	0.97	0.44	2.12	0.93
Black (non-Hispanic)	0.51	0.46	1.66	0.68	4.09	0.27
Hispanic/Latino	− 0.24	0.52	0.79	0.28	2.20	0.65
Other	− 0.08	0.71	0.92	0.23	3.72	0.91
Information	− 0.25	0.10	0.78	0.64	0.94	0.01*
Motivation	− 0.02	0.07	0.98	0.85	1.12	0.72
Behavioral skills	0.73	0.19	2.07	1.41	3.02	0.00*
Information × venue of meeting	0.05	0.12	1.05	0.84	1.33	0.66
Motivation × venue of meeting	− 0.11	0.09	0.90	0.75	1.07	0.24
Behavioral skills × venue of meeting	− 0.03	0.24	0.97	0.60	1.57	0.90

Quasi Likelihood under Corrected Independence Model Criterion (QIC) = 309.216 N = 254

*$p < 0.05$

> You don't know what the other person has. So, all of that is like Russian roulette. You don't know what you're going to get, so it's best that you just don't get it at all. I know gonorrhea, syphilis and all that, they're curable. Herpes isn't, you know. I'm better off being safe with all three, and by treating everybody the same [in terms of condom use]. —01, M, age 27, DSP only
>
> Yeah, they [STIs] may not kill you, but they're still uncomfortable. I know there's genital scratching, and itching, and discoloration that nobody really wants. Not exactly something anyone looks forward to. —11, F, age 20, Offline only

There were a few incidents when deficits in the participant's knowledge about HIV or STIs emerged, as shown below. One young woman explained that she did not perceive herself to be at increased risk of an STI because she and her partner engaged in anal sex. The deficit in her knowledge is the idea that STIs cannot be passed via anal sex, possibly resulting in unintended exposure to STIs and HIV.

> I just think because it wasn't vaginal sex that it [STIs] was not really much of a concern. I think it's [STIs] more [transmitted] vaginally [than anal]. —03, F, age 23, DSP only

Another young woman showed some deficits in her knowledge about how HIV testing is conducted because she thought that any blood work equaled HIV testing.

> I just went to the doctor, they drew my blood, and I'm assuming the stuff on the tests they would ask for HIV. What else do they draw your blood for? I guess there's other stuff that they draw your blood for. —13, F, age 22, Offline only

Partner-specific information Many participants remarked that they did not know their partners, although their scores on the partner-specific information scales indicated that they knew a moderate level of information about their partners. The perceived lack of familiarity about their partners influenced their condom use decisions. It seems like heuristics—simple decisions rules about whether or not a partner is a risk for HIV—influenced their condom use decision. "Known partners are safe" is a heuristic common for established couples; however, it seems that the heuristic for these participants with new partners was "unknown partners are unsafe." At the time of first sex, participants had little foresight about the direction of their relationship with their new partner and wanted to protect themselves from any negative outcomes.

> You got to be safe [in reference to condom use] until you comfortably know what is up with her. —08 M, age 29, DSP only
>
> I didn't know who she was going to be in my life and if I slept with her once and then didn't talk to her again, that like those things don't matter to me because… well it matters to me a little bit, but I didn't feel like it was going to put me at any risk like any permanent… you know, I knew I was going to use a condom and so if like a… it didn't quite ma… yeah, it didn't really matter. —05, M, age 26, DSP only

For some topics (e.g., HIV status, drug use), some participants seemed to gather information about their partners

Table 5 Comparison of survey participants characteristics without and with interview

Characteristic	Survey participants without interview N = 233		Survey participants with interview N = 20		Sig. (*t*-test)
	M	SD	M	SD	
Age	23.35	3.01	23.93	3.31	0.45
Characteristic	n	Percent	n	Percent	Sig. (χ^2)
Gender					0.38
Male	93	36.9	10	50.0	
Female	140	60.1	10	50.0	
Race/ethnicity					
Asian	21	9.0	0	0.0	0.10
Black/African American	60	25.8	8	40.0	0.64
White/Caucasian	95	40.8	9	45.0	0.36
Hispanic/Latino	29	12.4	4	20.0	0.73
Other	7	3.0	1	5.0	0.86
Sexual identity					0.08
Heterosexual/straight	150	86.2	18	90.00	
Homosexual/gay	2	1.2	0	0.00	
Bisexual	18	10.3	0	0.00	
Other	4	2.3	2	10.00	
Condom use					0.01*
No condom use	96	50.8	6	30.0	
Condom use	93	49.2	14	70.0	
Venue-based strategy of meeting					0.31
Offline only	143	61.4	9	45.0	
DSP only	59	25.3	8	40.0	
Both	31	13.3	3	15.0	

