Abstract

Internalized HIV/AIDS Stigma and Alcohol Use in a Sample of Adults Living with HIV/AIDS in the Bronx, New York

Introduction

One of the most significant challenges people living with HIV/AIDS (PLWHA) face is internalized HIV/AIDS stigma (IHAS). IHAS has been associated with numerous adverse physical and mental health outcomes, including alcohol use. Alcohol use among PLWHA has serious implications for both the individual and society. Therefore, it is crucial to identify notable factors, such as IHAS, that perpetuate alcohol use among PLWHA. This was the first study to examine the relationship between IHAS and alcohol use behaviors (i.e., number of drinking days per week, number of alcoholic drinks consumed per week, heavy drinking, and binge drinking) among PLWHA in the Bronx, New York. The potential moderating roles of race, ethnicity, and sexual orientation were also explored.

Methods

Two hundred and eighty-seven PLWHA (55.4% male; 57.0% single; 72.1% heterosexual; 52.9% Black; 55.0% Latinx) were recruited from the Center of Positive Living (CPL) in the Bronx, New York and completed self-report measures of demographics, IHAS, and alcohol use. The relationship between IHAS and each alcohol use variable was examined using binomial logistic regressions. The moderating effects of race, ethnicity, and sexual orientation were explored using hierarchical binomial logistic regressions.

Results

The current study did not find significant associations among IHAS and alcohol use behaviors. However, race marginally moderated the effect of IHAS on the number of alcoholic drinks consumed per week, such that greater levels of IHAS were marginally protective against greater drinks consumed per week for White/Other participants ($p = .066$). Additionally, ethnicity moderated the effect of IHAS on the number of alcoholic drinks consumed per week, such that greater levels of IHAS were associated with fewer drinks consumed per week for Latinx participants ($p = .045$). It was also found that PLWHA who have lower education, lower BMI, are female, and identify their sexual orientation as bisexual/other engaged in greater drinking behaviors than PLWHA who have higher education, higher BMI, are male, and identify their sexual orientation as heterosexual or homosexual.

Conclusions

While IHAS was not associated with alcohol use status or alcohol use behaviors, other factors (e.g., ethnicity) were shown to be significant within this relationship. Given the high rates of alcohol use among PLWHA, further research is needed to identify factors that contribute to alcohol use in this population. Lower education, BMI, female gender, and bisexual/other sexual orientation identification are important factors to consider when screening for and implementing alcohol reduction or cessation interventions among PLWHA.

Internalized HIV/AIDS Stigma and Alcohol Use in a Sample of Adults Living with HIV/AIDS in the Bronx, New York

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Dedication

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Chapter I: Introduction

Overview of HIV/AIDS.

Human Immunodeficiency Virus (HIV) is a virus that suppresses the human immune system by attacking and, consequently, reducing CD4 cells (i.e., white blood cells), which aid in fighting infections in the human body (Centers for Disease Control and Prevention, 2020b). The CD4 cell count in an individual with a healthy immune system is between 800-1,200 cells per cubic millimeter of blood, while the CD4 cell count in an individual with the most severe form of HIV, Acquired Immunodeficiency Syndrome (AIDS), is below 200 cells per cubic millimeter of blood. Thus, HIV decreases the ability to fight off infections in the body, which can lead to serious health outcomes, including death. Since the beginning of the HIV/AIDS epidemic in the 1980s, approximately 675,000 individuals in the United States (U.S.) have died from the disease (Centers for Disease Control and Prevention, 2016). In the U.S. alone, approximately 1.2 million individuals have HIV and an estimated 38,000 individuals received a diagnosis of HIV in 2018 (Centers for Disease Control and Prevention, 2020c). Overall, Black individuals are the most affected by HIV, with regard to new HIV diagnoses, followed by Latinx individuals (Centers for Disease Control and Prevention, 2020c; Hall et al., 2009). The lifetime cost for an individual who becomes infected with HIV by 35 years of age is $326,000 (Schackman et al., 2017). Moreover, a recent study found that the aggregate societal cost of those with HIV/AIDS was $10.7 billion greater than those without HIV/AIDS in the U.S., demonstrating the significant economic burden of HIV-AIDS (Ritchwood, Bishu, Egede, 2017).

In the U.S., HIV is most commonly spread through unprotected vaginal or anal sex and sharing needles for drug use with someone who has HIV (HIV.gov, 2019). Without treatment, HIV can progress into AIDS. If treatment non-adherence continues, AIDS has an approximate life expectancy of three years (U.S. Department of Health and Human Services, 2017). Although there is currently no cure for HIV/AIDS, the advent of antiretroviral therapy (ART) has allowed people living with HIV/AIDS (PLWHA) to live a longer life, such that HIV/AIDS can be a chronic disease rather than a terminal one (Deeks, Lewin, & Havlir, 2013). When taken properly, ART suppresses the virus in the blood and increases the number of CD4 cells in the body, aiding the body to fight off infections. Further, ART can reduce the likelihood of transmitting the virus to others. Despite this, confounding factors have been shown to reduce adherence to ART, such as internalized HIV/AIDS stigma (IHAS; Earnshaw, Smith, Chaudoir, Amico, & Copenhaver, 2013; Levi-Minzi & Surratt, 2014).

Internalized HIV/AIDS Stigma.

HIV stigma is largely based on Goffman's (1963) Social Stigma Theory which asserts that stigma occurs when individuals who possess a discredited attribute are viewed and treated as "flawed" (Goffman, 1963). Goffman (1963) also posited that in addition to society viewing the individual as stigmatized, the individual also views themselves as such.

Historically, HIV/AIDS has been associated with behaviors deemed "aberrant" and "morally wrong" by society, such as sexual promiscuity, homosexuality, and injection drug use (Alonzo & Reynolds, 1995). As a result, PLWHA experience stigmatization and discrimination secondary to their illness. A lack of understanding about the illness and its transmission, as well as fears of contagion, further perpetuate HIV/AIDS-related stigma. Importantly, HIV/AIDS-related stigma remains one of the most significant challenges to

PLWHA (Aggleton & Parker, 2002; Chambers et al., 2015; Reidpath & Chan, 2006; Wardell, Shuper, Rourke, & Hendershot, 2018). Moreover, certain sub-populations of PLWHA, such as Black and Latinx individuals and sexual minorities, have been shown to experience greater HIV/AIDS-related stigma than White and non-sexual minority individuals due to pre-existing social inequalities and discrimination (Cochran & Mays, 2009; Loutfy et al., 2012; Skinta, Lezama, Wells & Dilley, 2015; Wardell, Shuper, Rourke, & Hendershot, 2018; Williams, Neighbors, Jackson, 2003).

Four main types of HIV/AIDS-related stigma have been identified among PLWHA: enacted stigma (experiencing discrimination from others); perceived stigma (being aware of the existence of HIV/AIDS-related stigma); anticipated stigma (anticipating and fearing future stigma and discrimination); and internalized stigma (believing external negative beliefs about one's illness as true) (Earnshaw & Chaudoir, 2009; Herek, Gillis, & Cogan, 2015; Link, 1987; Scambler, 1989). Internalized HIV/AIDS stigma (IHAS) remains one of the most prevalent subtypes of HIV/AIDS-related stigma with approximately 80% of PLWHA reporting IHAS, and may lead PLWHA to become more vulnerable to the other types of HIV-AIDS-related stigma (i.e., enacted, perceived, and anticipated stigma; Baugher et al., 2017; Chesney & Smith, 1999; Lee, Kochman, & Sikkema, 2002; Turan, Budhwani, et al., 2017). Furthermore, IHAS has been associated with numerous adverse health outcomes including lower quality of life, health care utilization, illness disclosure to sexual partners, ART adherence, and social support, as well as higher HIV/AIDS symptom severity, medical co-morbidities, depression, anxiety, and substance abuse, including alcohol use (Earnshaw & Quinn, 2012; Earnshaw et al., 2013; Jang & Bakken, 2017; Lee et al., 2002; Levi-Minzi & Surratt, 2014; Rael & Hampanda, 2016; Rendina, Millar, & Parsons, 2018; Sayles et al.,

2008; Simbayi et al., 2007; Wolitski, Pals, Kidder, Courtenay-Quirk, & Holtgrave, 2009; Zhang et al., 2016).

Alcohol Use in Society.

Throughout America, alcohol use has remained prevalent and accepted by society. Approximately 86% of Americans aged 18 and older reported drinking alcohol at some point in their life (Substance Abuse and Mental Health Services Administration [SAMHSA], 2019a). Additionally, 70% of these individuals reported drinking in the past year and 55% reported drinking in the past month (SAMHSA, 2019b; SAMHSA, 2019c). Movies, television, and social media positively influence alcohol social norms through various medias, including product placements and advertisements (Sudhinaraset, Wigglesworth & Takeuchi, 2016). For example, Alhabash and colleagues (2016) presented social media advertisements for bottled water versus beer among 121 participants from a community sample. At study conclusion, participants were offered to choose between two gift cards: one for a bar and one for a coffee shop. Seventy-three percent of participants who were exposed to the beer advertisements chose the bar gift card when compared to 55% of participants who were exposed to the bottled water advertisements. Despite alcohol sales being regulated, alcohol advertisements are common in the United States. Prior research has demonstrated that targeted alcohol marketing has resulted in the development of positive beliefs about drinking, thus, leading to increased alcohol use (Alaniz & Wilkes, 1998; Hastings et al., 2005; McKee et al., 2011; Tanski et al., 2015).

Moreover, the alcohol industry utilizes marketing techniques that target specific demographic groups, such as Black and Latinx individuals (Alaniz & Wilkes, 1998; Moore et al., 2008; Wilson & Till, 2012). Though Black individuals account for 13% of the

population, they purchase 67% of malt liquor in the United States (Miller Brewing Company, 2000). Malt liquor is a more potent and less expensive type of alcohol that has been targeted to Black individuals through music, billboards, and newspapers (Cohen et al., 2006; Herd, 2013; McKee et al., 2011). This targeted advertising towards Black individuals in the U.S. has led to increased alcohol consumption (Kwate & Meyer, 2009). Racial and ethnic minority communities also have higher concentrations of alcohol stores when compared to non-minority communities (Alaniz & Wilkes, 1998; Freisthler et al., 2015; LaVeist & Wallace, 2000; Pollack et al., 2005; Romley et al., 2007; Scribner et al., 2010; Treno et al., 2000).

The use of alcohol as a coping mechanism is normalized in American culture. Alcohol has been shown to be used to cope with discrimination and stigma (Conger, 1956; Dawson et al., 2005; Hatzenbuehler, 2009; Paradies, 2006). Among Latinx and Asian individuals, racial discrimination has been associated with higher alcohol use (Chae et al., 2008; Gee et al., 2007; Mulia et al., 2008; Yoo et al., 2010). However, the association between discrimination and alcohol use remains mixed among Black individuals. Some studies have demonstrated links between racial discrimination and alcohol use among Black participants (Borrell et al., 2007; Boynton et al., 2014; Mulia et al., 2008), while other studies have not (Kwate & Meyer, 2009). Mixed findings highlight the need to further examine the impact of race and ethnicity on alcohol use. Moreover, individuals who are part of the lesbian, gay, bisexual, and transgender (LGBT) community also experience discrimination and stigma that has been associated with increased alcohol use. McCabe and colleagues (2010) found that over two-thirds of LGBT individuals experienced discrimination and those who reported racial or sexual orientation discrimination were nearly four times more likely to

use alcohol. As such, racial, ethnic, and sexual minority groups may be at a higher risk of using alcohol to cope with stigma and discrimination.

Alcohol Use in People Living with HIV/AIDS.

Stress related to HIV/AIDS stigma may lead PLWHA to adopt maladaptive coping behaviors, particularly avoidant coping (Turan, Hatcher, et al., 2017). Roth and Cohen (1986) coined the term "avoidant coping" as the cognitive and emotional activity directed away from the threat (Roth & Cohen, 1986). While avoidant coping can help alleviate stress in the short-term, avoidant coping can lead to harmful physical and mental health outcomes in the long-term. Among PLWHA, avoidant coping methods can include not taking one's HIV/AIDS medication, avoidance of HIV/AIDS care, and substance use, including alcohol use (Chambers et al., 2015; Turan, et al., 2017). Though PLWHA might use substances as a temporary distraction from the distressing thoughts associated with HIV/AIDS stigma, which may help alleviate one's stress and/or negative affect, the use of substances may actually perpetuate negative mood and health outcomes in the long term (see Figure 1).

