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Psychological threat avoidance as a barrier to HIV testing in gay/bisexual men

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Abstract The present study examined how three psychosocial barriers—anticipated HIV stigma, HIV infectiousness-reduction beliefs, and optimism about available HIV treatments—related to HIV testing history and acceptance of an at-home HIV test among men who have sex with men. We also examined the mediating role of a variable that affects medical screening for other health conditions but has not yet been investigated in HIV contexts: the tendency to avoid psychologically threatening information. Volunteers completed a paper and pencil survey and were offered a free at-home HIV test during the 2015 Atlanta Pride Festival in Atlanta, GA. Anticipated HIV stigma, infectiousness beliefs, and treatment optimism were inconsistently related to HIV testing history and acceptance of an at-home HIV test, but all had direct effects on the desire to avoid HIV information. In a mediation model, each of these psychosocial barriers had indirect effects on both HIV testing outcomes via information avoidance. These findings suggest that information avoidance is an important proximal HIV testing barrier, thus providing a novel target for interventions and information campaigns.

Keywords HIV testing · Decision making · Psychosocial barriers · Medical testing · MSM

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Despite advances in HIV treatment and testing technologies, new infections currently outpace prevention efforts. In 2015, the Centers for Disease Control and Prevention (CDC) reported 39,513 new HIV infections in the United States (Centers for Disease Control and Prevention, 2015b). The geographic epicenter of HIV diagnoses has shifted geographically since early diagnoses (e.g., 1981), from the northeast and west coast to the southern United States (Centers for Disease Control and Prevention, 2016a). Atlanta, Georgia, for example, ranked first among cities for number of new HIV infections in 2015 (Centers for Disease Control and Prevention, 2015a). Men who have sex with men (MSM) remain the predominant group affected by HIV infection, accounting for approximately two-thirds of all new HIV infections each year (Centers for Disease Control and Prevention, 2016b). As the diagnostic gateway to care, the CDC has focused on HIV testing, recommending that sexually active MSM get tested every 4–6 months (Centers for Disease Control and Prevention, 2014a). Despite intensive efforts to increase testing rates—including no longer requiring time-consuming risk reduction counseling, and the availability of rapid testing—an

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estimated 1 in 5 people living with HIV remain unaware of their HIV positive status (Centers for Disease Control and Prevention, 2016b). For the CDC's HIV prevention policy to succeed, barriers to HIV testing among MSM in the southern U.S. must be identified and addressed.

Factors influencing HIV screening

Because the number of people who are unaware of their HIV status has remained fairly stable, researchers have mounted efforts to try to understand psychosocial factors that may prevent someone at risk for HIV from getting tested. A recent review of psychological deterrents of HIV testing revealed that most research has focused on anticipated HIV stigma as a barrier to screening (Lorenc et al., 2011). Both anticipated internalized HIV stigma (e.g., concerns about feeling devalued if HIV positive) and anticipated enacted stigma/discrimination (e.g., being mistreated by family and friends) may impede testing. For instance, Bolsewicz and colleauges (Bolsewicz et al., 2015) found that gay men in the UK, Australia, and Canada cited HIV related stigma as barriers to HIV testing, including threats to self-worth and concerns about discrimination from others. Anticipated HIV stigma is especially harmful for those who already hold a stigmatized identity (e.g., sexual minorities, injection drug users, sex workers), as the threat of an added stigma may lead to even more avoidance of learning their HIV status (Nunn et al., 2012).

HIV testing behavior is also influenced by people's (often inaccurate) knowledge about available treatments, including their beliefs about their ability to control an HIV infection, and their optimism about how treatment outcomes may affect their lifestyle (Lorenc et al., 2011). For example, African American men report that they avoid testing because they view a positive diagnosis as a "death sentence" that no medication could prevent or control (Wallace et al., 2011). Additionally, men and women in a black South African township were less likely to undergo HIV testing if they had less optimistic views about HIV treatments or they believed they would have less control over the virus (Kalichman & Simbayi, 2003). Across multiple studies, MSM reported that they avoided testing because they feared that their quality of life would significantly deteriorate as a result of HIV treatment (Lorenc et al., 2011).

Unfortunately, many studies of barriers to HIV testing focus on one or two psychosocial predictors of HIV testing, without identifying the underlying psychological mechanisms of these predictors. As a result, prior research has missed a broader foundational underpinning that may greatly influence psychosocial barriers to testing: the tendency to avoid psychologically threatening information.

