Indicators of HIV-risk resilience among men who have sex with men: a content analysis of online profiles

Jaclyn M. White Hughto^{A,B,H}, Anna P. Hidalgo^C, Angela R. Bazzi^{A,D}, Sari L. Reisner^{A,E,F}, and Matthew J. Mimiaga^{A,F,G}

^AThe Fenway Institute, Fenway Health, 1340 Boylston Street, 8th Floor, Boston, MA 02215, USA

^BYale School of Public Health, Department of Epidemiology, 60 College Street, New Haven, CT 06510, USA

^CColumbia University, Department of Sociology, 606 West 122nd Street, New York, NY 10027, USA

^DBoston University School of Public Health, Department of Community Health Sciences, 801 Massachusetts Avenue, Crosstown Center, 4th Floor, Boston, MA 02118, USA

^EBoston Children's Hospital/Harvard Medical School, Division of General Pediatrics, 300 Longwood Avenue, Boston, MA 02115, USA

^FHarvard T.H. Chan School of Public Health, Department of Epidemiology, 677 Huntington Avenue, Boston, MA 02115, USA

^GBrown University, Institute for Community Health Promotion, 21 South Main Street, 8th Floor Providence, RI 02912, USA

Abstract

Background—HIV-risk resilience, or positive adaptation in the face of risk, is increasingly being recognised as an important characteristic among men who have sex with men (MSM). However, resilience in the context of online partner seeking remains underexplored among MSM.

Methods—Using content analysis methodology, this study operationalised indicators of HIV-risk resilience in the profiles of 933 MSM using a sexual networking website. HIV-risk resilience included endorsing foreplay only (non-penetrative sex) or a versatile sexual position; being “out” (e.g. disclosed sexual orientation), having a profile photo, seeking friendship, seeking a relationship, serosorting, not endorsing alcohol or drug use, safer sexual adventurousness (e.g. role playing, bondage), and safer sex.

Results—The majority of men were between 18 and 35 years old (76.0%) and 73.3% were racial/ethnic minorities. The mean number of resilience components endorsed was 5.2 (s.d. = 1.5; range 0–9). Nearly half (48.0%) reported being “out” and 68.7% had a profile photo. The majority of men were seeking relationships (66.5%) and/or friendships (69.7%), were sexually versatile

^HCorresponding author: jwhite@fenwayhealth.org.

Conflicts of interest

None declared.

(53.3%), and preferred safer sex only (76.3%). The majority did not endorse drug use (82.0%) and 25.4% did not endorse alcohol use. Nearly one-quarter (21.4%) endorsed sexual adventurousism and 2.5% were serosorting by partner's HIV negative status.

Conclusion—HIV-risk resilience may be common among MSM using sexual networking websites and may manifest in safer sex intentions. Rather than exclusively focusing on sexual risk reduction, health promotion efforts targeting MSM online should acknowledge, measure, and leverage existent HIV-risk resilience strategies in this group.

Additional keywords

health behaviour; HIV prevention; Internet; sexual health; sexual risk

Introduction

More than 30 years into the HIV/AIDS epidemic, men who have sex with men (MSM) remain the highest risk group for HIV in the United States.^{1,2} Syndemics or co-occurring epidemics of psychosocial health problems, such as substance abuse, victimisation, depression and childhood sexual abuse, disproportionately affect MSM and increase their risk of HIV infection.^{3,4} While documenting such risk factors is important to understanding HIV transmission among MSM, such deficit-based approaches ignore the existing strengths that allow the majority of MSM to remain HIV uninfected, despite known vulnerabilities. Recognising the potential utility of strengths-based models in preventing HIV, interventionists and public health program planners are increasingly calling for greater understanding of how MSM exhibit characteristics representative of HIV-risk resilience or positive adaptation in the face of HIV risk.⁵

More than an innate individual trait, resilience is conceptualised as a process that develops over time to equip individuals with the ability to overcome illness and social harms.⁶ HIV-risk resilience in the context of MSM sexual health includes the acquisition of skills or strategies to avoid acquiring HIV despite exposure to biological and syndemic risks (e.g. biological susceptibility through anal sex, experiencing homophobia, living in an area where HIV is prevalent, being a member of an at-risk group). Some MSM may internalise homophobic attitudes, leading to reduced self-esteem and increased sexual risk-taking.^{7,8} However, being out about one's sexual identity, as well as participating in civil rights activism, can combat internalised homophobia, in turn allowing men to remain resilient to HIV risk-taking.^{5,9}

While sexual adventurousism, or the engagement in diverse pleasurable activities, is common among MSM in high-income countries,^{10,11} and can include higher risk activities (e.g. condomless casual sex with multiple partners),¹² MSM have also been shown to engage in lower risk sexual adventurous activities such as the use of sex toys or role-playing.^{10,11} These creative sexual activities mark individual freedom, intimacy, transgression from heterosexual norms, pride in sexual identity and survival for MSM; thus, they may serve as a source of resilience among MSM.^{10,13} Other creative HIV-risk resilience strategies include serosorting or only engaging in sex with partners of the same HIV status^{14,15} and strategic positioning (i.e. being the insertive partner when having anal sex with an HIV-infected partner), which

may confer reduced susceptibility to HIV infection.^{16–18} Additionally, given that being under the influence of drugs or alcohol can lead to sexual risk-taking, some MSM abstain from drugs and alcohol.^{5,19} While multiple strengths exist within the MSM community and contribute to HIV-risk resilience, only one HIV-resilience framework developed by Herrick *et al.* (2011)⁵ explicitly defines how deficits may be overcome through the natural strengths of MSM.

