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The Role of Critical Self-Reflection on Assumptions in Changes in Sexual Beliefs and Behaviors by Men Who Use the Internet to Seek Sex with Men

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Abstract

The Men's INternet Study II is a randomized controlled trial to develop and test an Internet-based HIV prevention interventions for men who use the Internet to seek sex with men in the USA. In 2008, men who use the Internet to seek sex with men ($N=650$) were randomized to an online, interactive, sexual risk-reduction intervention or to a waitlist null control. After three months, participants in both conditions reported varying degrees of change in sexual beliefs or behaviors. This mixed-methods study sought to understand why these changes occurred. Responses to five open-ended questions were coded thematically. Level of critical self-reflection on assumptions appears to explain the differences in changes between and within intervention and control participants. When developing HIV-prevention interventions, researchers and practitioners are encouraged to include activities in their curriculum that foster critical self-reflection on assumptions.

In the United States, men who have sex with men (MSM) remain at high risk for HIV/STIs,^{1,2} and men who use the Internet to seek sex with men (MISM) appear to have a high incidence of these infections.^{3–5} To address the HIV/STI prevention needs of MISM, our study team developed *Sexpulse*, an Internet-based HIV prevention intervention tailored for MISM. *Sexpulse* was designed and tested through the Men's INternet Study II (MINTS II), an NIMH-funded randomized control trial (RCT)⁶ (B.R.S. Rosser, J. M. Oakes, J. Konstan, et al., in preparation). At three-month follow-up, participants were asked about their sexual beliefs and behaviors. An analysis of participant responses revealed that men in both the intervention and control condition reported cognitive and behavioral changes (B.R.S. Rosser, J. M. Oakes, J. Konstan, et al., in preparation). The purpose of this paper is to understand why these changes occurred and, more importantly, to identify the mechanism responsible for instigating change.

Health education, as a profession, relies on theories or models to explain changes in participants' sexual beliefs and behaviors.⁷ While there are a number of practical theories for designing or evaluating an intervention, the AIDS risk reduction model (ARRM) was developed specifically to explain those factors contributing to behavioral change in MSM.⁸ According to ARRM, behavior change is a three-stage process: 1) a man must label his sexual behavior as risky, 2) he must commit to changing these behaviors, and 3) he must enact those changes to which he has committed.⁹ In recent years, ARRM has been found to successfully predict risk behavior in a variety of at-risk groups including, injection drug

users,^{10–13} HIV-positive persons,¹⁴ and high-risk heterosexual men and women.^{15–17} A meta-analysis of interventions aimed at reducing unprotected sex among people living with HIV, provides support for several ARRM constructs.¹⁴ Specifically, unprotected sex was found to be more common among people with less knowledge about the risks of HIV and modes of transmission, low commitment to practice safer sex for themselves or others, little belief in their ability to enact safer sex practices, and difficulty discussing safer sex with their partners. Because *Sexpulse* was designed to address many of these factors, we concluded that ARRM would provide a good theoretical framework for this analysis.

However, while ARRM provides a useful outline for the preconditions and stages of change, the model does not provide an adequate commentary of why someone would label his behavior as risky – what catalyst causes an individual to examine the beliefs and assumptions behind his actions? The answer, perhaps, comes from Education. Critical self-reflection of assumptions (CSRA),¹⁸ a component of Transformational Learning Theory,¹⁹ complements ARRM, offering a plausible explanation for this process. CSRA is defined as principled thinking that is impartial, consistent, and non-arbitrary. When an individual engages in CSRA, he begins a decision-making process that eliminates some options while highlighting others. The result is often a change in assumptions that allows the individual to proceed to the next stage and commit to changing his behavior. Self-reflection is a recurring theme within health intervention literature.^{20–24} Reflection is used as a therapeutic tool to assist the individual in identifying the assumptions governing one's feelings and dispositions that may underlie problematic behaviors.¹⁸

The main results of the MINTS-II study are reported elsewhere (B.R.S. Rosser, J. M. Oakes, J. Konstan, et al., in preparation).⁶ To summarize, in 2008, MSM ($N=650$) were randomized to the *Sexpulse* intervention or a waitlist null control. Three-month follow-up results showed a significant 20% reduction in reported unprotected anal intercourse with a male partner (UAIMP) among participants in the treatment condition versus control. In this paper, we took a mixed-methods approach to the three-month data in order to understand why MSM in both experimental conditions reported changes in sexual beliefs and behaviors. We began our analysis with a grounded-theory approach.²⁵ Early in the thematic coding process, CSRA came forward as a major theme, and ARRM became a useful framework to categorize changes described by study participants. Thus, the original aim of this qualitative study – seeking to understand why differences existed – was refined to investigate the role CSRA played in triggering change in beliefs or behaviors within our sample of MSM.

