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Evidence for Information Avoidance as a Barrier to HIV Testing: A Two Study Test of Theory and Intervention

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Despite the United States being home to the most advanced HIV treatments, as well as substantial funding for outreach and testing efforts, new domestic HIV infections are still reaching epidemic proportions throughout the country. One proposed contributor to the epidemic is at-risk individuals not engaging in routine HIV testing and unintentionally spreading an undiagnosed infection to others. Although alleviating structural barriers remains crucial to increasing HIV testing among those at-risk for HIV, psychosocial barriers also perpetuate HIV testing disparities in the United States. The current study sought to both understand which psychosocial barriers predict engagement with HIV testing and to subsequently intervene on the major psychosocial barrier discovered in the first study. Study 1 tested several previously studied psychosocial barriers, and one novel predicted barrier, HIV status information avoidance in relation to the decision to engage in HIV testing with a mobile testing van. Results of Study 1 indicated that HIV status information avoidance was the only significant predictor of whether someone had engaged in HIV testing recently or not. The second study then sought to intervene on the underlying psychosocial barrier to HIV testing by testing two previously studied social psychological health behavior change interventions to reduce avoidance of testing and increase HIV testing engagement among at-risk men who have sex with men (MSM). Study 2 indicated that the two social psychological interventions employed to reduce avoidance of testing did not increase HIV testing numbers in an at-risk sample. Implications for these findings are discussed.

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A Two Study Test of Theory and Intervention

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Evidence for Information Avoidance as a Barrier to HIV Testing: A Two Study Test of Theory and Intervention

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Table of Contents

Chapter 1

Introduction

Despite advances in HIV treatment and testing technologies, new infections currently outpace prevention efforts. The most recent statistic from the Centers for Disease Control and Prevention (CDC) estimated that of the 1.3 million HIV positive people living in the United States, 156,300 of them do not know they are living with HIV (Centers for Disease Control and Prevention, 2016a). Additionally, roughly 40,000 new HIV infections were reported last year and 30% of these new infections were attributed to transmission by people who were unaware of their HIV status (Centers for Disease Control and Prevention, 2016a). Despite intensive efforts to increase testing rates—including no longer requiring risk reduction counseling and the availability of rapid, at-home testing—an estimated 1 in 7 people living with HIV remain unaware of their HIV positive status (Centers for Disease Control and Prevention, 2005).

Despite being home to the most advanced HIV treatments, as well as substantial increased funding for outreach and testing efforts, new HIV infections are still reaching epidemic proportions in parts of the United States, particularly in the South East (AIDSVu, 2017b). Specifically, Washington, D.C. is one of the areas hardest hit by HIV in the United States, with prevalence rates higher than parts of West Africa. However, the fight against HIV can be thought of as one of promise in D.C. In 2009, Washington, D.C. officials announced that the district's HIV rate was hovering around 3% of the population. In an attempt to fight the HIV epidemic, the mayor of D.C. announced the "90-90-90-50" plan, in which 90% of people living with HIV will know their positive status, 90% of people who are living with the virus will be in care or receiving treatment, and 90% of people with HIV will have an undetectable level of the virus in

their bodies. This plan was developed with the goal to cut the number of new diagnoses in D.C. by 50% by 2020 (Curry, 2015). In response to this initiative, HIV testing outreach and funding was significantly scaled up and the HIV prevalence dropped from 3% to 2.5% (District of Columbia Department of Health, 2017). Despite these advances, D.C.'s prevalence still exceeds UNAIDS' definition of a "generalized" epidemic (i.e., having HIV prevalence greater than 1% of the population; District of Columbia Department of Health, 2017). With its high prevalence and strong local financial support, D.C. provides a fertile ground to test new, innovative strategies for HIV prevention. Specifically, with structural barriers to HIV testing significantly reduced in D.C., this location is ideal for investigating what psychosocial factors may be preventing testing.

Men who have sex with men (MSM) are still the predominant group affected by HIV in the United States and accounted for 66% of new cases in D.C. in 2014 (District of Columbia Department of Health, 2017). Despite current efforts to use testing as the first defense against HIV transmission, the National HIV Behavioral Surveillance System shows that only 49% of young gay and bisexual men aged 18 to 24 years knew of their HIV positive status, whereas 76% of those aged 40 and older were aware of their HIV infection (Centers for Disease Control and Prevention, 2016a). Additionally, black residents in D.C. have been hardest hit by the disease, representing about three quarters of people living with HIV, but only half of the District's population (The Henry J. Kaiser Family Foundation, 2010). Specifically, 72% of people living with HIV in 2015 were black, 7% were Hispanic/Latino, and 17% were white (District of Columbia Department of Health, 2017). Clearly, the current HIV prevention strategies are falling short in preventing the most vulnerable, at-risk populations from new HIV infections. The diversity of the populations impacted by HIV also makes D.C. an excellent place to study novel

HIV prevention efforts as findings from this region should be generalizable to other racially diverse, at-risk populations across the country.

One such racially diverse, at-risk population can now be found in South Florida. Miami-Dade and Broward counties have topped the national charts with their recent HIV incidence numbers. In 2015, Miami had the highest rate of new HIV infections in the country. In the same year, Broward County had the second highest incidence of HIV in the country (AIDSVu, 2017a). South Florida's epidemic is very racially diverse. Specifically, 36% of people newly diagnosed with HIV between 2011 and 2015 were black, 53% Hispanic/Latino, and 10% were white (AIDSVu, 2017a). Similar to D.C., male-to-male sexual contact accounted for the majority of new HIV infections (78.9%) (AIDSVu, 2017a). Despite the startling progression of HIV incidence in these two counties, the state's governor and local government has been far slower to act than their D.C. counterparts. Sexual health services, including HIV prevention, has been cut by millions of dollars from the state of Florida's budget since Governor Rick Scott took office in 2012 (Florida Department of Health, 2017). With a growing HIV epidemic similar to D.C., but not nearly the same amount of financial support, South Florida is in dire need of outreach and represents an area that could greatly benefit from low-cost, innovative intervention.

The following document will explore the various psychosocial barriers to HIV testing, introduce an additional, unstudied psychosocial barrier to HIV testing, and explore possible interventions that may neutralize these barriers. Next, two studies will be described in which all proposed psychosocial barriers to testing will be tested against each other in a naturalistic HIV testing decision making setting and then an intervention will be implemented, and its efficacy tested in an at-risk group to increase HIV testing numbers.

Psychosocial Barriers to HIV

Although there are structural barriers that can prevent people from getting tested, such as lack of transportation, long distances to HIV testing locations, and lack of funding for sexual health education and services, there are also psychosocial factors that can impede testing. These psychosocial factors include psychological mechanisms that can result in an at-risk person making the deliberate choice to avoid testing. A literature review was conducted using PubMed/MEDLINE to locate articles that focused on research identifying predictors of HIV testing avoidance in at-risk populations the search was not limited by geographical location. Articles were located through January 15, 2017 using a combination of the key terms "avoidance", "testing", "predictors", "barriers" and "HIV". Non-English articles were excluded as were articles not published in scholarly journals. Articles included were restricted to the last 5 years. People who tested positively for HIV and AIDS at the same time were included in the review as they were reflecting retrospectively on why they waited so long to get tested. Only articles that reported directly asking participants why they avoided getting tested for HIV were included. That is, reports of avoidance of HIV testing could not be inferences by researchers or health care workers. Articles were also excluded if they measured avoidance of medical tests other than HIV, such as hepatitis C or tuberculosis. Articles containing nonempirical discussions or commentaries were not used in this review; however, their references were reviewed to manually locate primary research articles that would fit the current study's criteria. Additionally, studies conducting secondary analyses were excluded from the review in order to avoid duplication of original research (Wallace, 2011).

The search yielded 970 potential articles (see Figure 1). Abstracts were reviewed to determine if they matched the eligibility criteria: (a) conducted within the last 5 years, (b) directly asked participants about avoiding HIV testing, and (c) did not include avoidance of other medical

tests. Because the goal of this paper was to find predictors of HIV testing avoidance broadly, any paper that looked at this construct was included in the study, regardless of location or population studied. A total of 18 articles met these criteria and were eligible for review. A systematic examination of each article was performed to extract information on study design, sample characteristics, HIV testing avoidance predictors, HIV testing avoidance measures, and the general take away of the studies. Special attention was given to the specific reasons participants gave for avoiding getting tested for HIV. The predictors of HIV testing avoidance were listed in the way in which they were described in each study to maintain the original content. Information that provided additional meaning or context to the predictors were coded in the general take away section. The most common barriers to HIV testing were anticipated HIV stigma (17 studies), fear about their health with an HIV positive status (treatment optimism;12 studies), lack of education on the controllability of an HIV infection (HIV infectiousness-reduction beliefs; 9 studies) and lack of desire to change behavior if diagnosed with HIV (5 studies). Each of these barriers encompassed their own unique concerns and points of interest in understanding why individuals may actively avoid getting tested for HIV despite risk. However, some of these predictors overlapped with others to create a complex and nuanced picture of the motivations for avoiding HIV testing.

In all the studies reviewed, concerns of HIV stigma were the most frequently reported reason why someone was actively avoiding getting tested for HIV. Participants feared that an HIV positive status would result in experiencing stigmatizing attitudes from friends, partners, family, and society. For example, in a study conducted with African Americans in Philadelphia, participants reported experiences where family members would not let known HIV positive people into their homes (Wallace, McLellan-Lemal, Harris, Townsend, & Miller, 2011). This experience made them anticipate that they would be treated similarly if they were to test positive

for HIV. Those at risk for HIV may also fear that a positive HIV status would make their romantic partners question their fidelity and leave them, or they may react angrily or aggressively and hurt them (Iqbal, Souza, R, & Yudin, 2014; Kohler et al., 2014). The threat of stigma also affected willingness to get tested for HIV in the form of participants not wanting to be seen anywhere near a testing site. A study conducted in a northern California emergency room found that participants were sometimes unwilling to get tested for HIV if others knew that was what they were doing (Christopoulos et al., 2012). Even the act of getting tested seemed to imply a positive status, or the confirmation that one was engaging in a shameful behavior. Therefore, it was seen as best to avoid the practice all together. The concern over stigma also encompassed internalized HIV stigma in that participants thought they would feel inherently sick and infectious. Specifically, in two studies that interviewed people who tested positive for both HIV and AIDS, participants mentioned wanting to avoid seeing themselves as sick or weak as a reason for not wanting to know their status (Dowson, Kober, Perry, Fisher, & Richardson, 2012; Schwarcz, Hsu, & Scheer, 2015).

People at risk for HIV often hold multiple stigmatized identities. The experiences they have had living with these identities adds nuance to their decision to test for HIV, as being HIV positive can add additional stigma to their lives (Arnold, Rebchook, & Kegeles, 2014). Many participants said that the threat of having to experience the stigma of HIV motivated them to avoid learning their status all together. African American men in the United States reported that they were aware that black men were beginning to be associated with being carriers of HIV and testing positive would reinforce this stereotype (Bond et al., 2015). Another study done with African American participants found that in addition to concerns about confirming negative stereotypes about being Black, those who identified as gay or bisexual were worried that testing

HIV positive would stigmatize their identity further, so not knowing was preferable (Nunn et al., 2012).

Beyond the effects of perceived stigma, inaccurate beliefs regarding HIV treatment and health outcomes while having HIV can contribute to an at-risk person's decision to avoid HIV testing. Specifically, both HIV treatment optimism and HIV infectiousness-reduction beliefs fall under the umbrella of inaccurate beliefs and have been studied at length in the HIV testing literature. HIV treatment optimism refers to those who hold optimistic views of current HIV treatment options. Whether one is optimistic or pessimistic about their health outcomes while living with HIV can motivate someone at risk for HIV to get tested or to avoid it all together. In three studies conducted on barriers to HIV testing, participants specifically used the phrase "death sentence" to describe what they understood an HIV positive status to mean (Dowson et al., 2012; Jürgensen, Tuba, Fylkesnes, & Blystad, 2012; Wallace et al., 2011). Many still believed that HIV was untreatable, and that it was pointless to learn their status because there was nothing they could do to preserve their health (Jürgensen et al., 2012). Others feared that the treatment would make them horribly ill and the cost would be too much of a burden (Draucker et al., 2015; Schwarcz et al., 2015; Wallace et al., 2011). A lack of optimism surrounding HIV treatment, both in viewing HIV as an untreatable illness and in thinking the treatments available will result in low quality of life, is a major barrier to HIV testing.

Another tool to measure inaccurate beliefs about HIV treatments is HIV infectiousness-reduction beliefs. HIV infectiousness-reduction beliefs refer to the possibility of controlling one's likelihood of transmitting HIV to another person with the treatments available for HIV. This construct is distinct from HIV treatment optimism in that those at risk for HIV may believe that HIV treatments will keep them alive and healthy but may not be aware that it is possible for

them to control their infection to such an extent that they would not be able to transmit it to others. In fact, the CDC formally announced in September 2017 that there is "effectively no risk" to transmit HIV to someone if your viral load is undetectable (Centers for Disease Control and Prevention, 2017). Although the advent of antiretroviral therapy has made HIV equivalent to a chronic illness rather than a fatal diagnosis, many at-risk individuals are unaware of how controllable an HIV infection is now (Schwarcz et al., 2015). Additionally, many at-risk individuals are unaware of the advantage of early HIV diagnoses and how it can lead to better treatment outcomes. Reiterating the earlier sentiments that fear drove those at-risk for HIV to not get tested, lack of understanding HIV as a controllable disease and the subsequent fear it presented was motivating many participants not to seek testing. Even if they recognized they were at risk, they did not want to know their status due to a perceived sense of helplessness if they were to test positive (Lahuerta, 2013; TI, Hayashi, & Suwannawong, 2013). Presumably, with an increase in the level of knowledge one has about current HIV treatments, the controllability of HIV under proper care, and the benefits of an early diagnosis, they might exhibit more HIV testing seeking behaviors.