[a]Percentages for race/ethnicity may not total 100% because participants were allowed to select more than one option

[b]The values for venue of meeting are not equivalent to the number of participants because these values represent all the partners each participant reported

*$p < 0.05$

through interactive communication—directly engaging in dialog with their partner. Some respondents initiated these conversations. However, for most topics participants had no strategy for gathering information about their partner because they either assumed the details based on the personality of their partner or they did not want to know the information. For instance, participants who did not seek information about their partner's number of past partners thought it was not their business and it was an invasive question to ask a new partner.

> In terms of sexual health, that's really none of my business. You know what I mean? When you start to talk to people about what you've been in the past… Especially as a female, it starts to shape what you think about her and stuff like that. I didn't want… I don't ever want to change my opinion about somebody based off their past because I wouldn't really want them to change their opinion about me about my past. My past is not who I am today. All of that stuff is pretty much irrelevant, so I don't really talk to people about how many people they had sex with or anything like that because it doesn't have any bearing on our relationship, you know? —14, M, age 23, Offline only

> We'd only recently started dating. It was something that I just didn't really ask. I only recently asked him how many sexual partners he's had. I generally don't ask them until later on. Until we get to know each other more. I guess I don't want to seem invasive I think, and I don't want it to seem like I'm… I don't know. I just don't want to seem invasive I think. —19, F, age 22, Both

Motivations for not seeking information about their partner emerged when participants were asked to discuss their thoughts about the risk their partner posed to them for HIV.

Table 6 Comparison of survey participants information, motivation, and behavioral skills scores without and with interview

Variable	Survey participants without interview		Survey participants with interview		Sig. (*t*-test)
	M	SD	M	SD	
Information	5.69	4.25	5.17	4.11	0.50
HIV knowledge	0.32	0.96	0.35	0.97	0.82
Partner-specific information	5.42	3.94	4.71	3.91	0.32
Motivation	21.21	3.49	22.63	3.41	0.02*
Subjective norms	5.75	1.59	6.23	1.46	0.09
Attitudes	12.08	3.36	12.94	3.36	0.15
Perceived vulnerability to HIV	3.35	1.46	3.46	1.42	0.69
Behavioral skills	3.55	2.18	3.76	2.18	0.59
Communication skills	2.24	1.81	2.09	1.88	0.64
Condom use skills	1.31	0.87	1.62	0.70	0.05

*$p < 0.05$

Some people chose not to gather information about their partner's HIV status because they assumed that their partner would have told them if they were living with HIV.

> I would like to think if she had it [HIV], she would have disclosed it, but there are some people in this world who would not have disclosed it, so yeah, there's that. I think I could sue them actually if they don't disclose it [a positive HIV status]. —16, M, age 20, Offline only
>
> Like I was saying, if she posed some type of risk I would hope she would have said something because that's really F'd up. If she would just have something and not say anything you know what I mean? —14, M, age 23, Offline only

Some of the information that participants assumed about their partner, such as perceptions that their partners are "clean," have similar social networks, or "good" personalities, represent implicit theories. Implicit theories connect a person's partner's personality or demeanor to risks about HIV. Some people admitted that this type of information eased their mind when having sex with their partner for the first time. For instance, one male who had a mutual friend with his partner whom he met on Tinder shared this:

> Then I hit up the friend, and she was like "Yeah, yeah. She's a really good girl." I kind of had like… I got a thumbs up from a different source. I will say this. Nothing reduces the risk. It's just going to ease your mind. Because the risk is like… If the risk is there, the risk is there. The risk is always there, it's just how willing you are to take the risk. It reduces the, it makes it easier to take that risk. —01, M, age 27, DSP only

The information construct seemed to be influential for condom use in three ways. First, knowledge about the severity of HIV influenced their decisions to use condoms because they knew condom use is a prevention method. Secondly, although many participants reported that partner-specific information did not affect their condom use behaviors, their decisions to use a condom for their first sexual encounter with a new partner seemed to be influenced by unfamiliarity or limited information about their partner. Lastly, it emerged that implicit theories shaped their thoughts about the perceived risks their partners posed to them. However, these theories seem not to have as much weight as the heuristic at the time of first sex, but may be important for subsequent encounters.

There were no notable differences in information participants had about HIV, condom use, or their partners based on the venues in which people met their partners.

