AIDS and Behavior (2019) 23:3165–3174
https://doi.org/10.1007/s10461-019-02534-4

ORIGINAL PAPER

Willingness of MSM Living with HIV to Take Part in Video-Groups: Application of the Technology Readiness and Acceptance Model

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Published online: 23 May 2019

Abstract

Group-based programs are important for the psychosocial care of people living with HIV; however, programs are often limited by geography and availability. Video-groups, conducted via group-based video-conferencing on video-phones or computer, offer the benefits of group-based programs while overcoming barriers to attendance. This study sought to explore if, and how, the Technology Readiness and Acceptance Model (TRAM) could be used to explain the willingness of men to take part in video-groups. The TRAM was used as the guiding framework for thematic qualitative analysis. Among 106 participants, there was a general willingness to participate in video-groups. TRAM constructs were present in the data—with perceived usefulness (extent that participating in a technology-based program would facilitate group intervention behaviors) and insecurity (distrust/skepticism of technology) emerging as the most salient themes. The TRAM alone did not account for concerns related to group settings or the level of privacy needed when talking about HIV.

Keywords HIV · eHealth · Video-conferencing · Technology

Introduction

Gay, bisexual, and other men who have sex with men (MSM) are disproportionately affected by HIV, heightening the need for continued prevention and care services [1–4]. Due to this disproportionate burden of HIV, the 2020 National HIV/AIDS Strategy stated that MSM were a critical population to target for effective delivery of HIV care and prevention [4]. However, MSM experience particularly high risks for social discrimination and stigma, which may complicate access to care [3, 5]. Although services specific to MSM living with HIV are available across the country [6, 7], research has suggested that some men cannot access in-person interventions due to limited geographic availability or transportation; others lack interest in in-person programs [8, 9]. To address these concerns, many HIV prevention and care programs utilizing computer and Internet technologies (eHealth/mHealth programs; henceforth eHealth programs) have been developed to target MSM [10–13].

While computer-based interventions have been studied for HIV prevention and care [14–19], few studies have investigated the use of video-conferencing groups (henceforth video-groups) in HIV care [9, 20–22]. Group-based eHealth video-conferencing interventions (in which people can see and hear one another in real time; i.e. video-groups) are unique because they allow for the face-to-face interaction of individuals when in-person groups are not feasible and may reduce some costs, burdens, and fidelity challenges [9]. Although concerns people living with HIV (PLH) may have regarding eHealth for HIV services and care have been discussed in the literature [23–25], it is unclear how these concerns would translate to video-group programs. Participants may view video-groups as providing unique concerns and benefits because they occur in groups rather than one-on-one, and contain both video and audio of the person participating. Moreover, video-conferencing can occur via an array of modalities, including video-phones (home-based telephone lines with a live screen to see and hear other people) or, more recently, via computers.

Studies have investigated the concerns and benefits that WLH have regarding video-groups and found that the location at which participants log onto the video-group (i.e., at home or at an agency computer), privacy, and altruism may contribute to overall acceptance of such programs [21, 22, 26, 27]. One

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study investigated how the location from which video-groups are accessed can play a role in the overall acceptance of such programs; this study found, among women, that privacy was a concern regardless of the physical location from which women accessed the video-groups (i.e. at home vs. private room in an agency) [22]. Additionally, one mixed-gender study has addressed the feasibility and marketability of video-group programs in a tobacco cessation program for PLH using the Diffusion of Innovations [9]. Yet, among MSM living with HIV, there is little theory-driven empirical evidence identifying the facilitators or barriers to taking part in group-based eHealth interventions.

The Technology Readiness and Acceptance Model (TRAM) is a model that combines the Technology Acceptance Model (TAM) [28] and Technology Readiness Index (TRI) [29, 30] to explain a person's readiness for, and uptake of, a new technology [31]. The model posits that the components of technology readiness (innovativeness; optimism; discomfort; and insecurity) impact the perceived usefulness and perceived ease of use that a person has toward a new technology; each of these factors (technology readiness; perceived usefulness; and perceived ease of use) directly impact the model outcome—behavioral intention to take part in a new technology (see Table 2 for in-depth construct definitions). Traditionally, these theories are applied to consumer marketing and organizational psychology; however, given the rise in eHealth programs, these theories may have utility in public health. To date there has been limited application of the TRAM to group-based ehealth programs [26]. Only one study has applied the TRAM in the uptake of new group-based technologies for health related interventions; that study did not include MSM [26]. Application of the TAM to ehealth HIV programs has not included group-based programs and has been limited [17, 32]. The TRAM [31] may provide guidance in determining programmatic elements important to men who may access these programs; and, thus, what should be considered during the development and delivery of targeted, appropriate interventions for MSM. The present study utilizes the TRAM to explore the potential for video-groups among MSM living with HIV. Specifically, this study investigates: (1) To what extent do men's' reactions to video-group scenarios fit with the constructs of the TRAM? and (2) In what ways do men's responses introduce new ideas for understanding the potential uptake of video-group programs among MSM living with HIV?