While many HIV testing interventions have focused on anticipated stigma or inaccurate beliefs, few have focused on an underlying mechanism linking each of these psychosocial barriers: psychological avoidance, employed as a coping mechanism and defense strategy when presented with potentially negative information about oneself. Information avoidance is defined as any behavior carried out with the intent to prevent or delay the knowledge of available but potentially unwanted information (Sweeny, Melnyk, Miller, & Shepperd, 2010). Information avoidance can be active (e.g., by asking someone not to reveal information) or passive (e.g., by failing to take a needed diagnostic test) (Sweeny et al., 2010). Research on avoidance of

information is primarily is grounded in dissonance theory and proposes that people typically avoid information that challenges their beliefs, behaviors, and desired emotions because the information will create cognitive dissonance (Festinger, 1962; Hart et al., 2009; Smith, Fabrigar, & Norris, 2008). People are not equally likely to avoid information across all occasions. Instead, there are situational factors that can make information avoidance more or less likely to occur. The following constructs are thought to moderate the drive to avoid: (a) control over of the consequences of information, (b) resources to cope with the information, (c) ease of obtaining or interpreting the information, and (d) expectations about the content of information (Sweeny et al., 2010). The drivers of information avoidance can have real impacts on an individual's health. In the only study exploring information avoidance and HIV, a study of gay and bisexual men were given the opportunity to learn their HIV status and almost 80% of men who declined to learn their status reported concern over the psychological impact of a positive test result and lack of control over living with HIV (Lyter, Valdiserri, Kingsley, Amoroso, & Rinaldo Jr, 1987; Zapka, Stoddard, Zorn, McCusker, & Mayer, 1991). Other studies find that concerns with experiencing unpleasant emotions and lack of control account for information avoidance for a host of other medical conditions including Alzheimer's disease (Cutler & Hodgson, 2003), Huntington's disease (van der Steenstraten, Tibben, Roos, Van de Kamp, & Niermeijer, 1994), breast and ovarian cancer (Thompson et al., 2002), as well as other cancers (Leydon et al., 2000). Recently, my colleagues and I applied this approach to a modern HIV context, as the last study to explore this topic was conducted in the height of the HIV epidemic before effective treatments were available. In a study of 302 gay and bisexual men at an Atlanta Pride festival, we found that health information avoidance predicted both past and present HIV testing behavior beyond the effects of anticipated HIV stigma, HIV treatment optimism, and HIV infectiousness beliefs

(Price, Gesselman, Howell, Finneran, Eaton, Quinn & Kalichman, 2017). The current studies presented here will expand on this finding by replicating the results in a more diverse sample in Washington D.C. and Miami and attempt to intervene on the process of avoidance. The Health Information Avoidance Framework and related studies are reviewed in more detail in Chapter 3.

Health Information Avoidance

The avoidance of health information is a well-established phenomenon in preventative health care. In one study, 37% of university students and 31% of general-population adults indicated that they had at some point done something to "avoid getting information about a health topic" (Barbour, Rintamaki, Ramsey, & Brashers, 2012). Additionally, 39% of a nationally representative sample of U.S. adults agreed with the statement, "I would rather not know my risk for cancer" (Emanuel et al., 2015), and 34% of a sample of cancer survivors reported actively avoiding information about cancer at some point (McCloud, Jung, Gray, & Viswanath, 2013). This pattern of avoidance has been demonstrated in acceptance of medical testing as well. For example, although almost 88% of rural black adults in one study signed up to attend an oral cancer screening, only 40.1% of the participants who signed up for the test attended their screening appointment (Shepperd, Emanuel, Howell, & Logan, 2015). Similarly, although over three-quarters of women in one study (Howell & Shepperd, 2014) and 90% of women in another study (Chaliki et al., 1995) reported that they would undergo a free test for the genetic mutations associated with breast cancer, less than a third of women who received a free testing opportunity underwent testing (Brooks et al., 2004). Thus, regardless of the participants' specific reasons for failing to undergo testing (e.g., perceived stigma, treatment optimism), the overarching psychological strategy of coping with threatening information by avoiding it may

account for the lack of uptake among at-risk individuals for tests regarding life-threatening illnesses, such as HIV.

The health information avoidance framework proposes that people avoid health information for three broad reasons: the information potentially threatens how they wish to (1) feel, (2) think, or (3) behave (Sweeny et al., 2010). For instance, researchers have found that patients' forecasting of their own negative emotions prompt avoidance of doctors (Persoskie, Ferrer, & Klein, 2013). Additionally, research suggests that people will avoid genetic testing if they believe that a resulting medical diagnosis from the tests would cause themselves and others to think of them in a negative light (i.e., perceived stigma; Yaniv, Benador, & Sagi, 2004). Moreover, people will avoid health screenings if they believe the screening will be unpleasant, or the testing results will obligate them to make an undesired lifestyle change (Howell & Shepperd, 2013). This behavior can be especially problematic when it relates to medical testing that might mean the difference between life and death via early detection and treatment.

Research on health information avoidance shows people display measurable individual differences in their tendency to avoid relevant medical screening for a disease they may be at risk for (Emanuel et al., 2015; J.L. Howell, Crosier, & Shepperd, 2014). Specifically, researchers have applied the this framework to predict screening acceptance for multiple diseases such as cancer (Emanuel et al., 2015; J.L. Howell & Shepperd, 2012; J.A. Shepperd & Howell, 2015; Shepperd, Howell, & Logan, 2014), diabetes (Howell & Shepperd, 2013; van Koningsbruggen & Das, 2009), heart disease (Howell, Ratliff, & Shepperd, 2015), UV-related skin damage (Dwyer, Shepperd, & Stock, 2015), STD testing (Ganguly & Tasoff, 2014) and recently, HIV testing (Price, et al., 2017).

There is evidence that the specific threat of an HIV positive diagnosis may motivate at-risk individuals to avoid this information more often than not. Putting such a diagnosis in the context of the health information avoidance framework and its three proposed reasons for avoiding threatening health information, there is extensive evidence that people avoid HIV testing to avoid changes in affect, cognition, and behavioral change. In terms of the affective component, the fear of testing positive for HIV has been well documented in people at risk for the disease (Dowson et al., 2012; Jürgensen et al., 2012; Lyter et al., 1987; Wallace et al., 2011; Zapka et al., 1991). An HIV positive status may also threaten one's worldviews if they have stigmatizing views about people living with HIV and therefore testing positive would significantly affect how they view themselves (Christopoulos et al., 2012; Dowson et al., 2012; Schwarcz et al., 2015). Many studies have also revealed that those at risk for HIV are concerned by how much an HIV positive status would require them to make dramatic lifestyle and behavioral changes (Hall, Peterson, & Johnson, 2014; Wallace et al., 2011). For this reason, they chose not to learn about their HIV status, so they will not have to act differently given a positive status. Some participants mentioned their financial situation was already difficult without the added burden of medical costs and transportation concerns (Draucker et al., 2015). For these participants, it is easier to not learn their HIV status so that there is no obligation to pay for treatment. Others did not want to have to change their sexual behavior, including wearing condoms or not engaging in sex with many partners. For example, in one study that interviewed male clients of female Guatemalan sex workers, the clients reported that they believed it was the woman's job to stay HIV negative, because as the client they should not have to protect themselves as it interfered with their pleasure (Lahuerta, 2013). If the client did find out they had a positive HIV status, they would have the burden of knowing that would require them to take

action in a way they did not want (i.e., wearing condoms, disclosing to spouses and partners). Thus, avoidance was undertaken in this context to maintain behaviors that may otherwise need to be changed.

While the existing research on avoidance of HIV testing can easily fit into the health information avoidance framework, my colleagues and I recently conducted the first study explicitly using the framework and associated measures in respect to HIV testing. We surveyed 491 gay and bisexual men about their psychosocial barriers—including those previously documented, along with a measure from the framework that we termed "information avoidance"—to HIV testing and their HIV testing histories. After the survey, we offered participants the opportunity to be mailed a free, at-home HIV test. Our results revealed that anticipated HIV stigma, HIV infectiousness-reduction beliefs, and HIV treatment optimism were only partially related to HIV testing history and to acceptance of an at-home HIV test. However, in a mediation model, each of these predictors had indirect effects on both of these HIV testing outcomes when our measure of information avoidance was included as a mediating variable. This study provided important insights into the relationship between those previously studied psychosocial barriers to testing and the underlying mechanism of information avoidance. However, our behavioral outcome was the *request* for an at-home HIV test. We do not know if participants took the test that they received in the mail, and thus do not know the effects of information avoidance on actual testing. A study focused on real-time HIV testing would provide a more robust test of the health information avoidance framework, allowing for direct measurement of test avoidance. The first part of the current study utilized a setting in which people at risk for HIV made contemporaneous decisions about whether or not to get tested at an

HIV mobile testing site. In the second project, the findings from this first study were used as the basis for an intervention on HIV testing avoidance.

Health Information Avoidance Interventions

There have been several successful attempts to intervene on the psychological defense process of avoiding threatening information. Two strategies have currently shown success: a hypocrisy dissonance paradigm and increasing perceived control.

In a hypocrisy dissonance paradigm (Aronson, Fried, & Stone, 1991), participants make a positive statement about the value of a target behavior (e.g., engaging in preventative care). If the person has past failures regarding this behavior, the inconsistency between their present attitudes and past transgressions leads to the arousal of dissonance. In this paradigm, the primary method of dissonance reduction is behavior change rather than attitude change. For example, if an individual is due for an HIV test and is directed to write a positive statement about HIV testing encouraging an at-risk peer to get tested, dissonance will arise because their current expressed attitude does not align with their behavior. This psychological state is so uncomfortable that many studies have shown participants' willingness to endorse attitudes they previously opposed or engage in behaviors they previously believed to be immoral (i.e., shocking someone) in order to reduce this psychological state of dissonance (Festinger, 1962). This uncomfortable mental state may be reduced if the participant engages in the previously avoided behavior (Aronson et al., 1991). Freijy and Kothe (2013) found in a recent review paper on dissonance-based health behavior change interventions that participants who were made to write out dissonance-inducing prompts regarding their health behavior saw success in changing a variety of different health behaviors (i.e., condom use, drug use, weight loss). They also concluded that the hypocrisy dissonance paradigm was found to be the most effective at inciting change across a range of

health behaviors than free-choice, effort justification, and induced compliance paradigms of dissonance (Freijy & Kothe, 2013). This form of intervention has also successfully reduced avoidance of health-risk feedback for a variety of serious diseases including cardiovascular disease and melanoma (Howell, Ratliff, & Shepperd, 2016). These interventions have found success with writing prompts as short as one minute, which can be easily implemented in studies conducted outside of the lab (Rosas et al., 2017).

In addition to the hypocrisy dissonance paradigm, interventions designed to elicit a sense of control in the participant over their health outcomes have shown success in increasing a desired health behavior, such as diagnostic testing. Beliefs about control, such as perceived control and self-efficacy, play a key role in many social psychological theories, including the Learned Helplessness Theory and Theory of Planned Behavior (Ajzen, 1985; Hiroto & Seligman, 1975). Although definitions of control beliefs vary, the unifying factor is a belief that one's actions can influence desired outcomes. The common research finding in studies using these theories indicate that people display greater behavioral intentions and actions when perceived behavioral control is high compared to when it is low. Uncontrollable diseases represent a threat to people's ability to control their lives, meaning perceived behavioral control is low. This may induce avoidance of information about these diseases in comparison to more controllable diseases (Melnyk & Shepperd, 2012; Yaniv et al., 2004). However, interventions that focus on emphasizing the controllable aspects of disease can reduce testing avoidance. For example, women in one study were more likely to choose to learn their breast cancer risk from an online risk calculator if they read about the controllable predictors of breast cancer (e.g., diet, exercise) than if they read about uncontrollable predictors of breast cancer (e.g., genetics; Melnyk & Shepperd, 2012). In another study, participants were more likely to express interest in

testing for a disease similar to Huntington's disease (e.g., appears in adulthood and produces a painful death within 10–20 years of diagnosis) if they believed the disease was treatable than if it was described as untreatable (Shiloh, Ben-Sinai, & Keinan, 1999). Perceived controllability over one's risk for a disease, as well as perceived controllability over life while living with the disease, can impact willingness to get tested. Similar to the hypocrisy paradigm, these interventions can be implemented using a writing time as short as one minute (Rosas et al., 2017), making them ideal for field study settings.

The majority of the studies described above have taken place in a lab setting. However, given their short implementation time and low need for resources, they make for ideal interventions in a field study setting. Additionally, these interventions have shown success in affecting moment-by-moment decision making and could be ideal paradigms for intervening on avoidance of HIV testing as that avoidance is activated. For example, multiple studies using both dissonance-inducing paradigms or increased controllability paradigms have found success in both getting people to sign up for testing appointments and having participants then successfully attend those appointments (Draycott & Dabbs, 1998; Sheeran & Orbell, 2000). If successful, these interventions could be utilized by organizations that provide HIV testing in order to capture more people in need of testing.

Community Based Organizations as Points of Intervention

Community based organizations (CBOs) are on the front lines of preventative sexual health care. In 2017, the CDC requested $120 million to put towards HIV surveillance services, such as HIV testing services administered through community based clinics and organizations (Centers for Disease Control and Prevention, 2016b). This investment is well placed. Studies have shown that offering HIV counseling and testing in community or outreach settings can be

an effective strategy for identifying people with unrecognized HIV infection (Bucher et al., 2007; Centers for Disease Control and Prevention (CDC, 2007b, 2007a; Liang et al., 2005). For example, some studies of HIV testing among high-risk people in nonclinical or outreach settings have found HIV seroprevalence ranging from 4% to 25%, a markedly higher rate than clinical settings (Bucher et al., 2007; Centers for Disease Control and Prevention (CDC, 2007b; Liang et al., 2005).

Community members who use these services report overall favorable attitudes toward the organizations and the care they receive, indicating an established trust between the community and the organizations (Thornton, Delpech, Kall, & Nardone, 2012). This relationship allows staff to reach out to those at risk for HIV in a way that may feel more comfortable to those from marginalized backgrounds than a traditional medical setting. When these organizations have mobile testing sites (i.e., mobile HIV testing vans), they drive them into communities that have a known high HIV prevalence. In addition to HIV testing, many CBOs also provide safer sex items such as condoms and lubricant. The established relationship between the organization and community members, and their targeted access to those at risk for HIV, makes these settings an ideal environment for translating interventions tested in the lab into more ecologically valid, naturalistic, and high-impact settings. Given CBOs' limited time and resources, "wise" interventions, or interventions that have significant impacts in short bursts of time, are an ideal method for attempting to create behavioral change in the community.

Overview of Current Research

The health information avoidance framework has only recently been applied to HIV testing behavior (Price et al., Under Review). In the current studies, I expand on this line of research in an attempt to generalize those findings to people who are testing in real time, as well

as to a more naturalistic setting. The present studies utilized community-based organizations' HIV testing vans, clinics, and community outreach staff. This partial replication of Price et al. (under review) could provide further evidence that health information avoidance is a driving mechanism behind participants' decisions to test or not test.

While the aforementioned interventions—hypocrisy dissonance paradigm and increasing perceived control—have shown to be successful in their controlled experimental settings, none to date have been conducted in a field setting in which the decision to approach or avoid health information occurs contemporaneously. Additionally, no study or meta-analysis exists in which these two interventions have been undertaken concurrently to determine differences in effectiveness. Finally, while dissonance interventions have been used to increase HIV preventative behaviors such as condom use, none have focused on increasing the rate of HIV testing uptake (Freijy & Kothe, 2013). Since HIV testing reveals information about a disease that may present a threat to an individual in a variety of domains in their lives—how they feel, think and behave—they may be more inclined to avoid this test. Given the evidence that the two interventions mentioned above have increased medical testing uptake for a variety of serious diseases, it would be an important extension of HIV testing literature to attempt to increase HIV testing uptake through interventions informed by the health information avoidance framework. Such an extension would greatly benefit researchers as well as CBOs, as they would be able to incorporate this intervention into many of the standard protocols they already follow for administering an HIV test, providing a highly generalizable and affordable option for intervention.

In Study 1, I investigated which psychosocial factors (general health information avoidance, HIV status avoidance, anticipated HIV stigma, HIV infectiousness-reduction beliefs,

and HIV treatment optimism) impact HIV testing. I conducted a survey study in conjunction with a CBO to measure these constructs in a setting where decision-making to seek or avoid an HIV test is taking place in real-time. In Study 2, I intervened on the decision to avoid an HIV test in participants who were at risk for HIV and due for a test. The intervention builds upon previous work that has seen success in intervening on health decision making. A successful intervention could lead to implications for increasing HIV testing among those who are at highest risk.