Motivation

Attitudes About Condom Use Most participants perceived condom use as necessary when having sex with a new partner and they routinely used condoms with new or all partners. However, a few participants did mention that they did not like or prefer using condoms.

> I don't really like to use [condoms], but I know it's something that you have to do when you're first getting to know somebody. It's like, you just… standard protocol, you use condoms in the beginning —06, F, age 22, Offline
>
> In general, I think you should use condoms. With whoever you're sleeping with. He was still somebody new. If it's somebody new, the first time, I always use a condom. —02, F, age 29, DSP only

Some participants indicated that using a condom is good practice until they get to know their partner or until there is some form of relationship commitment.

> [Using a condom] was like more sexual STD prevention, but maybe just like a formality or I don't know, just like this person's new to me and if we keep on sleeping with each other, yeah, we could talk about not using one, but just the first time I don't know. —05, M, age 26, DSP only
>
> I feel that if you are in a committed relationship and you know the other person's status, then you don't really need them. If you're hooking up a lot, then you should use them. —08, M, age 21, DSP only

Subjective Norms When asked how their partner(s) influenced their decisions to use condoms, most respondents said that their partner's views on condom use did not influence their decision to use a condom. Many of the respondents made the decision to use a condom independently of their partner. If they did have a conversation about condom use, the partner's thoughts only confirmed or supported the respondent's intention.

> If he said that [he didn't want to use a condom]: I didn't want to do that [not use a condom] I would be like 'I'm not doing that,' that's just my personality, so. —12, F, age 24, Offline only
> Well, the first time, he wanted them [condoms] too, because we don't know each other that well. — 11, F, age 20, Offline only
> That's the first time. I don't know her, like… You know what I'm saying?…She was adamant we use a condom anyway. —01, M, age 27, DSP only

However, one participant expressed that he made his decision to use condoms partly to sway how his partner would perceive him, reflecting impression management.

> I mean, some of it maybe was showing her that I was responsible and wasn't just trying to get it on and do it however that felt the best way. It was like yeah, I use protection and so yeah. Some of it maybe was to just show her that I'm not going to meet someone for the first time and sleep with them without a condom. I guess like keeping my own like saving face or keeping face. I don't know. —05, M, age 26, DSP only

One participant said that she left the decision to use a condom up to her partner.

> The first [time] we did, but since…We did for a few months, but since we're only talking about that first instance, we did but it wasn't as intentional as it could've been. It was just more of his routine… Whatever he wants to do, that's what I'm going to do. —15, F, Offline only

In the cases where couples did not use condoms, they either mutually decided not to use condoms, or they felt that their partner would have objected to condomless sex if they truly wanted to use a condom.

> He just said he doesn't like the way it feels, it's not the same, and I agreed. —03, F, age 23, DSP only
> When we were about to do it and stuff, she didn't say anything to me— Like she wanted to use it… When it came down to that moment, she didn't say nothing. She didn't say "Oh, hold up. Go get a condom. What are you doing?" —14, M, age 23, Offline only

Perceived Risk of HIV and STIs Most participants did not view their partner as increasing their risk to HIV because they assumed their partner was "clean" or they had "evidence" that their partner did not have HIV or STIs.

> I don't want to say that I judge people, but if someone comes up to you and they're fresh-looking, they show you their place, and it's super clean, you're going to assume that they're clean. Does that make sense? I don't know. Usually, you could spot if someone has something and what it looks like. I don't want to say I'm highly educated on sexual health, but I do know if something looks out of the ordinary and it's not a pimple, it has to be something else. If it looks like a sore, then you probably have something. —19, F, age 22, Both
> Yeah…we got tested [before we had sex for the first time], and I trust him. I don't see him as being a risky type of person. Yeah, I had no real reason to think that he had anything, or that he would give me anything, or nothing like that. —13, F, age 22, Offline only

In cases where people felt vulnerable, it was because of the partners' past sexual health history, their partner's reputation or drug use, or their beliefs about the prevalence of STIs in their area.

> In the past, he had some STD and I just felt unsafe, so I just said that he needs to do it [use a condom]. —18, F, age 21, Both
> He's had a lot of partners. I don't know if I'm being told the truth all the time. I guess anyone who's had multiple partners is at a moderate risk. There's other things, like STDs. The test was only for HIV, so I don't know. I am a worrier, despite my actions, and I feel that if maybe something is dormant, a disease, and then being there, but not being diagnosed by the doctor because it just happened or something, there's always that chance too. —03, F, age 23, DSP only
> At least here [omitted for privacy] where I live, there was a breakout of chlamydia last year, and that was within specifically the [omitted for privacy]. That's why I just say yeah, there's probably a risk [that my partner could have a STI]. —19, F, age 22, Both

Perceived Risk of Pregnancy It emerged from the data that for many of the participants, pregnancy prevention was a motivating factor for using a condom—stating that they were "not ready" to become a parent. The participants acknowledged that they were at risk of becoming pregnant if they did not use a condom during sex.