Methods

Participant Recruitment and Survey Administration

Participants were recruited through provider referral at an urban HIV specialty care clinic in the Southeastern United States. Eligibility criteria included: (1) positive HIV serostatus, (2) identified as male, (3) reported having had sex with a man, and (4) at least 18 years of age. Eligible men completed a 15–30 min survey administered by trained study staff in a private office or over the telephone. Participants were compensated for their time with a $10 gift card. The study was approved by the institutional review boards at researchers' affiliated university and the state department of health.

As described, video-groups have been under studied. To understand general interest in video-groups, a survey containing vignettes was utilized. During the informed consent process, participants were told that we will ask questions about: "your preferences for taking part in an online group program to help men build healthy and safe relationships; your experiences with computers; your experiences with sexual relationships and sexual behavior; and the specific issues you face as a man in relationships." Trained study staff administered a structured survey containing both closed and open-ended questions related to demographics, comfort and willingness to participate in interventions utilizing technology, and reasons to participate, or not participate, in video-groups. Each participant was read three scenarios and asked to indicate his willingness to participate in a program similar to the scenario described (Table 1). Based on prior work [22] finding that the location in which participants access eHealth interventions may impact their experience, we also specified if the scenario would be taking place at home or within an agency. Scenario one described going to a private place, outside of participants' homes, where participants could use video-conferencing on a computer to talk with other men living with HIV as part of a group-based program. Scenario two described the same intervention accessed using video-phones. Participants were shown a picture of a video-phone to further explain the technology. Scenario three described accessing group-based eHealth interventions on their own devices from home. Participants who indicated *yes* or *maybe* to future participation in such an intervention were asked to further explain their response. Every participant was asked to describe what would make them not want to participate in a program similar to each scenario.

Data Analysis

Typed field notes containing participant responses were examined. First, two coders (DT and SM) read through all responses and created an initial codebook using the TRAM [31] as the guiding framework. Codes emerging from previous work [26] were also included. Preliminary coding was conducted on 10% of field notes to ensure accuracy of the codes. Responses were then coded thematically [33] by two coders (DT and SM); the codebook was tested and revised until agreement was met. A constant comparative approach was undertaken to guide

Table 1 Scenarios described to participants

Description	Questions asked to participant	% willing to take part in this type of program
Scenario 1		
Imagine that you could go to a private place to use a computer to talk with other men living with HIV; you could see their faces on the computer and hear them, and they could see and hear you on their computer. You would be assigned to go through a group-based program that would meet multiple times. The group members would be the same each time. A person would be nearby to help you with using the computer. Two professional group leaders who specialize in talking with men living with HIV would help lead the discussion and would lead you in some activities. *Would you be willing to try out a program like that, on a computer talking with other men living with HIV?*	Asked if participant responds yes or maybe: *What about this type of program (on a computer talking with other men living with HIV) would make you want to participate?* Asked to all participants: *What would make you NOT want to participate in a program like that?*	n = 78; 74%
Scenario 2		
Imagine that you could go to a private place to use a special video-phone to talk with other men living with HIV. It would be just like the program we just talked about except it would be on a video-phone instead of a computer. *Would you be willing to try out a program like that, on a video-phone talking with other men living with HIV?*	Asked if participant responds yes or maybe: *What about this type of program (on a video-phone talking with other men living with HIV) would make you want to participate?* Asked to all participants: *What would make you NOT want to participate in a program like that?*	n = 80; 75%
Scenario 3		
Imagine that you wanted to do a program over a computer or on a video-phone, like what we just talked about. It would be a group video-conference, except this time you would be on the computer or video-phone at your home, and the other people would be participating from their homes. You could see and hear them and whatever is going on in their home and they could see and hear you and whatever is going on in your home. *Would you be willing to try out a program like that, on a video-conference from your home, talking with other men living with HIV?*	Asked if participant responds yes or maybe: *What about this type of program (on a video-conference from your home, talking with other men living with HIV) would make you want to participate?* Asked to all participants: *What would make you NOT want to participate in a program like that?*	n = 69; 65%