Methods

The MINTS-II trial enrolled a national sample of MSM living in the US. Participants were recruited in two ways. First, banner advertisements were placed on one of the nation's largest gay websites directing 4,566 MSM to the study webpage in December 2008. Second, e-mail invitations were sent to 1,324 MSM who completed a 2005 online survey, and expressed interest in joining future University studies. Inclusion criteria were MSM 18 years or older, residing in the US, with access to a broadband Internet connection. Because the primary purpose of the overall study was to determine the effect of the online intervention on self-reported sexual risk behavior, we oversampled men who engaged in UAIMP in the prior 90 days. Potential participants were informed they needed to be comfortable viewing sexually explicit materials online, and able to complete all online activities within seven days. Six hundred fifty men met eligibility requirements and consented to participate in the study. Participants were randomly assigned to either the *Sexpulse* intervention ($n=337$), or a null waitlist control ($n=313$). Retention at three-month follow-up was 86.2% ($n=560$).

Procedures

All procedures were conducted virtually. Prospective participants were directed to a secure website containing a welcome message, overview of procedures, information about the study and staff, and contact information should they have further questions. After completing eligibility questions, ineligible persons were directed to a webpage thanking them for their interest but informing them they were not eligible. Their IP addresses were then blocked to prevent multiple entry attempts. Eligible respondents then reviewed the purpose, tasks, risks and benefits of the study using a chunked consent process approved by the University of Minnesota Institutional Review Board.²⁶ Signed consent was waived. After the consent section, participants filled in payment and contact information in order to complete their enrollment into the study.

Participants completed a baseline survey, then were randomized to either the intervention or control condition. The intervention group completed the *Sexpulse* intervention, a 14-module sexual health and HIV prevention intervention based in persuasive computing (B.R.S. Rosser, J. M. Oakes, J. Konstan, et al., in preparation). Immediately after completing this, participants filled in a post-test survey. The null control group proceeded immediately to a “post-test” survey that included questions about level of sexual risk-taking, sexual compulsive behavior, and internalized homonegativity. Participants were required to complete all study modules in the intervention group, and all survey questions in the control. Participants in both conditions were compensated \$80 upon completing the post-test. Three months later, all participants received the first follow-up survey. Those who completed the three-month follow-up were paid an additional \$20.

Measures

Participants completed a 112-item baseline survey prior to being randomized to the intervention or control condition, an 85-item post-test survey, and a 65-item three-month follow-up survey. In the baseline and three-month follow-up, participants were asked to report the number of UAIMP they had in the last 90 days. The post-test contained open-ended questions asking about likes, dislikes, and suggestions for improving the intervention (or in the control group, the survey questions). Intervention participants also received an open-ended question asking them to describe their experience with *Sexpulse*. The three-month follow-up survey asked participants to rate, on a 5-point Likert scale (strongly disagree to strongly agree), their level of reflection with the question: *Over the last 3 months, I thought about the ideas contained in Sexpulse (or “the surveys”).* Using the same scale, participants were asked if they discussed the intervention or surveys: *Over the last 3 months, I talked about the ideas in Sexpulse (or “the surveys”) with at least one other person.* The follow-up survey also included an open-ended question for intervention participants, *Over the last 3 months, how has Sexpulse influenced your thoughts, attitudes, or behavior?* Similarly, control participants were asked, *Over the last 3 months, how have these surveys influenced your thoughts, attitudes, or behavior?*

Data Analysis

We chose a mixed-method approach²⁷ to data analysis because triangulating the quantitative and qualitative data provided a deeper understanding of why changes in the participants’ sexual beliefs and behaviors occurred. Intervention and control participants were divided into four groups based on self-reported risk at baseline and at three months: 1) no baseline risk-no risk at three months (NR-NR), 2) no baseline risk-increased risk (NR-IR), 3) baseline risk-reduced risk (IR-RR), and 4) baseline risk-remained at risk (IR-IR). The IR-RR group was further subdivided into baseline risk-reduced risk to zero (No Risk) and baseline risk-reduced risk not to zero (Less Risk). Risk was defined as having one or more UAIMP in

the last 90 days. A total of 2,886 responses to the open-ended questions were thematically coded using NVivo 8 by two members of the research team.