> I want to protect myself because I am not ready yet. I am too young. I was like, "No way." I was not going to get pregnant at this age. —11, F, age 20, Offline only

> [I use condoms] Mostly to not get the person pregnant. I mean, STD's are on the list, but they're not high on the list because I know a lot of them are treatable, or at least not terrible, but if they're pregnant, that's one thing where I'm rather young, and I'd rather not have to be a baby daddy so young. —16, M, age 20, Offline only

In the case that people did not use condoms or did not use a condom from start to finish of sex, they felt that pregnancy was of no concern, or little concern, due to the particular circumstances of their sexual encounter with their partner. This often occurred when participants felt they were taking actions, albeit not effective, to reduce the likelihood of pregnancy – such as putting on a condom before ejaculation or "pulling out." Although these methods are less effective methods of pregnancy prevention, participants felt their actions were enough to warrant no, or little, concern about pregnancy.

> I would only not use a condom for the first few minutes. We would start without a condom and then a little bit into it I'd put one on so I didn't feel [concerned about pregnancy]. —05, M, age 26, DSP only
>
> I think because he didn't cum inside me, he came on me that I felt like, okay, I'm not going to get pregnant. —07, F, age 22, DSP only
>
> I pulled out. I know in order to get someone pregnant it usually takes a bunch of times of trying to get pregnant, usually. I mean, not always, obviously, so I figured this one time it was a low chance of her getting pregnant. —20, M, age 20, Both

Condom use was a "backup method" for some people who used other forms of birth control.

> Even though, yeah, the birth control, I take it religiously. It's very effective, plus a condom. You just never know. There's always that weird little risk… I'm just not interested in having kids so I wouldn't want to be put in a situation where I get pregnant. —03, F, age 23, DSP only

However, only one person stated that he did not have a condom available and he felt comfortable not using a condom because he knew his partner was on birth control.

> So, we were in my car and I didn't have anything on me. That's just not something I really ever keep on me. I don't ever really have condoms…Like I said, it wasn't planned because we had never had sex before. It just went there and I didn't have anything on me, and she told me before she was on birth control. And because I knew she was on birth control…I'm thinking, 'She's covered. She's on birth control so its okay.' So I didn't really have nothing to worry about. I wasn't really too concerned about getting her pregnant because one, she's on birth control. —14, M, age 23, Offline only

Perceived Risk of DSP Partners Of the people who met partners in both locations, they felt that venue had no impact on their decision to use condoms. They believed that if the risk is there, the risk is there no matter where you met.

> I mean, having sex with anybody is risky, alright? I'm just thinking "Yo. The same way she liked my picture, she could have like fifty other people's pictures." With that same reasoning, the same way I got a girl's number at a club, she could have gave the number to fifty other dudes. It's just your preference. I just put like "Yeah. It's a high risk." No matter what. —01, M, age 27, DSP only
>
> I think they both pose equal risk. I think that people in general, no matter which way you met them, in person or on Tinder, I think that it doesn't really matter. I think just people might pose a risk. I've met a lot of really nice guys off of Tinder and I met a lot of creeps in real life too, so it's hard to say which is riskier. I just think that it doesn't really have an effect on it. —19, F, age 22, Both

Overall, there seemed to be a sentiment that condom use is necessary for new sexual relationships. Pregnancy prevention seemed to be the greatest motivating factor for condom use. Participants mentioned avoidance of STIs and HIV was a motivating factor to use condoms, but most did not feel susceptible to contracting STIs including HIV from the partners with whom they had sex.

Additionally, there were no outstanding differences in motivation to use condoms based on the venues in which people met their partners because all participants had similar attitudes and perceptions of vulnerability to pregnancy and HIV.

Behavioral Skills

Enacted Condom Use Communication Skills Most people discussed condom use before their first sexual encounter with their partner, but it was typically only a brief conversation at the moment and usually to ask the location of condoms or ask permission to get a condom. Usually, the decision to use a condom was made by the inquiring party before any brief communication about condoms. Based on the participants description of the conversation about condom use, the partner seemed to know that a condom would be used for sex at the moment the participant said they were going to get a condom, asked where the condom was or when the condom was retrieved.