Chapter 2

Study 1: Information Avoidance as a psychosocial barrier to recent and contemporaneous HIV testing decision making

The primary goal of the current study was to assess whether HIV status information avoidance is an important psychosocial barrier to getting tested for HIV in a diverse, at-risk

sample, and whether HIV status information avoidance would be significant beyond the effects of anticipated HIV stigma, HIV treatment optimism, and HIV infectiousness-reduction beliefs. In the current study, D.C. residents who were assessed as at risk for HIV based on their self-reported risk behavior, took a survey that measured their anticipated HIV stigma, their HIV treatment optimism beliefs, and their HIV infectiousness-reduction beliefs after they had either accepted or rejected an HIV test. Those who accepted the HIV test at the mobile HIV testing site took the survey after receiving their test results. Only those who tested negative (the *accepted testing* group), and those who turned down the HIV test, were asked to take the survey. For the purpose of my analyses, those who turned down the HIV test were divided into two categories: those whose last self-reported HIV test was more than 4 months ago (the *not recently tested* group), and those tested for HIV in the last 4 months (the *recently tested* group). Those who had not been tested for HIV in the last 4 months but had reported being sexually active in the last 4 months were considered to be at risk for HIV. Intravenous drug use was not assessed because the majority of HIV infections in the area (86%) are attributed to sexual contact. Consistent with the information avoidance framework, my hypotheses were:

(1) Those who accept testing will have the lowest HIV status information avoidance scores compared to those who were recently tested and those we were not recently tested.

(2) Controlling for demographic variables, HIV status information avoidance would be a significant predictor of having *not been tested recently* (i.e., of avoiding testing).

(3) Because they do not appear to be avoiding testing, HIV status information avoidance scores will be lower in *recent* (i.e., within the last four months) or *contemporaneous* (i.e., accepting the HIV test prior to the survey) HIV testers, when controlling for demographic variables.

A secondary goal of the current study was to explore the extent to which well-established psychosocial barriers would predict recency of participants' HIV testing (*not recently tested*, *recently tested*, *accepted testing*). Based on the literature review, it was hypothesized that all of the psychosocial barriers would be significant predictors of HIV testing group. Thus,

> (4) Controlling for demographic variables, those who had higher levels of anticipated HIV stigma, lower levels of HIV treatment optimism, and lower levels of HIV infectiousness-reduction beliefs would be more likely to have not been tested recently (i.e., not in the last four months; vs. *tested recently* group).

While each of these three psychosocial constructs have been repeatedly demonstrated as barriers to testing, the Information Avoidance Framework (Sweeny et al., 2010) proposes information avoidance as an overarching and independent psychosocial mechanism affecting responses to potential threats. Thus,

> (5) In a multiple regression model including HIV status information avoidance, anticipated HIV stigma, HIV treatment optimism, and HIV infectiousness reduction beliefs as predictors of participant HIV testing group, HIV status information avoidance will emerge as a unique and significant predictor.

A final goal of the current study was to explore how general health information avoidance is related to HIV testing group compared to the more targeted HIV status information avoidance. This exploration allows for understanding whether HIV testing activates a psychological avoidance reaction that is present in the context of any potentially negative health information, or whether HIV conjures a unique response within the Information Avoidance Framework. This information is important for understanding whether previously successful

interventions developed from information avoidance studies could be adapted to HIV contexts, and how they may need to be modified.

Method

Location

The District of Columbia has been disproportionally impacted by the HIV epidemic in the U.S (District of Columbia Department of Health, 2017). Approximately 2.5% of the population in D.C. is living with HIV (District of Columbia Department of Health, 2017), which rivals rates in some sub-Saharan African countries. The majority of current and new cases of HIV reside in men, particularly men who have sex with men. In 2014, 79% of the new cases of HIV in D.C. were in men, and 66% of the new cases of HIV were transmitted sexually by men who have sex with men (District of Columbia Department of Health, 2017). Additionally, black residents are most affected?—they represent three quarters of people living with HIV, but half of the District's population (District of Columbia Department of Health, 2017). Due to the high prevalence of HIV, D.C. makes an ideal place to extend the current findings on psychosocial barriers impacting HIV testing uptake.

This work was conducted with the community health center, Whitman Walker Health. Whitman Walker Health specializes in administering healthcare to individuals who face barriers to accessing it, as well as having a special expertise in LGBT and HIV care. They also receive funding from the CDC and grants to help reduce HIV transmission in the District of Columbia (Centers for Disease Control and Prevention, 2016b). Their community health department operates a mobile HIV testing van that goes into at-risk communities and provides free HIV testing and prevention education. This van goes to various diverse venues, from dance clubs to grocery stores, to reach as many at-risk residents as possible. Thus, Whitman Walker Health's

HIV testing van provided the infrastructure and testing equipment needed to conduct this study. Additionally, Whitman Walker's community outreach team agreed to implement the current survey. All field team members completed IRB training and certification prior to the study.

Participants and Procedure

Participants in this study were recruited as they passed by Whitman Walker Health's mobile HIV testing van. Recruitment took place between the months of August 2016 and June 2017 in various high-prevalence areas throughout D.C. Participants were compensated with a $5 Starbucks gift card. The study was advertised as being a community health survey that would aid Whitman Walker Health and University of Connecticut researchers in gaining a better understanding of community sexual health in the D.C. area. Participants completed a 10-minute survey on paper booklets outside of the HIV testing van—as far away or as close to the van as they felt comfortable. The survey contained scales measuring HIV status information avoidance, general information avoidance, HIV infectiousness beliefs, HIV treatment optimism, and anticipated HIV stigma. After completing the survey, a research assistant gave compensation.

Study participants consisted of men and women living in the D.C. area who were at risk of contracting HIV (sexual minority, racial minority, and/or sexually active) based off the demographic descriptors of HIV incidence in this area and their self-reported sexual behavior. They were primarily recruited in front of dance clubs and bars that cater to the LGBT community, or community events such as a Latino culture festival. The majority of our efforts were focused on recruiting at events that would attract LGBTQ people of color and lower SES people of color in the D.C. area.

A total of 281 D.C. residents completed the study. Of the total sample, 73 people agreed to an HIV test, and 159 people declined testing. Of those who declined testing, 36.6% (n = 85) self-reported that they had been *tested recently* (i.e., within the last 4 months) and 31.9% (n = 74) self-reported that they had *not been tested recently* (i.e., more than 4 months ago). In this sample, about 32.8% were female, 65.1% were male, and 1.3% identified as transgender men. There were no significant differences in acceptance of HIV testing by gender (p = 0.289). The average annual household income for this sample was between $31,000-$45,000. As expected, there were significant income differences in HIV testing acceptance, with those of lower income brackets being less likely to accept testing or to have been tested recently (p < .001). About 49% of the sample identified as black or African American, 15% identified as Latino, 27% identified as White. The remaining 9% of sample was Middle Eastern (n = 14), Pacific Islander (n = 4), American Indian (n = 3), or Multiracial or Other (n = 12). Zip code data indicated that 43% of the participants lived in Wards 5, 7, or 8, the areas with the highest number of HIV cases in the city (District of Columbia Department of Health HIV/AIDS, Hepatitis, STD, and TB Administration, 2016). All participants reported having penetrative sex with at least one person in their lifetime.

Recruitment. Participants were recruited in collaboration with Whitman Walker Health's community outreach initiative in which their HIV testing van was driven to various high prevalence locations to provide free, rapid HIV testing. Once the HIV testing van was parked and set up for testing, researchers and field staff began asking D.C. residents walking by if they would like to have a free, rapid HIV test. If the individual agreed to a test, they were escorted into the HIV testing van and an HIV test was administered. Upon receiving negative HIV test results, testers were asked if they would like to take a 7-10-minute community health survey in

exchange for a $5 Starbucks gift card. Similarly, if an individual declined testing, a research team member asked them if they would like to take the same survey in exchange for a $5 Starbucks gift card. This procedure was developed in collaboration with the Whitman Walker's community outreach project manager to prioritize HIV testing for the participant. The author and the project manager wanted to ensure that a) the content of the survey did not deter participants from getting tested and b) the time the survey took would not deter participants from getting tested afterward. Therefore, participants who got tested for HIV took the survey after they received a negative result. This aspect of the procedure will be discussed in more detail in the limitation section.

When participants agreed to take the survey, they read an IRB approved information sheet and were given the survey and a pencil. They could complete the survey in the testing van, at a table outside of the van, or away from the van if they did not want to be seen sitting in front of it. Once finished, participants returned their survey to a research team member who performed a quality check (i.e., looking for accidentally skipped pages or incomplete answers). The research team member deposited the completed survey in a secured box and compensated the participant.

Survey Measures

Demographics. Participants answered basic demographic items such as age, race, gender, sexual orientation identity, income, education, and employment status.

HIV Testing Measures. Participants were asked to report their latest HIV testing date with the month and the year, number of past tests, and intention to get tested in the future.

HIV Status Information Avoidance. To assess participant's tendency to avoid knowing their HIV status, a modified 10-item Information Avoidance Scale (Howell et al., 2016) was used. Items were modified from a general health focus to indicate HIV-status avoidance (α = 0.74). Two example items are "I will be able to cope if I learn I am HIV positive," and "Even if it will upset me, I want to know my HIV status." Responses to these items were assessed using a 4-point Likert scale from 1 (*strongly disagree*) to 4 (*strongly agree*). For the analyses, a mean was taken of the scores.

General Health Information Avoidance. Participant's tendency to avoid threatening health information generally (i.e., not HIV specific) was measured using an adapted, validated 2-item scale (Howell et al., 2016; r = 0.86). The two items were "Even if it will upset me, I generally want to know health information about myself" and "In general, I would avoid learning health information about myself." Questions were answered on a 4-point Likert scale from 1 (*strongly disagree*) to 4 (*strongly agree*). For the analyses, a mean was taken of the scores.

HIV Stigma. Anticipated HIV stigma was assessed using a 7-Item Anticipated HIV Stigma scale (Golub & Gamarel, 2013a; α = 0.76). Example items included, "If I got infected with HIV, men would not want to have sex with me" and "I would feel I were not as good a person as others if I got HIV." Items were responded to on a 1 (*strongly disagree*) to 4 (*strongly agree*) point Likert scale. For the analyses, the scores were averaged together.

HIV Infectiousness Beliefs. To assess participants' beliefs about the infectiousness of HIV, participants responded to a 3-item HIV Infectiousness Beliefs scale (Kalichman et al., 2007; α = 0.75). Example items included, "HIV positive persons are less likely to infect their sex partners if they consistently take their HIV medications," and "It is safe to have anal sex without a condom with an HIV positive man who has an undetectable viral load." Participants responded

to the items on a 4-point Likert scale from 1 (*strongly disagree*) to 4 (*strongly agree*). For the analyses these scores were averaged together.

HIV Treatment Optimism Beliefs. To assess beliefs about the efficacy of HIV medication and treatment, participants responded to a 3-item HIV Treatment Optimism Beliefs scale (Kalichman et al., 2007); $\alpha = 0.79$). Example items included, "HIV treatments have brought hope for a cure," and "Because of HIV medications, people living with HIV can have a normal and healthy life." Items were responded to on a 4-point Likert scale from 1 (*strongly disagree*) to 4 (*strongly agree*). For the analyses, these scores were averaged.

Perceived Risk. A single-item measure was used to assess participant's perceived risk for HIV infection (Kalichman et al., 2007). The item was, "Think about your sexual relations for the past 4-months. Based on your sexual behaviors for the past 4 months, how much risk do you believe you are at for getting HIV or infecting someone with HIV?" Participants were asked to respond on a scale from 0 (*not at all at risk*) to 4 (*very high risk*).

Sexual Partner Information. Participants were asked to complete six items about their sexual behavior. Items came from similar HIV research studies that proved to be effective at assessing riskier sex (Kalichman et al., 2007). Participants were asked to report the number of men they had ever had sex with, the number of times they had unprotected anal sex, the number of times they had protected anal sex, the number of women they had ever had sex with, the number of times they had unprotected vaginal sex, and the number of times they had protected vaginal sex. Averages of these scores were used in the analyses.

State Based Anxiety. Participants were asked to complete a six-item scale designed to assess their contemporaneous anxiety symptoms (STAI, 2011; $\alpha = 0.83$). Example items

included “I feel tense” and “I feel worried.” Participants were asked to respond on a scale from 0 (strongly disagree) to 4 (strongly agree).

Data Analysis

I first examined demographic and risk behavior (drug/alcohol use, sex behavior) differences across HIV testing groups using χ^2 tests for categorical variables and one-way analyses of variance (ANOVA) for continuous variables to establish relevant control variables. Next, I conducted a one-way analysis of variance (ANOVA) to determine whether there were significant differences in the HIV status information avoidance scores among the three testing groups (Hypothesis 1). Next, controlling for relevant demographic variables, I used multinomial logistic regression to determine whether HIV status avoidance was related to having not been recently tested (Hypothesis 2), and unrelated to recent or contemporaneous testing (Hypothesis 3). To test Hypothesis 4, anticipated HIV stigma, HIV treatment optimism, and HIV infectiousness-reduction beliefs were examined as predictors of HIV testing group in a multinomial regression model, controlling for significantly different demographic variables identified earlier. To test Hypothesis 5, HIV status information avoidance was added into the previous multinomial regression model from Hypothesis 4. Finally, to test the exploratory question, HIV status information avoidance and general health information avoidance were tested as predictors of HIV testing group in a multinomial regression. The recently tested group was used as the reference group for all comparative analyses (Hypotheses 3-5 and exploratory analysis).

Results

Raw correlations for all variables are presented in Table 1. Table 2 presents the by-item characteristics of the HIV status information avoidance scale.

Demographic and Risk Factors Associated with HIV Testing Group

As Table 3 shows, there were significant differences among the three testing groups (i.e., *accepted testing, recently tested, not recently tested*) on the demographic characteristics of race, employment, education, income, and sexual orientation. Specifically, those who were *not recently tested* were more likely to be unemployed, have less than 12 years of education, make less than $30,000 a year, and identify as heterosexual than were those who *accepted testing* and were those who had *recently been tested*. There were also significant differences on some of the HIV risk factors that were measured. Specifically, there were significant differences on number of male sex partners in the past four months and number of condom-protected anal sex acts. Those who had *recently tested* were more likely to have more male sex partners and more condom-protected anal sex acts than those who had *accepted testing* and those who had *not recently tested*.