The model by Herrick *et al.* conceptualises HIV-risk resilience based on six strengths that many MSM already use to remain resilient in the face of HIV risk.⁵ One key strength is *self-monitoring* or the establishment of personal limits when using drugs or alcohol and having sex to counter against poor decision-making and loss of control. Related to self-monitoring is *sexual creativity*, or the use of alternative strategies to create safe sexual expression and reduce the risk of HIV. Sexual creativity may involve practices such as serosorting, strategic positioning, only engaging in foreplay (i.e. non-penetrative sex) or safer sexually adventurous activities (e.g. sex toys, bondage, role playing) with partners of an unknown or HIV-infected status. Seeking *social support* is another strength, which counters loneliness and unhealthy relationships that can place people at risk for substance abuse, depression and sexual risk behaviour. While some individuals may have more opportunities for social support than others, *social creativity* can help isolated individuals find like-minded friends and realise they are not alone. Social creativity may involve seeking out gay, bisexual and other MSM through online meet-up groups, sports groups or other creative means. *Shamelessness* entails being out about one's sexual orientation/identity in order to counter the effects of homophobia (e.g. internalised homophobia and depression). It may also include a lack of shame about one's sexual practices or interests. Lastly, *volunteerism/social activism* counters social vulnerability to violence, victimisation and homophobia and may be achieved, for example, by participating in gay pride events, lobbying for marriage equality or workplace protections, or fundraising for local service organisations. Herrick *et al.* call for the integration of strengths-based approaches into HIV prevention interventions, noting that interventions using strengths-based frameworks may be more positively received and will therefore be more sustainable over time than interventions targeting deficits.^{5,20} However, developing effective and far-reaching resilience-based interventions requires identifying and measuring the specific strategies MSM utilise to stay HIV-uninfected, particularly in environments that may confer greater risks to MSM.

One popular environment that may facilitate HIV risk is the Internet, the primary venue used by many MSM to meet sexual partners.²¹ Sexual partner seeking on the Internet has been shown to be associated with an elevated frequency of condomless anal sex, sex with multiple partners and substance use before or during sex.^{19,22–25} While research suggests that men who engage in higher risk behaviours may be more likely to use the Internet to meet sex partners than those who typically engage in lower risk sexual activities, the Internet still provides a vehicle through which to easily access partners interested in engaging in high-risk sex.²⁶ Despite these risks, the Internet also provides several protective factors that can facilitate HIV-risk resilience. Indeed, qualitative research suggests that the Internet provides MSM with the ability to locate individuals and communities that are affirming of their sexuality.²⁷ Moreover, the relative anonymity of the Internet provides a judgment-free environment in which some men may communicate safer sex intentions or disclose their

HIV status or sexual orientation in their online profiles before meeting partners.^{27–30} Connecting with affirming communities can be considered a form of resilience against HIV risk-taking that allows MSM to counter homophobia. Similarly, communicating safer sex preferences and openly disclosing one's HIV status and sexual orientation may also serve as forms of resilience against HIV risk-taking, namely sexual creativity and shamelessness. Despite the potential for men to demonstrate HIV-risk resilience when seeking sex partners online, no studies, to our knowledge, have explicitly explored resilience in this setting.

Guided by the resilience framework proposed by Herrick *et al.* (2011),⁵ we sought to: (i) identify personal characteristics and sexual partnering intentions in the online profiles of HIV-uninfected MSM using content analysis procedures; and (ii) operationalise HIV-risk resilience using characteristics identified through content analysis. Understanding the strategies that MSM use to overcome HIV-risk vulnerabilities when seeking partners online could pave the way for Internet-based interventions that leverage individuals' natural strengths to support sexual safety and promote health.

Methods

Study population

In October 2011, we systematically extracted free and publicly accessible data from the online profiles of Boston-area members of a sexual networking website popular among racially diverse MSM in the USA.³¹ In order to protect the privacy of website members, the authors agreed not to disclose the name of the website used for data collection. All data collection procedures were in line with the terms of use of the website. Members were eligible for inclusion if they reported being male, resided in the Boston area, and identified as one of the four major racial/ethnic categories in the US (Black, White, Latino or Asian/Pacific Islander).^{27,32,33} In order to assess HIV-risk resilience, we also restricted our sample to men who self-reported being HIV-negative (and therefore potentially at risk for HIV) in their profile.

To capture variability by race/ethnicity, we utilised a stratified proportional sampling approach^{34,35} where the size of each strata (i.e. number of profiles sampled from a specific racial/ethnic group) was proportional to the population size of the strata (e.g. total number of profiles of a specific racial/ethnic group within the Boston area). To reach our target sample size for each race, we sampled every 5th Black, 15th White, 4th Latino and 2nd Asian profile, resulting in a final sample of 933 member profiles. Additional details concerning methodology and study procedures have been reported elsewhere.³⁶ This study was approved by the Institutional Review Board of Fenway Health.

Data collection and content analysis

When creating online profiles, members provide a variety of demographic and sexual preference information using checkboxes or open-text fields. We used content analysis to categorise data regarding demographics, partner preferences and behavioural intentions involving open and closed coding methods (see measures below).^{34–42} We developed a detailed codebook guided by website response options and coding schemes used in previous

research.^{19,27,33,40} Profile content was coded in the aggregate (frequency observed) and no identifying data (e.g. screen-names, photos, exact text) were recorded.

Measures

Demographics included categorical variables for *Age* (18–25, 26–35, 36–50, 50+ years) and *Race/ethnicity* (White, Black, Latino, Asian/Pacific Islander).

HIV-risk resilience was operationalised by selecting behavioural intentions that mapped onto the resilience constructs conceptualised by Herrick *et al.* (2011)⁵ and depicted in Table 1.