> I was just like, "Hey, I need to get a condom." Then just whipped it out. —19, F, age 22, Both
> While it was happening, I mean. She asked before it happened, she asked if I had a condom. That's how I knew I was having sex. —01, M, age 27, DSP only

The last quote signals a deeper issue of a lack of communication about decisions to have sex in general, which could make communication about condom use difficult.

Those who had conversations about sex before having sex said they were comfortable or felt it was a necessary conversation.

> We talked about it. I brought that [condoms] up, and I said I'd be more comfortable if we used protection, and he agreed. He said that's whatever I want. He's kind of a "go with the flow" type of guy, even though he is that rugged type. —03, F, age 23, DSP only
> We just talked about it from the beginning. I'm really open about sex. I don't allow the nitty–gritty details to make it awkward because, if you do, that's when condoms aren't used, and people don't get tested and all that stupid bullshit. If you're upfront about it, to begin with without being nervous, it tends to create fewer issues. —18, F, age 21, Both

However, those who did not discuss condoms felt that no discussion was necessary because the decision to use condoms was already made, or there was discomfort with discussing condom use or because sex was unexpected (e.g., not planned before meeting). However, sometimes despite the absence of a condom discussion, they used a condom.

> That's [talking about condom use] just not something I really do. I just leave it up to them. It's just like an unspoken thing. You know in the beginning, you're going to use condoms, and if they are going to use it, they pull it out, and you use it. It's not really something that you really need to talk about. —13, F, age 22, Offline only
> I don't know. I think it's just one of those things where you don't necessarily casually bring it up. It was maybe a bit sudden, but I think when she saw that I was putting it on she was like, "Oh, okay." She was understanding of that. —16, M, age 20, Offline only

HIV Testing Skills Some people either had proof of their partner's HIV test results (exchanged test results or viewed the results of their partner's test) or got tested together before having sex for the first time with their partner. Although they exchanged or discussed test results, or got tested together, most of the participants still used a condom for the first sexual encounter.

> I go every year, and I get checked. I knew that I didn't have anything, and then he was also checked, so I knew that he didn't have anything. We both got checked together. —10, F, age 21, Offline only
> I asked him for a thing from his doctor saying he was HIV free. The letter actually didn't say a date so I wasn't really sure [when he was tested]…I just assumed it was recently. —03, F, age 23, DSP only

Some others asked their partner about their HIV status or ask about their HIV test results without actual verification to substantiate their self-reported status. According to the survey results, 45.1% (n = 158) knew their partner's HIV status.

> She do a medical, and you do a medical, and you come together and say, "Okay, everything is fine. —08 M, age 29, DSP only
> I asked her, "Are you HIV positive?" She responded, "No.—09, M, age 19, Offline only"

However, of those who said they knew their partner's HIV status, only 68.9% (n = 102) of those people knew the last time their partner was tested for HIV. Participants made several assumptions about their partner and HIV testing—including assumptions that their partner was tested for HIV, although it was not explicitly stated.

> Well, to even get into pharmacy school, they test you for HIV. So, I just assumed because he got into the program that he was clean… Because we're in a health program, you have to get certain shots and stuff. I'm assuming that, in order for him to get into the program that, and same thing for me, we had to get our blood drawn, and that they would have taken or given us a HIV test. —13, F, age 22, Offline only

Enacted Condom Use Skills All but one person who had a condom available used a condom, implying that having a condom available is critical for condom use. The male partner often supplied the condom. However, when a male participant was responding, it was unclear if their female partner had condoms available, too.

> The guy just gets the condom. You just do it. You already have it underneath the pillow waiting. I always put it underneath either their pillow or my pillow. I just put it under there quick. —17, M, age 24, Offline only
> I had them at my house, yeah. He used the ones I had, yeah. —04, F, age 23, Online

There was only one instance where a condom was available, but they decided not to use the condom. Usually, if participants did not use a condom, they did not have one available.

> I didn't intend on having sex when I left for the night, but by that time all the stores around me were closed.

> Yeah, the stores were closed and I was too drunk to drive, so I wasn't going to go get a condom. —20, M, age 20, Both
>
> I didn't have condoms on me. Because it was kind of like a random situation. —14, M, age 23, Offline

One woman stated that she keeps condoms at home, but does not carry condoms with her in public. However, the majority of women felt that men were responsible for obtaining and carrying condoms.