Health information avoidance

Research on health information avoidance suggests that people will actively avoid health information if they think that learning the health information will threaten how they think, feel, or behave (Sweeny et al., 2010). Information avoidance theorists emphasize psychological threat—whether emotional, cognitive, or behavioral—as the common mechanism underpinning the decision to "say no" to available, but potentially unwanted, information (Sweeny & Miller, 2012). They have successfully applied this health information avoidance framework to predict screening avoidance behavior for a variety of health conditions including cancer and diabetes (Howell & Shepperd, 2013; van Koningsbruggen & Das, 2009), heart disease (Howell et al., 2016), and UV-related skin damage (Dwyer et al., 2015).

In the current research, we apply the health information avoidance framework to better understand the association between commonly observed psychosocial barriers and the avoidance of HIV testing. We expected this framework—and the resulting information avoidance variable tested in this research—to be particularly applicable to the context of HIV testing both because it has been successful in predicting avoidance of medical screening for other serious conditions, and because prior work has demonstrated that HIV testing avoidance emerges in the presence of threats to affect, cognition, and behavior. For instance, consistent with an affective-threat motive for avoidance, "late" HIV testers (i.e., those who are simultaneously diagnosed with AIDS and HIV due to delayed testing) frequently report that they avoided earlier testing due to fear and anxiety (Dowson et al., 2012). Similarly, in one study one of African sex workers and their clients, several indicated that they would not want to learn their HIV status because it would have negative affective consequences (Varga, 2001), with one client reporting that an HIV diagnosis would make him a "slave to fear" (p. 329). Consistent with a cognitive-threat motive, prior work suggests those who hold the greatest stigma about HIV/AIDS are least likely to be tested (Bolsewicz et al., 2015; Kalichman & Simbayi, 2003). That is, believing that people with HIV are somehow inferior can cause testing avoidance, as people aim not to change their own self-views and self-esteem by becoming a member of a stigmatized group (Bolsewicz et al., 2015). Last, consistent with a behavioral-threat motive for avoidance, at-risk participants in another study were much more likely to enroll in an HIV prevention counseling session when they were told it might not change their behavior but would give them options for prevention, than when they were told it was very likely to change their behavior (Albarracín et al., 2008).

Despite evidence that the health information avoidance framework fits the existing HIV testing literature, we know of no study that has examined whether the broader motivation to avoid psychological threat may undergird the variety of identified psychosocial barriers to screening (e.g., anticipated HIV stigma, HIV infectiousness-reduction beliefs, and low HIV treatment optimism). Applying the health information avoidance framework can help organize the seeming proliferation of HIV testing avoidance motives into a more proximal and singular target for intervention. Thus, in the current study, we apply the health information avoidance framework to our examination of how psychosocial barriers impact past and present HIV testing avoidance.

The present investigation

The current study advances the HIV testing literature by examining the unique predictive power of the health information avoidance framework in explaining HIV testing behavior. We specifically investigated whether HIV test result avoidance (termed *information avoidance*) mediates the relationship between previously examined psychosocial barriers to HIV testing—anticipated HIV stigma, HIV infectiousness-reduction beliefs, and optimism about available HIV treatments—and HIV testing behavior. We examined the impact of these psychosocial barriers in relation to HIV testing history, as well as current interest in self-testing (i.e., participants' decision to receive an at-home HIV test for self-testing). Consistent with prior literature, we hypothesized that anticipated HIV stigma, HIV infectiousness-reduction beliefs, and optimism about available HIV treatments would be directly associated with both HIV testing history (Hypothesis 1) and interest in self-testing via an at-home HIV test (Hypothesis 2). Moreover, because the health information avoidance framework proposes an underlying psychological defense mechanism activated by threatening health information, and thus encompasses each of these psychosocial barriers, we expected *information avoidance* to mediate the association between the three psychosocial barriers and both forms of HIV testing behavior. That is, we expected indirect effects of each of the barriers on testing behaviors through a tendency to avoid psychological threat (Hypothesis 3).

Methods

Participants

Participants were male volunteers attending the 2015 Atlanta Pride Festival in Atlanta, GA. A total of 491 men between the ages of 18 and 81 completed anonymous surveys. Of our initial participants, 362 identified as gay, 40 identified as bisexual, 68 identified as heterosexual, and 21 identified as "other." We removed 192 men from the analysis who (a) did not report having sex with men in the past 4 months (n = 127)—we wanted to focus on the high-risk sexually-active MSM group—and (b) who reported an HIV positive status (n = 65), as HIV testing is irrelevant to this group.