Using a grounded theory approach,²⁵ all qualitative comments were thematically coded to identify the major themes. As new themes arose, the two researchers responsible for coding the data agreed on definitions for each theme. CRSA emerged as a major theme worthy of further analysis. A second round of coding focused on responses to an open-ended question asking how *Sexpulse* (or the surveys) had influenced their thoughts, attitudes, or behavior (n=476). Responses to this question were coded as no action, labeling, committing, or enacting, to coincide with the stages of ARRM. Differences in the information available to participants and level of CSRA were also explored. Borrowing the axial coding technique from grounded theory, a chart was created to understand the themes occurring between different self-reported risk groups. Peer debriefings were used to check analytic validity. Inter-rater reliability was 98.8% (kappa = 0.95).

Quantitative data analyses were planned a priori using survey measures appropriate to the themes that emerged during qualitative analysis and included tests for differences in reflection and discourse between and within experimental conditions. Because the distributions of reported UAIMP at baseline, three months, and the differences between the two were not normal, all analyses followed nonparametric methods. Differences within the intervention and control responses to the quantitative measures were assessed by running Mann-Whitney U tests to detect differences in the population sample, and logistic regression to predict odds ratios of belonging to a risk group. All statistical tests were conducted using SPSS version 15 with a significance threshold of 0.05.

Results

Sample Characteristics

Baseline demographic characteristics are reported in Table 1. Randomization appeared successful as demographic differences between the intervention and control groups at baseline were insignificant, allowing for intergroup and intragroup comparisons. Overall, 58.7% of the sample was age 35 or under. Over two-thirds of participants were Caucasian (67.9%), followed by Latino/Hispanic (14.3%), and African American (6.8%). The sample was highly educated with 61.1% of the participants earning one or more college degrees. Most (75.7%) earned less than \$65,000 per year. The majority of participants (89.6%) engaged in UAIMP within the last 90 days, and 20.4% were HIV-positive.

Reasons for Change

As illustrated in Table 2, the counts of qualitative responses from the NR-NR and NR-IR groups were similar for each stage of ARRM; column percentages for these risk groups should be interpreted cautiously due to their small denominators. However, when comparing IR-RR treatment and control responses, which had larger denominators, 14.8% more control responses indicated no action, suggesting less change in beliefs and behaviors. Similarly, 12.9% more IR-IR control responses indicated no action. In contrast, among treatment participants, 12.2% more IR-RR and 10.1% more IR-IR responses indicated an enactment of changes to sexual beliefs and behaviors.

To explain reasons for these changes, the following paragraphs summarize results of the qualitative analysis by stages of ARRM. Participants randomized to the treatment condition appeared more likely to engage in holistic self-reflection, evaluating connections between their risk-taking behavior, their overall health, and their environment. In contrast, participants in the control condition appeared more likely to describe their risk narrowly as a behavioral outcome, e.g., a failure to use condoms when in a sexual situation.

Reasons for taking no action—Among the four risk groups, persons who reported no action tended to report little or no CRSA. Participation in *Sexpulse* or the surveys seemed to affirm current safer sex practices. A typical response for treatment participants was “My thoughts are pretty similar to that of *Sexpulse*. If anything, it makes me think of how much healthier I have become in the last few years.” Among control participants, a representative response was “I have always been very open with talking about sex, and have not found that this survey inspired any new discussions.”

A few control participants with baseline risk suggested that their exposure to numerous health surveys discouraged CSRA. For example, one participant wrote, “They’ve had no effect on me one way or another. Living in San Francisco predisposes one to countless public health surveys and messages. After a while, it becomes background noise.” Similar comments were not identified among treatment participants.