> He had them. I don't buy condoms. I don't think that's really my job or anything like that. The guy is supposed to have the condoms. —13, F, age 22, Offline only
>
> I just know that guys mostly carry them around, whether or not it's their responsibility. I'll bring them if they ask. It's no problem for me, but they just generally seem to have them more than… —11, F, age 20, Offline only

Such views may make women particularly vulnerable to condomless sex, because if their male counterpart is not carrying a condom, then a condom may not be available for the sexual encounter. This is especially concerning in light of our findings suggest that the availability of a condom may be an important determinant of condom use.

Having a condom available was critical for condom use. However, communication about condoms did not seem to have a major influence on condom use because most often when they did communicate about condoms, they were not communicating to decide on condom use, but rather announcing the desire to retrieve a condom or asking where they could find a condom. More participants who met partner's offline mentioned not communicating about condom use before sex than participants who met at least one partner online. On the other hand, there seemed to be no other differences in non-communication-related condom use skills (i.e. condom use skills such as having a condom available) based on venues in which participants met partners.

Interpretation of Quantitative and Qualitative Findings of the IMB Model for New Sex Partners

Overall, the findings suggest information about HIV and condom use as a prevention method may influence condom use—albeit insufficient (see Fig. 2). The heuristic "unknown partners are unsafe" may motivate a person to use condoms with a new partner. Attitudes that condoms should be used with a new partner may influence a person to be prepared for sex by having a condom available. Additionally, motivations to prevent consequences, such as pregnancy, may influence condom use skills and condom use. Behavioral skills were found in the quantitative analysis to be significantly associated with condom use. The qualitative findings supported that specifically, having a condom available was important for condom use behaviors. Note that venue is not in the figure because neither the quantitative or qualitative findings

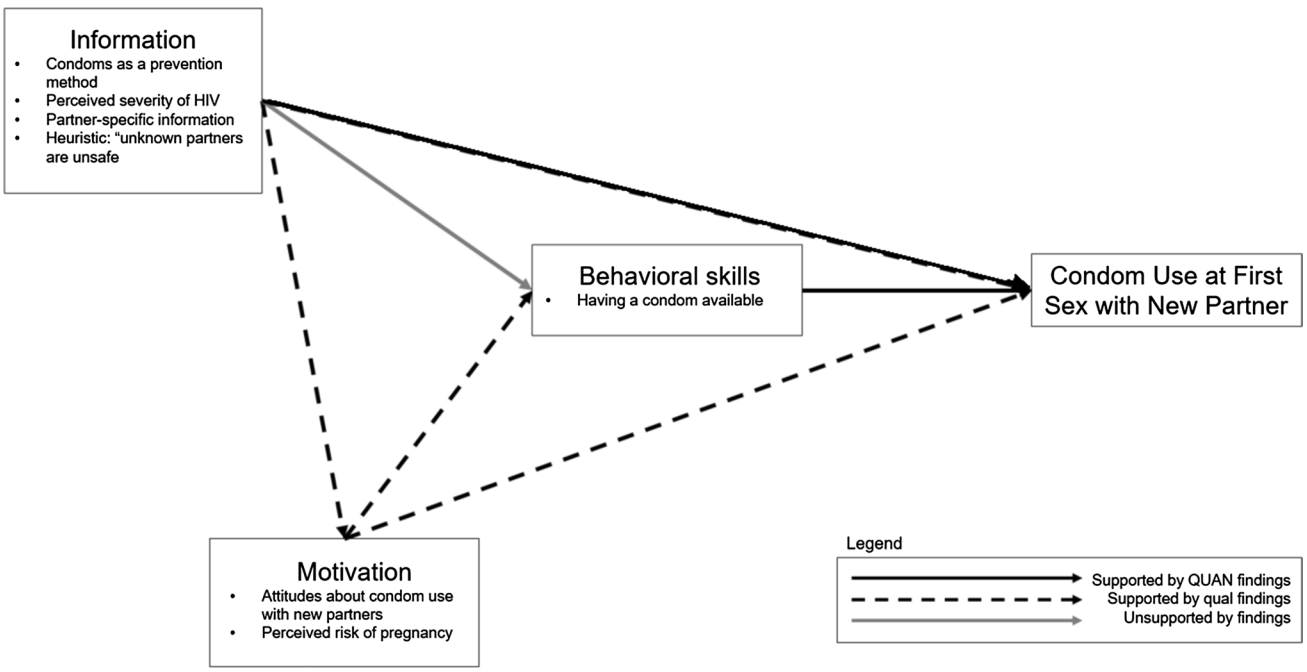

Fig. 2 Information, motivation, behavioral skills model for new sex partners

supported differences in condom use based on the venue in which participants met their partners.