The final sample for all analyses reported here was 299 MSM who were sexually active and did not have a known HIV positive test result. The average age was 33 years old (SD = 12.60), 70% identified as white, and the majority (95%) identified as gay or bisexual. Additionally, power analyses for SEM are complex and vary quite a bit depending on a number of factors including sample size, percentage of variance explained, and number of elements in the model (see Wolf et al., 2013). While we did not conduct formal power analysis given the complexities and variability of the sample and analyses, the final sample was greater than the size recommended by various of rules-of-thumb: (1) it was over N = 200 (Boomsma, 1985), (2) contained more than 10 cases per variable (which would have required 60 in our largest model; Nunnally, 1967), and (3) contained more than 10 observations per estimated parameter (which would require 140 participants in our largest model; Bollen, 1989).

Procedure

Trained field-staff members approached Festival attendees and asked the attendees if they would be willing to complete a 10-min survey on LGBT health. The participants took the survey in a paper and pencil booklet. Participants were compensated $5 for their time, and an additional $3 was given to an Atlanta-based HIV support program for each survey collected. The staff also gave participants the opportunity to receive a free, at-home HIV test in the mail and recorded their decision.

Measures

Our measures were divided into four primary sections: demographics, sexual history, psychosocial barriers, and HIV testing. Means for all continuous measures are presented in the final row of Table 1. Frequencies for all

Table 1 MSM partitioned by their HIV testing history and by at-home HIV testing request (N = 299)

Characteristic	HIV testing history					At-home HIV test			
	Recently tested %(*N*)	Not recently tested %(*N*)	Never tested %(*N*)	χ^2	Φ	Requested %(*N*)	Rejected %(*N*)	χ^2	Φ
Race									
Minority	33 (52)	25 (21)	32 (17)	1.73	0.08	33 (48)	27 (42)	1.30	0.07
White	67(107)	75(64)	68(37)			67(96)	73(112)		
Employment									
Employed	75 (118)	71 (60)	58 (32)	14.76*	0.22	69 (99)	72 (111)	5.74	0.14
Unemployed	25 (40)	29 (25)	42 (23)			31 (44)	28 (44)		
Income									
< $30,000	35 (56)	42 (35)	54 (29)	15.89	0.23	43 (61)	39 (59)	3.41	0.11
> $30,000	65 (103)	58 (47)	46 (25)			57 (81)	61 (94)		
Marital status									
Not married	90 (141)	80 (68)	84 (46)	4.96	0.13	92 (130)	81 (125)	7.28*	0.16
Married	10 (16)	20 (17)	17 (9)			8 (12)	19 (30)		
Sexual orientation									
Gay	89 (142)	88 (74)	72 (39)	15.55*	0.23	89 (128)	83 (127)	5.20	0.13
Bisexual	9 (15)	6 (5)	19 (10)			9 (11)	12 (19)		
Heterosexual	0 (0)	4 (3)	6 (3)			3 (4)	1 (2)		
Other	1 (2)	2 (2)	4 (2)			1 (1)	4 (5)		
Outness									
Not out	2 (3)	6 (5)	13 (7)	12.00*	0.20	3 (4)	7 (11)	3.58	0.11
Sometimes out	27 (43)	21 (18)	29 (16)			29 (41)	23 (36)		
Out	71 (113)	72 (62)	58 (32)			69 (99)	70 (108)		

Characteristic	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*F*	η^2	*M* (*SD*)	*M* (*SD*)	*t*	d
Age	32.0 (11.62)	36.1 (13.62)	30.1 (12.87)	4.62*	0.17	34.5 (13.90)	31.1 (10.81)	2.39*	0.28
Education	9.97 (2.04)	9.33 (2.43)	9.5 (2.30)	2.65	0.07	9.8 (2.02)	9.6 (2.40)	0.98	0.11
No. of male sex partners in last 4 months	4.08 (6)	2.4 (3.96)	8.16 (36.63)	2.13	0.08	2.99 (6.05)	5.81 (22.81)	− 1.43	− 0.17
No. of times HIV tested	14.12 (57.17)	4.68 (6.26)	2.5 (3.41)	2.01	0.41	11.58 (59.66)	7.44 (7.70)	0.81	0.10

If values do not add up in the cells, it is due to some missing data

*$p < .05$. **$p < .01$. ***$p < .001$

categorical measures are presented in the first four columns of Table 1.