In the U.S., alcohol use among PLWHA is common, with approximately 40-53% reporting alcohol use in the past month (Chander et al., 2008; Galvan et al., 2002). While alcohol use has major impacts on individuals and societies at large, alcohol use specifically among PLWHA can have even more profound outcomes (GBD 2016 Alcohol Collaborators, 2018; Rogers, Boardman, Pendergast & Lawrence, 2015). Among PLWHA, alcohol use can have serious consequences for both the individual and society, including lowered adherence to ART, acceleration of HIV/AIDS progression, worse immunological functioning, and an increase in risky sexual behaviors (e.g., Azar, Springer, Meyer, & Altice, 2010; Baum et al., 2010; Hutton et al., 2019; Samet, Horton, Meli, Freedberg, & Palepu, 2004; Tucker, Burnam,

Sherbourne, Kung, & Gifford, 2003; Vagenas et al., 2015). Engaging in risky sexual behaviors can increase PLWHA's risk of acquiring more than one strain of HIV, as well as increase the risk of transmitting the disease to others (Kalichman et al., 2002; Stein et al., 2005). Furthermore, alcohol use can exacerbate the toxic effects of ART on the liver (Kahler et al., 2017; Neff, Jayaweera, & Sherman, 2006; Nunez, Lana, Mendoza, Martín-Carbonero, & Soriano, 2001; Price & Thio, 2010). Of note, Black and Latinx individuals have a higher risk of developing alcohol-related liver disease when compared to White individuals, potentially compounding the toxic effects of alcohol on PLWHA of racial/ethnic minority status (Stinson, Grant, & Dufour, 2001).

Numerous research studies have demonstrated alcohol's adverse physiological (e.g., immune dysfunction; mortality) and care-related (i.e., poor medication adherence) effects among PLWHA. For example, an analysis from the Veterans Aging Cohort Study found that PLWHA who were currently drinking alcohol had increased mortality and physiologic injury (e.g., injuries to the organ system) than individuals without HIV/AIDS who were currently drinking (Justice et al., 2016). This research suggests that PLWHA might be more vulnerable to alcohol-related harm than individuals without HIV/AIDS. Additionally, Tucker and colleagues (2013) examined substance use and mental health correlates of ART non-adherence among a sample of PLWHA in the U.S. (Tucker et al., 2003). Compared to those who did not report drinking alcohol, PLWHA who reported moderate, heavy, or frequent heavy drinking (i.e., over the past four weeks, < 5 drinks per day, ≥ 5 drinks for one to four drinking occasions, ≥ 5 drinks for five or more drinking occasions, respectively) were more likely to be non-adherent to their HIV/AIDS medication. Furthermore, ART non-adherence

increased with the level of drinking severity. Taken together, it is crucial to identify important and modifiable factors, such as IHAS, that perpetuate alcohol use among PLWHA.

Internalized HIV/AIDS Stigma and Alcohol Use.

Prior research has postulated that PLWHA use alcohol as a means to cope with HIV/AIDS-related stigma (e.g., Liao et al., 2014; Lunze et al., 2017; Felker-Kantor et al., 2019). Indeed, higher levels of HIV/AIDS-related stigma have been associated with increased alcohol use. For example, Liao and colleagues (2014) examined potential correlates between HIV/AIDS-related stigma and discrimination and alcohol consumption among men who have sex with men (MSM) in China (Liao et al., 2014). HIV/AIDS-related stigma and discrimination was measured with three stigma and discrimination dimensions: shame, blame, and social isolation; perceived discrimination; and, equity. Alcohol consumption was defined as drinking more than three days per week over the past six months. The investigators found significant, positive associations among the three HIV/AIDS-related stigma and discrimination dimensions and alcohol consumption.

A similar study was conducted among a sample of PLWHA in Russia examining the relationship between HIV-related stigma and problematic alcohol use (Lunze et al., 2017). HIV-related stigma was measured with the abbreviated Berger HIV stigma scale and unhealthy alcohol use was defined as alcohol dependence using the Composite International Diagnostic Interview (CIDI; Berger, Ferrans, & Lashley, 2001; Kessler, Andrews, Mroczek, Ustun, & Wittchen, 1998; Wright, Naar-King, Lam, Templin, & Frey, 2007). The investigators found a significant, positive association between HIV-related stigma and alcohol dependence. Importantly, both aforementioned studies did not include U.S. PLWHA,

did not parse out the different types of HIV/AIDS-related stigma (e.g., IHAS), and problematic alcohol use was defined as a single, crude measure.

Most recently, Felker-Kantor and colleagues (2019) examined the relationship between overall HIV-related stigma, as well as three stigma subtypes (i.e., enacted, anticipated, and internalized stigma) and hazardous drinking among a sample of PLWHA in New Orleans, Louisiana (Felker-Kantor et al., 2019). Hazardous drinking was measured with the Alcohol Use Disorders Test (AUDIT) questionnaire. Responses range from 0 to 40, with scores of 8 or higher reflecting hazardous drinking. Of the 380 study participants, 82% were Black, 17% were White, and 1% were classified as other races; the authors did not indicate whether participants were Latinx or non-Latinx. Interestingly, the investigators did not find a significant association between overall HIV-related stigma and alcohol use severity; however, they did find a significant, positive relationship between IHAS and hazardous drinking, such that greater IHAS was associated with greater hazardous drinking.

While accumulating evidence points to an association between HIV- and AIDS-related stigma and alcohol use behaviors (Crockett et al., 2019; Earnshaw et al., 2020; Felker-Kantor et al., 2019; Hojilla et al., 2020; Liao et al., 2014; Lunze et al., 2017; Murphy, Austin, & Greenwell, 2007; Wardell et al., 2018; Wray, Pantalone, Kahler, Monti, & Mayer, 2016; Wright et al., 2007), no study to date has specifically examined IHAS and alcohol use behaviors (i.e., alcohol drinking status; quantity and frequency of alcohol use) in a sample of PLWHA living in the Bronx, New York, predominately consisting of Black and Latinx individuals. Racial, ethnic, and sexual minority individuals living with HIV/AIDS have demonstrated higher levels of HIV/AIDS related stigma, which might further impact alcohol use behaviors (Ferlatte, Salway, Oliffe & Trussler, 2017; Loutfy et al., 2012; Wardell,

Shuper, Rourke, & Hendershot, 2018; Williams, Neighbors, Jackson, 2003). Furthermore, it is crucial to study the association of IHAS and alcohol use behaviors in the Bronx as it is considered a geographic "hotspot" for HIV (i.e., a county with one of the highest numbers of new HIV diagnoses) by the Centers for Disease Control and Prevention (CDC; HIV.gov, 2020).

A Theoretical Model.

As mentioned above, HIV/AIDS stigma is primarily based on Goffman's (1963) Social Stigma Theory, which states that stigma occurs when individuals who possess a discredited attribute are viewed and treated as "flawed," and, in turn, view themselves as flawed (Goffman, 1963). Injunctive norms (i.e., beliefs about what behaviors other individuals approve or disapprove of) regarding perceptions of acquiring HIV/AIDS (e.g., drug use, unsafe sex; Alonzo & Reynolds, 1995) also contribute to HIV/AIDS stigma. HIV/AIDS stigma may prevent PLWHA from seeking social support and other important resources, potentially increasing their overall stress levels (Simbayi et al., 2007).

To cope with stress, PLWHA can either engage in adaptive or maladaptive coping. Prior research has shown that individuals who experience racial, ethnic, and/or sexual orientation discrimination turn to maladaptive coping behaviors, including alcohol use (McCabe et al., 2010; Williams, Neighbors, & Jackson, 2003); as such, it is theorized that racial/ethnic/sexual orientation discrimination-related coping can be expanded to include coping with IHAS. Furthermore, evidence has demonstrated that PLWHA often adopt maladaptive coping mechanisms, such as alcohol use, leading to worse health outcomes (Hatzenbuehler, Phelan, & Link, 2013; Turan et al., 2017). Lastly, racial/ethnic/sexual minority individuals living with HIV/AIDS might experience a compounded effect of

multiple stigma identities (i.e., racial/ethnic discrimination, sexual orientation discrimination; McCabe et al., 2010; Williams, Neighbors, Jackson, 2003), signaling the importance of examining race, ethnicity, and sexual orientation as potential moderators between IHAS and alcohol use behaviors.

Summary.

Alcohol use is a significant health concern among PLWHA and is associated with numerous negative physical and mental health outcomes (e.g., Baum et al., 2010; Samet et al., 2004). Understanding potential factors (e.g., IHAS) that contribute to alcohol use can be useful to ultimately reduce the deleterious effects that alcohol use has on PLWHA. While prior research has postulated that PLWHA use alcohol to cope with HIV/AIDS-related stigma and has demonstrated associations between HIV/AIDS-related stigma and alcohol use, no study to date has examined IHAS and specific alcohol use behaviors in a sample of PLWHA in the Bronx, New York. The overall aim of this study was to examine the relationship among IHAS and alcohol use behaviors in a sample of PLWHA. This study explored the potential moderating effects of race, ethnicity, and sexual orientation on the relationship between IHAS and alcohol use among PLWHA.

Study Aims and Hypotheses.

Primary Aim 1: Within a sample of PLWHA: to examine whether there are differences in level of IHAS by alcohol drinking status.

Hypothesis 1: PLWHA who currently drink alcohol will report higher IHAS than will PLWHA who do not currently drink alcohol.

Primary Aim 2: Within a subsample of PLWHA who currently drink alcohol: to examine whether level of IHAS is related to quantity and frequency of alcohol use.

Aim 2a: To examine whether level of IHAS is related to number of drinking days per week.

Hypothesis 2a: Level of IHAS will positively relate to number of drinking days per week.

Aim 2b: To examine whether level of IHAS is related to number of alcoholic drinks consumed per week.

Hypothesis 2b: Level of IHAS will positively relate to number of alcoholic drinks consumed per week.

Aim 2c: To examine whether level of IHAS is related to engagement in heavy drinking.

Hypothesis 2c: Level of IHAS will positively relate to engagement in heavy drinking.

Aim 2d: To examine whether level of IHAS is related to engagement in binge drinking.

Hypothesis 2d: Level of IHAS will positively relate to engagement in binge drinking.

Exploratory Aim 3: Within a subsample of PLWHA who currently drink alcohol: to explore whether race moderates the relationships between IHAS and quantity and frequency of alcohol use.

Aim 3a: To explore whether race moderates the relationship between IHAS and number of drinking days per week.

Aim 3b: To explore whether race moderates the relationship between IHAS and number of alcoholic drinks consumed per week.

Aim 3c: To explore whether race moderates the relationship between IHAS and engagement in heavy drinking.

Aim 3d: To explore whether race moderates the relationship between IHAS and engagement in binge drinking.

Exploratory Aim 4: Within a subsample of PLWHA who currently drink alcohol: to explore whether ethnicity moderates the relationships between IHAS and quantity and frequency of alcohol use.

Aim 4a: To explore whether ethnicity moderates the relationship between IHAS and number of drinking days per week.

Aim 4b: To explore whether ethnicity moderates the relationship between IHAS and number of alcoholic drinks consumed per week.

Aim 4c: To explore whether ethnicity moderates the relationship between IHAS and engagement in heavy drinking.

Aim 4d: To explore whether ethnicity moderates the relationship between IHAS and engagement in binge drinking.

Exploratory Aim 5: Within a subsample of PLWHA who currently drink alcohol: to explore whether sexual orientation moderates the relationships between IHAS and quantity and frequency of alcohol use.

Aim 5a: To explore whether sexual orientation moderates the relationship between IHAS and number of drinking days per week.