Shamelessness was represented in online profiles by men who indicated they were ‘out’ about their sexual orientation (i.e. *Out about sexual identity*), as disclosing one’s sexual orientation identity can address HIV vulnerability by countering homophobia. *Having a profile photo* also represented shamelessness as these men were willing to show a photo of themselves on a sex-seeking site for gay, bisexual and other MSM. Profile photos included both explicit (e.g. penis image) and non-explicit photos (e.g. face). *Sexual adventurousness* also demonstrated men’s shamelessness around endorsing diverse and/or stigmatised sexual practices in their online, publically accessible profiles. Sexual adventurousness included the endorsement of lower HIV risk sexual activities including: watersports (urinating); scat play (faeces play), rimming (oral anal sex), bondage/S&M, leather, nipple play, sex toys, webcam and miscellaneous fetishes.

Sexual creativity was represented in the online profiles of men who were *Serosorting* according to a potential partner’s HIV-negative status (i.e. looking for other HIV-negative men). Serosorting is a form of sexual creativity as it demonstrates the use of non-traditional methods (i.e. engaging in condomless sex with a partner of the same HIV status) to reduce one’s vulnerability to HIV. Men reporting a *Versatile* sexual position in their profile were also considered sexually creative, as they are capable of adapting to sexual positions that may confer less risk for HIV (i.e. strategic position as the insertive partner). *Sexual adventurousness* was also included, as these activities demonstrate men’s interest in engaging in creative sexual practices that are lower risk for HIV (e.g. webcam, role playing). Finally, creative forms of *Safer sex* were included under sexual creativity. As a website response option, the definition of safer sex could vary according to each user. While safer sex is traditionally considered to be the use of condoms, creative sexual practices such as the use of Pre-Exposure Prophylaxis (PrEP), serosorting, strategic positioning, and engaging in sex with HIV-positive partners with an undetectable viral load, may fall under the definition of safer sex for some users.

Self-monitoring was represented by men who *Did not endorse drug use* or who *Did not endorse alcohol use* in their profiles. While some of these men may use alcohol or drugs, the lack of promotion of substance use can serve as a form of self-monitoring against locating and ultimately engaging in substance use during sex with partners met online. Citing *Foreplay only* (e.g. kissing, oral sex, mutual masturbation) as one’s sexual position is also a form of self-monitoring indicative of an intention to not engage in penetrative sex. *Serosorting* represents another form of self-monitoring to protect against higher risk sex with

HIV-positive partners. Finally, men who endorsed *Safer sex only* were considered to be engaging in a form of self-monitoring to protect against sexual risk-taking.

Social support seeking was demonstrated by men who indicated that they were *Seeking friendships* and/or *Seeking a relationship* in their profile. Building a social support network through friendships or a relationship could aid in preventing or combating loneliness and subsequent sexual risk-taking.

Social creativity was also demonstrated by men *Seeking friendships* and/or *Seeking a relationship* in their profile, as the use of the Internet to form relationships represents a creative strategy to meet like-minded individuals and avoid the negative health sequelae of loneliness (e.g. substance abuse, depression, sexual risks).

The only strength that could not be measured through a content analysis of men's profiles was *volunteerism/social activism*.

By operationalising these strengths via content coding of online profile data, a continuous HIV-risk resilience variable was created. Specifically, a 1 was given to the endorsement of each of the 10 resilience components (i.e. *Sexual position: foreplay only or versatile; Out about sexual identity, Having a profile photo, Seeking friendship, Seeking a relationship, Serosorting, Did not endorse alcohol use, Did not endorse drug use, Sexual adventurousness, Safer sex*). The resilience components were then summed to create an HIV resilience sum score (minimum value = 0, no resilience indicators endorsed; maximum value = 10, all resilience indicators endorsed).

Statistical analyses

Descriptive statistics (means, frequencies) were calculated for the full sample. The variables of interest were selected based on the variables available to us in the pre-specified checkboxes and supplemented by coding of open-text fields. Linear regression analyses explored unadjusted and age-adjusted associations between demographic factors (i.e. age and race) and HIV-risk resilience (continuous outcome). Significance was determined at a *P*-value of < 0.05. Analyses were conducted using SAS v9.2.⁴³

Results

Sample characteristics and resilience

In a sample of 933 online profiles, the majority of men were between the ages of 18 and 35 years (76%) and were ethnically diverse (73.3% racial/ethnic minorities) (Table 2).

Men endorsed a variety of resilience indicators (range 0–9), and the mean number of resilience components endorsed was 5.2 (s.d. = 1.5; range 0–9). Nearly half (48%) reported being 'out' about their sexual orientation identity and 68.7% had a profile photo. The majority of men were seeking relationships (66.5%) and/or friendships (69.7%). The most commonly reported sexual position was versatile (53%). Only 3% cited foreplay only as their preferred sexual position.

Sexual partnering preferences that also contributed to the creation of our HIV-risk resilience variable included reporting a preference for safer sex only (endorsed by 76.3% of the sample) and sexual adventurism (21.4%). Serosorting by partner's HIV negative status was only identified in 2.5% of the profiles sampled. The majority of the sample did not endorse drug use (82.0%) and one-quarter (25.4%) did not endorse alcohol use in their profiles.

In bivariate analyses, age was not significantly associated with HIV-risk resilience ($B = 0.01$; $s.e. = 0.01$; $P = 0.57$). Race/ethnicity was significantly associated with HIV-risk resilience in bivariate and age-adjusted analyses. Specifically, Black race/ethnicity was associated with decreased HIV-risk resilience as operationalised here ($B = -0.59$; $s.e. = 0.13$; $P < 0.0001$), while Latino race/ethnicity ($B = 0.29$; $s.e. = 0.13$; $P = 0.03$) was associated with increased HIV-risk resilience, relative to White race/ethnicity. No significant differences were found by Asian race/ethnicity ($B = 0.03$; $s.e. = 0.16$; $P = 0.82$).