Demographic characteristics

Participants reported their age, race, education, income, employment status, relationship status, sexual orientation (i.e., gay, bisexual, heterosexual, other), and the extent to which they were "out" about their sexual orientation. The response options included "not 'out' about my sexual orientation" and "'out' about my sexual orientation." Participants also reported their alcohol use, drug use, and sexual behavior as a means of describing the participant's potential risk for HIV, but these were not used in the current study and are not reported here.

Sexual history

Sexual partners and sexual behavior

Participants completed six items about their sexual behavior. Items are similar to those used in previous HIV studies (Kalichman et al., 2007). Participants reported their number of male and female sex partners. All items referred to the previous 4 months of sexual activity.

Psychosocial barriers

HIV test result avoidance

We adapted the 9-item Information Avoidance Scale (Howell & Shepperd, 2016) to assess an overall tendency

to avoid HIV testing and knowing one's HIV status. Example items include, "I can think of situations in which I would rather not know my HIV status" and, "Even if it will upset me, I want to know my HIV status." Participants indicated whether the item was true for them (0) or not true for them (1). A summary score was calculated such that a higher score meant higher desire to avoid one's HIV status ($\alpha = 0.90$).[1]

Anticipated HIV stigma

We used nine items from Earnshaw's validated HIV Stigma scales to assess endorsements of HIV stigma (Earnshaw et al., 2013). An example item included, "I would worry that people would reject me if I tested positive for HIV." Items were presented on 4-point Likert scales (1 = *Strongly disagree*; 4 = *Strongly agree*), and were coded such that higher scores indicated higher levels of anticipated HIV stigma ($\alpha = 0.90$).

HIV infectiousness-reduction beliefs

To assess participants' beliefs about the infectiousness of HIV, we used the 3-item HIV infectiousness-reduction beliefs scale (Kalichman et al., 2007). An example item included, "HIV positive persons who take HIV medications are less likely to infect their sex partners." Participants responded to the items on 4-point Likert scales (1 = *Strongly disagree*; 4 = *Strongly agree*). Responses were coded such that higher scores indicated a stronger belief that HIV positive people who were taking HIV medications could become less infectious ($\alpha = 0.76$).

HIV treatment optimism beliefs

To assess beliefs about the efficacy of HIV medication and treatment, we used the 3-item HIV treatment optimism beliefs scale (Kalichman et al., 2007). An example item included, "Because of HIV medications, people living with HIV can have a normal and healthy life." Responses were made on 4-point Likert scales (1 = *Strongly disagree*; 4 = *Strongly agree*), and were coded such that higher scores indicated more optimism about the outcomes of those undergoing HIV treatments ($\alpha = 0.73$).

[1] As we would expect given the nature of its measurement, the information avoidance scale was positively skewed. However, transforming the scale using a Log_{10} transformation (i.e., making the data normal) did not influence the pattern of results presented here.

HIV testing

HIV testing history

Participants indicated whether they had ever been tested for HIV (*yes, no*), the date of last test, and if they had been tested, the results of their most recent test (*positive, negative*). We used these responses to create three subgroups of participants based on the time since they were last tested for HIV. These subgroups included those who reported having never been tested ("never tested"); those who had been tested, but not in the last year ("not recently tested"); and those who had been HIV tested in the last year ("recently tested"). This grouping variable represented our primary dependent measure of HIV testing history.

Current interest in self-testing

At the end of the survey, participants had the opportunity to choose to receive a free, at-home HIV test. Specifically, they responded to the item, "Would you like to receive a free at-home HIV test in the mail?" Response options were "yes," "yes, to give to someone else," and "no." Their choice represented our primary dependent measure of current testing behavior. Participants who responded "yes, to give to someone else" were excluded from the analyses regarding HIV testing uptake ($n = 23$).

Data analysis

To assess whether demographics predicted HIV testing history, we first examined differences in demographic and risk behavior (sex behavior) between testing history groups using Chi square tests for categorical variables and one-way analyses of variance (ANOVA) for continuous variables. Those who were up to date on their HIV testing (i.e., sexually active and tested within the past 4 months) were not included in this analysis. We followed a similar strategy to assess whether demographics predicted current interest in self-testing (i.e., at-home HIV test request for oneself: Yes = 1, No = 0). We examined demographic differences between men who requested the at-home HIV test for self-testing and those who did not using Chi square tests for categorical variables and *t* tests for continuous variables.