Table 2 Relationship between TRAM constructs and definitions used in analysis

Construct	Original TRAM operationalization [31]	Study operationalization (adapted from previous operationalization [26])
Optimism	A positive view of technology and a belief that technology offers people increased control, flexibility, and efficiency	Increased opportunity or control *caused by* the use of technology. This includes increased flexibility and efficiency, specifically as caused by technology use
Innovativeness	A tendency to be a technology pioneer and thought Leader	Willingness to participate in an ehealth program *because* the program is new, different, or innovative
Discomfort	A perception of lack of control over technology and a feeling of being overwhelmed by it	Perceived lack of control over technology; overwhelmed by technology-based programs
Insecurity	Distrust of technology and skepticism about its ability to work properly	Distrust of technology and skepticism about its ability to work properly, including distrust in the privacy technology provides
Perceived usefulness	The extent to which a person believes that using a particular system will enhance his or her performance	The extent to which participating in a technology-based program with other men living with HIV would facilitate group intervention behaviors, including sharing with others, teaching, and reciprocity
Perceived ease of use	The extent to which a person believes that using a particular system will be free of effort or easy to do	The extent to which participating in an eHealth program with other men living with HIV would be easy to do, including use of the technology
Application of emerging constructs		
HIV related privacy concerns	N/A	Confidentiality and privacy concerns regarding a participant's HIV status that are not specific to the use of technology
Group readiness	N/A	Discomfort with group dynamics that could occur in any group-based program

the coding and revise the codebook as needed. Analyses of the results involved all authors (DT, SM, EL) meeting to assess the fit of the data with the TRAM, by: (1) confirming the presence of the TRAM constructs in the data and (2) examining the data to see what other constructs emerged. Adapted definitions of the TRAM constructs can be seen in Table 2. In qualitative analysis, constructs were quantified based on the following ranges: some ≥ 10%; many ≥ 30%; most ≥ 50%. Frequencies of the quantitative data (participant characteristics and willingness) were analyzed in SPSS v.24.

Results

Participant Characteristics

The mean age of participants was 44.5 years (range = 20–71 years). Forty-eight (45%) participants identified as White, 44 (42%) Black, and 15 (14%) Hispanic/Latino. Most participants had completed high school or its equivalent (n = 37, 35%) or some college education (n = 43, 41%). Approximately one-third (n = 37, 35%) of participants were retired or disabled, and 32 (30%) were employed full-time or part-time. Over half of participants (n = 68, 64%) were single; remaining participants were in a committed relationship. The majority of participants identified as homosexual/gay (n = 87, 82%). A total of 106 participants were included in analysis.

Overview of Willingness to Take Part in Video-Groups

Findings of this study revealed a general acceptance towards technology-based group interventions. Participants indicated willingness to participate in a computer-based (n = 78, 74%) or video-phone based intervention (n = 80, 75%) accessed at a "private location". Sixty-nine participants (65%) indicated willingness to participate in a group-based intervention from home. Qualitative themes emerged specific to the use of technology for group-based programs and concerns related to general participation in any group-based intervention (Fig. 1). Participants indicated strengths and weaknesses of interventions occurring at home and those accessed from a community-based organization. Participants did not indicate differences in their types, or level of, concern when accessing the group via video-phone or computer. However, regardless of concerns related to video-groups, most were willing to take part.

Relationship Between TRAM Constructs and Willingness to Use Video-Groups: Concerns Regarding Video-Groups

Two salient TRAM constructs reflected concerns regarding the use of eHealth programs: *insecurity* and *discomfort* (Table 2).