Reasons for labeling—Qualitative differences between participants’ level of CRSA became apparent when analyzing the comments of those who labeled their behavior as risky. Persons in the control condition seemed to rely on previously learned information about safer sex, reflecting on how that information affected them. For example, a control participant in the IR-RR group wrote, “[The surveys] caused me to reflect on my sexual activity and personal health and allowed me to analyze what I’m doing well or not doing well.” While control participants only had past experiences and knowledge to inform their CSRA, treatment participants were able to enhance self-reflection using new information presented in the intervention, as illustrated by this comment from a treatment participant in the IR-RR group:

I think perhaps it served as a catalyst for introspection... I have been more clear-minded and thoughtful about what it is I need or am seeking... having taken the time to really think about my sexual health has in some ways given me permission to be true to that self-knowledge with more confidence than in the past.

A comparison of these two comments illustrates that participants in both conditions engaged in CRSA, but treatment participants had more information to inform their thought processes than control participants.

Reasons for committing—Only participants with a baseline risk commented on their commitment to change. Responses from this category, in both control and treatment conditions, were similar to this quote from an IR-RR control participant: “I will think about protected sex more often and avoid condom-free sex.” Behaviors committed to were similar between control and intervention participants and included increased communication with sexual partners, testing for HIV/STIs, fewer partners, and serosorting.

Reasons for enacting—Participants with no baseline risk reported increased partner communication, regardless of study condition. There is some indication that the level of CRSA may have been greater for respondents with no baseline risk in the treatment condition compared to those in the control, as illustrated by an NR-NR treatment participant who wrote, “I’ve thought more before hooking up. Not only have I made it a rule to not hook up with someone after talking to them the first time, but when we do [hook up], it’s in a safe environment.” Specific exercises within *Sexpulse* encouraged participants to identify triggers for sexual risk-taking and to develop strategies that minimize placing oneself in a potentially risky situation. No control participants made a similar comment.

Among those who had baseline risk, there were differences between the comments of control and treatment participants. While respondents from both conditions reported harm reduction behaviors--e.g., increased partner communication, testing, fewer sexual partners,

less substance use, and increased condom use--some treatment participants also reported changes in the ways in which they thought about sex, as illustrated by a comment from an IR-RR treatment participant:

I keep condoms at my house now. I think more about the types of people I want in my life, even if I don't consider them to be long-term relationships. I'm more conscious of the responsibilities I have to myself and my health... Before the study, I had never been much affected by awareness campaigns or ads.

This comment illustrates how treatment participants who enacted behavioral changes, e.g., beginning to use condoms, were also likely to report changes in how they view the relationship between their sexual health and other aspects of their life – an objective of *Sexpulse* that appears to have had some measure of success.

Reasons for Reducing Risk

We were particularly interested in understanding why persons in the IR-RR category reported a reduction in risk. Table 3 summarizes a comparison of IR-RR treatment and control responses. We found that 10.4% more treatment participants reduced their risk to zero. Within the Less Risk sub-group, 12.8% more control participants indicated no action, and 11.3% more treatment participants indicated the enactment of new behaviors. Among the No Risk sub-group, 17.7% more control participants indicated no action, and 13.6% more treatment participants indicated that they had enacted new behaviors.

In order to explore more deeply the reasons for risk reduction among IR-IR and IR-RR participants, we conducted a quantitative analysis of the Likert-scale questions for reflection and discourse, factors for CSRA. A Mann-Whitney U test resulted in no between-condition differences in reflection ($U=36700$, $Z=-1.11$, $p=0.266$) or discourse ($U=37698$, $Z=-0.458$, $p=0.647$). However, within-condition differences for the treatment group proved significant (Table 4). In the treatment condition, the IR-RR group more strongly agreed that they had thought about the concepts in the intervention than those in the IR-IR group ($U=4673.5$, $Z=-2.54$, $p=0.011$). In fact, those in the treatment IR-RR group categorized as No Risk more strongly agreed that they had thought about the concepts in the intervention than those categorized as Less Risk ($U=2390.0$, $Z=-3.24$, $p=0.001$).

Results of a logistic regression (Table 5) showed that a higher reflection score weakly indicated belonging to the treatment IR-RR group as opposed to the treatment IR-IR group [$OR = 1.35$ ($1.01-1.81$)]. Among those in the treatment IR-RR group, reflection more strongly explained inclusion in the No Risk group over the Less Risk group [$OR = 1.71$ ($1.18-2.50$)]. However, reflection did not indicate risk reduction within the control condition. In addition, engaging in discourse with others about *Sexpulse* or the surveys did not affect and could not explain any risk reduction within either trial condition.