Discussion

Nearly three decades of HIV research has documented high rates of depression, substance use, victimisation and other co-occurring health problems that drive HIV transmission risk among MSM.^{3,4,44–47} Nevertheless, the majority of MSM remain HIV-uninfected and demonstrate characteristics representative of resilience or positive adaptation in the face of HIV vulnerabilities.^{48,49} Drawing on the framework developed by Herrick *et al.* (2011),⁵ our study is the first, to our knowledge, to operationalise and describe potential indicators of HIV-risk resilience in the online profiles of MSM seeking sex online. Using theoretically informed constructs, we defined resilience as the sum of 10 possible behavioural preferences or intentions that included: foreplay only or versatile sexual positions, being out about one's sexual orientation identity, having a profile photo, seeking friendship, seeking a relationship, serosorting, not endorsing alcohol use, not endorsing drug use, sexual adventurism and safer sex. Consistent with prior research,^{5,9,15,20,50,51} our content analysis of men's profiles revealed that men endorsed a variety of resilience indicators (mean = 5.2; $s.d. = 1.5$; range = 0–9), despite networking in an online environment that may confer HIV risk. These findings have important implications for efforts to promote sexual health among MSM seeking sex and other relationships with men online.

Recent literature suggests that interventions seeking to leverage the strengths men draw upon to stay safe and healthy (even in environments that can facilitate risk) can help reduce HIV vulnerability and improve sexual health in ways that are more sustainable than traditional risk- or deficits-focussed approaches.^{5,20} By mapping the resiliency attributes of our sample onto the strengths proposed by Herrick *et al.* (2011),⁵ our study highlights how *shamelessness* (represented by being out about one's sexual identity, having a profile photo and sexual adventurism), *sexual creativity* (represented by stating a preference for safer sex, having a versatile sexual position, serosorting and sexual adventurism), *self-monitoring* (represented by not endorsing drug or alcohol use, having a sexual position of foreplay only, serosorting and safer sex) and *social support and creativity* (represented by seeking friendships and/or relationships) indicators of risk resilience are shown in the online profiles of MSM. Such resilience components may counteract documented HIV vulnerabilities stemming from homophobia, sexual risk behaviour and loss of control, although additional

research is needed to better understand whether the endorsement of such online strengths actually contribute to HIV-risk resilience. Nonetheless, our study contributes to a growing body of evidence highlighting resiliency characteristics that could be considered and used in the design and implementation of theoretically informed, strengths-based HIV prevention interventions for men seeking relationships with other men online.

Our operationalisation of resilience represents a starting point at which to identify strategies men are using to remain HIV negative when seeking sex and other relationships online. When looking at demographic factors associated with HIV-risk resilience, age was not significantly associated with resilience in bivariate analyses. However, significant differences were found by race in bivariate and an age-adjusted model. Specifically, Latino race/ethnicity was positively associated with resilience, while Black race/ethnicity was negatively associated with resilience (all $P < 0.05$; referent = White race/ethnicity). A cautionary note regarding the interpretation of these preliminary analyses is warranted, as it is possible that certain groups (e.g. Black men) may possess other characteristics representative of resilience that were not captured here (e.g. activism, sex with partners with undetectable viral load). Mixed methods research is needed to understand the validity of our conceptualisation of HIV-risk resilience in diverse populations.

A key assumption of the resilience framework is that strengths such as safer sex intentions serve as protective factors against HIV risk.²⁰ The Theory of Planned Behaviour, which posits that behaviour change depends on both behavioural intentions and control,⁵² could shed light on the ways in which intentions could be leveraged for HIV prevention in online environments. In fact, a 2010 meta-analysis of behaviour change interventions delivered to diverse populations online found that those drawing from this theoretical perspective achieved substantial positive effects on reported health behaviours.⁵³ As many sexual networking websites allow users to specify their sexual preferences in their profiles, behavioural intentions could be recognised and harnessed to promote self-efficacy (behavioural control) and sustain positive sexual health behaviours (e.g. condom use, HIV serosorting, strategic positioning) within any partnerships that result. For example, counsellors could be available on partner-seeking websites to provide men with real-time guidance on the value of intentions in predicting behaviour and help men to problem solve any barriers in translating behavioural intentions into sexual practices. Weekly surveys could then assess whether intentions predict behaviours and counsellors could provide encouragement for any demonstration of behavioural strengths (e.g. self-monitoring) and offer resilience-oriented solutions (e.g. obtaining social support, sexual creativity) as strategies for any barriers men experienced. Pilot research, testing strength-focussed, sexual health interventions grounded in the theory of planned behaviour, are warranted among MSM.

While online HIV prevention programs for MSM have not yet utilised a resilience framework, recent research demonstrates the feasibility, acceptability and preliminary efficacy of Internet-based interventions targeting MSM.^{54–58} Moreover, existing sexual networking websites for MSM may be amenable to working with researchers to develop and evaluate services that promote sexual health and HIV-risk resiliency.⁵⁹ Examples might include interactive tools and tutorials illustrating how men can disclose their HIV status or

communicate diverse safer sex preferences (e.g. serosorting, PrEP use, condom use, foreplay only) with potential partners before sexual encounters. Research also suggests that some MSM already seek out websites aligned with their sexual risk preference; for example, those seeking condomless sex may access BarebackRT.com over other sites.²⁸ Thus, another possible strategy could be to develop a website designed specifically for MSM seeking safer sex. Efforts are needed to develop websites and interventions that draw on and promote existing HIV-risk resiliencies among diverse groups of MSM seeking sex online.