Insecurity

Regarding insecurity, participants indicated that they were not sure if information sent via the Internet was

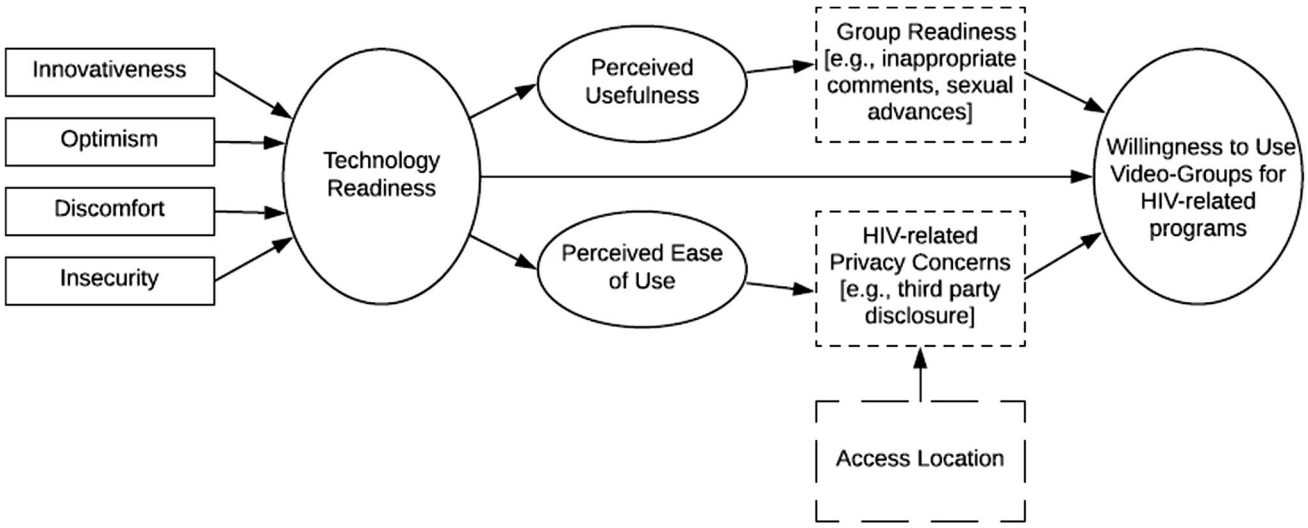

Fig. 1 Application of the TRAM for Group-base eHealth Interventions for MSM (adapted from [26]). Solid line represents constructs within the TRAM [15]. Short dashed line represents additional constructs added by [26]. Long dashed line represents constructs suggested based on study findings

truly private. Some were concerned with "*too many people getting information"* and that "*computers [are] not safe, [you] don't know who is listening*." Participants also indicated *"trust issues with anything (computer, internet) where info could get out; not issues with the people (participants or facilitators) but rather the technology*."

Discomfort

Few participants noted discomfort with new technology (*discomfort* in Table 2). This was illustrated through statements such as "*I'm old fashioned. [I] never used a computer*." Some participants indicted that, despite participant knowledge and comfort with technology, video-conferencing was not a comfortable way to engage in group-based programs: "*I just know about a computer, it's not as personal. You can see and hear people but I feel like it's just not that personal. I'd rather meet the people, actually talk to them.*"

Relationship Between TRAM Constructs and Willingness to Use Video-Groups: Benefits of Video-Groups

Perceived Usefulness

The most commonly expressed facilitating construct was *perceived usefulness*—informants indicated that participating in an eHealth intervention would be a great way of getting information and participating in groups. Participants were also interested in taking part in eHealth programs so others would have, "*… a person to turn to… someone who is newly HIV positive may not know where to go or who to talk to. I might be able to tell my story and provide guidance as a resource*." Men indicated that participation would also help them "*get advice and meet other people with similar issues*" or "*learn how others are dealing with their HIV and to share [my] experiences*." Often, participants felt the intervention was, at the very least, worth trying.

Optimism

Some participants said the availability of eHealth groups increased the opportunity to access such interventions (*optimism* in Table 2), since *"there's not necessarily a place to one stop shop to find out about…support groups and meeting people who are HIV+"*. Participants also stated that the groups would be "*more convenient*" and it would be "*interesting to meet people [and they would appreciate] the convenience of it online*."

Ease of Use

A less salient theme included the expected ease in accessing the intervention (*ease of use* in Table 2). The majority of men surveyed had at least some experience with computers, and did not express concern about the transition from general computer use to video-conferencing.

Innovativeness

Some men were willing to participate in an eHealth intervention for the mere interest in technology alone–to learn the intricacies of a program via video-groups (*innovativeness*). Men said: "*The technology is here, why not utilize it. You'd be able to see the person you're talking [to]*" and "*[I] would love to try the technology*."