Not all changes can be attributed to the intervention. The qualitative analysis found that beginning a new relationship, committing to better physical health, increasing self-worth, and being diagnosed, or having a partner diagnosed, with HIV or an STI, appear to be diluting the treatment effect of *Sexpulse*. For example, one IR-RR control participant wrote, "I have had sex with fewer men and entered a long-term relationship. I am also living a healthier lifestyle by being more physically active and feeling more positive about my body image." One of the IR-IR treatment participants reported changing his behavior because of a recent STI diagnosis. Another participant in the same group said he changed after learning that his former partner was recently diagnosed with HIV. Despite the influence of these other variables, CSRA remained an important explanatory variable for change.

Discussion

As one of the first Internet-based HIV prevention RCTs conducted, MINTS-II is uniquely placed to examine how people change behavior through online interventions. This paper is the first to examine the cognitive mechanisms underlying the behavioral change observed in an online HIV prevention intervention, and affirms that ARRM is a useful model to understand how MSM reduce sexual risk-taking. In addition, CSRA appears a useful construct to explain why MSM may label their behavior as risky, initiating their movement through the ARRM stages.

The no-action comments implied that the limited CSRA resulted in a lack of labeling one's behavior as risky. The comments of participants who took no action revealed that they felt the intervention or instrument did not apply to them, or that it affirmed their current sexual beliefs. This was consistent across risk groups and condition assignment. Participants at the labeling stage appeared to reflect on previously held sexual beliefs and past behaviors, but were not yet ready to commit to behavior change. Participants in both conditions needed enough information to be able to label their current behavior as risky in order to commit to less harmful behaviors. For example, while participants in both conditions were able to reflect on previous beliefs and behaviors when completing the surveys, treatment participants had additional information and opportunities for reflection. Access to these supplementary resources appears to explain, in part, the greater number of IR-RR *Sexpulse* participants reporting changes to sexual beliefs and behaviors.

We believe CSRA complements ARRM by explaining how MSM begin the process of labeling their sexual behaviors as risky, ultimately committing to and enacting changes to their sexual beliefs and behaviors. This study demonstrated that an HIV-prevention intervention that encourages participants to engage in CSRA – about cofactors like health and environment that seem to influence a person's sexual beliefs and behaviors – improves the likelihood that participants will label their behavior as risky, commit to, and enact behavior change. However, discourse, which often complements or is a mechanism for CSRA, appeared to have no role in shifting participants' beliefs or behaviors. The absence of discourse is likely to be a product of the intervention delivery method. Since *Sexpulse* is an example of a self-regulated online learning environment,²⁸ participants did not have an opportunity to discuss intervention concepts with other participants. Thus, they could only engage in a reflective dialogue with non-participant friends or colleagues. This additional step of reaching out to non-participants, many of whom may not be familiar with *Sexpulse* concepts, is likely too large a barrier for participants to overcome on their own.

When designing online HIV-prevention curricula, we recommend the inclusion of activities that foster CSRA. To have the strongest impact on risk behavior, we believe interventions need to include a combination of interactive exercises and facilitated peer dialogue, designed to challenge sexual beliefs and behaviors in various risk-taking environments, both online and in the real world. Because some participants are likely to have been exposed to numerous prevention messages, which in the words of one participant have become "background noise," researchers and practitioners must continue looking for novel ways to present prevention information.

There are several limitations to this study. First, the study used self-reported data from a convenience sample of men recruited through banner advertisements. Thus, the sample may not represent the broader population of MSM, and some underreporting of risk behavior is likely. Second, we collected qualitative data via an online survey, so there was no opportunity to ask participants clarifying questions. Third, the primary purpose of the MINTS-II intervention RCT was to evaluate the effectiveness of *Sexpulse*, resulting in

limited opportunity to assess CSRA and ARRM staging. Despite these limitations, the use of mixed method evaluation appears a promising method for confirming the validity of results observed and for examining reasons why some trial participants change behavior while others do not.

In summary, we conducted one of the first online HIV-prevention interventions that resulted in a change in participants' sexual beliefs and behavior. Further, we found that engaging participants in CSRA facilitated the labeling of beliefs or behaviors as risky, which in turn assisted in committing to and enacting change. We recommend that future researchers explore the role of CSRA as an added construct to ARRM and as a catalyst for changing sexual beliefs and behavior. Results of this mixed-methods study suggest that including CSRA in online HIV-prevention curricula can change risky sexual beliefs and behaviors, potentially increasing the efficacy of these interventions and reduce the number of new infections among MSM.