This study is a preliminary investigation of potential indicators of HIV-risk resilience present in the online profiles of MSM. In coding demographic and sexual partnering preferences, we were limited to collecting the data present in men's profiles, and thus were unable to assess other possible HIV-risk resiliencies such as volunteerism/activism (a strength proposed by Herrick *et al.*).⁵ Moreover, we were unable to determine how men conceptualised their endorsement of safer sex, including whether safer sex was limited to condom-protected sex or extended to more creative sexual activities such as serosorting, PrEP use and choosing partners with an undetectable viral load. Additionally, social desirability may have contributed to under-reporting of characteristics and intentions perceived as taboo or stigmatised (e.g. alcohol or drug use) within online profiles; although the anonymity of the Internet likely buffers against such concerns. Qualitative research assessing men's conceptualisation and online experiences with the six resilience components proposed by Herrick *et al.*⁵ is needed in order to fully operationalise HIV-risk resilience and to account for the limited data available in online profiles.

In conducting a content analysis of men's profiles, we were unable to assess the extent to which men's intentions reflect actual behaviours. However, as discussed above, health behaviour theories highlight how behavioural intentions often drive in-person practices; thus, we believe the HIV-risk resilience characteristics and intentions reported here may serve as proxies. Relatedly, while seeking friendships or a relationship demonstrates men's attempts to counter loneliness, it does not suggest that men actually have social support. Additional research is needed to determine the extent to which resilience intentions translate into real-life behaviours and resiliencies. It should also be noted that these HIV resilience indicators were identified in the online profiles of men using a non-mobile website in 2012. Since the data were collected, location-based applications (e.g. Grindr, Scruff) have become one of the primary social networking technologies men use to connect with other men.²⁶ Future research should consider how HIV-risk resilience may be conceptualised and harnessed via the use of location-based applications. Additionally, due to resource constraints, our sample was restricted to Boston-area members of a specific partner-seeking website; thus, findings may not generalise to MSM in other areas or on other websites. Finally, in using a resilience framework specific to HIV-uninfected men, we restricted our analytic sample to men who reported an HIV-negative status. Future research is needed to understand the factors that drive HIV transmission resilience among HIV-positive men so that strengths-based, sexual health and secondary HIV prevention interventions can be developed.

Despite these limitations, our study contributes to an emerging literature investigating how most of gay, bisexual and other MSM are able to remain HIV-uninfected despite heightened susceptibility and exposure to HIV and environments that confer risk.^{5,9,15,20,50,51} While a

rich body of evidence generated since the beginning of the HIV epidemic highlights how psychosocial deficits and risk behaviours may contribute to the disproportionate vulnerability to HIV experienced by MSM (e.g. depression, substance use, childhood sexual abuse, sexual risk behaviour),^{44,45,47,60,61} research is urgently needed to understand how HIV-risk resilience operates in different risk contexts. Our study extends the existing literature by demonstrating the presence of sexual resilience indicators among MSM seeking sex partners online. Future research should explore the extent to which sexual risk resilience characteristics and intentions described in the online profiles of MSM extend to actual practices and how Internet-based sexual health interventions can harness the strengths of MSM seeking partners online.

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References

1. Prejean J, Song R, Hernandez A, Ziebell R, Green T, Walker F, et al. Estimated HIV incidence in the United States, 2006–2009. *PLoS One*. 2011; 6:e17502.doi: 10.1371/journal.pone.0017502 [PubMed: 21826193]
2. Center for Disease Control and Prevention. HIV Mortality (through 2009). Atlanta, GA: US Department of Health and Human Services; 2013. Available online at: <http://www.cdc.gov/hiv/topics/surveillance/resources/slides/mortality/> [verified 8 April 2013]
3. Stall R, Mills TC, Williamson J, Hart T, Greenwood G, Paul J, et al. Association of co-occurring psychosocial health problems and increased vulnerability to HIV/AIDS among urban men who have sex with men. *Am J Public Health*. 2003; 93:939–42. DOI: 10.2105/AJPH.93.6.939 [PubMed: 12773359]
4. Mustanski B, Garofalo R, Herrick A, Donenberg G. Psychosocial health problems increase risk for HIV among urban young men who have sex with men: preliminary evidence of a syndemic in need of attention. *Ann Behav Med*. 2007; 34:37–45. DOI: 10.1007/BF02879919 [PubMed: 17688395]
5. Herrick A, Lim S, Wei C, Smith H, Guadamuz T, Friedman M, et al. Resilience as an untapped resource in behavioral intervention design for gay men. *AIDS Behav*. 2011; 15:25–9. DOI: 10.1007/s10461-011-9895-0
6. Fergus S, Zimmerman MA. Adolescent resilience: a framework for understanding healthy development in the face of risk. *Annu Rev Public Health*. 2005; 26:399–419. DOI: 10.1146/annurev.publhealth.26.021304.144357 [PubMed: 15760295]
7. Jeffries WL IV, Marks G, Lauby J, Murrill CS, Millett GA. Homophobia is associated with sexual behavior that increases risk of acquiring and transmitting HIV infection among black men who have sex with men. *AIDS Behav*. 2013; 17:1442–53. DOI: 10.1007/s10461-012-0189-y [PubMed: 22569942]
8. Mizuno Y, Borkowf C, Millett GA, Bingham T, Ayala G, Stueve A. Homophobia and racism experienced by Latino men who have sex with men in the United States: correlates of exposure and associations with HIV risk behaviors. *AIDS Behav*. 2012; 16:724–35. DOI: 10.1007/s10461-011-9967-1 [PubMed: 21630014]
9. Herrick AL, Stall R, Chmiel JS, Guadamuz TE, Penniman T, Shoptaw S, et al. It gets better: resolution of internalized homophobia over time and associations with positive health outcomes

among MSM. *AIDS Behav.* 2013; 17:1423–30. DOI: 10.1007/s10461-012-0392-x [PubMed: 23283578]