Additional Salient Constructs

While the constructs of the TRAM were present in the data, additional constructs specific to PLH also emerged including *HIV-related privacy* concerns and a generally discomfort with group dynamics (*group readiness*).

HIV-Related Privacy

Participants feared that their HIV status would not be kept private, thus increasing the potential for inadvertent disclosure (*HIV-related privacy concerns* in Table 2). This was often stated directly as "[*I would not want to participate*] *If [my] personal information is shared with anyone else*" or saying programs should be "*confidential, make sure that all participants have HIV and are respectable and keep status private*."

Group Readiness

Additionally, some men felt group programs for MSM sometimes resulted in sexual advances, which was not something they were seeking in this setting. Participants indicated that inappropriate behaviors were more likely to happen in an online environment than an in-person setting (*group readiness* in Table 2). For example, one participant noted they would not want to participate due to the possibility of inappropriate behaviors, such as *"someone showing up naked"*, while another participant stated he thought *"some people may not be going into it [the group program] with the right purpose…like [they may end up] trying to hit on someone."*

Access Location

Access location (accessing video-groups in a private space at home vs. at an agency) did not change participant

willingness to take part in video-groups; however, the location from which a participant accesses an HIV-related program may impact the concerns that he or she has regarding program participation. The comfort of participating from home was evidenced through advantages such as "*not going to a remote location and [feeling] comfortable [and] at ease*." Participants also said that taking part in such a program at home would remove barriers related to transportation. Access location may also be an important moderator of HIV-related privacy concerns. Others indicated that video-groups accessed at home could compromise security, as data breaches (e.g., hacking) and HIV-related privacy concerns (e.g., disclosure of HIV status) could be more prevalent in a home-based setting because others present in the homes of group participants could potentially see participants' faces or hear their voices, and subsequently disclose their HIV status.

Discussion

This study explored willingness to participate in eHealth group interventions among MSM living with HIV, applying the TRAM—a model of technology readiness and assessment that has not yet been applied to MSM living with HIV. Participants indicated a general willingness to take part in video-group eHealth programs, regardless of the location from which they would join (home or agency). *Perceived usefulness* and *optimism* were drivers of potential participation, while privacy related concerns (*insecurity* and *HIV-related security*) were drawbacks. Our findings suggest a modified version of the TRAM may be useful when attempting to determine the factors most important to MSM deciding whether to take part in video-group programs for PLH. While this study explored the TRAM constructs via qualitative data, future work should explore appropriate quantitative measurement of TRAM constructs. Understanding these aspects is critical as the field continues to develop and market eHealth programs for MSM living with HIV.

This work builds upon findings of a previous study that applied the TRAM to understand willingness to use eHealth among women living with HIV [26]. Combined, these studies suggest similar facilitators and barriers may be present among both MSM living with HIV and women living with HIV, with a few nuanced differences. For example, *group readiness* within our current study of MSM was expressed differently than in our prior work with women. MSM referred to the potential for unsolicited advances–which could be heightened in the online environment, perhaps due to the normalization of online dating applications designed for MSM—whereas women made no reference to such potential.

Similar to other studies investigating technology acceptance among PLH, in this study, *perceived usefulness* and *optimism* were important concepts [32, 34, 35]. The salience of *perceived usefulness* and *optimism* suggests that the men perceived relative advantages of video-groups versus other modalities [36]. Some men may be lonely and isolated [37] and lack access to face-to-face interventions, thus technology-based interventions may be the only form of face-to-face social support from others living with HIV that some men would experience. Others may be motivated by the novelty of video-groups. Our results suggest many men may be compelled by the opportunities for sharing ideas, networking, and meeting new people. Highlighting these beneficial aspects of the technology may be important for video-group recruitment efforts.