Aim 5b: To explore whether sexual orientation moderates the relationship between IHAS and number of alcoholic drinks consumed per week.

Aim 5c: To explore whether sexual orientation moderates the relationship between IHAS and engagement in heavy drinking.

Aim 5d: To explore whether sexual orientation moderates the relationship between IHAS and engagement in binge drinking.

Significance.

Alcohol reduction and/or cessation among PLWHA can have significant positive outcomes on both the individual and general public. As such, it is crucial to identify factors related to alcohol use among PLWHA, such as IHAS. The more that is known about specific factors that are associated with alcohol use among PLWHA, the better understanding there will be about underlying mechanisms that contribute to the consumption of alcohol by PLWHA and about components that may be important to include in treatment programs focused on alcohol by PLWHA. The development of tailored alcohol cessation interventions may be an imperative step for the reduction and/or cessation of alcohol use among PLWHA. Should IHAS differences exist by drinking status, and should IHAS levels relate to alcohol use quantity and frequency, it may be beneficial to develop interventions that target IHAS for PLWHA who drink alcohol. Furthermore, should race, ethnicity, and/or sexual orientation moderate the relationship between IHAS and alcohol use, the results will foster a greater understanding of which individuals may need increased support in reducing their alcohol consumption. Such interventions have the potential to improve health outcomes for PLWHA at both the individual and societal levels.

Reviews of past research have demonstrated mixed evidence regarding the effectiveness of interventions aimed at reducing alcohol use among PLWHA, with some

studies finding a reduction in alcohol use and other studies finding no reduction in alcohol use following interventions (Brown, DeMartini, Sales, Swartzendruber, & DiClemente, 2013; Madhombiro et al., 2019; Scott-Sheldon, Carey, Johnson, Carey, & MASH Research Team, 2017). For example, Kahler and colleagues (2018) conducted a randomized controlled trial examining the efficacy of motivational interviewing on alcohol use among men who have sex with men (MSM) living with HIV. The motivational interviewing intervention resulted in significantly fewer drinks per week and number of heavy drinking days when compared to the control condition. Conversely, Chander and colleagues (2015) conducted a brief alcohol intervention among women living with HIV. The brief alcohol intervention consisted of two twenty-minute face-to-face sessions with a counselor, conducted one month apart, based on the brief intervention developed for Project TrEAT (Trial for Early Alcohol Treatment; Fleming, Barry, Manwell, Johnson & London, 1997). Each session was followed by a 5–10-minute booster phone call. The intervention included content related to the impact of alcohol use on HIV medication adherence and HIV transmission risk behaviors. Women in the brief alcohol intervention group demonstrated fewer drinking days per week compared to those in the control group, however, there were no significant differences in heavy/binge drinking or the number of drinks per drinking day between groups. Taken together, the mixed results of interventions targeting alcohol use among PLWHA corroborates the need to understand specific factors that are related to alcohol use which then can be incorporated into alcohol interventions for PLWHA.

Innovation.

Alcohol use, a modifiable health behavior, has been associated with lowered medication adherence, acceleration of HIV/AIDS disease progression, worse immunological

functioning, and an increase in risky sexual behaviors among PLWHA (e.g., Azar, Springer, Meyer, & Altice, 2010; Baum et al., 2010; Hutton et al., 2019; Samet, Horton, Meli, Freedberg, & Palepu, 2004; Tucker, Burnam, Sherbourne, Kung, & Gifford, 2003; Vagenas et al., 2015). IHAS, also a modifiable factor, has been linked with alcohol use, such that PLWHA may use alcohol as a means to cope with disease-related internalized stigma (Chambers et al., 2015; Turan, et al., 2017). For example, evidence has shown that stigma related to race, ethnicity, and sexual orientation is related to maladaptive coping behaviors, including alcohol use (e.g., Cochran & Mays, 2009; Loutfy et al., 2012). While past research has found associations between IHAS and alcohol use, the current study provided novel information to the current state of science within this area.

First, despite the high prevalence of both IHAS and alcohol use among PLWHA, no study to date has examined the relationship between IHAS and specific alcohol use behaviors (i.e., alcohol drinking status; quantity and frequency of alcohol use, including number of drinking days per week, number of alcoholic drinks consumed per week, engagement in heavy drinking [for females, ≥ 8 drinks/week; for males, ≥ 15 drinks/week], and engagement in binge drinking [for females, ≥ 4 drinks/sitting; for males, ≥ 5 drinks/sitting]). To the author's knowledge, only a few studies to date have examined the relationship between IHAS and alcohol use among PLWHA (i.e., hazardous drinking; alcohol dependent; drinking ≥ 3 times per week in the past six months) and primarily accounted for problematic drinking behaviors rather than capturing a range of use (Crockett et al., 2019; Felker-Kantor et al., 2019; Liao et al., 2014; Lunze et al., 2017). The current study will reflect alcohol use across the spectrum (i.e., number of drinking days per week; number of alcoholic drinks consumed per week; engagement in heavy drinking; engagement in binge drinking).

Second, no studies have examined IHAS and alcohol use among PLWHA in a Bronx, New York-based population. The prior studies on this topic were conducted in China (Liao et al., 2014), Russia (Lunze et al., 2017), New Orleans, Louisiana, U.S. (Felker-Kantor et al., 2019), and Georgia, U.S. (Crockett et al., 2019), all of which have different demographics than the Bronx, New York. As noted above, the Bronx, New York has been identified as a geographic HIV hotspot (i.e., a county with one of the highest numbers of new HIV diagnoses) by the CDC and therefore is an important geographic area for research on PLWHA (HIV.gov, 2020).

Third, no prior studies examined IHAS and alcohol use among PLWHA in a sample of primarily Black and Latinx adults who, of note, are the most affected by both HIV/AIDS and HIV/AIDS-related stigma (Centers for Disease Control and Prevention, 2020c; Hall et al., 2009; Loutfy et al., 2012; Wardell et al., 2018). While Felker-Kantor et al.'s (2019) study examined HIV-related stigma and alcohol use severity among a predominantly Black sample of PLWHA in New Orleans, Louisiana, the authors did not report ethnicity status. The current study was the first to explore race, ethnicity, and sexual orientation as potential moderators of the relationship between IHAS and alcohol use.

Lastly, while the prior studies examined IHAS (Crockett et al., 2019; Felker-Kantor et al., 2019; Liao et al., 2014; Lunze et al., 2017), none used the Internalized AIDS-Related Stigma Scale (IARSS) used by the current study. In sum, the current study provided novel information about factors that are associated with alcohol use among predominantly Black and Latinx PLWHA, such as IHAS, in the Bronx, New York.

Chapter II: Methods

Participants and Recruitment.

The current study utilized a cross-sectional survey design to examine differences in IHAS levels by alcohol drinking status, and to examine associations between IHAS levels and a number of alcohol use variables (i.e., number of drinking days per week; number of drinks consumed per week; engagement in heavy drinking; engagement in binge drinking). This study was a secondary analysis of data from a parent study titled "Self-Control and Adults with HIV/AIDS" (Weinberger et al., 2021) which was approved by the Albert Einstein College of Medicine (AECOM) Institutional Review Board (IRB #2016-7308; PI: Dr. Andrea H. Weinberger) and for which data collection is complete. The primary aim of the parent study was to examine the relationships between self-control and cigarette smoking in a sample of PLWHA in the Bronx, New York.

Participants were recruited from the Montefiore Center for Positive Living (CPL) waiting room in the Bronx, New York. The CPL is a comprehensive HIV/AIDS clinic that provides care to over 2,600 HIV-infected adults in the Bronx. The majority of the clinic population is male (56%), Latinx and Black (54% and 39%, respectively), and have household incomes below the federal poverty line (80%; Shuter, Bernstein, & Moadel, 2012). Study personnel provided a brief description of the study and screened potential participants for eligibility. If eligible, potential participants were guided to a private room where they provided verbal informed consent and were given the opportunity to ask questions. A copy of the oral consent form was provided to each participant. Participants were informed they

could stop participation at any time and decline any question. Participants then completed a questionnaire which took approximately 25-35 minutes to complete. Assessments relevant to this study, described in more detail below, included measures of demographic information, internalized HIV/AIDS stigma, and alcohol use.

Inclusion/Exclusion Criteria.

Participants were eligible for the parent study if they were English-speaking, ≥ 18 years old, and receiving care for HIV/AIDS at the Montefiore Center for Positive Living (CPL) in the Bronx, New York. Participants were excluded from the parent study if they were under 18 years old, did not report an HIV diagnosis, did not have the capacity to provide informed consent, were non-English speaking, or expressed suicidality or homicidality. There were no other inclusion/exclusion criteria included for the present study.

Risks and Ethics.

Verbal consent was obtained at the study appointment by research personnel and no participant names were collected. However, other information that relates to identity (e.g., age, gender, ethnicity, HIV/AIDS status, marital status) was collected. Therefore, participants' research data is securely stored in a locked file cabinet and digital files are password protected. Research data are only accessible to research personnel. Lastly, all research data will be shredded following the required period of time for retention of data as indicated by federal and state laws. Additionally, participants might have felt uncomfortable with certain questionnaire items (e.g., questions about HIV/AIDS, questions about use of alcohol and other drugs). Consequently, mental health and substance use treatment resources were provided to each participant upon study completion.

Benefits.

Participants were compensated for their time and study participation with a $20.00 Target gift card. Participants were also provided with information about resources related to mental health and substance use treatment.

Measures.

Demographics.

Participants self-reported demographic data including their age, gender, marital status, ethnicity, race, sexual orientation, highest education level completed, height, and weight. Participants' Body Mass Index (BMI) was calculated using self-reported weight (in pounds) and height (in inches) as follows: ([weight/height]/height) x 703 (Centers for Disease Control and Prevention, 2020a).

Internalized HIV/AIDS stigma (IHAS).

The Internalized AIDS-Related Stigma Scale (IARSS) is a six-item, self-report measure of IHAS (Kalichman et al., 2009). Items reflect guilt, shame, and self-worth related to HIV status, as well as concealment of HIV status (e.g., "It is difficult to tell people about my HIV status", "Being HIV positive makes me feel dirty", "I feel guilty that I am HIV positive"). Respondents answer dichotomously (agree = 1; disagree = 0) and responses are summed. Total scores range from 0-6, with higher scores reflecting higher IHAS. The IARSS has demonstrated adequate internal consistency ($\alpha = .75$), test-retest reliability ($r = .53$), and convergent, discriminant, and criterion-related validity in samples of PLWHA from Africa and the U.S. (Kalichman et al., 2009; Tsai et al., 2013). In the current study sample, the IARSS demonstrated good internal consistency ($\alpha = .80$; Segal, 2019).

Alcohol use.

Drinking status. Participants self-reported their alcohol drinking status by answering Yes or No to two questionnaire items developed by the parent study's investigator: 1) whether they have ever used alcohol in their life; 2) whether they currently use alcohol. Participants were characterized as either currently drinking alcohol (i.e., responded "yes" to both questions) or currently not drinking alcohol (i.e., responded "no" to question 2).

Number of drinking days per week. Among participants who reported currently drinking alcohol, the number of drinking days per week was self-reported. Number of drinking days per week was a continuous variable ranging from 1-7, with higher scores indicating more drinking days per week.

Number of alcoholic drinks consumed per week. Participants self-reported how many days they drank per week (same as prior variable) and how many drinks they consumed each time. Among participants who reported currently drinking alcohol, these two questionnaire items (i.e., number of drinking days per week and number of drinks consumed each time) were multiplied to create a continuous variable of number of drinks consumed per week.

Engagement in heavy drinking. Among participants who reported currently drinking alcohol, engagement in heavy drinking was characterized dichotomously by number of drinks consumed per week (same as prior variable) using the Centers for Disease Control and Prevention (CDC) criteria for heavy drinking according to gender (Centers for Disease Control and Prevention, 2020d). For female participants, heavy drinking was defined by the consumption of ≥ 8 alcoholic drinks per week. For male participants, heavy drinking was defined by the consumption of ≥ 15 alcoholic drinks per week.