HIV Status Information Avoidance as a Predictor of HIV Testing Group

Table 4 shows the results of an ANOVA examining the differences in HIV status information avoidance scores among the three testing groups (i.e., *accepted testing, recently tested, not recently tested*). There were differences in HIV status information avoidance scores among the three testing groups such that those who have been *recently tested* had the lowest scores (M=12.79, SD=3.58), those who *accepted testing* the second lowest (M=14.65, SD=4.59), and those who were *not recently tested* had the highest scores (M=16.78, SD=16.78), $F(2,227) = 16.39$, $p < 0.001$. The means between those who *accepted testing* and those who were *recently tested* were significantly different. The means between those who were *recently tested* were significantly different from those who were *not recently tested*. Thus, hypothesis 1 was partially supported. Table 5 shows the results of a multinomial regression of HIV status information

avoidance and demographic control variables (income, employment, education, race, sexual orientation) predicting HIV testing group, with those who had *been tested recently* as the comparison group. HIV status information avoidance was a significantly related to recency of HIV testing. Those who reported greater HIV status information avoidance were more likely to have *not been tested recently* (*OR* = 1.12, $CI_{95\%}$ [1.02-1.24]) when compared to those who had been *tested recently*. Hypothesis 2 was supported. Additionally, HIV status information avoidance was unrelated to contemporaneously *accepting testing* when compared to being *tested recently* (*OR* = 1.08, $CI_{95\%}$ [0.98-1.17]). Hypothesis 3 was also supported.

Psychosocial Barriers as Predictors of HIV Testing Group

To determine whether HIV stigma, HIV treatment optimism, and HIV infectiousness-reduction beliefs were related to HIV testing group, I conducted a multinomial regression, with demographics entered as control variables (Table 6). Those who had been tested recently were used as the comparison group. Contrary to Hypothesis 4, and prior literature, none of the psychosocial barriers were related to HIV testing group (*p*s ≥ .07). Hypothesis 4 was unsupported. However, when HIV status information avoidance was added to the model, it emerged as the only significant psychosocial predictor. Those who reported greater HIV status information avoidance were more likely to have *not been tested recently* (*OR* = 1.10, $CI_{95\%}$ [1.04-1.21] vs. *tested recently*). As in the test of Hypothesis 2, HIV status information avoidance was unrelated to the *accepted testing* and *recently tested* groups (*OR* = 1.07, $CI_{95\%}$ [0.98-1.73]). Thus, Hypothesis 5 was supported.

Exploratory Aim: Examining General Health Information Avoidance and HIV Information Status Avoidance on HIV Testing Groups

Controlling for demographic variables, I conducted a multinomial regression exploring general health information avoidance and HIV information status avoidance as predictors of HIV testing group (Table 7). General health information avoidance was not a significant predictor of HIV testing group (recently vs. not recently tested: *OR* = 0.90, $CI_{95\%}$ [0.65-1.24]; accepted testing vs. recently tested: *OR* = 1.03, $CI_{95\%}$ [0.78-1.36]). However, HIV status information avoidance did emerge as a significant predictor, with participants reporting higher levels of HIV status information avoidance being more likely to have been *tested recently* (vs. *not tested recently*; *OR* = 1.12, $CI_{95\%}$ [1.02-1.24]). As in the previous analyses, HIV status information avoidance was unrelated to the *accepted testing* and *recently tested* groups (*OR* = 1.07, $C_{95\%}$ [0.98-1.17]).

Discussion

The goal of Study 1 was to assess whether HIV status information avoidance is a significant psychological barrier to HIV testing among a diverse, at-risk sample from the D.C. metropolitan area. Taken together, nearly all hypotheses were supported, demonstrating that HIV status information avoidance is predictive of how recently one has engaged in HIV testing. Results indicated that HIV status information avoidance is an important psychosocial barrier to consider when predicting whether someone has been a consistent HIV tester (i.e., had been tested in the last 4 months) or has avoided recent testing despite being sexually active. As expected, those who *had not* been tested in the past 4 months reported higher HIV status information avoidance than those who *had* been tested in the past 4 months (Hypothesis 1). These results are straightforward but suggest underlying individual differences in coping. Specifically, those who are at risk for HIV and have not been tested recently are likely to be coping with threatening health information in a psychologically different way than those who have recently been tested.

This is supported by evidence from participants reported sexual behavior. Specifically, those who *had* been tested recently had, on average, two more male sex partners and significantly more condomless sex acts than both those who had not been tested recently and those who accepted the HIV test (i.e., contemporaneous testers). That is, participants who reported risker recent sexual histories were more likely to already know their HIV status from recent testing and were on the lower end of the spectrum for HIV status information avoidance. These results provide an interesting perspective into the ways in which people psychologically cope with threat, demonstrating that potentially threatening health information can motivate some individuals to be proactive about their health or to avoid potentially unsettling news. Alternatively, these results may also indicate that individuals may engage in riskier sex as a direct result of knowing their HIV status, and thus may feel motivated to test to ensure their freedom to engage in the sex that they want with peace of mind (i.e., condomless sex). These individual differences in coping style may provide researchers with a useful starting point for tailored interventions for HIV testing avoidance.

Interestingly, the findings of those who accepted HIV testing compared to those who *had not* been tested recently did not follow predictions stemming from the information avoidance framework. Those who accepted HIV testing had significantly higher ratings of HIV status information avoidance than those who had *recently been tested,* but lower than those who had *not been recently tested*. I expected those who had just accepted the HIV test and received their negative results to have the lowest HIV status information avoidance. Several factors could have contributed to these unexpected results. First, HIV mobile testing vans are designed to capture those who are at risk and who might not be especially proactive about their health (i.e., may not be motivated to seek out testing on their own). Thus, these individuals may typically avoid going

to the doctor or to a clinic but being presented with a testing opportunity with very little of their own effort required may have made it difficult for them to psychologically justify avoiding testing. Additionally, the participants who accepted HIV testing took the survey immediately after receiving the results from their HIV test. This experience—particularly the anxiety experienced between taking the test and waiting for the results—could have momentarily changed their cognitions around getting another HIV test in a way that might make future testing seem less desirable. However, there were no significant differences on the State Based Anxiety measure between those who had accepted testing and those who had not. It is also possible that the mobile HIV testing vans are doing what they are designed to do: capturing those at elevated risk of HIV who are not likely to get tested in a traditional clinical setting. Perhaps those testing with the mobile testing vans do indeed have heightened levels of HIV status information avoidance and made a split-second decision to get tested at the van when they could not reconcile the ease and availability of testing with their own psychological avoidance. Further research is needed to tease apart this particular finding.

The findings for the other psychosocial barriers—anticipated HIV stigma, HIV treatment optimism, and HIV infectiousness-reduction beliefs—provided no support for the hypothesis that these barriers would be individually predictive of HIV testing group. HIV treatment optimism, HIV infectiousness-reduction beliefs, and anticipated HIV stigma were all non-significant predictors of HIV testing group both on their own and in a full model. When all of the psychosocial barriers were placed in the full model together, only HIV status information avoidance remained a significant predictor of HIV testing group. HIV status information avoidance was the only significant psychosocial barrier predictive of whether or not someone had been tested for HIV in the last 4 months. It was not predictive of whether someone *had* been

tested in the last 4 months compared to if they had accepted an HIV test at the mobile testing site. However, this null finding follows the Information Avoidance framework (Sweeny et al., 2010) as the two groups who engaged in testing, either within the last 4 months or as a part of the study, ultimately engaged in the behavior of testing and therefore may cope with threat in a psychologically different way than those who avoided they test.

These results provide further evidence that pop-up HIV testing events and mobile HIV testing vans are essential in capturing people who may not be as active about getting tested but will still test if the opportunity presents itself. The ease of convenient HIV testing sites aids in capturing those who otherwise may not be so proactive about their health as to make an appointment at a clinic for an HIV test. However, those who cope with the threat of HIV by avoiding learning their status may not be swayed by these particular outreach efforts. These results indicate that those who are relying on avoidance as a way to cope with the threat of HIV may warrant a specific psychological intervention in order to help them seek out testing.

Limitations

Study 1 had four main limitations that warrant discussion. First, participants were offered an HIV test in real time as they passed by an HIV mobile testing van. This method of testing is not preferred by everyone at risk for HIV. Some at-risk people may have concerns of anonymity as there can be fears of being seen walking into the van. Additionally, many of the participants walking by the van were on their way to activities or at festivals. They may not have wanted to risk receiving some upsetting news while at or on their way to attend these events, therefore limiting the generalizability of the study. This limitation was addressed in the second study by giving participants the option of getting tested at a mobile HIV testing van or in a clinic. The second limitation concerns the timing of the survey. The research team and the Whitman

Walker staff decided that ethically the best time to administer the survey to the participant would be after they had a) received HIV testing and b) received their subsequent results. This procedure was decided upon so as to prioritize people's time towards getting tested rather than taking the survey. However, the participants who took the survey immediately after receiving their negative HIV status results may have been in a heightened arousal state compared to the other two groups. Although there were no significant differences among the HIV testing groups on their state-based anxiety measures, participants who just tested for HIV may have their cognitions surrounding the measures assessed for the study altered in a way that may have been different from their "baseline." For example, participants who received testing had significantly higher HIV status information avoidance scores than those who had reported they had been tested in the past 4 months. It is possible that this finding represents a psychological response to having just undergone a stressful experience in testing. However, it is also possible this result means that the mobile testing is serving its purpose and capturing people at-risk for HIV who passively avoid testing. Further studies should be conducted to tease apart the true implications of these findings. This limitation was also addressed in the second study by having participants take the follow up survey containing psychosocial barriers at least a week after they took the intervention and presumably got tested. Additionally, all participants had to indicate whether they wished to receive an HIV test prior to taking the study. Participants who refused to take the HIV test may have this decision impact their responses on the psychosocial barriers. For example, perhaps those who declined testing felt they needed to respond in a favorable way on the HIV testing avoidance measure by indicating they are not actually avoiders, indicating response bias. However, there were significant differences among recent testers and those who have not been

tested recently in the opposite direction of this possible limitation, thus indicating that while this limitation should be kept in mind, it does not ultimately seem to have invalidated the measure.

The third limitation relates to the self-reported HIV testing date that was used to establish the three categories of participants used in the study. Response bias may have been present if participants felt compelled to report a more recent HIV testing date than was accurate. While this is a limitation of self-report measures in general, the study had fairly even numbers of participants in each HIV testing group, accounting for possible response bias and recollection problems.

The fourth limitation has to do with the choice-driven nature of the study. That is, participants chose whether or not they received an HIV test and were not randomly assigned to receiving an HIV test. Therefore, the research findings cannot provide evidence for true causality between the psychosocial barriers and their influence over cognitions surrounding testing. However, given the unethical nature of randomly assigning participants known to be at-risk for HIV to test or not, this limitation was not addressed in the second study.

Chapter 3

Study 2: HIV Testing Intervention in the Field

The goal of Study 2 was to test whether a brief social psychological writing intervention could increase HIV testing behavior in at-risk men who have sex with men (MSM) by disrupting the mechanism related to HIV testing decision making established in the previous study—avoidance of threatening information (i.e., an HIV positive status). Specifically, this study tested the efficacy of a cognitive dissonance-inducing intervention via the hypocrisy paradigm (adapted from Walton, 2014) and a perceived controllability enhancing intervention (adapted from

Katapodi, Lee, Facione, & Dodd, 2004). Both interventions have been hypothesized to break the cycle of avoidance by diverting the threat elsewhere (i.e., threatening self-integrity) or making the threat less overwhelming (Howell et al., 2016). Although interventions using cognitive dissonance and perceived controllability to promote health behavior have shown success in the past, none of the previous studies have examined the effects these interventions may have on increasing HIV testing among an at-risk population in a field setting.

Cognitive dissonance-inducing interventions using the hypocrisy paradigm (Aronson et al., 1991) have resulted in behavioral changes in a variety of pro-health behaviors. Hypocrisy occurs when people advocate a health behavior (in this study, HIV testing) and are then made mindful that they have not performed the target health behavior regularly in the past (in this study, having not been tested for HIV in the past 4 months). This discrepancy in attitude versus behavior poses a threat to their self-integrity, which participants can reduce by bringing their own health attitudes (regular HIV testing is a good thing) and behavior into line with the standards for good health – getting tested for HIV. A recent systematic review paper explored the efficacy of cognitive dissonance paradigms in relation to health behavior change. A total of 14 studies using the hypocrisy paradigm were examined, spanning a diverse range of health behaviors including alcohol use, smoking, and condom use (Freijy & Kothe, 2013), although none of the examined studies included HIV testing behaviors. Of the studies that used this paradigm to change a behavior, seven studies showed a significant, positive change in the health behavior targeted, the majority of which related to condom use and sexual risk-taking behavior. That is, seven studies found that making participants feel cognitive dissonance by making them feel hypocritical for not using condoms in the past significantly increased condom use compared to their control conditions. Given the strength of effects these interventions have had on other

stigmatized health behaviors, such as condomless sex, applying this paradigm to HIV testing behavior could reveal similar effects.

The current study uses the hypocrisy paradigm to arouse dissonance in participants by making salient the inconsistency between participants' present encouragement of HIV testing and past avoidance of HIV testing. To reduce the discomfort arising from being in a state of dissonance, this paradigm suggests that participants should be more likely to seek out HIV testing following the experimental manipulation. As such, the hypocrisy paradigm of cognitive dissonance interventions should be particularly effective for those who have just explained the importance of regular HIV testing to others but have not engaged in the behavior they are encouraging, thus resulting in feelings of hypocrisy and cognitive imbalance.

Perceived controllability of an outcome plays a key role in many social psychological theories including the Learned Helplessness Theory and the Theory of Planned Behavior (Ajzen, 1985; Hiroto & Seligman, 1975). These theories posit that people display greater behavioral intentions and actions when behavioral control is high than when it is low. Therefore, uncontrollable diseases represent a threat to people's ability to control their lives, and as such may induce avoidance of information about these diseases in comparison to more controllable diseases (Melnyk & Shepperd, 2012; Yaniv et al., 2004). However, increasing one's perceived control over a disease has proven to be effective in increasing health screenings for threatening diseases, such as breast cancer, in prior research (Katapodi et al., 2004; Schwarzer & Fuchs, 1995). Women in one study were more likely to show up to a mammogram screening if they read a pamphlet emphasizing the controllable aspects of breast cancer before the appointment than if they were given a control pamphlet about how to lead a healthy lifestyle in general (Katapodi et al., 2004). In another study, participants were more likely to express interest in testing for a

disease similar to Huntington's disease (e.g., appears in adulthood and produces a painful death within 10–20 years of diagnosis) if they believed the disease was treatable than if it was described as untreatable (Shiloh et al., 1999). Given the promising effects of previous studies investigating similar behavior, applying an intervention to increase perceived controllability of an HIV positive diagnosis may increase HIV testing in men at-risk for HIV.

In order to test the effectiveness of the cognitive dissonance and perceived control conditions for increasing HIV testing in at-risk MSM, an experimental control writing condition was also included. Participants in the experimental control condition were asked to report their most recent HIV testing date and then write for at least one minute about what they did the day before. The final outcome of the study was to see if there was a change in self-reported test date that would indicate the participant had gotten tested between the intervention and the follow-up survey. There is theoretical evidence that both experimental conditions (i.e., cognitive dissonance and increased perceived control) will significantly increase the number of participants who sign up for and get an HIV test compared to the experimental control group. My hypotheses were:

(1) Participants in the experimental conditions of the intervention (cognitive dissonance and increased perceived controllability) will be more likely to make an appointment for HIV testing with Latinos Salud than those in the experimental control condition.
(2) Participants in the experimental conditions of the intervention (cognitive dissonance and increased perceived controllability) will be more likely to get an HIV test with Latinos Salud after participating in the study than participants in the experimental control condition.