The present work builds upon previous studies that have examined technology use among MSM and PLH on apps, the internet, and social networks [13, 38–40]. Similar to previous research in other areas of healthcare [41, 42], as well as among women living with HIV [22], data from this study suggest that *discomfort* with technology may not be the primary determinant of participation; concerns related to security and privacy appear more paramount [23–25]. One recent study found Black MSM who were living with HIV wanted technology-based interventions in which they could participate anonymously [13]. It is unclear how, or if, this would influence participation among Black MSM in video-groups. Our findings suggest that preference is likely informed by both *HIV-related privacy concerns* and *Internet-related security* concerns. As in any group program for PLH, steps should be taken to mitigate risk of unintentional third-party disclosure of a participant's HIV status, and potential participants should be informed of those risks and efforts [43–45]. For example, in our work we screen all participants and verify HIV status prior to program entry. Many authors have described efforts to increase privacy protections for video-conferencing engagement, among them: enhancing and testing the encryption and security measures of video-conferencing platforms [43–47]; requiring password protected entry into the programs [43–45]; discussing the ethical and legal aspects of health-related video-conferencing with the participants prior to program entry [43–45, 47]; and acknowledging that applicable laws may vary dependent upon the state from which a person is participating [43, 47]. Moreover, guidelines for best practice have been established specific to telemedicine [47, 48]. Researchers and those implementing video-group based social support programs may benefit from applying these guidelines as suited. Both advertisements and recruitment materials should specify all efforts taken to protect participant privacy and confidentiality [9].

Some, though few, participant responses reflected concern regarding difficulty in technology use and a lack of comfort using new technologies. Lai and colleagues utilized an extension of the Technology Acceptance Model to examine

acceptance of an individually-accessed computer program aimed to assist in depression management [17]. They found that people who did not have prior experience with technology were less likely to find a new technology-based intervention to be useful and easier to use. Technological support may be needed for some individuals accessing video-groups and other eHealth interventions. Advertising the availability of technology support in promotional materials for such programs may help to encourage persons with low technology-related experience and self-efficacy to participate.

Similar to our findings among women living with HIV who had participated in a video-group intervention [26], responses in this study suggest mixed feelings on the impact intervention location may have on participation. Although participants indicated that interventions accessed at home would decrease barriers to participation (e.g. transportation), such interventions also evoked concerns. Home-based technology interventions are complicated by many factors, including HIV-related privacy. Some participants felt they would achieve greater privacy doing the intervention from their own homes, because they would not be seen at a physical intervention site that might reveal their HIV status to others outside the group. However, some participants stated the potential for decreased privacy during home access, such as a lack of control over who was within the other participants' homes (friends, family, or others) and concerns about others seeing or hearing the participant and learning of their HIV status. Although not explicitly explained by the data, it is possible that other constructs could be impacted by the location from which participants access a program—including group readiness, ease of use, discomfort, and optimism. Despite these concerns, over 60% of MSM indicated a willingness to participate in these interventions from home.

The strengths of this study are in its innovative theoretical application and focus on video-groups, a largely untapped resource for delivering programs to PLH. The TRAM, an existing theoretical framework, may help guide those working in eHealth research and practice, with some modifications. Quantitative measures of the TRAM should be employed to understand uptake of eHealth programs for PLH; *group readiness* and *HIV-related privacy concerns* should also be assessed and included in statistical models.

This study provides insight into the factors related to the potential willingness of MSM to participate in eHealth group-based interventions and, specifically, video-groups; however, limitations exist. Data were collected at one metropolitan location in the southern United States. One intention of developing eHealth interventions is to provide access to people who may otherwise not be able to participate in such interventions, such as those living in rural areas. Unfortunately, rural-residing individuals were not captured in this study. Furthermore, the data analyzed were short responses from a survey. In the future, focus groups, open-ended interviews, and/or quantitative assessments could be utilized to glean greater detail from participants. Ultimately, a randomized controlled trial in which participants can choose to engage, or not engage, in a video-group program would provide the most fruitful data regarding program uptake; future investigations could seek to explain program uptake decisions and lived experiences of participants. Additionally, this study focused on video-group programs; however, in the future, the TRAM should be utilized to investigate other group-based technology programs for PLH.

Conclusions

This study found that: (1) men were generally willing to use video-groups for HIV related programs regardless of the location in which men were to access such programs (home or agency); and (2) a modified TRAM may be useful when determining the factors most important to men living with HIV participating in eHealth programs. The most salient themes related to willingness to participate in video-groups were perceived usefulness and privacy. An important implication of this study is the need for marketing eHealth programs for MSM living with HIV in a way that highlights how privacy will be protected, while emphasizing the opportunities to increase information and/or support for this priority population.

Acknowledgements We would like to thank Don Kurytka for his help with this research study.

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