Next, we examined whether the three psychosocial barriers—anticipated HIV stigma, HIV infectiousness-reduction beliefs, and low HIV treatment optimism—predicted HIV testing history and current interest in self-testing both directly and indirectly via information avoidance tendencies. We conducted two Structural Equation Models using SPSS AMOS. The first model (Fig. 1)

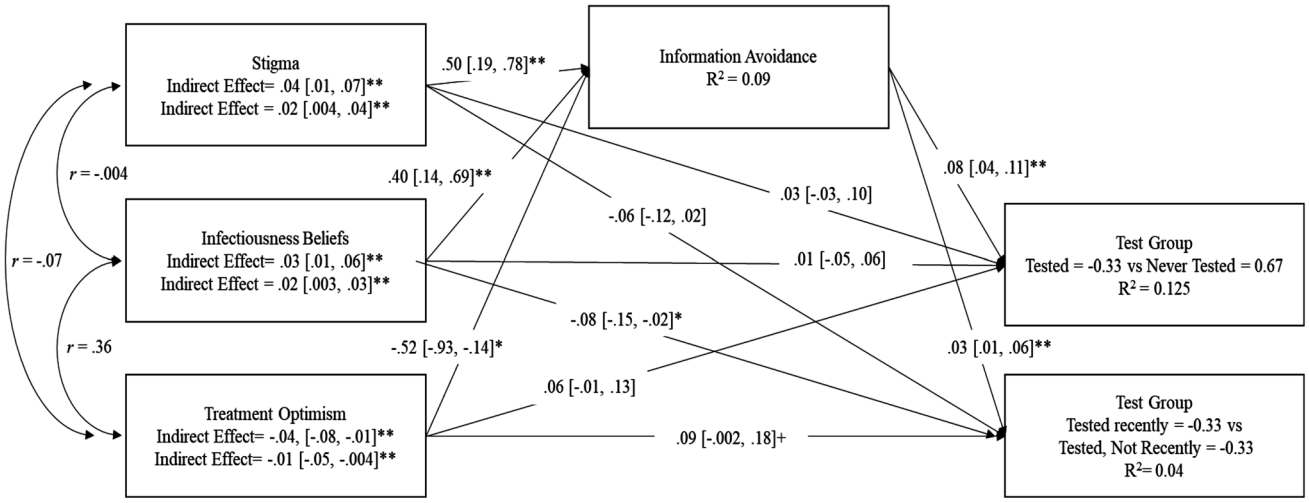

Fig. 1 Mediation model of information avoidance on HIV testing group history. The indirect effects of each variable on the outcomes of interest via information avoidance appear below the label of the variable on the left-hand side of the figure. Model fit: RMSEA = .11, $CI_{90\%}$ [.02, .22], p close = .10 and CFI = .91, $+p = 0.055$, $*p < .05$, $**p < .01$

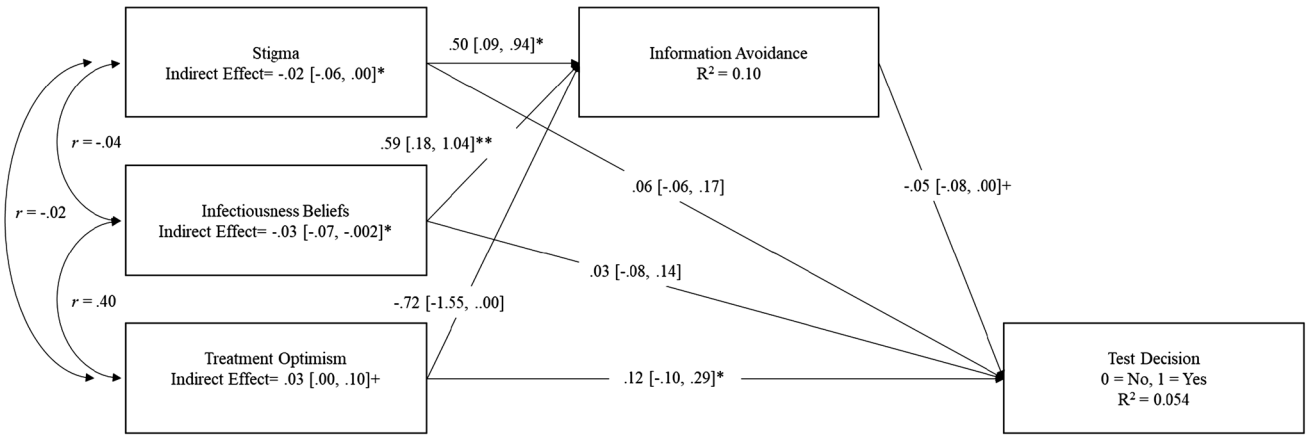

Fig. 2 Mediation model of information avoidance on acceptance of an at-home HIV test. Model fit: RMSEA = .16, $CI_{90\%}$ [.11, .21], p close< .00, $+p = 0.052$, $*p < .05$, $**p < .01$

predicted HIV testing history using two orthogonal testing history variables. The first testing history variable compared those who had been tested to those who had never been tested (i.e., "tested recently" = −0.33, "tested, but not recently" = −0.33; "never tested" = 0.67), and the second behavior variable compared those who had been tested recently to those who had been tested but not recently (i.e., "tested recently" = −0.5; "tested, but not recently" = 0.5; "never tested" = 0).