Discussion

This mixed methods study sought to understand the relationship between the IMB model for HIV preventive behavior constructs and condom use, and also whether the venue that emerging adults met their sex partners contributed to differences in condom use. Based on the quantitative findings, information and behavioral skills were the only constructs from the IMB model that had a statistically significant association with condom use. Venue of meeting was not significantly associated with condom use. Therefore, the venue of meeting did not have an impact of condom use, but rather the participant's information and behavioral skills. The qualitative findings supported that condom use skills, specifically having a condom immediately available, were important for condom use during the first sexual encounter among new emerging adult sex partners. However, the qualitative findings suggest that specific aspects of information (e.g., heuristics) and motivation (e.g., condom use attitudes and pregnancy prevention) constructs of the IMB model are also influential for condom use. For instance, heuristics, attitudes about condom use, and pregnancy prevention influence a person's decision to have condoms available and use condoms for the first sexual encounter with a new partner. Similar to the quantitative findings, there was no evidence to suggest that meeting venue contributed to differences in the relationship between the IMB model constructs and condom use.

Our qualitative findings suggest that heuristics influence condom use. Previous research indicated that the heuristic "known partners are safe" interferes with condom use in close relationships [30, 52] because feelings of familiarity can lead to judgments of lower HIV risk [30, 53]. However, our findings highlight that there is some value—regarding condom use in new sexual relationships—in not knowing one's partner because the unfamiliarity with their partner made the participants feel that they could not take a risk that might lead to negative outcomes (i.e., pregnancy or STIs). When strangers meet they will attempt to gain information about the person to better understand how to interact with that person (e.g. to use a condom or not) [54]. Our qualitative findings suggest that some people did not want to find out some risk-related information about their partner, which may be counter to the theory. Nevertheless, it may be beneficial to advocate the heuristic "unknown partners are unsafe," because this heuristic influenced motivations to use condoms with new partners. However, it should not be assumed that the converse heuristic "known partners are safe" is true, because it not necessarily true and may place people at risk for HIV.

Our qualitative findings highlight that some emerging adults may have the attitude that condoms must be used for sex with new partners. Condom use at first sex may be a normative behavior for emerging adults engaging in heterosexual sex, although it is acknowledged that there are some instances where condoms are not used. Misovich et al. [30] theorized that impression management—a person's attempt to control others' judgments and impressions of them [55]—might negatively influence condom use behaviors in close relationships. A recent study also found that impression management was one reason why heterosexuals who met their partners online did not use condoms [56]. However, there was only one interview participant who described condom use for impression management. Nevertheless, attitudes about condom use in new sexual relationships seemed to supersede knowing certain information about their partner—even if they inquired and learned that their partner was low risk. The quantitative findings suggested that with more partner-specific information, there is a higher likelihood of condomless sex. It may be beneficial that the interview participants' attitudes about the importance of using condoms with new partners outweighed any information they may have learned about their partner. Often the interview participants' did not verify the information they acquired or they made assumptions based on unrelated statements their partners made, on the partner's personality, or the partner's social associations [57]. These assumptions could be dangerous because research has shown that a person's perception of their partner's risk is often inaccurate [58]. Research has suggested that condom use wanes over the course of a relationship [59–63], however, there is limited research to help understand how condom discontinuation occurs [63]. Future research may consider exploring when attitudes about condom use with new partners change by investigating sex encounters longitudinally.

Based on the findings of motivations to use condoms, there may be some implications for social normative interventions to promote condom use among emerging adults with new partners. Social normative interventions are a form of health promotion that addresses the correction of misperceptions about the prevalence or attitudes or behaviors in a population or group [64, 65]. This approach may be helpful for decreasing condomless sex among emerging adults with new partners because perhaps their deficits in information and motivation are fueled by misperceptions about the standard behavior (condom use) with new partners. A universal social normative intervention (i.e. focus on all members of a population) [66], such as social norms marketing campaigns, either implemented on DSPs or offline (e.g., billboards and television ads), can promote messages about condom use with new partners to correct the misperceptions of emerging

adults who do not use condoms at all, or consistently with new partners. Since this research only collected data about the first sexual encounter, it may be important to conduct further studies to determine if and how the information, motivation and behavioral skills determinants change over time (i.e. with more sexual encounters or as the relationship progresses) and become less effective for promoting condom use.