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Table 1

Demographic and Health Characteristics of Participants at Baseline (N=560)*

	Treatment (n=267)	Control (n=293)	<i>p</i>
	<i>n</i> (%)	<i>n</i> (%)	
Age (in years)			
18 – 25	65 (24.5)	69 (23.6)	0.963
26 – 35	93 (35.1)	100 (34.2)	
26 – 45	70 (26.4)	83 (28.4)	
Older than 45	37 (14.0)	40 (13.7)	
Race/Ethnicity			
Caucasian/White	189 (70.8)	191 (65.2)	0.442
Black or African American	15 (5.6)	23 (7.8)	
Latino/Spanish/Other	33 (12.4)	47 (16.0)	
Asian	7 (2.6)	14 (4.8)	
Other	23 (8.6)	18 (6.1)	
Educational Attainment			
Less than high school or high school graduate	19 (7.1)	19 (6.5)	0.928
Some college	86 (32.2)	94 (32.1)	
College graduate	57 (21.3)	69 (23.5)	
Graduate/Professional School	105 (39.3)	111 (37.9)	
Annual Income			
Less than \$20,000	48 (18.0)	52 (7.7)	0.774
\$20,000 – \$31,999	46 (17.2)	62 (21.2)	
\$32,000 – \$44,999	57 (21.3)	53 (18.1)	
\$45,000 – \$64,999	53 (19.9)	53 (18.1)	
Greater than \$65,000	54 (20.2)	60 (20.5)	
Refuse to answer	9 (3.4)	13 (4.4)	
Sexual Orientation			
Homosexual/Gay/Same Gender Loving	242 (90.6)	272 (92.8)	0.345
Bisexual/Straight/Other	25 (9.4)	21 (7.2)	
UAIMP in the last 90 days*			
None	30 (11.2)	29 (9.9)	0.826
Once	45 (16.8)	47 (16.1)	
Two or more	192 (71.9)	216 (75.0)	
HIV Status			
HIV-positive	48 (18.0)	66 (22.5)	0.182
HIV-negative	218 (81.6)	226 (77.1)	

* Included missing values were less than 1% of total.

Note: This table reports baseline data on the 560 users who completed both baseline and 3-month surveys.

Table 2

Summary of Coded Responses to Open-Ended Reflective Question* based on the AIDS Risk Reduction Model (N=556)

	Treatment (n=265)					Control (n=291)				
	NR-NR [†] n (%)	NR-IR n (%)	IR-RR n (%)	IR-IR n (%)	Total n (%)	NR-NR n (%)	NR-IR n (%)	IR-RR n (%)	IR-IR n (%)	Total n (%)
No Action	12 (57.1)	3 (37.5)	77 (47.0)	36 (50.0)	128 (48.3)	16 (69.6)	3 (50.0)	107 (61.8)	56 (62.9)	182 (62.5)
Label	3 (14.3)	1 (12.5)	45 (27.4)	16 (22.2)	65 (24.5)	4 (17.4)	2 (33.3)	44 (25.4)	19 (21.3)	69 (23.7)
Commit	0 (0.0)	0 (0.0)	6 (3.7)	3 (4.2)	9 (3.4)	0 (0.0)	0 (0.0)	5 (2.9)	2 (2.2)	7 (2.4)
Enact	6 (28.6)	4 (50.0)	36 (22.0)	17 (23.6)	63 (23.8)	3 (13.0)	1 (16.7)	17 (9.8)	12 (13.5)	33 (11.3)
Total	21	8	164	72	265	23	6	173	89	291

* Reflection was assessed with the following question, “Over the last 3 months, how has “Sexpulse” if intervention or “the surveys” if control) influenced your thoughts, attitudes, or behavior?”

[†] NR-NR (No Baseline Risk - No Risk), NR-IR (No Baseline Risk - Increased Risk), IR-RR (Increased Risk - Reduced Risk), IR-IR (Baseline Risk -Remained at Risk).