10. Smith, G.; Worth, H.; Kippax, S. Sexual adventurism among Sydney gay men. Sydney: National Centre in HIV Social Research, Faculty of Arts and Social Sciences, the University of New South Wales; 2004.
11. Kippax S, Campbell D, Van de Ven P, Crawford J, Prestage G, Knox S, et al. Cultures of sexual adventurism as markers of HIV seroconversion: a case control study in a cohort of Sydney gay men. *AIDS Care.* 1998; 10:677–88. DOI: 10.1080/09540129848307 [PubMed: 9924523]
12. DiFranceisco W, Ostrow DG, Chmiel JS. Sexual adventurism, high-risk behavior, and human immunodeficiency virus-1 seroconversion among the Chicago MACS-CCS cohort, 1984 to 1992: a case-control study. *Sex Transm Dis.* 1996; 23:453–60. DOI: 10.1097/00007435-199611000-00003 [PubMed: 8946628]
13. Batrouney, C. Gay men and sexual adventurism: where to from here?. Sydney: National Centre in HIV Social Research, the University of New South Wales; 2009.
14. Philip SS, Yu X, Donnell D, Vittinghoff E, Buchbinder S. Serosorting is associated with a decreased risk of HIV seroconversion in the EXPLORE study cohort. *PLoS One.* 2010; 5:e12662.doi: 10.1371/journal.pone.0012662 [PubMed: 20844744]
15. Kurtz SP, Buttram ME, Surratt HL, Stall RD. Resilience, syndemic factors, and serosorting behaviors among HIV-positive and HIV-negative substance-using MSM. *AIDS Educ Prev.* 2012; 24:193–205. DOI: 10.1521/aeap.2012.24.3.193 [PubMed: 22676460]
16. Parsons JT, Schrimshaw EW, Wolitski RJ, Halkitis PN, Purcell DW, Hoff CC, et al. Sexual harm reduction practices of HIV-seropositive gay and bisexual men: serosorting, strategic positioning, and withdrawal before ejaculation. *AIDS.* 2005; 19:S13–25. DOI: 10.1097/01.aids.0000167348.15750.9a
17. Van De Ven P, Kippax S, Crawford J, Rawstorne P, Prestage G, Grulich A, et al. In a minority of gay men, sexual risk practice indicates strategic positioning for perceived risk reduction rather than unbridled sex. *AIDS Care.* 2002; 14:471–80. DOI: 10.1080/09540120208629666 [PubMed: 12204150]
18. Jin F, Crawford J, Prestage GP, Zablotska I, Imrie J, Kippax SC, et al. HIV risk reduction behaviours in gay men: unprotected anal intercourse, risk reduction behaviours, and subsequent HIV infection in a cohort of homosexual men. *AIDS.* 2009; 23:243–52. DOI: 10.1097/QAD.0b013e32831fb51a [PubMed: 19098494]
19. Bull SS, McFarlane M. Soliciting sex on the Internet: what are the risks for sexually transmitted diseases and HIV? *Sex Transm Dis.* 2000; 27:545–50. DOI: 10.1097/00007435-200010000-00008 [PubMed: 11034529]
20. Herrick AL, Stall R, Goldhammer H, Egan JE, Mayer KH. Resilience as a research framework and as a cornerstone of prevention research for gay and bisexual men: theory and evidence. *AIDS Behav.* 2013; 18:1–9.
21. Liao A, Millett G, Marks G. Meta-analytic examination of online sex-seeking and sexual risk behavior among men who have sex with men. *Sex Transm Dis.* 2006; 33:576–84. DOI: 10.1097/01.olq.0000204710.35332.c5 [PubMed: 16540884]
22. White J, Mimiaga M, Reisner S, Mayer K. HIV sexual risk behavior among Black men who meet other men on the Internet for sex. *J Urban Health.* 2012; 90:1–18.
23. Garofalo R, Herrick A, Mustanski BS, Donenberg GR. Tip of the iceberg: young men who have sex with men, the Internet, and HIV risk. *Am J Public Health.* 2007; 97:1113–7. DOI: 10.2105/AJPH.2005.075630 [PubMed: 17463378]
24. Berg R. Barebacking among MSM Internet users. *AIDS Behav.* 2008; 12:822–33. DOI: 10.1007/s10461-007-9281-0 [PubMed: 17676278]
25. Benotsch E, Kalichman S, Cage M. Men who have met sex partners via the Internet: prevalence, predictors, and implications for HIV prevention. *Arch Sex Behav.* 2002; 31:177–83. DOI: 10.1023/A:1014739203657 [PubMed: 11974643]
26. Grov C, Breslow AS, Newcomb ME, Rosenberger JG, Bauermeister JA. Gay and bisexual men's use of the Internet: research from the 1990s through 2013. *J Sex Res.* 2014; 51:390–409. DOI: 10.1080/00224499.2013.871626 [PubMed: 24754360]