Engagement in binge drinking. Among participants who reported currently drinking alcohol, engagement in binge drinking was characterized dichotomously by number of drinks consumed per occasion using the CDC criteria for binge drinking according to gender (Centers for Disease Control and Prevention, 2020d). For female participants, binge drinking was defined by the consumption of ≥ 4 alcoholic drinks per occasion. For male participants, binge drinking was defined by the consumption of ≥ 5 alcoholic drinks per occasion.

Data Analytic Plan.

Power and sample size.

Power calculations were conducted to estimate the proposed study's required sample size using G*Power 3.1.9.3. The power calculations were based on the study's hypotheses for Aim 1 and Aims 2a and 2b, respectively: PLWHA who currently drink alcohol will report higher IHAS than will PLWHA who do not currently drink alcohol (Aim 1); among those reporting current alcohol drinking, the level of IHAS will positively relate to number of drinking days per week (Aim 2a); and, among those reporting current alcohol drinking, the level of IHAS will positively relate to number of alcoholic drinks consumed per week (Aim 2b).

Past research has observed small effect sizes for HIV/AIDS-related stigma and alcohol use (e.g., Wardell et al., 2018), however, the effect of IHAS has not been previously investigated in relation to specific alcohol use behaviors (i.e., alcohol drinking status; quantity and frequency of alcohol use). Thus, the current study assumed medium effects. In order to conduct an independent samples *t*-test with an α of .05 and 80% power for Aim 1, a total sample size of 128 participants (64 participants per drinking status group) was estimated to be needed to detect medium effects ($d = 0.5$). An additional power analysis was conducted

for Aims 2a and 2b, such that to conduct hierarchical multiple regression analyses, each with an α of .05 and 80% power, a total sample size of 34 participants would be needed to detect medium effects ($f^2 = 0.25$). Lastly, to conduct power analyses for the binomial logistic regressions in Aims 2c and 2d, each with an α of .05 and 80% power, post-hoc analyses were run, as data analysis was needed prior to obtaining input parameter values.

As estimated by the power analyses, the current study's sample size included 122% more participants than the sample size needed (i.e., 284 participants versus 128 participants, respectively) for 80% power. The current study's subsample size of PLWHA who currently drink alcohol included 45% more participants than needed (i.e., 93 participants versus 64, respectively) for 80% power. Furthermore, the current study's subsample size of PLWHA who do not currently drink alcohol included 198% more participants than needed (i.e., 191 participants versus 64, respectively) for 80% power. As such, there was enough power for the current study's analyses even after accounting for unusable (e.g., extreme outliers) or missing data. The current study's sample size provided approximately 99% power for Aims 1, 2a, and 2b.

Preliminary analyses.

Full Sample: Descriptive statistics (e.g., means, standard deviations, frequencies, percentages) were calculated for all study variables. The demographic variables (i.e., age, gender, marital status, ethnicity, race, sexual orientation, years of education, and BMI) were compared by alcohol drinking status group (i.e., currently drinking and currently non-drinking) using *t*-tests and chi-square tests (i.e., for continuous and categorical variables, respectively). Demographic variables that significantly impacted the dependent variables were entered as covariates for the current study's statistical analyses as follows.

Aim 1: Significant outliers were checked for the IHAS variable. Normality was tested using the Shapiro-Wilk test. When normality assumptions were not met, nonparametric analyses were conducted, or the data was transformed. Lastly, homogeneity of variance was checked for using Levene's test.

Aims 2a, 2b, 3a-5a, and 3b-5b: Autocorrelations, or the independence of observations, were tested for using the Durbin-Watson statistic. For each linear regression analysis, the relationship between the independent variable (i.e., IHAS) and the dependent variable (i.e., number of drinking days per week; number of drinks consumed per week) were checked for linearity by visually inspecting the scatterplots. When non-linear relationships were found, a non-linear regression analysis was conducted, or the data was transformed. Additionally, homoscedasticity was tested for using a scatterplot of residuals on predicted values. Significant outliers were checked for using casewise diagnostics. Lastly, residuals were tested for normality using a histogram. When residuals were not normal, nonparametric analyses were conducted.

Aims 2c, 2d, 3c-5c, and 3d-5d: For each binomial logistic regression analysis, the relationship between the continuous independent variable (i.e., IHAS) and the logit transformation of the dichotomous dependent variable (i.e., engagement of heavy drinking; engagement of binge drinking) was checked for linearity using the Box-Tidwell test.

Statistical analyses.

Aim 1: To examine whether there were differences in level of IHAS by alcohol drinking status. The difference in level of IHAS between PLWHA who currently drink alcohol and PLWHA who do not currently drink alcohol was determined using a multiple linear regression. Alcohol drinking status was included as a dichotomous independent

variable and level of IHAS was included as a continuous dependent variable. Covariates were included in the multiple linear regression if indicated.

Aim 2: To examine whether level of IHAS is related to quantity and frequency of alcohol use. The relationship between level of IHAS and number of drinking days per week (i.e., Aim 2a) and number of alcoholic drinks consumed per week (i.e., Aim 2b) was determined using binomial logistic regression analyses. The number of drinking days per week and number of alcoholic drinks consumed per week were originally continuous dependent variables, however, as the data were inappropriate for linear regressions, the two alcohol variables were dichotomized for binomial logistic regressions. The relationship between level of IHAS and engagement in heavy drinking (i.e., Aim 2c) and engagement in binge drinking (i.e., Aim 2d) was determined using binomial logistic regression analyses. Engagement in heavy drinking and engagement in binge drinking were considered as dichotomous dependent variables. Covariates were included in the binomial logistic regression analyses if indicated.

Exploratory Aims 3-5: To explore whether race/ethnicity/sexual orientation moderated the relationships between IHAS and alcohol use, hierarchical logistic regressions for Aims 3a-5a, 3b-5b, 3c-5c, and 3d-5d were run. Independent variables, IHAS and race/ethnicity/sexual orientation, were entered in Block 1 and the interaction term, IHAS x race/ethnicity/sexual orientation, was entered in Block 2. Dependent variables included: number of drinking days per week (Aims 3a-5a); number of alcoholic drinks consumed per week (Aims 3b-5b); engagement in heavy drinking (Aims 3c-5c); and, engagement in binge drinking (Aims 3d-5d).

Chapter III: Results

Preliminary Analyses.

Participant recruitment and study sample.

Between 3/22/2017 and 4/19/2018, 445 patients in the Center for Positive Living (CPL) waiting room were approached by Research Assistants (RAs) for study participation. Of the 445 patients, 147 patients did not complete the study questionnaire due to: a) a lack of interest in participating in the study (n = 128); b) being non-English speaking (n = 41); and c) declining study participation after being read the consent form (n = 7). After completing consent procedures, three patients began to fill out the study questionnaire, but did not complete the packet due to: a) not having enough time to complete the packet (n = 1); b) walking away with the packet and not returning with it (n = 1); c) being HIV negative (n = 1). A total of 298 patients from the CPL completed the study questionnaire. Of the 298 patients, eleven were excluded from analyses due to a) reporting they were HIV negative after they completed the questionnaire (n = 2); b) not reporting cigarette smoking status (a main variable in the parent study; n = 2); c) leaving required information blank (n = 5); d) being non-English speaking (n = 2). A total of 287 patients were included in the final analyses (see Figure 2).

Descriptive statistics.

Characteristics of the full sample. Table 1 displays the demographic characteristics for the full sample. Among the 287 participants, the average age was 50.6 and just over half identified as male (55.4%). The majority of participants identified themselves as single

(57.0%), heterosexual (72.1%), and having either an education level between 9th-11th grade (25.9%) or completed some college (25.2%). Approximately half of the participants identified their race as Black (52.9%) and half identified their ethnicity as Latinx (55.0%). Approximately one third reported current alcohol use (32.7%). Out of those who reported current drinking, 19% reported binge drinking and 25% reported heavy drinking, which is lower than prior studies in both the U.S. (i.e., 35% reported high alcohol use severity; Felker-Kantor et al., 2019) and Russia (i.e., 30% reported binge drinking; Amirkhanian et al., 2020). The current study's demographic characteristics are somewhat representative of the overall Bronx population (47.4% male, 43.8% Black, 56.4% Latinx, 20.3% Bachelor's Degree or higher; Census Bureau, 2021).

Sample characteristics by alcohol drinking status. The average number of alcohol drinking days per week was 2.5 days and alcohol drinks consumed per week was approximately seven drinks. Most participants did not report engaging in heavy drinking (71.8%) or binge drinking (79.4%). There were more than twice the number of participants reporting non-current alcohol use (n = 188) compared to participants reporting current alcohol use (n = 88; see Table 2). Participants reporting non-current alcohol use were significantly older than participants reporting current alcohol use. Moreover, gender significantly differed within groups, such that participants currently drinking alcohol were more likely to be female and participants not currently drinking alcohol were more likely to be male. Sexual orientation also significantly differed within groups, such that participants identifying as heterosexual were most likely to report both current and non-current drinking, followed by participants identifying as homosexual, and lastly, participants identifying in the "Other" group (i.e., Bisexual, Other). See Tables 5 and 6, as well as the information below

("Model Covariates"), further describing characteristics for heavy drinking and binge drinking.

Model covariates. For each primary aim, covariates were determined by examining the potential relationships between demographic variables (i.e., gender, ethnicity, marital status, race, sexual orientation, education, age, BMI) and outcome variables (i.e., IHAS, alcohol days per week, alcohol drinks per week, heavy drinking, binge drinking; see Tables 26-60). To examine the relationships among demographic variables and IHAS, independent samples *t*-tests were run for gender and ethnicity, a one-way ANOVA was run for marital status, race, sexual orientation, and education, and correlations were run for age and BMI. To examine gender, ethnicity, marital status, race, sexual orientation, and education with the drinking variables (i.e., dichotomized splits for days per week and drinks per week, heavy drinking, binge drinking), chi-square (X^2) tests of independence were run. To examine age and BMI with the drinking variables (i.e., dichotomized splits for days per week and drinks per week, heavy drinking, binge drinking), independent samples *t*-tests were run.

A significant correlation was found for the following variables, which were included as covariates in the primary analyses: IHAS and gender (i.e., male participants reported greater IHAS than female participants); IHAS and race (i.e., "Combined Other" participants [i.e., American Indian/Alaskan Native, Asian, Native Hawaiian/Other Pacific Islander, Other] reported greater IHAS than Black participants); IHAS and age (i.e., younger participants reported greater IHAS than older participants); drinks per week and education (i.e., participants with lower education reported more drinks per week); heavy drinking and gender (i.e., female participants were more likely to report heavy drinking than male participants); heavy drinking and BMI (i.e., participants with lower BMI were more likely to

report heavy drinking than participants with higher BMI); binge drinking and gender (i.e., female participants reported more binge drinking than male participants); binge drinking and sexual orientation (i.e., "Combined Other" participants [i.e., Bisexual, Other] were most likely to report binge drinking, followed by homosexual participants and then heterosexual participants); and, binge drinking and BMI (i.e., participants with lower BMI were more likely to report binge drinking than participants with higher BMI). Marginally significant correlations were found for IHAS and ethnicity (i.e., Latinx participants reported greater IHAS than non-Latinx participants), alcohol days per week and race (i.e., "Other" participants were most likely to report binge drinking, followed by White participants and then Black participants), and binge drinking and education (i.e., participants with lower education were more likely to report binge drinking than participants with higher education). Marginally significant correlations were not included as covariates in the main analyses.

Main Analyses.

Primary Aim 1: To examine whether there were differences in level of IHAS by alcohol drinking status.

A multiple linear regression was used to examine whether individuals who currently drink alcohol differ in level of IHAS compared to individuals who do not currently drink alcohol. Preliminary analyses indicated three demographic variables (i.e., gender, race, and age) were related to IHAS, and thus, were included as covariates. Multicollinearity was checked with the variance inflation factor (VIF), which was met as all VIF values were less than 1.2. Homoscedasticity was assessed with a scatterplot of residuals on predicted values, which was also met. Normality of residuals were not met as there was a positive skew after

visually inspecting the data. Thus, a square root transformation was conducted with an addition of a constant one, resulting in symmetrical residuals.