(3) To account for the possibility of seeking out HIV testing at a location other than Latinos Salud, the experimental conditions of the intervention (cognitive dissonance and increased perceived controllability) will we be more likely to change in their self-reported most recent HIV test date between the intervention and the follow up survey compared to the experimental control group.

The secondary purpose of Study 2 was to explore any psychosocial barriers that were related to the HIV testing decision outcomes. The secondary hypotheses were:

(4) HIV status information avoidance, anticipated HIV stigma, HIV treatment optimism, and HIV infectiousness-reduction beliefs will be significantly predictive of all three HIV test decision outcome measures (i.e., scheduled appointment, test with Latinos Salud, test date change)

(5) HIV status information avoidance will be the strongest predictor of the HIV test decision outcome measures.

Method

Location

South Florida has some of the highest rates of HIV in the country. The rate of new HIV diagnoses in South Florida spiked to more than three times the national average in 2015, according to the Centers for Disease Control and Prevention's annual HIV Surveillance Report, which found that diagnoses in the Miami-Fort Lauderdale-West Palm Beach area last year averaged about 38.8 cases per 100,000 people (CDC, 2005; Florida Department of Health, 2017). The national average was 12.3 cases per 100,000 people during the same time frame (Centers for Disease Control and Prevention, 2016a; Centers for Disease Control and Prevention, 2005).

Despite the increasing numbers of HIV incidence in the area, the state of Florida has allocated limited funding to fight the threat of HIV. In fact, Florida governor Rick Scott, has consistently cut funding to and employment in Florida's Department of Health since 2012, and recently blocked the creation of an HIV/AIDS outpatient program in Broward County, Florida—the location of the 2nd highest incidence rate of HIV in the country in 2015 (Florida Department of Health, 2017). With skyrocketing HIV incidence rates and limited funding, South Florida was an ideal location to test this intervention.

The current study took place in collaboration with a local community-based health center, Latinos Salud, with locations in both Miami Beach and Wilton Manors. Latinos Salud provides sexual health services—including HIV and STI testing—to LGBT identified, primarily Latino, residents in these areas. The current study recruited participants from locations in Miami Beach, South Beach, and Wilton Manors. Because they focus on at-risk demographics in a high-risk area, Latinos Salud was selected as the site of the study, helping to field the survey and experimental manipulation, and providing free HIV testing to participants.

Participants

In total, 207 MSM residing in Miami or Fort Lauderdale participated in this study (M = 25.97 years, SD = 6.40). The majority of our participants identified as cisgender men, however, 4% identified as transgender women and 10% identified as genderqueer. The majority (51%) of the average annual household income for this sample was below $30,000. Over half of our sample (59%) reported they had completed a degree from a 2-year college or higher. About 70% of the participants were employed and 20% were currently students. About 54% of the sample identified as Latino (n = 111), 18% identified as Black (n = 38), 5% identified as Asian (n = 11), 25% identified as white (n = 51), and 4% multiracial (n = 9). All of our participants had reported

being sexually active in the past four months with someone who identified as the same gender as them. All of our participants reported they had not been tested for HIV in the past four months.

Procedure

Participants were recruited outside of dance clubs by mobile testing venues, at pop-up HIV testing events, outside of Latinos Salud during community events, and to maximize reach, online via Grindr. Participants who showed interest were given an IRB-approved information sheet or sent an online copy. Once they read the information sheet, they were directed to the questionnaire. Because our inclusion criteria were that they had been sexually active in the past four months but not HIV tested in that time frame, and were not to their knowledge HIV positive, the questionnaire first screened them for these criteria before advancing. Those who did not meet these criteria were re-directed to the end of the survey and paid for their time via a $5 Amazon gift card.

Those who screened into the intervention advanced to the writing intervention portion of the survey. Participants were randomly assigned to either the cognitive dissonance hypocrisy paradigm condition ("Our team is launching a campaign to encourage young gay and bisexual men to get tested for HIV. We need your help! Please write a brief letter to a young gay or bisexual man explaining to him all the benefits of regular HIV testing. Please spend at least a minute on this task."), the perceived control group ("Our team is launching a campaign to encourage young gay and bisexual men to get tested for HIV. We need your help! Please write a letter to a young gay or bisexual man about all the ways that an HIV positive gay or bisexual man can control his health and life (i.e., effective HIV treatments, etc.)"), or the experimental control group ("Our team is seeking to understand what the lives of our community members look like on a daily basis. Please write a brief description of the activities you did yesterday.

Please spend at least a minute on this task."). After completing their writing prompt, participants reported whether they would like to sign up for an appointment with Latinos Salud for HIV testing. If they were recruited from outside of a mobile HIV testing location or Latinos Salud, they also had the option to take an HIV test on location, following completion of the survey.

Once participants completed the survey, they were asked if they would like to provide an email for a follow-up survey and were compensated with a $5 Amazon gift card for their participation. Participants who signed up for a follow-up survey (94% of the sample) were sent an email with the link to the survey one week later. Those who did not complete the survey were sent a reminder email after two days. Follow-up survey links expired two weeks after completion of their initial intervention survey. Those who completed the follow-up survey were compensated with a $10 Amazon gift card.

In order to track participants' attendance for their HIV testing appointments with Latinos Salud or decision to use one of their mobile testing sites, unique identifiers were collected from participants on the first survey. These unique identifiers are a combination of letters and numbers that Latinos Salud uses to give anonymous identifiers to their clients. A list of the studies' unique identifiers was sent to Latinos Salud for comparison with their records.

Power analysis. An a priori analysis (see Bredenkamp, 1969; Cohen, 1988) was conducted to determine the appropriate sample size using logistic regression (outcome: test/no test). The following parameters were used in calculating the individual-level sample size necessary to achieve 95% power of finding an effect: 2 tailed test, alpha = 0.05, Odds Ratio = 2.59 (calculated from a previous study of mammogram risk assessment avoidance [Melnyk & Shepperd, 2012]). With these parameters, a sample size of 63 individuals per condition would be

needed to achieve 95% power of finding an effect. In order to account for follow-up survey attrition, 70 individuals were recruited per condition.

Intervention Delivery via Smart Phone

The decision to deliver the intervention via smart phone was informed by the marked rise of smart phone ownership and usage among Americans, particularly younger, low income Americans. Most (92%) of adults ages 18 to 29 own a smart phone (Pew Rearch Center, 2017). Additionally, those with lower incomes and educational attainment levels, younger adults, and non-whites are especially likely to heavily depend on their smart phone to perform tasks that have traditionally been reserved for desktop/laptop computers (Pew Research Center, 2015). For example, 88% of smartphone owners used their smart phones to write and receive email in 2016 (Pew Research Center, 2017). Due to the high prevalence of smart phone ownership in the population this intervention was designed for, smart phones provided an innovative and naturalistic method for delivering the writing intervention. When participants were recruited in person, a hot spot was active in order to provide Wi-Fi services for those who did not have data plans, or had low data usage plans, so they would be able to participate without incurring any costs. Additionally, a tablet was brought to every physical recruitment site to provide an opportunity to participate for those who did not own a smart phone.

Initial Survey Measures

Demographics. Participants reported their age, gender, 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. Outness was reported on a 5-point Likert scale from "completely in the closet" to "Completely out of the closet."

Sex Behavior. Participants completed six items about their sexual behavior. Items were similar to those used in previous HIV studies (Kalichman et al., 2007). Participants reported their number of male sex partners, as well as the number of female sex partners. Participants also reported the number of condomless and condom-protected sex acts that were performed with each gender. All items referred to the previous four months of sexual activity.

Past HIV Testing Behavior. 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).

Expressive Writing Intervention. Once screened into the study, participants were randomly assigned by the Qualtrics survey to one of three conditions: cognitive dissonance hypocrisy condition, perceived controllability condition, or the experimental control condition. The prompts were presented as a means for helping Latinos Salud to get to know their clientele's thoughts on HIV and community health services, so they could improve them. The cognitive dissonance hypocrisy condition prompted participants to write to a young gay or bisexual man about all the benefits of getting tested for HIV consistently for one minute. In theory, the task should induce cognitive dissonance in the participant, as they have not been tested in the last four months despite being sexually active. In order to alleviate their cognitive dissonance, they may then be motivated to seek out HIV testing.

The perceived controllability condition prompted participants to write about how controllable living with HIV is for one minute. Increased cognitive awareness of the controllability of living with HIV may encourage participants at risk for HIV to seek out HIV testing.

Finally, the control condition involved participants writing for one minute about what they did the day before. Typing on smart phone keyboards have been found to be not only a viable option in low income and low literacy populations, but a more effective means of delivering expressive writing interventions than writing with pen and paper (Newell, Logan, Guo, Marks, & Shepperd, 2015).

At the end of each writing condition, participants were offered the opportunity to sign up for an HIV test with Latinos Salud, a local HIV testing center with multiple locations in South Florida. Next, using anonymous unique identifiers, participants were recorded as using Latinos Salud's HIV testing services at any of their locations or mobile HIV testing vans.

Follow-Up Survey Measures

A link to the follow-up survey was sent one week after completion of the initial survey, to participants who provided an email address (98%). The primary purpose of this survey was to record possible updates to the self-reported most recent HIV test dates between the intervention and the follow-up survey. Participants reported their most recent HIV test date (Month and Year) in both the intervention study and in the follow-up study. If participants reported in the follow up survey their last HIV test date was now the month of the intervention, they were recorded as having a "HIV test date change." Since all participants enrolled in the study reported their last HIV test date with a month and year that indicated they had not been tested in at least four months prior to the intervention, the implication of this test date change was the participant has gotten tested between the intervention and follow up survey. A table examining each participant's self-reported HIV test dates for both intervention and follow up survey can be found in the appendix.

The secondary purpose of the follow-up survey was to capture possible mediating variables that were observed in Study 1, allowing for partial replication of those results. The items included on the follow up survey were not included in the initial intervention screener so that the content of the scales did not influence the validity of the intervention.

HIV Risk Perception. A two-item measure was used to assess participant's perceived risk for HIV infection (Golub & Gamarel, 2013a). An example item was, "How likely do you think you are to get HIV in your lifetime?" Participants were asked to enter a number from 0 to 100, where 0 means not at all and 100 means they felt they would definitely get HIV in their lifetime. The 2 items measuring HIV risk perceptions displayed good internal reliability (r = 0.74).

HIV Worry. A three-item measure was used to assess the extent to which participant's worry about contracting HIV (Golub & Gamarel, 2013a). An example item included "How often do you think about HIV day-to-day?" Participants were asked to respond on a scale from 0 (never) to 7 (all of the time). The 3 items measuring worry about HIV displayed good internal reliability ($\alpha = 0.79$).

HIV Testing Preferences and Date. Participants were asked where they had last been tested for HIV, their preferred HIV testing venue, if they were tested at a pop-up HIV testing site, and how likely they were to get tested at a Pride festival, a mobile testing event, or a clinic. Participants were asked to respond on a scale from 0 (extremely unlikely) to 4 (extremely likely) for the likelihood measures. Participants were also asked to report their latest HIV testing date with the month and the year.

Health Information Avoidance. An adapted 2-item Information Avoidance Scale was used to assess the tendency to avoid health information in general (Howell & Shepperd, 2016). Items were modified to indicate health information avoidance. The items were "In general, I would avoid learning health information about myself." and "Even if it will upset me, I generally want to know health information about myself." Questions were answered on a 7-point Likert scale from 1 (strongly disagree) to 7 (strongly agree). For the analyses, these scores were averaged to assess an overall tendency to avoid health information about oneself. The 2 items measuring general health information avoidance displayed good internal reliability ($r = 0.81$).

HIV Status Avoidance Scale. An adapted 10-item Information Avoidance Scale was used to assess an overall tendency to avoid learning one's HIV status (Howell & Shepperd, 2016). Items were modified to indicate HIV-status avoidance. Example items included: "I will be able to cope if I learn I am HIV positive" and "Even if it will upset me, I want to know my HIV status." Questions were answered on a 5-point Likert scale from 1 (strongly disagree) to 7 (strongly agree). For the analyses, these scores were summed to assess an overall tendency to avoid HIV testing and knowing one's HIV status. The 10 items measuring HIV status information avoidance displayed good internal reliability ($\alpha = 0.74$).

Anticipated Stigma. A 16-Item Anticipated HIV Stigma scale was used to assess HIV negative participants' own endorsements of HIV stigma (Golub & Gamarel, 2013b). Example items included "If I got infected with HIV, men would not want to have sex with me" and "I would feel I were not as good a person as others if I got HIV." Items were responded to on a 4-point Likert scale, 1 (strongly disagree) to 4 (strongly agree). For the analyses, these scores were averaged. The 16 items measuring anticipated HIV stigma displayed good internal reliability ($\alpha = 0.93$).

HIV Treatment Optimism. To assess beliefs about the efficacy of HIV medication and treatment, a 3-item HIV Treatment Optimism Beliefs scale was used (Kalichman et al., 2007). Example items included, "Because of HIV medications, people living with HIV can have a normal and healthy life." Items were responded to on a 4-point Likert scale (1 = *Strongly disagree*; 4 = *Strongly agree*). For the analyses, these scores were averaged. The three items measuring HIV treatment displayed good internal reliability ($\alpha = 0.71$).

HIV Infectiousness-Reduction Beliefs. To assess participants' beliefs about the infectiousness of HIV, a 3-item HIV Infectiousness Beliefs scale was used (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 a 4-point Likert scale (1 = *Strongly disagree*; 4 = *Strongly agree*). For the analyses, these scores were averaged. The three items measuring HIV infectiousness-reduction beliefs displayed good internal reliability ($\alpha = 0.73$).

Data Analyses

I first examined demographic and risk behavior (drug/alcohol use, sex behavior) differences across condition using χ^2 tests for categorical variables and one-way analyses of variance (ANOVA) for continuous variables to establish relevant control variables and to ensure that randomization was successful. Next, I conducted a series of Chi-Square tests across conditions and HIV testing outcomes (Hypotheses 1-3). Next, controlling for relevant demographic variables, I used multinomial logistic regression to determine whether HIV status information avoidance, anticipated HIV stigma, HIV treatment optimism, and HIV infectiousness-reduction beliefs would be significantly predictive of all three dichotomous HIV

test decision outcome measures (i.e., scheduled appointment, test with Latinos Salud, test date change) and if HIV status avoidance would be the strongest of these predictors (Hypotheses 4-5).

Results

Correlations for all variables are presented in Table 8.

Preliminary Analyses

Table 9 presents the results of χ^2 tests and ANOVAs that were conducted on all the demographic variables assessed (i.e., race, gender, sexual orientation, employment, education etc.) to ensure that randomization was successful across the conditions. There were no significant differences between groups. Of the 207 participants who completed the intervention study, 141 participants completed the follow up survey (68% retention rate). Additionally, there were unequal numbers across condition due to several participants being flagged as having taken the survey while visiting the area (non-residents), thus making the outcome measures moot in their cases. Figure 1 shows the participant flow throughout the intervention trial.