27. Paul J, Ayala G, Choi K-H. Internet sex ads for MSM and partner selection criteria: the potency of race/ethnicity online. *J Sex Res.* 2010; 47:528–38. DOI: 10.1080/00224490903244575 [PubMed: 21322176]
28. Grov C, Agyemang L, Ventuneac A, Breslow AS. Navigating condom use and HIV status disclosure with partners met online: a qualitative pilot study with gay and bisexual men from Craigslist.org. *AIDS Educ Prev.* 2013; 25:72–85. DOI: 10.1521/aeap.2013.25.1.72 [PubMed: 23387953]
29. Grov C, Hirshfield S, Remien RH, Humberstone M, Chiasson MA. Exploring the venue's role in risky sexual behavior among gay and bisexual men: an event-level analysis from a national online survey in the US. *Arch Sex Behav.* 2013; 42:291–302. DOI: 10.1007/s10508-011-9854-x [PubMed: 22012413]
30. Chiasson MA, Hirshfield S, Remien RH, Humberstone M, Wong T, Wolitski RJ. A comparison of on-line and off-line sexual risk in men who have sex with men: an event-based on-line survey. *J Acquir Immune Defic Syndr.* 2007; 44:235–43. DOI: 10.1097/QAI.0b013e31802e298c [PubMed: 17179769]
31. Wohlfeiler, D.; Hecht, J.; Raymond, HF.; Kennedy, T.; McFarland, W. How can we improve HIV and STD prevention online for MSM?. Available online at: <http://www.stdpreventiononline.org/index.php/resources/download/1720> [verified 31 July 2015]
32. Raymond H, McFarland W. Racial mixing and HIV risk among men who have sex with men. *AIDS Behav.* 2009; 13:630–7. DOI: 10.1007/s10461-009-9574-6 [PubMed: 19479369]
33. Wilson P, Valera P, Ventuneac A, Balan I, Rowe M, Carballo-Díéguez A. Race-based sexual stereotyping and sexual partnering among men who use the Internet to identify other men for Bareback sex. *J Sex Res.* 2009; 46:399–413. DOI: 10.1080/00224490902846479 [PubMed: 19337934]
34. Neuendorf, K. The content analysis guidebook. Thousand Oaks, CA: Sage; 2002.
35. Riffe, D.; Lacy, S.; Fico, FG. Analyzing media messages: using quantitative content analysis in research. 2. Mahwah, NJ: Lawrence Erlbaum; 2005.
36. White JM, Reisner SL, Dunham E, Mimiaga MJ. Race-based sexual preferences in a sample of online profiles of urban men seeking sex with men. *J Urban Health.* 2014; 91:768–75. [PubMed: 24496568]
37. Feliciano C, Robnett B, Komaie G. Gendered racial exclusion among white Internet daters. *Soc Sci Res.* 2009; 38:39–54. DOI: 10.1016/j.ssresearch.2008.09.004 [PubMed: 19569291]
38. Phua V, Kaufman G. The crossroads of race and sexuality: date selection among men in Internet “personal” ads. *J Fam Issues.* 2003; 24:981–94. DOI: 10.1177/0192513X03256607
39. Krippendorff, K. Content analysis: an introduction to its methodology. Thousand Oaks, CA: Sage Publications; 2004.
40. Klein H. HIV risk practices sought by men who have sex with other men, and who use Internet websites to identify potential sexual partners. *Sex Health.* 2008; 5:243–50. DOI: 10.1071/SH07051 [PubMed: 18771639]
41. Hatala MN, Prehodka J. Content analysis of gay male and lesbian personal advertisements. *Psychol Rep.* 1996; 78:371–4. DOI: 10.2466/pr0.1996.78.2.371 [PubMed: 9148289]
42. Strauss, A.; Corbin, J. Grounded theory in practice. Thousand Oaks, CA: Sage Publishing; 1997.
43. SAS Institute Inc. SAS[®] version 9.2. Cary, NC: SAS Institute Inc; 2003.
44. Ciesla JA, Roberts JE. Meta-analysis of the relationship between HIV infection and risk for depressive disorders. *Am J Psychiatry.* 2001; 158:725–30. DOI: 10.1176/appi.ajp.158.5.725 [PubMed: 11329393]
45. Mimiaga MJ, Noonan E, Donnell D, Safren SA, Koenen KC, Gortmaker S, O'Cleirigh C, Chesney MA, Coates TJ, Koblin BA, Mayer KH. Childhood sexual abuse is highly associated with HIV risk-taking behavior and infection among MSM in the EXPLORE study. *JAIDS.* 2009; 51:340–8. DOI: 10.1097/QAI.0b013e3181a24b38 [PubMed: 19367173]
46. Beyrer C, Baral SD, van Griensven F, Goodreau SM, Chariyalertsak S, Wirtz AL, et al. Global epidemiology of HIV infection in men who have sex with men. *Lancet.* 2012; 380:367–77. DOI: 10.1016/S0140-6736(12)60821-6 [PubMed: 22819660]