Table 3
Comparison of Responses to Open-Ended Reflective Question ^{*} based on the AIDS Risk Reduction Model for IR-RR Participants (N=337)

	Treatment (n=164)				Control (n=173)			
	Less Risk [†] n (%)	No Risk n(%)	Total n (%)		Less Risk n (%)	No Risk n (%)	Total n (%)	
No Action	45 (48.9)	32 (44.4)	77 (47.0)		71 (61.7)	36 (62.1)	107 (61.8)	
Label	24 (26.1)	21 (29.2)	45 (27.4)		31 (27.0)	13 (22.4)	44 (25.4)	
Commit	3 (3.3)	3 (4.2)	6 (3.7)		1 (0.9)	4 (6.9)	5 (2.9)	
Enact	20 (21.7)	16 (22.2)	36 (22.0)		12 (10.4)	5 (8.6)	17 (9.8)	
Total	92	72	164		115	58	173	

^{*} Reflection was assessed with the following question, “Over the last 3 months, how has (“Sexpulse” if intervention or “the surveys” if control) influenced your thoughts, attitudes, or behavior?”

[†] Less Risk and No Risk are defined as a decrease in UAIMP from baseline to 3-month follow up.

Table 4Comparison of Reflection and Discourse/Articulation Scores in Analysis Groups of both Treatment Conditions at 3 months (N=501)^{*}

	<i>n</i>	Median Score (Q1, Q3)	U Statistic	Z Statistic	<i>p</i>
Treatment Group					
Reflection ^{**}					
IR-IR [‡]	71	4 (2, 4)			
IR-RR	164	4 (3, 4)	4673.5	-2.54	0.011 [‡]
Less Risk	92	4 (3, 4)			
No Risk	72	4 (4, 5)	2390.0	-3.24	0.001 [‡]
Discourse ^{***}					
IR-IR	71	3 (1, 4)			
IR-RR	163	3 (2, 5)	5075.0	-1.53	0.126
Less Risk	92	3 (2, 4)			
No Risk	71	4 (2, 5)	2966.5	-1.03	0.305
Control Group					
Reflection ^{**}					
IR-IR	90	4 (3, 4)			
IR-RR	173	4 (3, 4)	7629.0	-0.284	0.777
Less Risk	115	4 (3, 4)			
No Risk	58	4 (3, 4)	3087.0	-0.856	0.392
Discourse ^{***}					
IR-IR	90	3 (2, 4)			
IR-RR	173	3 (2, 4)	7305.0	-0.841	0.400
Less Risk	115	3 (2, 4)			
No Risk	58	3.5 (3, 4)	2954.5	-1.26	0.209

^{*} Included missing values were less than %1 of total. Excludes those with 0 UAI partners at baseline.[‡] IR-IR (Baseline Risk - Remained at Risk), IR-RR (Baseline Risk - Reduced Risk).[‡] Sample sizes vary in the treatment group (baseline risk, reduced risk) due to refusals to answer. Significance for Mann-Whitney = 0.05.

Reflection was assessed with the following question on 5-point Likert scale (strongly disagree to strongly agree) at 3-months: *Over the last 3 months, I thought about the ideas contained in Sexpulse (Sexpulse substituted with "the surveys" for Control).*

Discourse was assessed with the following question on 5-point Likert scale (strongly disagree to strongly agree) at 3-months: *Over the last 3 months, I talked about the ideas in Sexpulse with at least one other person (Sexpulse substituted with "the surveys" for Control).*

Table 5

Binary Logistic Regression Assessing Reflection and Discourse/Articulation Scores in 2 Treatment & Control Subgroups^a at 3 months (N=501)^{*}

	<u>IR-RR vs. IR-IR[†]</u>		<u>No Risk vs. Less Risk^{**}</u>	
	<i>n</i>	OR (95% CI)	<i>n</i>	OR (95% CI)
Treatment Group	234		163	
Reflection		1.35 (1.01, 1.81) [‡]		1.71 (1.18, 2.50) [‡]
Discourse		1.04 (0.83, 1.30)		0.92 (0.71, 1.18)
Control Group	263		173	
Reflection		1.02 (0.77, 1.35)		1.06 (0.73, 1.56)
Discourse		1.07 (0.88, 1.31)		1.14 (0.89, 1.47)

^{*} Included missing values were less than %1 of total. Excludes those with 0 UAI partners at baseline.

^a Excludes those with 0 UAI partners at baseline.

[†] IR-IR (Baseline Risk - Remained at Risk), IR-RR (Baseline Risk - Reduced Risk),

^{**} Includes only IR-RR participants.

[‡] Sample sizes vary due to refusals to answer; significant at p<0.05.