Primary Outcomes

Intervention Results. χ^2 tests were conducted to determine if a difference existed between the experimental and control conditions on the three primary HIV testing outcomes: number of HIV testing appointments scheduled with Latinos Salud (Cognitive dissonance n = 11; Perceived Controllability n = 5; non-intervention control n =7) , number of participants who got tested at Latinos Salud (Cognitive dissonance n = 0; Perceived Controllability n = 2; non-intervention control n =1), and a those who had positive change in self-reported HIV testing date between intervention and follow-up survey (i.e., those who reported in the follow-up study that they had

been tested since the intervention study) (Cognitive dissonance n = 7; Perceived Controllability n = 6; non-intervention control n =2). Phi (Φ) was calculated for these χ^2 tests to determine effect size for the analyses. Table 10 shows the results of the χ^2 tests on the three outcome measures by experimental condition. The number of appointments made with Latinos Salud did not significantly differ among the three conditions ($\chi^2 = 2.13$, $p > 0.10$). Next, the number of participants who got an HIV test at a Latinos Salud location did not significantly differ by condition ($\chi^2 = 2.11$, $p > 0.10$). Additionally, self-reported HIV test date changes between intervention and follow up did not significantly differ by test group ($\chi^2 = 3.35$, $p > 0.10$). Thus, hypotheses 1, 2 and 3 were unsupported.

Secondary Outcomes

Psychosocial barriers. Table 11 shows the results of two *t*-tests that were conducted to examine whether any of the assessed psychosocial barriers were associated with HIV testing appointments made and HIV test date changes, thus influencing the decision to make an HIV testing appointment or to seek out testing. *t*-tests were not run on those who went to Latinos Salud for testing due to underpowered cell size. Results revealed that there were no significant differences among any of the psychosocial barriers on the numbers of appointments made, appointments attended, or HIV test dates changed. Additionally, I assessed whether levels of each psychosocial barrier differed across conditions (i.e., cognitive dissonance, perceived controllability, and no-intervention control). Results from an ANOVA revealed that there were no significant differences among any of the psychosocial barriers by intervention condition (Table 12). Hypotheses 4 and 5, although exploratory, were unsupported.

Logistic Regression. Two binary logistic regressions were conducted to test the hypothesis that the psychosocial factors would be predictive of the dichotomous HIV testing

outcome measures of appointments made and HIV test date changes. A binary logistic regression was not run on those who went to Latinos Salud for testing due to an underpowered cell size. Table 13 shows the results of the binary logistic regressions. None of the psychosocial factors were predictive of any of the three HIV testing outcome measures.

Discussion

The goal of Study 2 was to investigate the extent to which a minimally invasive writing intervention could increase the HIV testing behaviors of at-risk MSM living in South Florida by either inducing cognitive dissonance around avoiding testing or increasing perceived controllability of living with an HIV positive diagnosis. Based on the Theory of Cognitive Dissonance and the Theory of Planned Behavior, both interventions were expected to be effective compared to the non-intervention control condition. However, because neither of the conditions had been tested in the context of HIV nor pitted against one another, there were no predictions about which intervention condition would produce stronger effects.

Findings from Study 2 indicate that cognitive dissonance and perceived controllability-increasing interventions may not be effective in increasing the HIV testing behavior of MSM at-risk for HIV. All three hypotheses were not supported in the study indicating that these brief interventions that have been tested primarily in a controlled lab space may not be effective for real world application. That is, none of the experimental intervention conditions led to significantly higher numbers of participants making an appointment with Latinos Salud, higher numbers of participants getting tested with Latinos Salud, or more updated test date. Additionally, neither experimental condition had significantly higher numbers of HIV test date changes than the other, indicating that both cognitive dissonance and perceived controllability interventions may be viable interventions to increase HIV testing in those at-risk for HIV.

Finally, Hypothesis 4 and 5 were not supported by the study. HIV status information avoidance, anticipated HIV stigma, HIV treatment optimism, and HIV infectiousness-reduction beliefs were not significantly predictive of any of the three HIV testing outcome measures.

It is interesting to note that participants in the intervention conditions were not more likely to sign up for HIV testing appointments with Latinos Salud, nor were they more likely to receive testing from Latinos Salud or have an updated test date change between intervention and follow up survey despite considerable evidence in the literature supporting these types of interventions for health behavior change. These results point to the potential external validity concerns related to interventions conducted in highly controlled experimental settings. Future research should examine the extent to which these laboratory studies replicate in a real-world setting with objective behavioral outcomes in order to understand if cognitive dissonance and perceived controllability paradigms have real-world implications.

The secondary analyses revealed the unexpected findings that none of the psychosocial barriers differed across conditions and none predicted HIV testing outcomes, thus leading to the rejection of Hypotheses 4 and 5. Past research, and Study 1 of this project, has supported the hypotheses that HIV Status Information Avoidance would be predictive of participants' likelihood of getting tested for HIV. Additionally, past research also indicated that anticipated HIV stigma, HIV treatment optimism, and HIV infectiousness-reduction beliefs would independently predict of participants' likelihood of agreeing to or seeking out HIV testing. While speculative, there are a few possible explanations. Because the assessment of each of the psychosocial barriers occurred in the follow-up survey, after interacting with the staff of Latinos Salud or the author and after the intervention took place, it may be that either the information received during the interaction or the induction of cognitive dissonance and increase in perceived

controllability changed perceptions of these barriers in such a way that the overall patterns of responses were similar across conditions. Another possible explanation is that this intervention tapped into a different mechanism related to HIV testing decision making, and this mechanism is more impactful than the previously studied psychosocial barriers. Last, the low statistical power present for the analyses of the dichotomous outcomes may also point to these findings being simply under-powered. This is discussed in the limitations section.

Limitations

Study 2 had five main limitations that warrant discussion. First were the low sample sizes for the cells of the dichotomous testing outcomes. The cells that indicated an affirmative to making an appointment, going to Latinos Salud, or having a test date change were statistically underpowered, thus making it difficult to firmly draw conclusions from the secondary analyses with confidence. This limitation should be addressed in future research, ensuring that all cells are large enough to produce adequately powered analyses.

The second limitation concerns the nature of the self-report method for tracking HIV test date change. Participants may have understood that the nature of the study was to assess whether motivation to get HIV tested could be increased. As such, they may have responded in a way they felt the researcher might have wanted on the follow-up survey. While I attempted to control for this potential bias by cross-checking appointments and testing with Latinos Salud, we cannot know whether the conflicting results—a lack of differences by condition on appointments and tests with Latinos Salud, but a greater number of recent tests reported in the intervention conditions—are due to this bias, or perhaps due to timing effects discussed above. It is important to note, however, that the follow-up survey results indicated that participants have strong testing venue preferences, and these preferences may have led to the low numbers of those who got

tested with Latinos Salud. It is also important to note that participants did not indicate any suspicion of the true nature of the study during the email interactions between intervention and follow-up survey. Future research should include a manipulation check to control against participant response bias, and future researchers should work with multiple organizations to get objective measures of testing.

The third limitation is the difference in recruitment methods for the intervention portion of the study. Participants were recruited both in person at community events and online via Grindr. These methods were implemented in order to increase the sample size to an adequately powered sample. Despite the differing methods of screening for the study, all participants were located within two miles of the in-person recruitment events to ensure all participants were recruited from geographically similar areas. Despite being recruited either online or in person, all participants did end up at the in-person recruitment site to receive their payment, and thus were exposed to the HIV testing site as well. All participants received the intervention via a link on their smart phones. However, participants who were recruited from Grindr were able to take the intervention from wherever they were located at the time of recruitment whereas those who were recruited in person completed it in front of the researcher. Thus, despite the mixing of recruitment methods not being ideal for a rigorous study, all measures were taken to try to keep the procedures as similar as possible for all participants (i.e., intervention delivery online, HIV testing venues immediately available.)

The fourth limitation relates to the three separate recruitment locations. Wilton Manors is located in Broward county whereas Miami Beach and South Beach are located in Miami-Dade County. The location for each participant's recruitment was recorded so as to track potential demographic differences among the groups. Despite the location differences, participants did not

significantly differ on any demographic variables by location. A table documenting these results can be found in the appendix. However, Miami Beach and South Beach are geographically more dense and urban compared to Wilton Manors. This geographic difference should be considered when interpreting the results as it could impact the ease of accessing HIV testing venues as testing options are more numerous in Miami Beach and South Beach.

Finally, the three HIV testing outcomes each have their own limitations. The HIV testing appointment outcome was designed to measure the participant's intentions to test. However, this outcome measure did not measure the participant's intent to test with other HIV testing organizations. This limitation was attempted to be somewhat addressed by asking participant's their last venue for testing in the follow up survey. Next, the objective HIV testing measure of number of participants who got tested with Latinos Salud was calculated by matching unique identifiers consisting of the participant's first two letters of their first and last name and their birthday year. Latinos Salud asks this information of all of their HIV testing clients so as to provide an anonymous record of their testers. However, it is possible that participants did not accurately disclose this information in the intervention survey due to privacy concerns. Therefore, some participant's may not have been captured by this method of tracking HIV testers. However, this was the most accurate and objective method for tracking participants from the intervention to testing with the collaborative location without a full-time research staff member being present at all three Latinos Salud location's and mobile testing sites. Of the three participants who were recorded as having been tested with Latinos Salud by unique identifier matching, one participant had made an appointment with Latinos Salud through the intervention survey. Finally, a somewhat less objective measure for HIV testing behavior was the HIV testing outcome of an updated self-reported HIV testing date between intervention survey and follow-up

survey. This measure was calculated by counting the number of participants who reported their latest HIV testing date was now the month the participant took the intervention and follow-up survey. The implication for the updated HIV testing date implies that the participant has been tested between the intervention and follow up since all participants reported a "last HIV testing date" of at least four months prior to the intervention in order to be screened in. However, it is possible that participants falsely reported an updated HIV testing date in the follow-up survey. Additionally, it is possible that some of the participants who signed up for HIV testing appointments with Latinos Salud were not captured with the unique identifier matching but were captured with an updated HIV testing date. Participant's reported their last venue for HIV testing in the follow up survey. A table has been added to the appendix reporting the locations participants with updated HIV testing dates reported being tested.

Finally, it is important to note that all participants in the current study were screened in for being at elevated risk for HIV and having not been tested in the past 4 months. Thus, this sample of participants were all likely high in avoidance (as supported by the results of Study 1). Therefore, the current studies' participants represent a restricted sample in which finding any correlations between avoidance and an outcome may become challenging. Future studies should allow for a more representative sample as to explore these associations between avoidance and HIV testing outcome measure.

Chapter 4
GENERAL DISCUSSION

Decades of research on HIV testing has found that those who are most at-risk for HIV are not getting tested for the disease in adequate numbers despite significant advances in both HIV testing technology and treatment. Past research aimed at understanding the psychological barriers to HIV testing have largely focused on narrowly defined constructs such as anticipated HIV stigma and beliefs about current HIV treatment prospects to understand the gap in incidence and diagnoses. However, the HIV testing literature has not explored how the social psychological framework of information avoidance could be relevant to this disparity in testing uptake. The current research contributed two studies that investigated the extent to which these well studied psychosocial barriers (i.e., anticipated HIV stigma, HIV treatment optimism and HIV infectiousness beliefs) impacted the decision to get tested for HIV as well as a newer, broader psychological mechanism for coping with threat—information avoidance (Sweeny et al., 2010)—and whether a brief social psychological intervention could effectively increase the decision to get an HIV test among at-risk MSM. Results from Study 1 indicated that HIV status information avoidance was a significant predictor of whether someone had engaged in HIV testing recently or not. Study 2 was designed to apply two prominent social psychological theories to an HIV field-testing intervention designed to disrupt the mechanisms that cause information avoidance of an HIV status. Results from Study 2 indicated that the three-different brief social-psychological interventions did not increase immediate scheduling of an HIV test, testing with a specific local LGBT health organization aimed at lessening the structural barrier to testing, or increase self-reported HIV testing between the intervention and the follow up survey.

These findings provide evidence that two commonly studied social psychological interventions may not operate in the same outside of a controlled lab space. These findings may also indicate that in order for these paradigms to work in a real-world context, the manipulation may need to be stronger than a brief writing intervention. For example, a stronger way to induce hypocrisy driven cognitive dissonance would be to have a participant report out loud to an HIV tester their last test date and then list the many positive aspects of getting regular testing. Finally, the interventions may not have impacted any of the HIV testing outcomes because they did not disrupt the cycle of avoidance as they were hypothesized too. However, more research is needed to understand how interventions that use cognitive dissonance and increasing perceived controllability to produce health behavior change can operate successfully in a real-world context. Additionally, these findings contradict the hypotheses that both of these interventions would disrupt the cycle of avoidance (J. Howell, Lipsey, & Shepperd, 2016). This study provides important preliminary work into understanding how to intervene on health information avoidance outside of the lab in an effective way.

How Might HIV Status Information Avoidance Contribute to At-Risk MSM Testing Gaps?

Since the advent of a diagnostic test for HIV, both behavioral researchers and physicians alike have been searching for ways to increase low testing numbers in those at-risk for the disease. Many of the current psychological explanations for this problem ignore the potential role that coping with threat by avoidance could be playing in at-risk individuals who fail to undergo testing. Avoidance takes place despite dramatic improvements in HIV testing technology via rapid testing (taking only a matter of minutes), at-home testing, and variation in testing methods (i.e., available via blood or oral swab), and a significant effort to decrease structural barriers to testing by large amounts of funding going to mobile HIV testing vans and clinics (Centers for

Disease Control and Prevention, 2016b). In addition to easing the burden of testing itself, modern treatment advances have made the disease transform from what was once a "death sentence" into a manageable, chronic disease, such as diabetes (Centers for Disease Control and Prevention, 2017). However, HIV is still a highly stigmatized disease that has not benefitted from a cultural shift in general being perceived as a manageable chronic-disease, much like diabetes. One of the goals of the current research was to gauge the extent to which commonly studied psychosocial barriers were present in relation to the decision to get tested for HIV, as well as studying how a social psychological concept – information avoidance – could also contribute to one's decision to get tested for HIV. Consistent with hypotheses, those at-risk for HIV in a diverse D.C. sample were more likely to *have not* been tested in over 4 months if they had higher HIV status information avoidance scores. Additionally, as expected, HIV status information avoidance did not predict whether someone had accepted contemporaneous HIV testing or if they *had* been tested in the last 4 months. These results held even when controlling for the other psychosocial barriers (i.e., anticipated HIV stigma, HIV treatment optimism, and HIV infectiousness-reduction beliefs) and other relevant control variables. Counter to expectations, those who had just undergone a test with the mobile HIV testing van reported *higher* HIV status information avoidance than those who had been tested in the last four months. These findings highlight the importance of understanding how coping with threat by avoiding can be a point of intervention, and highlight that avoidance exists on a time-varying continuum rather than strictly during the decision to accept to reject a testing offer. This means that potential points of intervention exist in the context of those who avoid testing all together, but also those who may desire to avoid testing in the future due to the mental strain and short-lived trauma of taking the test and waiting for their results. These findings add nuance to the Information

Avoidance Framework. Although information avoidance can have individual variation as a coping strategy when it comes to different threatening circumstances (Sweeny et al., 2010), it may also be a mechanism that can be temporarily elevated in even the most information-seeking person when a particularly uncomfortable psychological experience takes place, such as undergoing the anxiety of taking an HIV test. Additionally, Study 2 did not reveal further understanding of how HIV status information avoidance specifically works to undermine HIV testing acceptance. The reasons for this result will be discussed in the limitations section.