The regression equation was significant ($F(5, 266) = 4.25$, $p = .001$), with an R^2 of .074 (see Tables 7 and 8). Gender was coded with males as the reference group and females as the indicator group; race was coded with participants reporting "Other" (i.e., American Indian/Alaskan Native, Asian, Native Hawaiian/Other Pacific Islander, Other) as the reference group and Black participants, as well as White participants as the indicator groups. As seen in Table 9, female participants reported significantly lower IHAS than male participants; Black participants reported significantly lower IHAS than participants in the "Other" racial group (i.e., "American Indian/Alaskan Native", "Asian", "Native Hawaiian/Other Pacific Islander"), although White participants' reported IHAS did not significantly differ than participants in the "Other" racial group. Additionally, age had a significant negative relationship with IHAS, such that older participants reported lower stigma than younger participants. However, there was no significant difference in IHAS between those currently drinking alcohol versus not currently drinking alcohol ($\beta = .110$, $p = .144$; see Table 9).

Primary Aim 2: Within a subsample of PLWHA who currently drink alcohol: to examine whether level of IHAS was related to quantity and frequency of alcohol use.

Aim 2a: To examine whether level of IHAS was related to number of drinking days per week. The assumptions for a linear regression were tested. The data was visually inspected and the number of drinking days per week demonstrated an extreme positive skew and a bump at seven days per week (see Supplemental Figure 1). Attempting to run the linear

regression showed that the residuals had a similar shape as the dependent variable and did not meet assumptions of normality. Transformations of the dependent variable, including log and inverse transformations, were not able to meet the linear regression assumptions of normality.

As the data were not appropriate for a linear regression, the number of drinking days was dichotomized into 1-2 days (n = 50) or 3-7 days (n = 24) and a binomial logistic regression analysis was run. No covariates were included in this analysis as indicated by preliminary analyses. The Hosmer and Lemeshow test indicated that the model was a good fit, X^2 (5) = 4.58, p = .469. The overall model was not significant (X^2 (1) = 3.09, p = .079, Cox and Snell R^2 = .041, Nagelkerke R^2 = .057). IHAS was not a significant predictor of drinking days per week (p = .087; see Table 10).

Aim 2b: To examine whether level of IHAS was related to number of alcoholic drinks consumed per week. The data was visually inspected and the number of alcoholic drinks consumed per week demonstrated an extreme positive skew (see Supplemental Figure 2). Attempting to run the linear regression showed that the residuals had a similar shape as the dependent variable and did not meet assumptions of normality. Transformations of the dependent variable, including log and inverse transformations, were not able to meet the linear regression assumptions of normality.

As the data were not appropriate for a linear regression, the number of alcoholic drinks per week was dichotomized into 1-3 drinks (n = 37) or 4+ drinks (n = 33) and a binomial logistic regression analysis was run. Educational attainment was included as a covariate in this analysis as indicated by preliminary analyses. The Hosmer and Lemeshow test indicated that the model was a good fit, X^2 (7) = 4.11, p = .767. The overall model was

significant (X^2 (3) = 9.84, p = .020, Cox and Snell R^2 = .131, Nagelkerke R^2 = .175). Compared to the reference group (i.e., participants with less than a high school degree), participants with a high school degree did not significantly differ in more alcoholic drinks per week (p = .246). However, those with at least some college education had significantly lower odds of consuming more alcoholic drinks per week than those with less than a high school degree (p = .004). After adjusting for educational attainment, IHAS was not a significant predictor of alcoholic drinks per week (p = .367; see Table 11).

Aim 2c: To examine whether level of IHAS was related to heavy drinking. As the dependent variable was dichotomous, a binomial logistic regression analysis was run to predict engagement in "heavy drinking" (n = 18) as opposed to "no heavy drinking" (n = 53). Gender and BMI were included as covariates in this analysis as indicated by preliminary analyses. The Hosmer and Lemeshow test indicated that the model was a good fit, X^2 (8) = 3.567, p = .894. The overall model was significant (X^2 (3) = 15.57, p = .001, Cox and Snell R^2 = .207, Nagelkerke R^2 = .306). Compared to the reference group (i.e., male participants), female participants had significantly higher odds of engaging in heavy drinking when compared to male participants (p = .024). BMI did not significantly differ the odds of engagement in heavy drinking (p = .210). After adjusting for gender and BMI, IHAS was not a significant predictor of engagement in heavy drinking (p = .263; see Table 12).

Moreover, due to female gender being a near perfect predictor of engagement in heavy drinking, the regression was re-run after removing the gender variable. In this analysis, those with lower BMIs had significantly higher odds of engaging in heavy drinking when compared to those with higher BMIs (p = .036). Nonetheless, IHAS was still not a significant predictor of engagement in heavy drinking (p = .210; see Table 61).

Aim 2d: To examine whether level of IHAS was related to binge drinking. As the dependent variable was dichotomous, a binomial logistic regression analysis was run to predict engagement in "binge drinking" (n = 15) as opposed to "no binge drinking" (n = 65). Gender, sexual orientation, and BMI were included as covariates in this analysis as indicated by preliminary analyses. The Hosmer and Lemeshow test indicated that the model was a poor fit, X^2 (7) = 15.65, p = .029, therefore, the results should be interpreted with caution. The overall model was significant (X^2 (5) = 14.57, p = .012, Cox and Snell R^2 = .177, Nagelkerke R^2 = .286). Gender did not significantly differ the odds of engagement in binge drinking (p = .573). BMI also did not significantly differ the odds of engagement in binge drinking (p = .102). Compared to the reference group (i.e., homosexual participants), participants in the "combined other" group (i.e., bisexual, other) and heterosexual participants did not significantly differ the odds of engagement in binge drinking (p = .437 and OR = .242, p = .104, respectively). After adjusting for gender, sexual orientation, and BMI, IHAS was not a significant predictor of engagement in binge drinking (p = .682; see Table 13).

Again, due to female gender being a near perfect predictor of engagement in binge drinking, the regression was re-run after removing the gender variable. Those with lower BMIs and those who identified their sexual orientation as heterosexual had marginally significant higher odds of engaging in binge drinking when compared to those with higher BMIs (p = .066) and those who identified their sexual orientation as homosexual or other (p = .053). Nonetheless, IHAS was still not a significant predictor of engagement in binge drinking (p = .649; see Table 62).

Exploratory Analyses.

Exploratory Aims 3-5: Within a subsample of PLWHA who currently drink alcohol: To explore whether race, ethnicity, and sexual orientation moderated the relationships between IHAS and quantity and frequency of alcohol use.

Hierarchical binary logistic regressions were run for all exploratory aims. IHAS was centered at its mean (M = 2.55). While ethnicity was already dichotomized (i.e., Latinx, non-Latinx), race and sexual orientation were additionally dichotomized due to the small sample sizes. Race was dichotomized into "Black" and "White/Combined Other" (i.e., American Indian/Alaskan Native, Asian, Native Hawaiian/Other Pacific Islander, Other) as Black participants were the largest racial group. Sexual orientation was dichotomized into "Heterosexual" and "Homosexual/Bisexual/Other". For race, White/Combined Other race was the reference group and Black race was the indicator group; for ethnicity, non-Latinx ethnicity was the reference group, and Latinx ethnicity was the indicator group; for sexual orientation, Heterosexual orientation was the reference group, and Homosexual/Bisexual/Combined Other orientation was the indicator group. Separate analyses were conducted for each of these three demographics and for each of the four alcohol use variables (i.e., number of drinking days per week, number of alcoholic drinks consumed per week, engagement in heavy drinking, and engagement in binge drinking), each of which had been dichotomized as described for earlier analyses. For each model, the first step represented the main effect of IHAS and the main effect of the respective demographic variable (i.e., race, ethnicity, sexual orientation) and the respective interaction term of IHAS and the respective demographic variable was included in the second step. Due to the small sample sizes, no covariates were included in the exploratory analyses.

Exploratory Aim 3a: To explore whether race moderated the relationship between IHAS and number of drinking days per week. A hierarchical binary logistic regression was run with the main effects of IHAS and race and the interaction (IHAS by race) in the second step predicting number of drinking days per week (i.e., 1-2 days or 3-7 days; see Table 14). The sample included in this analysis consisted of 71 participants (Black, $n = 41$; White/Combined Other, $n = 30$).

In step one, the main effects model was significant, X^2 (2) = 8.288, $p = .016$, Cox and Snell $R^2 = .110$, Nagelkerke $R^2 = .154$. The Hosmer and Lemeshow test indicated that the model was a good fit across subgroups, X^2 (7) = 4.162, $p = .761$. Controlling for IHAS, race was significantly associated with number of drinking days per week ($p = .019$) such that Black participants were less likely than White/Combined Other participants to drink more days of the week. Controlling for race, greater IHAS was marginally associated with fewer drinking days per week ($p = .073$).

In step two, the interaction term (IHAS by race) did not significantly improve the model, X^2 (1) = .565, $p = .452$, although the overall model was still significant, X^2 (3) = 8.853, $p = .031$, Cox and Snell $R^2 = .117$, Nagelkerke $R^2 = .164$. The Hosmer and Lemeshow test indicated that the model did not fit differently across subgroups, X^2 (7) = 3.086, $p = .877$. There was no significant interaction of IHAS by race ($p = .459$). Thus, race did not moderate the effect of IHAS on number of drinking days per week.

Exploratory Aim 3b: To explore whether race moderated the relationship between IHAS and number of alcoholic drinks consumed per week. A hierarchical binary logistic regression was run with the main effects of IHAS and race and the interaction (IHAS by race) in the second step predicting number of alcoholic drinks consumed per week (i.e., 1-3 drinks or 4+ drinks;

see Table 15). The sample included in this analysis consisted of 67 individuals (Black, n = 40; White/Combined Other, n = 27).

In step one, the main effects model was not significant, X^2 (2) = .656, p = .721, Cox and Snell R^2 = .010, Nagelkerke R^2 = .013. The Hosmer and Lemeshow test indicated that the model did not fit differently across subgroups, X^2 (8) = 9.286, p = .319. Controlling for IHAS, race was not significantly associated with number of alcoholic drinks consumed per week (p = .536). Controlling for race, IHAS was not significantly associated with number of alcoholic drinks consumed per week (p = .554).

In step two, the interaction term (IHAS by race) marginally significantly improved the model, X^2 (1) = 3.669, p = .055, although the overall model was still not significant, X^2 (3) = 4.325, p = .228, Cox and Snell R^2 = .063, Nagelkerke R^2 = .083. The Hosmer and Lemeshow test indicated that the model did not fit differently across subgroups, X^2 (7) = 6.264, p = .509. The lower order effect of race indicated that at average levels of IHAS, Black participants were not significantly less likely than White/Combined Other participants to drink more alcoholic drinks per week (p = .373). The lower order effect of IHAS indicated that there was a trend such that for White/Other participants, greater IHAS was associated with somewhat lower odds of drinking more alcoholic drinks per week (p = .078). The marginally significant interaction term of IHAS by race indicated that for Black participants, greater IHAS was not associated with lower odds of more drinks per week (p = .066). Thus, race marginally moderated the effect of IHAS on alcohol drinks consumed per week, such that greater IHAS was in the direction of being protective against drinking more alcoholic drinks per week for White/Other participants, but not Black participants.

Exploratory Aim 3c: To explore whether race moderated the relationship between IHAS and heavy drinking. A hierarchical binary logistic regression was run with the main effects of IHAS and race and the interaction (IHAS by race) in the second step predicting heavy drinking (see Table 16). The sample included in this analysis consisted of 68 individuals (Black, $n = 40$; White/Combined Other, $n = 28$).

In step one, the main effects model was not significant, X^2 (2) = 1.879, $p = .391$, Cox and Snell $R^2 = .027$, Nagelkerke $R^2 = .040$. The Hosmer and Lemeshow test indicated that the model did not fit differently across subgroups, X^2 (8) = 7.688, $p = .465$. Controlling for IHAS, race was not significantly associated with heavy drinking ($p = .222$). Controlling for race, IHAS was not significantly associated with heavy drinking ($p = .443$).