The second model (Fig. 2) was identical to the first, but instead predicted current interest in self-testing (1 = Yes, 0 = No). In both models, we estimated the direct effects of the three psychosocial predictors—anticipated HIV stigma, HIV infectiousness-reduction beliefs, and low HIV treatment optimism—and information avoidance on current interest in self-testing, as well as the indirect effect of the three psychosocial predictors on current interest via avoidance (mediation). To ensure the robustness of our direct and indirect effects, we used bootstrapping procedures (n = 1000) and report bias-corrected 95% confidence intervals.[2]

[2] We also ran the mediation models controlling for age, marital status, sexual orientation, employment, and outness given their significant associations with our outcomes. However, adding these variables to the model did not meaningfully change the reported outcomes. As such, we report the simpler model.

Table 2 Means and bivariate correlations

Variable	1	2	3	4	5	6
1. HIV stigma	–					
2. Infectiousness beliefs	− 0.004	–				
3. Treatment optimism	− 0.07	0.36**	–			
4. HIV test result avoidance	0.22**	0.13*	− 0.11	–		
5. HIV testing history group	0.50	0.01	0.06	.30**	–	
6. Requests for HIV test	0.09	0.10	− 0.02	− 0.70	− 0.08	–
Descriptive statistics						
Mean	.88	2.61	3.42	2.20	1.18	1.65
SD	.91	.72	.57	.85	1.74	.77

*$p < .05$. **$p < .01$. ***$p < .001$

Results

Means and raw correlations between the three psychosocial barriers, HIV testing history variables, current interest in self-testing, and information avoidance are presented in Table 2.

Factors associated with HIV testing history

Demographic predictors

Table 1 shows participants' demographic characteristics partitioned by their HIV testing history and by current interest in self-testing, and significance testing of demographic differences by testing history group or by current interest in self-testing. There were significant differences among the three HIV testing history groups (i.e., recently tested, not recently tested, never tested) on the demographic characteristics of outness, sexual orientation, employment, and age. A comparison between groups on each of those variables suggested that those who had been tested before (i.e., recently been tested and not recently tested) were more likely to be employed, identify as gay, and be entirely "out" about their sexual orientation than were those who had never been tested. There were no group differences in sexual behavior.

Psychosocial barriers

To assess Hypothesis 1, we examined the direct effects of anticipated HIV stigma, HIV infectiousness-reduction beliefs, and low treatment optimism on the HIV testing history groups. As the direct paths from each of the psychosocial variables (on the far left) to the outcome variables (on the far right) in Fig. 1 shows, there was a significant direct effect: greater HIV infectiousness-reduction beliefs were related to a lower likelihood of having been tested, but not recently. Additionally, there was a significant marginal direct effect of HIV treatment optimism on HIV testing history group: those who had been tested before, but not recently, reported marginally greater levels of optimism. There was no significant effect of anticipated HIV stigma on testing history groups. Thus, Hypothesis 1 was only partially supported, and the directions of effects were in opposition to what prior literature would predict.

Factors associated with current interest in self-testing

Demographic predictors

As Table 2 shows, there were significant differences among those with or without current interest in self-testing on the demographic characteristics of marital status, age, and number of condom-protected anal sex acts. A comparison between these two groups on each of these variables suggested that those with current interest in self-testing were more likely to be single, slightly older, and have fewer instances of condom protected anal-sex than those who were not interested in self-testing.

Psychosocial barriers

To assess Hypothesis 2, we examined the direct effects of the three psychosocial barriers on current interest in self-testing. As the direct paths from each of the psychosocial variables (on the far left) to the outcome variable (on the far right) in Fig. 2 show, those with greater HIV treatment optimism were more likely to be interested in self-testing. However, there were no significant effects of anticipated HIV stigma or HIV infectiousness-reduction beliefs on current interest in self-testing. Thus, as with Hypothesis 1, Hypothesis 2 was only partially confirmed.