In this study, the qualitative data were meant to explain the quantitative findings further—meaning that when new information emerged in the qualitative interviews, there was no corresponding quantitative data. This is a limitation of the study design. Therefore, when pregnancy prevention emerged from the qualitative data as a major motivator for condom use, there was no corresponding data to be used to determine whether pregnancy prevention motivation had a statistical influence on condom use. Nonetheless, this study underscores the importance of including pregnancy motivations in HIV prevention research for people engaging in heterosexual sex. Previous applications of the IMB model for HIV prevention among heterosexual couples have neglected this determinant, as well [31]. Future research should consider the implications of dual protection (i.e., the use of condoms and another form of contraceptive) [67–71] and pregnancy ambivalence (i.e., conflicted, indifferent or wavering attitudes and feelings about pregnancy) [72, 73] for condom use. Further research within the context of new sexual relationships could be conducted to understand how people who do not use condoms with new partners contend with the possibility of an unintended pregnancy. Researchers focused on HIV and STI prevention cannot, and should not, ignore the important motivating role of pregnancy prevention.

Based on our mixed methods findings, behavioral skills, specifically having a condom immediately available, appear to be important for condom use among emerging adults who meet partners on DSPs, offline, or both. In this study, one of the ways condom use skills were defined was by having a condom immediately available for sex. Enacting skills such as obtaining a condom and having a condom at the time of sex are important preparatory skills for condom use, but not sufficient for condom use. Bryan, Fisher, & Fisher [42] presumed that some social and psychological factors might play a role in the enactment of skills. For instance, it is possible for a woman to use a condom with a partner without actually enacting any condom use skills, which parallels our findings that most men provided condoms and women did not carry condoms. This may reflect that sexual scripts about the roles partners play in sex may influence condom use skills [74]. Additionally, intentions to have sex or to use a condom may influence condom use skills for people who do not use a condom. In our qualitative sample, people who did not use a condom did not intend on having sex or intend on bringing condoms with them, so a condom was not used when they had sex. Therefore, public health messaging should encourage people to have condoms available. Previous studies found that young women relied on male partners to initiate condom use [74, 75], which aligns with our qualitative finding that women in this study tended to rely on men to supply condoms and initiate condom use. Public health messages should emphasize to women that they play a role in condom use, too—they can purchase condoms, carry a condom and insist on condom use.

Our findings suggest that the configuration of IMB model for new partners is similar to the original IMB model, but some of the determinants for each construct still differ from both the original IMB model and RELO-IMB model (e.g., specific heuristics, pregnancy prevention, attitudes about condom use with new partners). Further testing is warranted to determine if the proposed model presented here based on our quantitative and qualitative findings, holds up statistically for new partners. Nevertheless, the RELO-IMB model may be a good model to prevent the declines in condom use that are expected as a relationship progresses [60, 61].

This study is not without limitations; however, we tried to mitigate the effects of these limitations whenever possible. We allowed participants to report on behaviors of up to three of their new partners. This enabled us to combat some of the issues related to self-report and recall bias. The qualitative phase may have lessened the impact of self-report and recall bias because we were able to cross-reference the interview participant's survey responses during the qualitative interview and probe the participant for clarification of their responses. For the qualitative interviews, participants could choose between video and audio-only interviews, and there may have been differences in interviews based on the interview mode. Our qualitative interview sample was the statistically significant difference in the number of people who used condoms compared to the quantitative sample, meaning that our qualitative sample had a significantly higher percentage of people who used condoms than the survey sample. Consequently, the qualitative results may be biased toward perspectives from people who used condoms.

Despite the limitations of this study, there are several notable strengths. This mixed methods study revealed new insights on determinants related to heterosexual HIV transmission prevention that has not been captured in previous quantitative applications of the IMB model. Additionally, this study provides insights for future applications of the IMB model for reducing unintended pregnancy and STIs, including HIV among new partners. Furthermore, this is the first study to use qualitative methods to understand factors related to condom use among people who meet new partners on DSPs compared to offline.

In conclusion, we found no substantial evidence that condom use behaviors differ based on where people meet their partners (e.g., DSP or offline). However, we did identify that

the IMB model determinants for new relationships are different than those of established relationships. Prevention efforts focusing on new partners should consider advocating the heuristic "unknown partners are unsafe," promoting attitudes about condom use with new partners, pregnancy prevention motivation and having condoms available for sex. These strategies can be applied to both venues to reduce the likelihood of condomless sex. These strategies may be helpful in reducing the overall incidence of STIs, HIV and unintended pregnancy experienced by emerging adults throughout their sexual pursuits.

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Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the Institutional Review Board of the University of South Florida and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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