In step two, the interaction term (IHAS by race) did not significantly improve the model, X^2 (1) = 1.167, $p = .280$ and the overall model was not significant, X^2 (3) = 3.045, $p = .385$, Cox and Snell $R^2 = .044$, Nagelkerke $R^2 = .065$. The Hosmer and Lemeshow test indicated that the model did not fit differently across subgroups, X^2 (8) = 4.538, $p = .806$. There was no significant interaction of IHAS by race ($p = .285$). Thus, race did not moderate the effect of IHAS on heavy drinking.

Exploratory Aim 3d: To explore whether race moderated the relationship between IHAS and binge drinking. A hierarchical binary logistic regression was run with the main effects of IHAS and race and the interaction (IHAS by race) in the second step predicting binge drinking (see Table 17). The sample included in this analysis consisted of 77 individuals (Black, $n = 46$; White/Combined Other, $n = 31$).

In step one, the main effects model was not significant, X^2 (2) = .852, $p = .653$, Cox and Snell $R^2 = .011$, Nagelkerke $R^2 = .018$. The Hosmer and Lemeshow test indicated that the

model did not fit differently across subgroups, X^2 (7) = 7.843, p = .347. Controlling for IHAS, race was not significantly associated with binge drinking (p = .592). Controlling for race, IHAS was not significantly associated with binge drinking (p = .403).

In step two, the interaction term (IHAS by race) did not significantly improve the model, X^2 (1) = .811, p = .368, and the overall model was not significant, X^2 (3) = 1.663, p = .645, Cox and Snell R^2 = .021, Nagelkerke R^2 = .035. The Hosmer and Lemeshow test indicated that the model did not fit differently across subgroups, X^2 (8) = 8.079, p = .426. There was no significant interaction of IHAS by race (p = .367). Thus, race did not moderate the effect of IHAS on binge drinking.

Overall, race did not moderate the effect of IHAS on number of drinking days per week, heavy drinking, or binge drinking. However, race marginally moderated the effect of IHAS on the number of alcoholic drinks consumed per week, such that greater levels of IHAS were marginally protective against greater drinks consumed per week for White/Other participants, but not Black participants.

Exploratory Aim 4a: To explore whether ethnicity moderated the relationship between IHAS and number of drinking days per week. A hierarchical binary logistic regression was run with the main effects of IHAS and ethnicity and the interaction (IHAS by ethnicity) in the second step predicting number of drinking days per week (i.e., 1-2 days or 3-7 days; see Table 18). The sample included in this analysis consisted of 63 individuals (non-Latinx, n = 33; Latinx, n = 30).

In step one, the main effects model was not significant, X^2 (2) = 3.993, p = .136, Cox and Snell R^2 = .061, Nagelkerke R^2 = .088. The Hosmer and Lemeshow test indicated that the

model did not fit differently across subgroups, X^2 (8) = 10.080, p = .259. Controlling for IHAS, ethnicity was not significantly associated with number of drinking days (p = .167). Controlling for ethnicity, IHAS was not significantly associated with number of drinking days (p = .152).

In step two, the interaction term (IHAS by ethnicity) did not significantly improve the model, X^2 (1) = .004, p = .951, and the overall model was not significant, X^2 (3) = 3.997, p = .262, Cox and Snell R^2 = .061, Nagelkerke R^2 = .088. The Hosmer and Lemeshow test indicated that the model did not fit differently across subgroups, X^2 (8) = 10.036, p = .263. There was no significant interaction of IHAS by ethnicity (p = .951). Thus, ethnicity did not moderate the effect of IHAS on alcohol drinking days per week.

Exploratory Aim 4b: To explore whether ethnicity moderated the relationship between IHAS and number of alcoholic drinks consumed per week. A hierarchical binary logistic regression was run with the main effects of IHAS and ethnicity and the interaction (IHAS by ethnicity) in the second step predicting number of alcoholic drinks per week (i.e., 1-3 drinks or 4+ drinks; see Table 19). The sample included in this analysis consisted of 59 individuals (non-Latinx, n = 32; Latinx, n = 27).

In step one, the main effects model was not significant, X^2 (2) = .508, p = .776, Cox and Snell R^2 = .009, Nagelkerke R^2 = .011. The Hosmer and Lemeshow test indicated that the model did not fit differently across subgroups, X^2 (8) = 5.770, p = .673. Controlling for IHAS, ethnicity was not significantly associated with number of drinks consumed per week (p = .717). Controlling for ethnicity, IHAS was not significantly associated with number of drinks consumed per week (p = .532).

In step two, the interaction term (IHAS by ethnicity) significantly improved the model, X^2 (1) = 4.406, p = .036, although the overall model was not significant, X^2 (3) = 4.913, p = .178, Cox and Snell R^2 = .080, Nagelkerke R^2 = .107. The Hosmer and Lemeshow test indicated that the model did not fit differently across subgroups, X^2 (8) = 3.344, p = .911. The lower order effect of ethnicity indicated that at average levels of IHAS, Latinx participants were not significantly more likely than non-Latinx participants to drink more drinks per week (p = .467). The lower order effect of IHAS indicated that for non-Latinx participants, greater IHAS was not significantly associated with greater odds of more drinks per week (p = .367). The significant interaction term of IHAS by ethnicity indicated that compared to non-Latinx participants, greater IHAS was associated with lower odds of more drinks per week among Latinx participants (p = .045). Thus, ethnicity moderated the effect of IHAS on alcohol drinks consumed per week, such that greater IHAS was associated with fewer drinks consumed per week for Latinx participants compared to the effect of IHAS for non-Latinx participants.

Exploratory Aim 4c: To explore whether ethnicity moderated the relationship between IHAS and heavy drinking. A hierarchical binary logistic regression was run with the main effects of IHAS and ethnicity and the interaction (IHAS by ethnicity) in the second step predicting heavy drinking (see Table 20). The sample included in this analysis consisted of 60 individuals (non-Latinx, n = 33; Latinx, n = 27).

In step one, the main effects model was not significant, X^2 (2) = 3.789, p = .150, Cox and Snell R^2 = .061, Nagelkerke R^2 = .089. The Hosmer and Lemeshow test indicated that the model did not fit differently across subgroups, X^2 (8) = 3.583, p = .893. Controlling for

IHAS, ethnicity was not significantly associated with heavy drinking (p = .257). Controlling for ethnicity, IHAS was not significantly associated with heavy drinking (p = .112).

In step two, the interaction term (IHAS by ethnicity) did not significantly improve the model, X^2 (1) = .171, p = .680 and the overall model was not significant, X^2 (3) = 3.960, p = .266, Cox and Snell R^2 = .064, Nagelkerke R^2 = .093. The Hosmer and Lemeshow test indicated that the model did not fit differently across subgroups, X^2 (8) = 5.175, p = .739. There was no significant interaction of IHAS by ethnicity (p = .680). Thus, ethnicity did not moderate the effect of IHAS on heavy drinking.

Exploratory Aim 4d: To explore whether ethnicity moderated the relationship between IHAS and binge drinking. A hierarchical binary logistic regression was run with the main effects of IHAS and ethnicity and the interaction (IHAS by ethnicity) in the second step predicting binge drinking (see Table 21). The sample included in this analysis consisted of 69 individuals (non-Latinx, n = 39; Latinx, n = 30).

In step one, the main effects model was not significant, X^2 (2) = .443, p = .801, Cox and Snell R^2 = .006, Nagelkerke R^2 = .010. The Hosmer and Lemeshow test indicated that the model did not fit differently across subgroups, X^2 (7) = 4.864, p = .677. Controlling for IHAS, ethnicity was not significantly associated with binge drinking (p = .551). Controlling for ethnicity, IHAS was not significantly associated with binge drinking (p = .708).

In step two, the interaction term (IHAS by ethnicity) did not significantly improve the model, X^2 (1) = .809, p = .368 and the overall model was not significant, X^2 (3) = 1.253, p = .740, Cox and Snell R^2 = .018, Nagelkerke R^2 = .028. The Hosmer and Lemeshow test indicated that the model did not fit differently across subgroups, X^2 (8) = 4.424, p = .817.

There was no significant interaction of IHAS by ethnicity (p = .370). Thus, ethnicity did not moderate the effect of IHAS on binge drinking.

Overall, ethnicity did not moderate the effect of IHAS on number of drinking days per week, heavy drinking, or binge drinking. However, ethnicity did moderate the effect of IHAS on the number of alcoholic drinks consumed per week, such that greater levels of IHAS were associated with fewer drinks consumed per week for Latinx participants.

Exploratory Aim 5a: To explore whether sexual orientation moderated the relationship between IHAS and number of drinking days per week. A hierarchical binary logistic regression was run with the main effects of IHAS and sexual orientation and the interaction (IHAS by sexual orientation) in the second step predicting number of drinking days per week (i.e., 1-2 days or 3-7 days; see Table 22). The sample included in this analysis consisted of 73 individuals (Heterosexual, n = 42; Homosexual/Bisexual/Other, n = 31).

In step one, the main effects model was marginally significant, X^2 (2) = 5.882, p = .053, Cox and Snell R^2 = .077, Nagelkerke R^2 = .108. The Hosmer and Lemeshow test indicated that the model was marginally a good fit across subgroups, X^2 (7) = 13.751, p = .056. Controlling for IHAS, sexual orientation was not significantly associated with number of drinking days (p = .103). Controlling for sexual orientation, greater IHAS was marginally significantly associated with fewer drinking days per week (p = .057).

In step two, the interaction term (IHAS by sexual orientation) did not significantly improve the model, X^2 (1) = .009, p = .924, and the overall model was not significant, X^2 (3) = 5.891, p = .117, Cox and Snell R^2 = .078, Nagelkerke R^2 = .108. The Hosmer and Lemeshow test indicated that the model did not marginally fit differently across subgroups,

X^2 (7) = 13.953, p = .052. There was no significant interaction of IHAS by sexual orientation (p = .924). Thus, sexual orientation did not moderate the effect of IHAS on alcohol drinking days per week.

Exploratory Aim 5b: To explore whether sexual orientation moderated the relationship between IHAS and number of alcoholic drinks consumed per week. A hierarchical binary logistic regression was run with the main effects of IHAS and sexual orientation and the interaction (IHAS by sexual orientation) in the second step predicting number of alcoholic drinks per week (i.e., 1-3 drinks or 4+ drinks; see Table 23). The sample included in this analysis consisted of 69 individuals (Heterosexual, n = 40; Homosexual/Bisexual/Other, n = 29).

In step one, the main effects model was not significant, X^2 (2) = 3.223, p = .200, Cox and Snell R^2 = .046, Nagelkerke R^2 = .061. The Hosmer and Lemeshow test indicated that the model did not fit differently across subgroups, X^2 (7) = 3.314, p = .855. Controlling for IHAS, sexual orientation was not significantly associated with number of drinks consumed per week (p = .102). Controlling for sexual orientation, IHAS was not significantly associated with number of drinks consumed per week (p = .353).

In step two, the interaction term (IHAS by sexual orientation) did not significantly improve the model, X^2 (1) = .001, p = .974, and the overall model was not significant, X^2 (3) = 3.224, p = .358, Cox and Snell R^2 = .046, Nagelkerke R^2 = .061. The Hosmer and Lemeshow test indicated that the model did not fit differently across subgroups, X^2 (7) = 3.318, p = .854. There was no significant interaction of IHAS by sexual orientation (p = .974). Thus, sexual orientation did not moderate the effect of IHAS on number of drinks consumed per week.

Exploratory Aim 5c: To explore whether sexual orientation moderated the relationship between IHAS and heavy drinking. A hierarchical binary logistic regression was run with the main effects of IHAS and sexual orientation and the interaction (IHAS by sexual orientation) in the second step predicting heavy drinking (see Table 24). The sample included in this analysis consisted of 70 individuals (Heterosexual, $n = 40$; Homosexual/Bisexual/Other, $n = 30$).