Information avoidance as a mediator of psychosocial barriers on HIV testing

To assess Hypothesis 3, we conducted a mediation model to examine indirect effects of the three psychosocial barriers on HIV testing history and current interest in self-testing when information avoidance was included in the model as a mediating variable. As the direct paths from the mediating variable (information avoidance) to the outcome variables in Fig. 1 show, there were consistent direct effects: information avoidance related to a greater likelihood of either never having been tested, or not having recently been tested. Next, we examined whether there were indirect effects of our psychosocial variables on testing via information avoidance. The indirect effects of each variable on the outcomes of interest via information avoidance appear below the label of the variable on the left-hand side of the figure. The top estimates in each box are the indirect effects of each psychosocial variable on the tested versus never-tested comparison via information avoidance. The bottom estimates are the indirect effects of each psychosocial variable on being tested recently versus tested, but not recently, via information avoidance.

Consistent with Hypothesis 3, there were indirect effects of all three psychosocial variables on testing history via information avoidance. Those who perceived more anticipated HIV stigma, those who had greater HIV infectiousness beliefs, and those who had lower HIV treatment optimism had greater tendencies toward information avoidance, which in turn related to both having never been tested and having not been tested recently.

Similar effects emerged for current interest in self-testing. As the direct path from the mediating variable (information avoidance) to the outcome variable in Fig. 2 shows, greater information avoidance predicted marginally decreased likelihood of current interest in self-testing. As with HIV testing history, and consistent with Hypothesis 3, there were indirect effects of all three psychosocial variables on interest in self-testing via information avoidance. Those who perceived more anticipated HIV stigma, those who had greater HIV infectiousness beliefs, and those who had lower HIV treatment optimism had greater tendencies toward information avoidance, which in turn related to a decreased likelihood of interest in self-testing.

The model fit statistics presented in Figs. 1 and 2 are notably inadequate for both outcome measures. However, this poor model fit appears to be driven by the inclusion of the direct paths from our psychosocial barriers to testing decisions. After removing the direct paths from the model, model fit falls in the acceptable range both for predicting prior testing (RMSEA = .07, $CI_{90\%}$[.03, .11], p close = .175) and current interest in self-testing (RMSEA = .05, $CI_{90\%}$[.00, .16], p close = .40). Because they explained so little variance, removing these direct effects did not significantly change the remaining paths ($b < 0.01$ in margin of change) but we retain the results from the original model for any readers interested in these results. Improvement of the model after removing the direct paths provides further evidence of the process we have suggested: psychosocial factors create a desire to avoid HIV feedback which in turn influences testing interest and behavior.

Discussion

In a large sample of gay and bisexual men who have sex with men (MSM) and who have not previously been diagnosed with HIV, we examined the impact of three previously documented psychosocial barriers—anticipated HIV stigma, HIV infectiousness-reduction beliefs, and low HIV treatment optimism—on HIV testing history and on current interest in self-testing (i.e., through requests for at-home HIV test kits). In addition to these three well-studied psychosocial barriers, we introduced information avoidance as a mediating variable. While unstudied in the context of HIV, the health information avoidance framework and resulting information avoidance variable have been used successfully in other medical literatures (e.g., cancer screening) to predict medical screenings in at-risk populations, and theoretically encompasses common barriers to HIV testing.

Consistent with prior literature, we predicted that the three psychosocial barriers would be associated with HIV testing history (Hypothesis 1) and current interest in self-testing (Hypothesis 2). However, these hypotheses were only partially supported, with some findings in unexpected directions. First, more HIV treatment optimism was associated with greater interest in self-testing, and was marginally related to HIV testing history, but only for those who had not recently been tested. Second, contradictory to prior research findings (Lorenc et al., 2011; Wallace et al., 2011), greater infectiousness beliefs were related to having been recently tested, and were unrelated to interest in self-testing. Last, anticipated HIV stigma was unrelated to either testing variables. While these effects were nuanced and sometimes counter-theoretical, our third hypothesis—that information avoidance would mediate the relationships between psychosocial barriers to testing and testing groups—was fully supported. We found indirect effects of each of the predictors on testing behavior via avoidance as a mediating variable. Participants who reported greater perceived anticipated HIV stigma, greater HIV infectiousness-reduction beliefs, and lower HIV treatment optimism also reported greater tendencies toward information avoidance, which was in turn related to having

never been tested for HIV or having not been recently tested for HIV, and to lesser interest in self-testing. Thus, while perceptions of anticipated stigma, infectiousness, and lower HIV treatment optimism may not directly influence HIV testing, or may do so inconsistently, they may pose specific threats that increase information avoidance tendencies, resulting in lowered likelihood of having an HIV test.