Anticipated HIV Stigma, HIV Treatment Optimism, and HIV Infectiousness-Reduction Beliefs

Another goal of the current research was to examine how commonly studied psychosocial HIV testing barriers – anticipated HIV stigma, HIV treatment optimism, and HIV infectiousness-reduction beliefs – related to the decision to get tested for HIV. Previous studies have found that participants self-report these constructs as primary psychological reasons they do not get tested for HIV (Christopoulos et al., 2012; Draucker et al., 2015; Jürgensen et al., 2012; Wallace et al., 2011). Anticipated HIV stigma, in particular, is the most commonly reported reason participants avoid HIV testing and has been made a top funding priority by the NIH for this reason ("NOT-OD-15-137: NIH HIV/AIDS Research Priorities and Guidelines for Determining AIDS Funding," 2017). Despite the funding provided to understand a major social psychological influence over HIV testing and treatment, no study has yet to examine how the different psychosocial barriers, including but not limited to stigma, may interact together to influence an HIV testing decision. Surprisingly, none of the psychosocial barriers significantly predicted HIV testing decision when controlling for relevant control variables in Study 1 or Study 2. When exploring these constructs by conducting an ANOVA between the different HIV testing decision groups in Study 1, HIV treatment optimism and HIV infectiousness-reduction beliefs were

significantly different among the groups. However, anticipated HIV stigma was not significantly different among the groups despite being the most commonly cited reason people at risk for HIV avoid HIV testing.

Brief Social-Psychological Interventions and HIV Testing Uptake

Study 1 provided initial evidence that those at-risk for HIV may be vulnerable to HIV status information avoidance that may prevent them from getting tested. Study 2 tested whether a brief social psychological intervention could increase HIV testing in at-risk individuals by disrupting the processes that promotes avoidance and redirect the uncomfortable feeling of threat due to learning one's HIV status to either wanting to alleviate the uncomfortable psychological feeling of dissonance or increasing the perceived controllability of that outcome and thus alleviating a major contributor to avoidance. Specifically, Study 2 aimed to make a number of contributions to the literature on brief social-psychological interventions applied in a real-world context, as well as the HIV testing literature. First, this study was the first to test the cognitive dissonance hypocrisy paradigm and the increased perceived controllability paradigm on those at risk for HIV, outside of a lab context (Freijy & Kothe, 2013). Second, this study was the first to test the extent to which these brief social psychological interventions may be effective at increasing HIV testing in those at risk for HIV by disrupting the psychological processes that may lead to avoidance. Past studies have examined the extent to which these types of interventions increase attendance of breast cancer screenings or increase use of condoms (Aronson et al., 1991; Freijy & Kothe, 2013; Melnyk & Shepperd, 2012), both behavioral outcomes of health-related behavior, but the current study is the first to directly test the extent to which brief social-psychological interventions may benefit at risk individuals and their decision to take a stigmatized medical test. Finally, this study aimed to provide some clarification about

whether or not social-psychological brief interventions should be considered a viable strategy for combating low HIV testing rates in the United States among those who are at highest risk for HIV.

Cognitive Dissonance Intervention. It was hypothesized that the cognitive dissonance inducing intervention—designed to make participants feel hypocritical for espousing positive aspects about getting HIV testing while being behind in testing themselves—would create temporary psychological discomfort, in line with a wealth of previous research, and would thus motivate participants to relieve this uncomfortable state of dissonance by getting tested for HIV (Stone & Fernandez, 2008; Stone, Wiegand, Cooper, & Aronson, 1997). The cognitive dissonance condition did not significantly impact the number of participants who signed up for an immediate HIV testing appointment, those who got tested with Latinos Salud, or the number of participants whose self-reported HIV test date changed to an updated month between the intervention and follow-up survey. Findings examining the impact of the intervention on participants HIV status information avoidance tendencies and other psychosocial barriers revealed null results. The intervention may not have adequately disrupted the factors that lead to health information avoidance as they were hypothesized to do. When made mindful of how one is not upholding the advocated norms for behavior, the discrepancy activates cognitions linked to perceptions of self-integrity. According to the self-consistency revision of dissonance theory (Aronson, 1968; Aronson et al., 1999), people perceive an act of hypocrisy as a threat to their perception of self-integrity, and thus a threat to fundamentally valued attributes, such as honesty (Stone et al., 1997). Because changing their attitude to fit their own behavior—and thus advocate for not getting HIV tested—would be socially unacceptable, behavioral change becomes the more likely alternative. However, this threat to self-integrity may not have been significant

enough surpass the threat of a possible HIV positive test result. This is an important result to consider for future research that uses a hypocrisy paradigm to induce health behavior change in relation to a highly stigmatizing disease.

Perceived Control Intervention. It was also hypothesized that by increasing the perceived controllability of an HIV positive diagnosis, participants would be more likely to get tested for HIV. Counter to hypotheses, the perceived controllability intervention condition did not increase the number of immediate HIV testing appointments, the amount of people who got tested for HIV with Latinos Salud, or those whose self-reported HIV test dates were updated to the month of the study between the intervention and follow-up survey. Since the cognitive dissonance condition and the perceived controllability conditions have never been used to increase HIV testing behavior in at-risk individuals before, nor compared against each other for effectiveness in previous health-behavior change studies, there were no hypotheses about which experimental condition would produce stronger effects. To this point, results revealed that there were no significant differences in any of the three HIV testing outcomes among the two intervention groups. Previous research indicates that a major reason people avoid learning information is because they do not feel they can control the outcome of what this information may reveal (Sweeny et al., 2010). By increasing perceived controllability of an HIV positive diagnosis, it was hypothesized that participants would feel more in control of their health outcomes if they have HIV and would be more willing to get tested. However, this paradigm may not be powerful enough to override the many other factors that contribute to the decision to avoid threatening health information. For example, a participant may be made to feel more in control of an HIV positive status from a health perspective, but still not feel in control over how friends and family will react to this information. These findings highlight the importance of

understanding how increasing perceived controllability may not be impactful when it is limited to one domain of a stigmatized disease. Future research should consider the importance of increasing the perceived controllability of not just the health implications of having a stigmatized illness, but also the interpersonal aspects as well.

Limitations and Future Directions

Internal Validity. There were several internal validity concerns in both studies. In the first study, participants were divided into three HIV testing groups: those who got tested with the HIV testing van, those who turned down testing but reported having been tested recently, and those who turned down testing and reported they had not been tested recently. Those who were tested for HIV took the survey after they received the negative results of their HIV test. This decision to administer the survey after the participants who accepted HIV testing got tested may have impacted the conclusions one could draw from the psychosocial barrier results of this group. However, the main findings focused on the two groups of participants that had not just been tested for HIV. Additionally, those who had just been tested did not have significantly different state-based anxiety scores. This difference in psychological state upon taking the survey should be considered when interpreting the results. However, the study's methods do not invalidate the results of this study. This study should be used as an initial study that concludes there are significant differences among those who reported they had been tested in the last 4 months and those who had not on important psychosocial barriers. Additionally, if there is an ethical way to deliver the survey right before someone gets tested for HIV, a study should be conducted using this method to compare results of the psychosocial barriers from the current study's participants who accepted testing.

Next, concerns arose of the different settings for intervention delivery of the second study as well as the conclusions that could be drawn from the three outcome variables. In terms of location, participants did not significantly differ on any demographics among the three locations used to recruit participants. Additionally, participants who were recruited from Grindr did not significantly differ from those who were recruited in person on any demographic variables. Therefore, the participants retained good internal validity despite differences in location recruitment and method of recruitment. Next, there were concerns about the quality of conclusions that could be drawn from the three HIV testing outcome measures. First, concerns were raised about the potential for overlap of participants in the three HIV testing outcome measures. However, a table has been added to the appendix to show that those who had an HIV test date change did not overlap with those who were recorded as having gotten tested with Latinos Salud. Additionally, three participants who signed up for appointments with Latinos Salud indicated that they had been tested since they signed up for the appointment, but with alternative providers. Thus, the variable designed to capture intention to test was effective to some extent. Finally, the change in test date variable has self-report limitations. However, the majority of those who reported an updated HIV test date also reported a specific venue and provider they had last been tested with. The specificity of the recall of last HIV testing venue adds confidence that this variable retained sufficient internal validity to draw conclusions from the findings that those who reported an updated HIV test date did get tested between intervention and follow up.

Sample Size and Recruitment Limitations. The primary limitation of the current research pertains to the small sample size of the affirmative testing category for all three of the dichotomous outcomes of Study 2. The majority of the participants in each of the three

conditions did not make an appointment, did not get tested with Latinos Salud, and did not have an HIV test date change. While the total number of those who enrolled in the intervention had adequate power to detect an effect among the three conditions, it was underpowered for secondary analyses using binary logistic regression to explore the role the additional psychological constructs had on the decision-making process. Future research should account for the possibility of having low numbers in one of the outcome groups and increase the sample size so that adequate power can be achieved for secondary analyses.

Due to limited resources and the need to maximize outreach, some of the participants were recruited online for the intervention study. Participants who were recruited online were recruited from Grindr, which employs geolocation and restricts to a specified area, so that the researchers could ensure that the participants were indeed recruited from the targeted location. This method, while practical and generalizable, may have contributed to lower numbers for the scheduling of HIV testing appointments, testing with Latinos Salud, and HIV test date changes. It has been well documented that effects for social psychological interventions tend to be stronger in a controlled lab setting, with a research assistant providing oversight, whereas remote data collection may increase psychological distance and thus investment. As such, participants may be more willing to sign up for an appointment or get tested if the majority of the survey is taken in the presence of a research assistant, as the survey and the questions within it may be taken more seriously. A future research design should include an in-person delivery of the intervention and an online delivery of the intervention to compare the effectiveness of each method.

Last, participants in Study 2 were asked to provide an email address for the follow-up survey. Using email as the method for follow-up may have contributed to the lower response rate

because participants may not frequently check their email or may have thought the follow-up email was spam. Future researchers may benefit from using text messaging for survey link delivery to avoid these issues, as well as increased incentives to make the follow-up survey more appealing.

Measurement Limitations. In Study 1, participants who contemporaneously accepted HIV testing at a mobile HIV testing van location were asked to take the survey after they received an HIV negative result. This experience put the participants who decided to get tested in a uniquely aroused state compared to those who denied testing. This aroused state may have impacted their responses to the items in the survey. Despite this limitation, we concluded that it was important to prioritize HIV testing over our survey. Future research may be able to ethically employ the survey before an HIV test in a clinical waiting room rather than in a mobile testing setting.

Conclusion

With cutting edge HIV treatments and the advent of TaSP (treatment as prevention), HIV testing is more important than ever. However, the psychological processes individuals use to cope with threat can prove to be stubborn barriers to engaging in testing. The current research provides evidence that HIV status information avoidance may be an important mechanism for helping researchers understand psychological barriers to testing. However, the interventions that have been hypothesized to disrupt the decision to avoid unwanted health information did not provide support for increasing HIV testing behavior among at-risk men who have sex with men. Together, these findings suggest that while health information avoidance may be a psychological barrier to testing, more research needs to be done in order to pin point an effective point of intervention.

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Table 1. Bivariate correlations (Study 1).

Variable	1	2	3	4	5	6	7	8	9	10
1. Income	-									
2. Employment	0.28**	-								
3. Education	-0.30**	-0.53**	-							
4. Sexual Orientation	-0.39**	-0.57**	0.49**	-						
5. Race	-0.23**	-0.37**	0.33**	0.35**	-					
6. HIV Anticipated Stigma	-0.16**	-0.07	0.18**	0.13*	0.06	-				
7. HIV Treatment Optimism	0.22**	0.24**	-0.28**	-0.15*	-0.22**	-0.78	-			
8. HIV Infectiousness-Reduction Beliefs	0.15*	0.20**	-027**	-0.19**	-0.25**	-0.06	0.74**	-		
9. HIV Test Result Avoidance	-0.36**	-0.26**	0.24**	0.36**	0.26**	0.15*	-0.17**	-0.04	-	
10. HIV Testing History Group	-0.10	-0.19**	0.15*	0.14*	0.20**	0.06	-0.05	-0.07	0.14*	

Notes. + p < .06 * p < .05. ** p < .01. *** p <.001

Table 2. Information avoidance item characteristics

Item	Mean(SD)	Item-to-Total Correlation	Alpha if Deleted
I would rather not know my HIV status.	1.29(0.80)	0.31	0.73
I avoid learning my HIV status.	1.27(0.73)	0.46	0.71
Even if it still upset me, I want to know my HIV status.	3.54(0.96)	0.30	0.74
When it comes to my HIV status, ignorance is bliss.	1.68(1.11)	0.34	0.73
I want to know my HIV status.	3.76(0.69)	0.48	0.70
I can think of situations in which I would rather not know my HIV status.	1.62(1.00)	0.57	0.70
It is important to know my HIV status.	3.79(0.65)	0.55	0.70
I want to know my HIV status immediately.	3.67(0.75)	0.41	0.72
I can handle the news if I test HIV positive.	3.05(0.99)	0.29	0.73
I have a close friend or relative I can turn to if I am HIV positive.	3.37(0.98)	0.45	0.71

Table 3. Demographics by HIV testing Group (Study 1)

	HIV testing history				
	Accepted Testing	Denied Testing (< 4 months)	Denied Testing (>4 months)		
Characteristic	%(*N*)	%(*N*)	%(*N*)	χ^2	Φ
Gender					
Male	17(49)	22(62)	14(40)	6.47	0.17
Female	8(23)	7(21)	11(32)		
Transgender	.04(1)	.04(1)	.04(1)		
Race					
Black	12(27)	13(31)	24(55)	13.16**	0.24**
White	10(24)	12(27)	5(11)		
Latino	6(13)	9(21)	.04(1)		
Other	3(7)	3(7)	3(7)		
Employment					
Employed	21(49)	11(69)	16(38)	20.42***	0.30***
Unemployed	10(24)	6(15)	15(35)		
Education					
Less than 10	1(2)	0(0)	3(8)	27.15**	0.34**
11	1(3)	0(0)	1(3)		
12	7(17)	36)	6(13)		
More than 12	22(50)	34(78)	21(49)		
Income					
< 30,000	13(30)	9(21)	20(46)	35.34***	0.40***
> $31,000	19(43)	26(61)	10(24)		
Relationship Status					
Single	15(34)	18(41)	18(42)	5.36	0.15
Open Relationship	3(7)	5(12)	2(5)		
Monogamous Relationship	10(24)	8(19)	7(17)		
Married	3(8)	5(12)	4(9)		
Sexual Orientation					
Gay	12(31)	19(51)	6(16)	33.30***	0.38***
Bisexual	4(5)	5(13)	3(7)		

	%(N)	%(N)	%(N)	χ^2	Φ
Heterosexual	16(31)	7(15)	18(38)		
Other	2(6)	2(5)	4(10)		
Outness					
Not out	1(2)	1(2)	1(2)	4.91	0.19
Sometimes out	.04(1)	3(7)	2(4)		
Out	15(35)	25(59)	10(24)		
No. of alcoholic drinks monthly					
Never	3(8)	2(4)	3(8)	10.96	0.22
Monthly or less	2(5)	4(9)	5(11)		
2-4 times a month	12(27)	13(30)	10(23)		
2-3 times a week	9(20)	15(34)	8(19)		
More than 4 times a week	6(13)	3(7)	5(11)		
No. of alcoholic drinks daily					
0, I do not drink	4(9)	2(5)	4(10)	15.88	0.26
1-4	22(50)	28(65)	24(56)		
5-9	6(13)	6(14)	1(2)		
10 or more	.03(1)	0(0)	1(2)		
Frequency of 6 or more drinks					
Never	15(41)	10(28)	13(36)	6.59	0.15
Monthly	15(42)	17(48)	15(42)		
Weekly	4(11)	6(16)	4(10)		
Daily	.03(1)	0(0)	1(2)		

Characteristic	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*F*	η^2
Age	34.2(11.63)	32.5(10.34)	35.6(12.77)	1.60	0.01
No. of male sex partners in last 4 months	1.93(4.75)	4.06(5.83)	1.93(5.06)	4.64**	0.04
Anal sex, no condom	2.40(7.12)	3.27(6.10)	0.82(2.31)	3.06*	0.03
Anal sex, condom	0.65(1.61)	2.85(6.39)	0.57(1.23)	7.35**	0.06
No. of female sex partners in last 4 months	1.16(4.80)	0.26(0.67)	3.00(12.45)	2.81	0.02
Vaginal/anal sex, no condom	2.77(11.62)	2.38(11.58)	3.98(14.49)	0.30	0.003
Vaginal/anal sex, condom	2.71(13.46)	0.40(1.44)	2.15(10.48)	1.24	0.01
No. of times HIV tested	5.47(5.55)	11.13(9.94)	6.51(6.55)	13.72***	0.09

Notes. + p < .06 * p < .05. ** p < .01. *** p <.001

Table 4. ANOVA of psychosocial barriers by testing group (Study 1).