In step one, the main effects model was not significant, X^2 (2) = 4.674, $p = .097$, Cox and Snell $R^2 = .065$, Nagelkerke $R^2 = .095$. The Hosmer and Lemeshow test indicated that the model did not fit differently across subgroups, X^2 (7) = 5.262, $p = .628$. Controlling for IHAS, sexual orientation was marginally significantly associated with heavy drinking ($p = .053$) such that Homosexual/Other participants have greater odds of heavy drinking than Heterosexual participants. Controlling for sexual orientation, IHAS was not significantly associated with heavy drinking ($p = .246$).

In step two, the interaction term (IHAS by sexual orientation) did not significantly improve the model, X^2 (1) = .200, $p = .655$, and the overall model was not significant, X^2 (3) = 4.873, $p = .181$, Cox and Snell $R^2 = .067$, Nagelkerke $R^2 = .099$. The Hosmer and Lemeshow test indicated that the model did not fit differently across subgroups, X^2 (7) = 5.095, $p = .648$. There was no significant interaction of IHAS by sexual orientation ($p = .654$). Thus, sexual orientation did not moderate the effect of IHAS on heavy drinking.

Exploratory Aim 5d: To explore whether sexual orientation moderated the relationship between IHAS and binge drinking. A hierarchical binary logistic regression was run with the main effects of IHAS and sexual orientation and the interaction (IHAS by sexual orientation) in the second step predicting binge drinking (see Table 25). The sample included in this

analysis consisted of 79 individuals (Heterosexual, $n = 46$; Homosexual/Bisexual/Other, $n = 33$).

In step one, the main effects model was significant, X^2 (2) = 7.605, $p = .022$, Cox and Snell $R^2 = .092$, Nagelkerke $R^2 = .148$. The Hosmer and Lemeshow test indicated that the model was a good fit across subgroups, X^2 (7) = 1.960, $p = .962$. Controlling for IHAS, sexual orientation was significantly associated with binge drinking ($p = .010$) such that Homosexual/Other participants had greater odds of binge drinking than Heterosexual participants. Controlling for sexual orientation, IHAS was not significantly associated with binge drinking ($p = .972$).

In step two, the interaction term (IHAS by sexual orientation) did not significantly improve the model, X^2 (1) = .026, $p = .871$, although the overall model was marginally significant, X^2 (3) = 7.632, $p = .054$, Cox and Snell $R^2 = .092$, Nagelkerke $R^2 = .148$. The Hosmer and Lemeshow test indicated that the model did not fit differently across subgroups, X^2 (7) = 4.654, $p = .702$. There was no significant interaction of IHAS by sexual orientation ($p = .870$). Thus, sexual orientation did not moderate the effect of IHAS on binge drinking.

Overall, sexual orientation did not moderate the effect of IHAS on number of drinking days per week, number of alcoholic drinks consumed per week, heavy drinking, or binge drinking.

Chapter IV: Discussion

The current study examined the relationship between internalized HIV/AIDS stigma (IHAS) and alcohol use behaviors (i.e., alcohol drinking status, number of drinking days per week, number of alcoholic drinks consumed per week, engagement in heavy drinking, and engagement in binge drinking) among people living with HIV/AIDS (PLWHA) in the Bronx, New York. Overall, IHAS was not significantly associated with alcohol use behaviors. This study also explored the potential moderating effects of race, ethnicity, and sexual orientation on the relationship between IHAS and alcohol use behaviors among PLWHA. It was found that ethnicity significantly moderated the effect of IHAS on number of alcoholic drinks consumed per week. Findings from the main analyses, as well exploratory analyses, are described in detail below.

With regard to the study sample, the prevalence of alcohol use (31.9%) was lower than the alcohol use prevalence among PLWHA receiving medical care (40%; Chander et al., 2008) and the general population of PLWHA in the U.S. (53%; Galvan et al., 2002). Chander et al. (2008)'s participants were recruited from fourteen HIV treatment sites across the United States; six sites were located in the east, three located in the mid-west, two located in the south, and three located in the west. Of note, the study sample was only 14% Latinx compared to the current study's sample consisting of over half (55%) of participants identifying as Latinx. Latinx individuals are less likely to drink alcohol (National Institute on Alcohol Abuse and Alcoholism, 2021), which may explain the lower rates of alcohol use in the current study's sample. The mean IHAS score of the current sample (M = 2.3; see

Supplemental Figure 3) was comparable to the mean IHAS score of the sample the Internalized AIDS-Related Stigma Scale was validated on in Atlanta, Georgia (M = 2.4; Kalichman et al., 2009).

The first primary aim of this study was to examine whether there were differences in level of IHAS by alcohol drinking status among PLWHA. While it was hypothesized that PLWHA who currently drink alcohol would report higher levels of IHAS than PLWHA who did not currently drink alcohol, no significant differences were found. This result was inconsistent with prior research highlighting significant relationships between HIV/AIDS-related stigma and alcohol behaviors (Crockett et al., 2019; Felker-Kantor et al., 2019; Liao et al., 2014; Lunze et al., 2017). The inconsistency in past research and the current findings may be related to how alcohol use was defined. For example, Liao and colleagues (2014) found significant, positive associations between HIV/AIDS-related stigma and consuming alcohol more than three days per week over the past six months among men who have sex with men in China. However, the current study asked participants to report current alcohol use by answering either “yes” or “no”. Current alcohol use was not defined in a more detailed way as alcohol use was not a primary variable of interest in the parent study. Due to the broad assessment of alcohol use, it may have been difficult for significant findings to emerge in differences in level of IHAS between those reporting current alcohol use versus no current alcohol use. For instance, participants reporting current alcohol use may either rarely drink alcohol, or, on the contrary, engage in heavy and binge drinking. As such, the second primary aims of this study further examined specific alcohol use behaviors and IHAS, as discussed below.

The second primary aim of this study was to examine whether level of IHAS was related to quantity and frequency of alcohol use (i.e., number of drinking days per week, number of alcoholic drinks consumed per week, engagement in heavy drinking, and engagement in binge drinking) among PLWHA who report current drinking. While it was hypothesized that level of IHAS would positively relate to number of drinking days per week, number of alcoholic drinks consumed per week, engagement in heavy drinking, and engagement in binge drinking, no significant associations were found. One possible explanation may relate to other factors better explaining alcohol use engagement among PLWHA. For example, Sileo et al. (2019) qualitatively examined reasons for alcohol consumption among men living with HIV/AIDS in Uganda. Reasons for alcohol consumption included social or peer influences, cultural norms, and coping with interpersonal and financial stressors. Importantly, the majority of the clinic population (80%; Shuter, Bernstein, & Moadel, 2012) has household incomes below the federal poverty line. As such, financial stressors would be an important factor to examine in relation to alcohol use within the current study sample in future studies.

Felker-Kantor and colleagues (2019) also found that HIV-related stigma and alcohol use varied significantly by urban life stressors (e.g., housing, neighborhood crime), such that HIV-related stigma did not have a significant effect on alcohol use among individuals with higher urban life stressors. On the contrary, HIV-related stigma was significantly associated with alcohol use disorders among individuals with low urban life stressors. The researchers postulated that HIV-related stigma may be less important among PLWHA who have higher urban life stressors, such as high violence in the community, when compared to PLWHA who have lower urban life stressors. This hypothesis may help to explain the current study's

nonsignificant findings of IHAS levels and alcohol use among a sample of PLWHA in the Bronx, New York. The Bronx is one of the most financially disadvantaged boroughs (Javorsky, 2021) and has the highest crime rate in New York state (Cruz, 2021). PLWHA who live in the Bronx may have high urban life stressors, and thus, are less concerned about HIV-related stigma in the presence of high crime and financial distress. Future studies should examine other factors, such as urban life stressors, that may contribute to alcohol use among PLWHA. Additionally, this study focused on one location which may have limited the types and range of stressors within the sample. Urban life stressors should be examined across various geographic locations. By doing so, there may be a larger range of stressors and, thus, differences in stressors would be more likely to be identified. Nonetheless, these findings expand the current literature base related to IHAS and alcohol use behaviors among PLWHA.

The number of drinking days per week and number of alcoholic drinks consumed per week were both dichotomized due to their extreme positive skews. Number of drinking days per week was dichotomized into “1-2 days” or “3-7 days” and the former group may represent those who drink alcohol on the weekends versus those who drink more than on the weekends. However, dichotomizing this continuous variable was somewhat arbitrary and poses limitations. For example, someone who drinks alcohol three days of the week versus someone who drinks every day may have different clinical presentations. Future research may benefit from purposefully collecting data that will provide a normal distribution among each drinking day to avoid dichotomizing the data and allow for a closer examination of drinking days per week rather than grouping a range of days (e.g., an individual drinking two

days per week versus an individual drinking three days per week may have more similar patterns to one another than someone who drinks seven days per week).

Number of alcoholic drinks consumed per week was also dichotomized into "1-3 drinks" or "4+ drinks". When visually inspecting the data, there was one participant who reported 80 drinks per week. An individual who consumes 80 alcoholic drinks per week will likely differ from an individual who drinks four drinks per week. Future research may benefit from collecting data in a way that will provide an even distribution of data across the range of alcohol consumption to allow for a closer examination of drinks consumed per week rather than grouping a range of drinks consumed per week into two groups.

Future research should also consider utilizing the widely known Alcohol Use Disorders Test (AUDIT) questionnaire to assess for alcohol use severity (Saunders et al., 1993). The AUDIT contains items assessing alcohol consumption and is both a reliable and valid screening tool in a variety of settings. Rather than the current study's limited alcohol use questions, which were not primary variables in the parent study and therefore only assessed consumption broadly, the AUDIT may be a more robust measure of alcohol use behaviors. The AUDIT was not part of the parent study, and thus, could not be used in the current study.

Prior research has demonstrated significant associations between internalized stigma about one's HIV/AIDS and alcohol use (e.g., Crockett et al., 2019; Felker-Kantor et al., 2019; Liao et al., 2014; Lunze et al., 2017). For example, Felker-Kantor and colleagues (2019) found a significant, positive relationship between IHAS and hazardous drinking among PLWHA in New Orleans, Louisiana. Moreover, Lunze and colleagues (2017) found significant, positive associations between HIV-related stigma, including IHAS, and alcohol

dependence among PLWHA in Russia. Felker-Kantor et al. (2019) and Lunze et al. (2017) measured IHAS from a subset of questions from the HIV Stigma Scale (HSS) by Berger, Ferrans & Lashley (2001). However, this study was the first to utilize the Internalized AIDS-Related Stigma Scale (IARSS) while examining its association to alcohol use behaviors. As both Felker-Kantor et al. (2019) and Lunze et al. (2017) found significant, positive associations between IHAS and alcohol use, and the current study did not, future research may be warranted to compare the psychometric properties of the IARSS and the internalized stigma-related questions of the HSS to examine if each measure captures different constructs.

In addition, reporting negative beliefs about oneself with regard to HIV/AIDS may be a particular challenge when compared to reporting other types of HIV-related stigma (e.g., perceived stigma, anticipated stigma). Unlike the HSS, which asks questions regarding various stigma subtypes, the IARSS solely focuses on one's negative self-image (i.e., internalized stigma) regarding HIV/AIDS. The IARSS may touch upon emotionally difficult topics, such as asking participants if they feel "dirty" due to their HIV/AIDS status, while the HSS has a mix of internally focused (e.g., if they feel dirty due to their disease status) and externally focused questions (e.g., how they believe others view them due to their disease status). The utilization of qualitative data may be useful to examine whether or not subtypes of HIV/AIDS-related stigma differ in self-report difficulties, and thus, accurate results.

All measures used in the study were self-report, which lends itself to under-reporting and social desirability, particularly due to the sensitive nature of the questions (e.g., alcohol use behaviors, internalized stigma). An objective instrument, such as a breathalyzer or other biochemical measures, may help increase the accuracy of obtaining alcohol use behavior data (Madhombiro et al., 2019). A biochemically confirmed measure (e.g., alcohol biomarker:

Gamma Glutamyl Transferase; Ghosh et al., 2019) or examining physical measures related to alcohol use (e.g., liver functioning; Torruellas, French & Medici, 2014) in combination with a widely validated and reliable screening measure, such as the AUDIT, may provide the most accurate results pertaining to one's alcohol use status.