47. Mimiaga MJ, Reisner SL, Grasso C, Crane HM, Safren SA, Kitahata MM, Schumacher JE, Mathews WC, Mayer KH. Substance use among HIV-infected patients engaged in primary care in the United States: findings from the Centers for AIDS Research Network of Integrated Clinical Systems cohort. *Am J Public Health*. 2013; 103:1457–67. DOI: 10.2105/AJPH.2012.301162 [PubMed: 23763417]
48. Centers for Disease Control and Prevention. Prevalence and awareness of HIV infection among men who have sex with men—21 cities, United States, 2008. *MMWR Morb Mortal Wkly Rep*. 2010; 59:1201–7. [PubMed: 20864920]
49. Centers for Disease Control and Prevention. HIV surveillance in men who have sex with men (MSM). 2013. Available online at: <http://www.cdc.gov/hiv/topics/msm/pdf/msm.pdf> [verified 31 July 2015]
50. Stall, R.; Friedman, M.; Catania, JA. Interacting epidemics and gay men's health: a theory of syndemic production among urban gay men. In: Wolitiski, RJ.; Stall, R.; Valdiserri, RO., editors. *Unequal Opportunity: Health Disparities Affecting Gay and Bisexual Men in the United States*. New York: Oxford University Press; 2008. p. 251–74.
51. Reed SJ, Miller RL. Thriving and adapting: resilience, sense of community, and syndemics among young Black gay and bisexual men. *Am J Community Psychol*. 2016; 1(57):129–43. DOI: 10.1002/ajcp.12028
52. Ajzen, I. From intentions to actions: a theory of planned behavior. In: Kuhl, J.; Beckmann, J., editors. *Action control: from cognition to behavior*. Berlin: Springer-Verlag; 1985. p. 11–39.
53. Webb TL, Joseph J, Yardley L, Michie S. Using the Internet to promote health behavior change: a systematic review and meta-analysis of the impact of theoretical basis, use of behavior change techniques, and mode of delivery on efficacy. *J Med Internet Res*. 2010; 12:e4.doi: 10.2196/jmir.1376 [PubMed: 20164043]
54. Bowen AM, Horvath K, Williams ML. A randomized control trial of Internet-delivered HIV prevention targeting rural MSM. *Health Educ Res*. 2007; 22:120–7. DOI: 10.1093/her/cyl057 [PubMed: 16849391]
55. Chiasson MA, Shaw FS, Humberstone M, Hirshfield S, Hartel D. Increased HIV disclosure three months after an online video intervention for men who have sex with men (MSM). *AIDS Care*. 2009; 21:1081–9. DOI: 10.1080/09540120902730013 [PubMed: 20024766]
56. Christensen JL, Miller LC, Appleby PR, Corsbie-Massay C, Godoy CG, Marsella SC, et al. Reducing shame in a game that predicts HIV risk reduction for young adult men who have sex with men: a randomized trial delivered nationally over the web. *J Int AIDS Soc*. 2013; 16(3, Suppl 2):1–8. [PubMed: 24008177]
57. Lelutiu-Weinberger C, Pachankis J, Gamarel K, Surace A, Golub S, Parsons J. Feasibility, and preliminary efficacy of a live-chat social media intervention to reduce HIV risk among young men who have sex with men. *AIDS Behav*. 2014; 19:1–14.
58. Pachankis JE, Lelutiu-Weinberger C, Golub SA, Parsons JT. Developing an online health intervention for young gay and bisexual men. *AIDS Behav*. 2013; 17:2986–98. DOI: 10.1007/s10461-013-0499-8 [PubMed: 23673791]
59. Rosenberger JG, Reece M, Novak DS, Mayer KH. The Internet as a valuable tool for promoting a new framework for sexual health among gay men and other men who have sex with men. *AIDS Behav*. 2011; 15:88–90. DOI: 10.1007/s10461-011-9897-y
60. Mimiaga MJ, Biello K, Reisner SL, Crane HM, Wilson J, Grasso C, Kitahata MM, Mathews WC, Mayer KH, Safren SA. Latent class profiles of internalizing and externalizing psychosocial health indicators are differentially associated with sexual transmission risk: findings from the CFAR network of integrated clinical systems (CNICS) cohort study of HIV-infected men engaged in primary care in the United States. *Health Psychol*. 2015; 34:951–9. DOI: 10.1037/hea0000189 [PubMed: 25642839]
61. Mimiaga MJ, O'Cleirigh C, Biello KB, Robertson AM, Safren SA, Coates TJ, Koblin BA, Chesney MA, Donnell DJ, Stall RD, Mayer KH. The effect of psychosocial syndemic production on 4-year HIV incidence and risk behavior in a large cohort of sexually active men who have sex with men. *JAIDS*. 2015; 68:329–36. DOI: 10.1097/QAI.0000000000000475 [PubMed: 25501609]

Table 1

Framework for conceptualising and measuring HIV-related resilience within the online profiles of men who have sex with men using a sexual networking website

Resilience strength ^A	Online characteristics addressing HIV-related resilience	HIV-related deficit (risks addressed)
Shamelessness	Being out, having a profile photo, sexual adventurism	Counters homophobia (internalised homophobia, depression)
Sexual creativity	Serosorting, versatile sexual position, creative safer sex strategies, sexual adventurism	Counters HIV risk (alternative strategies to create safe sexual expression)
Self-monitoring	Foreplay only sexual position, serosorting, safer sex, didn't endorse drug or alcohol use	Counters loss of control (substance abuse, depression, sexual risks)
Social support	Seeking friendships and/or relationship	Counters unhealthy social relationships, loneliness (substance abuse, depression, sexual risks)
Social creativity	Seeking friendships and/or relationship	Counters loneliness, lack of social support (internalised homophobia, depression)
Volunteerism/social activism	<i>B</i>	Counters social vulnerability (violence victimisation, homophobia)

^A As proposed by Herrick *et al.*, (2011)⁵

^B No variable related to volunteerism among our sample.

Table 2

Demographic, substance use and sexual risk preferences by HIV-risk resilience as reported in the profiles of Boston-area men seeking men on a sexual networking site for MSM ($n = 933$)

Demographics	<i>n</i>	%
Age (years)		
18–25	344	37.0
26–35	359	39.0
36–50	191	20.5
>50	39	4.2
Race/Ethnicity		
White	250	27.0
Black	170	29.0
Asian	142	15.2
Latino	271	29.1
Resilience (mean, s.d.)		
Range 0–9	1.52	5.18
No. of resilience components endorsed		
0	2	0.2
1	8	0.9
2	32	3.4
3	82	8.8
4	168	18.0
5	241	25.8
6	215	23.0
7	139	14.9
8	43	4.6
9	3	0.3
Resilience components		
Sexual position		
Foreplay only	23	3.0
Versatile	497	53.3
Out about sexual identity	447	48.0
Having a profile photo	641	68.7
Seeking friendship	620	66.5
Seeking a relationship	650	69.7
Did not endorse alcohol use	237	25.4
Did not endorse drug use	763	82.0
Serosorting	23	2.5
Sexual adventurism	200	21.4
Safer sex	712	76.3

Note: Percentages may exceed 100% due to rounding. Serosorting, seeking partner of the same HIV status (i.e. HIV negative); sexual adventurism, activities that are low risk for the transmission/acquisition of HIV including watersports (urinating); scat play (faeces play), rimming (oral anal sex), bondage/S&M, leather, nipple play, sex toys, webcam and miscellaneous fetishes; safer sex, specified preference for safer sex only