	HIV Testing History				
	Accepted Testing	Recently tested (< 4 months)	Denied testing (>4 months)		
Characteristic	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*F*	η^2
HIV Anticipated Stigma	2.44(0.77)	2.29(0.69)	2.55(0.90)	2.33	0.02
HIV Treatment Optimism	2.87(0.73)	3.10(0.60)	2.78(0.79)	4.79**	0.03
HIV Infectiousness-Reduction Beliefs	2.74(0.78)	2.90(0.66)	2.62(0.79)	3.22*	0.02
PrEP Attitudes	1.88(0.67)	1.81(0.57)	2.13(0.82)	5.13**	0.04
HIV Test Result Avoidance	14.65(4.59)	12.79(3.58)	16.78(16.78)	16.39***	0.11

Notes. + p < .06 * p < .05. ** p < .01. *** p <.001

Table 5. Multivariate multinomial logistic regression for information avoidance variables by testing history groups (Study 1).

Accepted Testing vs Recently Tested (> 4 months)	B (SE)	Odds Ratios	95% CI
Income	0.05(0.11)	1.05	0.84-1.32
Employment	0.21(0.33)	1.24	0.64-2.37
Race	-0.70(0.50)	0.34	0.23-1.05
Sexual Orientation	0.29(0.14)	1.33*	1.01-1.75
Education	-1.08(0.50)	0.34*	0.13-0.91
HIV Test Result Information Avoidance	0.07(0.05)	1.08	0.98-1.17
Not Recently Tested (< 4 months) vs Recently Tested (>4 months)	B (SE)	Odds Ratios	95% CI
Income	-0.24(0.13)	0.79	0.61-1.01
Employment	-0.12(0.32)	1.23	0.47-1.68
Race	0.20(0.47)	1.23	0.49-3.09
Sexual Orientation	0.38(0.15)	1.47*	1.09-1.97
Education	-1.00(0.50)	0.37*	0.14-.97
HIV Test Result Information Avoidance	0.11(0.50)	1.12*	1.02-1.24

Notes. + p < .06 * *p* < .05. ** *p* < .01. *** *p* <.001

Table 6. Multivariate multinomial logistic regression for psychosocial variables by testing history group (Study 1).

Accepted Testing vs Recently Tested (> 4 months)	B (SE)	Odds Ratios	95% CI
Income	0.08(0.12)	1.08	0.86-1.36
Employment	0.23(0.35)	1.26	0.63-2.50
Race	-0.71(0.39)	0.49	0.23-1.06
Sexual Orientation	0.27(0.14)	1.31	0.98-1.73
Education	-0.98(0.50)	0.38*	0.14-0.99
Anticipated HIV Stigma	0.15(0.25)	1.01	0.71-1.89
HIV Treatment Optimism	-0.32(0.41)	0.73	0.32-1.63
HIV Infectiousness-reduction beliefs	0.03(0.39)	1.03	0.48-2.23
HIV Test Result Information Avoidance	0.07(0.05)	1.07	0.98-1.73
Not Recently Tested (< 4 months) vs Recently Tested (>4 months)	B (SE)	Odds Ratios	95% CI
Income	-0.31(0.14)	0.74*	0.56-0.96
Employment	-0.16(0.34)	0.85	0.43-1.67
Race	0.17(0.48)	1.18	0.46-3.04
Sexual Orientation	0.31(0.16)	1.36*	1.00-1.85
Education	-0.92(0.49)	0.40	0.15-1.05
Anticipated HIV Stigma	0.17(0.26)	1.18	0.70-1.98
HIV Treatment Optimism	-0.04(0.43)	0.97	0.42-2.25
HIV Infectiousness-reduction beliefs	-0.23(0.42)	0.80	0.35-1.80
HIV Test Result Information Avoidance	0.10(0.05)	1.10*	1.04-1.21

Notes. + p < .06 * p < .05. ** p < .01. *** p <.001

Table 7. Multivariate multinomial logistic regression for information avoidance variables by testing history groups (Study 1).

Accepted Testing vs Recently Tested (> 4 months)	B (SE)	Odds Ratios	95% CI
Income	0.06(0.12)	1.07	0.85-1.34
Employment	0.24(0.34)	1.28	0.66-2.48
Race	-0.67(0.39)	0.51	0.24-1.09
Sexual Orientation	0.31(0.14)	1.36*	1.03-1.79
Education	-1.02(0.50)	0.36*	0.14-0.97
General Health Information Avoidance	0.03(0.14)	1.03	0.78-1.36
HIV Test Result Information Avoidance	0.07(0.05)	1.07	0.98-1.18
Not Recently Tested (< 4 months) vs Recently Tested (>4 months)	B (SE)	Odds Ratios	95% CI
Income	-0.29(0.13)	0.75	0.58-0.97
Employment	-0.14(0.33)	0.38	0.14-1.66
Race	0.15(0.48)	1.17	0.46-2.98
Sexual Orientation	0.36(0.15)	1.44*	1.06-1.94
Education	-0.97(0.50)	0.38	0.14-1.01
General Health Information Avoidance	-0.11(0.17)	0.90	0.65-1.24
HIV Test Result Information Avoidance	0.11(0.50)	1.12*	1.02-1.24

Notes. + p < .06 * *p* < .05. ** *p* < .01. *** *p* <.001

Table 8. Bivariate correlations (Study 2).

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Income	-												
2. Employment	-0.40**	-											
3. Education	0.45**	-0.18*	-										
4. Sexual Orientation	-0.38**	0.25**	-0.19**	-									
5. Race	-0.07	-0.13	-0.04	-0.04	-								
6. Male Sex Partners	-0.08	0.25**	0.10	-0.02	-0.03	-							
7. Female Sex Partners	-0.04	0.23**	-0.02	0.26**	-0.63	.002	-						
8. Anticipated HIV Stigma	0.07	-0.12	0.19*	0.04	-0.04	-0.01	0.03	-					
9. HIV Treatment Optimism	-0.12	0.08	-0.14	-0.04	-0.03	0.11	0.06	-0.12	-				
10. HIV Infectiousness-Reduction Beliefs	-0.12	0.05	-0.15	0.04	0.04	-0.01	0.02	-0.14	0.62**	-			
11. HIV Status Avoidance	-0.02	-0.01	-0.01	0.05	0.08	-0.003	-0.08	0.2388	-0.09	-0.16	-		
12. Latinos Salud Appointment	-0.05	0.10	0.07	0.13	-0.09	0.02	-0.12	-0.04	-0.08	-0.01	.007	-	
13. Test Date Change	-0.06	-0.005	0.02	0.005	-0.03	-0.07	0.04	0.05	-0.03	-0.07	0.004	-0.12	-

Notes. + p < .06 * p < .05. ** p < .01. *** p <.001

Table 9. Demographics by condition (Study 2).

	HIV testing history				
	Cognitive Dissonance	Perceived Control	Control		
Characteristic	%(*N*)	%(*N*)	%(*N*)	χ^2	Φ
Race					
Black	8(16)	4(8)	7(14)	2.27	0.10
White	8(17)	11(23)	5(11)		
Latino	18(38)	18(38)	18(37)		
Other	4(8)	4(8)	6(12)		
Gender					
Cisgender Man	28(58)	26(53)	26(53)	5.43	0.16
Transgender Woman	1(2)	1(3)	1(2)		
Genderqueer	3(6)	4(8)	3(7)		
Employment					
Employed	22(46)	24(49)	24(50)	3.61	0.13
Unemployed	13(26)	9(19)	8(17)		
Education					
High School Diploma/GED	5(11)	5(10)	4(9)	10.41	0.22
Some College	10(21)	7(14)	10(20)		
Two Year College Degree	5(11)	5(11)	5(10)		
Bachelor's Degree	9(19)	10(21)	9(18)		
Postgraduate degree	5(10)	6(12)	5(10)		
Income					
< 30,000	17(36)	18(37)	17(35)	3.33	0.13
> $31,000	17(36)	15(31)	15(32)		
Relationship Status					
Single	15(32)	15(32)	12(25)	5.36	0.15
Casual Dating	8(16)	10(20)	8(17)		
Dating, Long term	9(18)	6(12)	7(14)		
Domestic Partnership	2(5)	3(7)	5(11)		
Married/Civil Union	2(5)	2(5)	3(6)		
Polyamorous	1(2)	1(3)	1(1)		
Open Relationship	1(3)	2(4)	2(5)		
Sexual Orientation					
Gay	26(54)	24(49)	24(49)	3.96	0.14
Bisexual	3(5)	4(8)	2(5)		
Heterosexual	1(2)	1(2)	1(2)		
Queer	4(8)	4(8)	5(10)		
Outness					
Not out	8(17)	9(18)	7(14)	8.14	0.20
Sometimes out	6(13)	3(7)	2(4)		
Out	22(46)	17(36)	24(49)		

Characteristic	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*F*	η^2
Age	26.18(6.35)	25.38(5.71)	26.34(7.12)	0.44	0.004
No. of male sex partners in last 4 months	3.75(4.93)	3.85(4.61)	5.64(8.46)	2.00	0.02
Anal sex, no condom	4.20(11.87)	3.40(9.31)	4.00(6.76)	0.13	0.001
Anal sex, condom	3.87(7.31)	3.21(5.56)	4.10(7.04)	0.32	0.003
No. of female sex partners in last 4 months	0.49(1.21)	0.68(1.63)	0.36(0.90)	1.04	0.01
Vaginal/anal sex, no condom	1.34(4.85)	1.02(2.16)	2.00(5.20)	0.87	0.009
Vaginal/anal sex, condom	0.41(1.11)	1.13(2.94)	2.35(6.48)	3.78*	0.04
No. of times HIV tested	6.26(9.34)	7.14(8.58)	6.59(10.03)	0.15	0.002

Notes. + $p < .06$ * $p < .05$. ** $p < .01$. *** $p < .001$

Table 10. Chi square test of condition by HIV testing outcome (Study 2).

	Condition				
	Cognitive Dissonance	Increased Perceived Control	Control		
Characteristic	%(*N*)	%(*N*)	%(*N*)	χ^2	Φ
Booked Appointment					
Yes	5(11)	2(5)	3(7)	2.25	0.11
No	25(52)	26(54)	25(51)		
Self-Report HIV Test Date Change					
Yes	3(7)	3(6)	1(2)	3.35	0.15
No	18(39)	19(41)	21(46)		
Went to Latinos Salud					
Yes	0(0)	1(2)	0.05(1)	2.12	0.10
No	35(72)	32(66)	32(66)		

Notes. + p < .06 * p < .05. ** p < .01. *** p <.001

Table 11. *t*-tests of psychosocial factor by HIV testing outcome (Study 2)

Psychosocial factor	Appointment						95% CI for Mean Difference		
	Yes			No					
	M	SD	n	M	SD	n		t	df
HIV Status Information Avoidance	24.36	3.37	14	24.42	3.15	102	-1.86, 1.73	-0.07	114
Anticipated HIV Stigma	2.33	0.68	14	2.25	0.71	103	-0.31, 0.48	0.43	115
HIV Treatment Optimism	2.88	0.85	14	2.67	0.81	104	-0.24, 0.68	0.93	116
HIV Infectiousness-Reduction Beliefs	3.05	0.83	14	3.01	0.90	104	-0.47, 0.54	0.15	116
	Date Change								
HIV Status Information Avoidance	24.50	2.20	12	24.54	3.39	122	-1.45, 1.53	0.06	132
Anticipated HIV Stigma	2.54	0.83	12	2.25	0.75	123	-0.75, 0.16	-1.29	133
HIV Treatment Optimism	2.54	0.66	13	2.67	0.82	123	-0.19, 0.89	1.29	134
HIV Infectiousness-Reduction Beliefs	2.69	0.78	13	3.05	0.95	123	-0.14, 0.84	0.79	134

Notes. + $p < .06$ * $p < .05$. ** $p < .01$. *** $p < .001$

Table 12. ANOVA of psychosocial factors by condition (Study 2).

Characteristic	Cog Diss *M* (*SD*)	Inc Control *M* (*SD*)	Control *M* (*SD*)	*F*	η^2
HIV Status Information Avoidance	24.74(3.54)	24.33(3.04)	24.54(3.35)	0.17	0.003
HIV Treatment Optimism	2.66(0.75)	2.54(0.82)	2.79(0.84)	1.14	0.02
HIV Infectiousness-Reduction Beliefs	3.00(0.95)	2.83(0.87)	3.20(0.98)	1.78	0.03
Anticipated HIV Stigma	2.31(0.82)	2.26(0.75)	2.25(0.73)	0.97	0.001

Table 13. Multivariate binomial logistic regression for psychosocial variables by HIV testing outcome (Study 2).

Appointment Made (yes/no)	B (SE)	Odds Ratios	95% CI
Anticipated HIV Stigma	-0.22(0.42)	0.80	0.35-1.81
HIV Treatment Optimism	-0.56(0.48)	0.57	0.22-1.45
HIV Infectiousness-reduction beliefs	0.29(0.44)	1.34	0.57-3.19
HIV Test Result Information Avoidance	0.27(0.10)	1.03	0.85-1.25
Date Change (Yes/No)			
	B (SE)	Odds Ratios	95% CI
Anticipated HIV Stigma	0.49(0.42)	1.64	0.72-3.74
HIV Treatment Optimism	0.08(0.49)	1.08	0.41-2.85
HIV Infectiousness-Reduction Beliefs	-0.47(0.46)	0.63	0.26-1.53
HIV Test Result Information Avoidance	-0.06(0.10)	0.94	0.77-1.15

Figures

Figure 1. Flow of participants through the trial.