Implications and applications

The unexpected null-link between most psychosocial barriers, HIV testing history, and current interest in self-testing may reflect a contemporary shift in how society views HIV. Thanks to the work of interventionists and medical researchers, HIV is now treatable, less infectious, less stigmatizing, and faster and easier to test. Those who have been diagnosed with HIV and are adhering to treatment are now living longer, healthier lives. Thus, negative feelings about treatment, infectiousness, and stigma may be becoming less impactful on HIV testing (Lekalakala-Mokgele, 2014; Prati et al., 2015). Still, our evidence suggests that these beliefs directly feed into information avoidance tendencies, which then impact testing behavior.

In this research, we demonstrated that information avoidance mediates the relationship between at least three well-known psychosocial barriers and HIV testing behavior. As such, interventions aimed at promoting HIV testing may benefit from shifting their focus. The HIV testing literature often emphasizes that there is no intervention that works for all groups. The populations affected by HIV vary greatly in demographics, beliefs, and perceptions, and therefore need interventions that are tailored to their individual needs. Nevertheless, our results suggest that broad interventions aimed at reducing tendencies toward information avoidance may also be useful for increasing HIV testing uptake. For instance, multiple studies have suggested that self-affirmation, or prompting people to focus on their values and strengths (Steele, 1988), can reduce health information avoidance across several diseases and even in situations known to prompt greater avoidance (Howell et al., 2016; Howell & Shepperd, 2012; van Koningsbruggen & Das, 2009). Moreover, multiple studies have demonstrated that prompting people to contemplate why they might seek or avoid a specific piece of health information before giving them the chance to take the test can reduce health information avoidance in multiple disease contexts (Howell et al., 2016; Howell & Shepperd, 2013). Rather than targeting specific psychosocial barriers that could affect behavior (e.g., stigma, knowledge about treatment), as most interventions do, interventions centered around health information avoidance focus on threat and defensiveness generally (Shepperd & Howell, 2015). Using interventions like these could save both time and resources while increasing HIV testing. Of course, future research is needed to examine whether the interventions shown to reduce health information avoidance in other disease contexts are effective in increasing HIV testing, and to compare their efficacy to that of other more tailored HIV interventions.

Limitations and future directions

The most notable limitations of our study involve the unique characteristics of our sample and study. Our sample was about 70% White, suggesting that our findings need to be replicated among Black, Latino, and other populations of color that may face unique barriers to testing (e.g., multiple stigmatized identities). Additionally, we collected data primarily from men who identified as gay or bisexual attending an LGBT Pride Festival. Men attending a Pride Festival may have access to more community support than others affected by HIV, providing a possible buffer against anticipated stigma (Price et al., under review). It is also important to note that there are biases inherent in cross-sectional mediation (Maxwell & Cole, 2007). These biases should be considered while interpreting the results. Finally, the study was conducted in a location where HIV prevalence is relatively high. It is possible that in such an area, there is more knowledge and less confusion about HIV, and that people have more resources for testing and coping with a positive test, leading people to be more open to HIV testing. As such, future research should examine the extent to which the present results generalize to other at-risk populations.

Conclusion

Despite increased efforts to reduce the rate of new HIV infections, incident infection rates remain consistently high. The first line of defense against the spread of HIV is making those who are living with HIV aware of their status (Centers for Disease Control and Prevention, 2014b). In the current study, we examined the impact of three previously documented psychosocial barriers to HIV testing—anticipated HIV stigma, HIV infectiousness-reduction beliefs, and low HIV treatment optimism—and introduced a new mediating variable into the HIV literature: health information avoidance. The health information avoidance framework, and resulting information avoidance variable, focuses on defensive avoidance of psychologically threatening health information (e.g., a possible HIV-positive status). Our results showed that information avoidance significantly mediated the relation between previously

studied psychosocial barriers and both prior and current HIV testing behavior. These results suggest that incorporation of the health information avoidance framework into the HIV testing literature will further our understanding of barriers to testing, and will provide researchers with a new point of intervention for HIV testing campaigns.

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Compliance with ethical standards

Conflict of interest Devon M. Price, Jennifer L. Howell, Amanda N. Gesselman, Stephanie Finneran, Diane M. Quinn and Lisa A. Eaton declare that they have no conflict of interest.

Human and animal rights and informed consent All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional review board and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study.

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