While there were no significant relationships between IHAS and alcohol use behaviors in this study, there were significant relationships between alcohol use and some demographics. First, education was significantly correlated with number of alcoholic drinks consumed per week, such that participants with lower education reported more drinks per week. This finding is consistent with prior research demonstrating that PLWHA who have lower education levels have higher rates of alcohol use (Galvan et al., 2002; Shacham et al., 2011). Future studies should clarify the directionality of this association and examine if alcohol use precedes lower education attainment or follows lower educational attainment.

Second, gender was significantly correlated with heavy and binge drinking, such that female participants were more likely to report both heavy and binge drinking than male participants. This finding is inconsistent with prior research demonstrating that men who have HIV/AIDS are more likely to engage in more alcohol use than women who have HIV/AIDS (Duko, Ayalew & Ayano, 2019; Koyejo et al., 2018). Cook and colleagues (2016) conducted a qualitative study to examine reasons for drinking alcohol among women living with HIV/AIDS in Jacksonville, Florida, Washington, DC, and Chicago, Illinois. The women described themes relating to why they drink alcohol, including coping with depression and stressors. There may be different mechanisms among women with HIV/AIDS that contribute to increased alcohol use, which was found in the current study results. Due to the present study's results (i.e., female PLWHA were more likely than men PLWHA to report heavy and

binge drinking) being inconsistent with prior research, future studies should examine gender as a moderator in the relationship between IHAS and alcohol use.

Lastly, BMI was significantly correlated with heavy and binge drinking, such that participants with lower BMIs were more likely to report both heavy and binge drinking than participants with higher BMIs. These findings are consistent with past research demonstrating that PLWHA who have lower BMIs engage in more drinking (Boodram et al., 2009). Boodram and colleagues (2009) examined BMI in relation to sociodemographic, psychological, and substance-use factors among 3,766 women with and without HIV in six U.S. cities, including the Bronx, New York. The researchers found that among women with HIV, lower BMI was associated with moderate-heavy drinking. This phenomenon might be explained by individuals with lower BMIs drinking more alcohol in lieu of consuming more calorically dense foods, especially among women when compared to men.

The first exploratory aim of the current study expanded on the second primary aim by exploring whether race moderated the relationships between IHAS and quantity and frequency of alcohol use among PLWHA who currently drink alcohol. In this sample, the racial composition consisted of Black (57.6%), White (12.9%), and Combined Other (i.e., American Indian/Alaskan Native, Asian, Native Hawaiian/Other Pacific Islander, Other; 29.4%) among PLWHA who currently drink alcohol. The study did not find race to moderate the relationships between IHAS and number of drinking days per week, heavy drinking, or binge drinking. However, race marginally moderated the effect of IHAS on the number of alcoholic drinks consumed per week, such that greater levels of IHAS were somewhat protective against more drinks consumed per week among participants who identified their race as “White” or “Combined Other” (i.e., American Indian/Alaskan Native, Asian, Native

Hawaiian/Other Pacific Islander, Other), but not among participants who identified their race as “Black”. This finding is inconsistent with prior literature highlighting internalized stigma as a risk factor for increased alcohol use, particularly among racial minority groups. In prior research, racial minority groups (e.g., Black, Asian) have been shown to experience more IHAS than non-minority racial groups (e.g., White; Ferlatte, Salway, Oliffe & Trussler, 2017; Loutfy et al., 2012; Wardell, Shuper, Rourke, & Hendershot, 2018; Williams, Neighbors, Jackson, 2003). However, due to the small racial sample sizes, “White” participants were combined with “Other” participants, such as American Indian, Asian, and Native Hawaiian. The combinations of multiple racial groups may have skewed the results as alcohol use behaviors likely differ among groups. For example, in tobacco use research, one study estimated the prevalence of tobacco use among different racial groups who are often collapsed into “Other” subgroups (e.g., non-Hispanic Asian, American Indian/Alaska Native, Native Hawaiian/other Pacific Islander; Mattingly, Hirschtick & Fleischer, 2020). It was found that tobacco use patterns differed across racial subgroups, highlighting the need to remove combined “other” subgroups. Future research should aim to collect enough data from each racial subgroup to avoid using “other” combinations.

Moreover, in the process of identifying covariates, there was a significant relationship found between IHAS and race, such that “Other” participants reported greater levels of IHAS than Black participants. Despite this, it remains unclear why greater levels of IHAS may be somewhat of a protective factor against increased drinking during the week among White, American Indian/Alaskan Native, Asian, and Native Hawaiian/Other Pacific Islander participants. Further examination of race as a moderator between the relationship of IHAS and number of drinks consumed per week may be warranted. In particular, future research

examining each racial group as a moderator may provide clearer results, rather than racial groups combined together.

It should also be noted that race has often been falsely conceptualized as a biological variable in prior research. The term "race" emerged around the 18th century to provide a rationale for enslaving African people in Western society (e.g., Bryant, Jordan & Clark, 2022). Rather, race is a social construct based on physical appearances and is often a proxy for structural determinants (e.g., marginalization, colonization) in our society (e.g., Williams, 1997; Williams Lawrence & Davis, 2019). While recent research recommends continuing to examine differences among population groups, it is also recommended that the term "race" no longer be used (Braveman & Dominguez, 2021). Replacing the analysis of "race" with the analysis of other variables, such as psychosocial stress or racism, should be strongly considered in future research to aid improvements in diagnosis and treatment (Pearson et al., 2021). Recent research has also demonstrated the genetic transmission of trauma (Akbar, 2020). Epigenetics related to race-related stress should be considered in future research. Moreover, although "ethnicity" has been criticized as being too broad at times, research generally recommends using "ethnicity" in place of "race" to reflect geographic ancestry and cultural differences (Aspinall, 2001; Bradby, 1995; Braveman & Dominguez, 2021). As such, the secondary exploratory aim of this study focused on ethnicity, which is discussed below.

The second exploratory aim of the current study expanded on the second primary aim by exploring whether ethnicity moderated the relationships between IHAS and quantity and frequency of alcohol use among PLWHA who currently drink alcohol. The study did not find ethnicity to moderate the relationships between IHAS and the number of drinking days per

week, heavy drinking, or binge drinking. However, ethnicity was found to moderate the relationship of IHAS to the number of alcoholic drinks consumed per week, such that greater levels of IHAS were associated with fewer drinks consumed per week for Latinx participants compared to non-Latinx participants.

One reason for this finding might be attributed to ethnicity-related factors. In the current study, more than half of the participants (55%) identified their ethnicity as Latinx. This is consistent with past percentages of ethnicity generated from the Center for Positive Living (54% Latinx; Shuter, Bernstein & Moadel, 2012). Compared to non-Latinx individuals, Latinx individuals have been shown to report more mental health stigma (Wong, Collins, Cerully, Seelam, & Roth, 2017) and are less likely to drink alcohol (National Institute on Alcohol Abuse and Alcoholism, 2021). Wong and colleagues (2017) examined mental health stigma and discrimination among 1,066 adults living in California with mild to moderate psychological distress. Latinx individuals experienced higher levels of internalized stigma regarding psychiatric distress than non-Latinx participants. Moreover, the National Institute on Alcohol Abuse and Alcoholism (2021) stated that Latinx individuals are less likely to drink alcohol than non-Latinx individuals. Nonetheless, it is surprising that greater levels of IHAS were associated with fewer drinks consumed per week for Latinx participants given that prior research has shown PLWHA use alcohol to cope with HIV/AIDS-related stigma. Galvan and colleagues (2008) examined HIV-related stigma and social support among a convenience sample of 283 Black PLWHA in Los Angeles, California. The authors found that those who met clinical criteria for current alcohol abuse or dependence reported higher levels of HIV-related stigma. Additionally, Liao and colleagues (2014) found that frequent alcohol use (i.e., drinking more than three days per week over the past six months)

was associated with higher levels of HIV/AIDS-related stigma. Of note, neither Galvan et al.'s 2004 study or Liao et al.'s 2004 study examined ethnicity within this relationship. Based on the current study's results, Latinx PLWHA may have different experiences of IHAS and alcohol use compared to non-Latinx PLWHA.

The Latinx population is comprised of many different ethnic subgroups, including Mexican, Puerto Rican, Central American, South American, and Cuban individuals (Caballero, 2011). Future research may benefit from examining different Latinx subgroups as moderators within this relationship due to the vast differences in alcohol use. For example, Puerto Rican individuals often drink the most alcohol and Mexican individuals drink the least alcohol (National Institute on Alcohol Abuse and Alcoholism, 2021). The current study's findings that Latinx individuals who experience more IHAS report more alcoholic drinks per week may differ across Latinx subgroups. Knowing if there are differences in the relationship between IHAS and number of alcoholic drinks consumed per week among Latinx subgroups can provide useful data for which subgroups to target in clinical interventions.

Moreover, it may be useful for future research to examine acculturation as a potential variable within this relationship. Acculturation, the process of adapting to the values and behaviors of a new culture, has been shown to be an important factor in alcohol drinking patterns among Latinx individuals. Higher acculturation levels have been associated with increased alcohol use among Latinx individuals living in the United States (National Institute on Alcohol Abuse and Alcoholism, 2021). Due to the parent study not assessing acculturation among Latinx participants, the current study could not examine this factor and future research should consider how acculturation status may influence the relationship between IHAS and alcohol use among Latinx PLWHA.

The third exploratory aim of the current study expanded on the second primary aim by exploring whether sexual orientation moderated the relationships between IHAS and quantity and frequency of alcohol use among PLWHA who currently drink alcohol. The current study did not find sexual orientation to moderate the relationships between IHAS and the number of drinking days per week, the number of alcoholic drinks consumed per week, heavy drinking, or binge drinking. To the author's knowledge, no prior studies have examined sexual orientation as a moderator within the relationship between IHAS and different alcohol use behaviors. Despite the study's results being nonsignificant, these findings contribute to the limited literature base that exists.

One possible reason for sexual orientation not moderating the relationship between IHAS and alcohol use behaviors is the way in which the sexual orientation variable was dichotomized. Due to the small sample sizes, sexual orientation was split into "heterosexual" and "homosexual, bisexual, other." When examining the inclusion of potential covariates, sexual orientation and binge drinking was found to have a significant correlation. Participants who identified their sexual orientation as "other" (i.e., not heterosexual, homosexual, or bisexual) were most likely to report binge drinking, followed by homosexual participants and then heterosexual participants. A possible limitation of the combination of "other" participants with "homosexual" participants may have skewed results in a nonsignificant direction. In future studies, larger sample sizes that allow for each sexual orientation category to be separately analyzed should be considered.

Clinical Implications.

Alcohol use among PLWHA has important clinical implications for both the individual and society, including reduced ART medication adherence, acceleration of

HIV/AIDS disease progression, worse immunological functioning, and increased risk of risky sexual behaviors (e.g., Azar, Springer, Meyer, & Altice, 2010; Baum et al., 2010; Hutton et al., 2019; Samet, Horton, Meli, Freedberg, & Palepu, 2004; Tucker, Burnam, Sherbourne, Kung, & Gifford, 2003; Vagenas et al., 2015). Due to the serious consequences of alcohol use among PLWHA, it is crucial to identify factors that contribute to alcohol use, and, subsequently, tailor alcohol reduction and/or cessation interventions to lower the prevalence of drinking among this population.

While internalized HIV/AIDS stigma (IHAS) was not associated with alcohol use behaviors (i.e., alcohol drinking status, number of drinking days per week, number of alcoholic drinks consumed per week, engagement in heavy drinking, and engagement in binge drinking), there were a number of associated variables that are notable to mention. Within the exploratory aims, race had a marginally significant moderating effect on the relationship between IHAS and number of alcoholic drinks consumed per week. Greater levels of IHAS were found to be somewhat protective against greater drinks consumed per week for White or "Combined Other" (i.e., American Indian/Alaskan Native, Asian, Native Hawaiian/Other Pacific Islander) participants. As such, it may be beneficial for clinicians to monitor IHAS, especially high levels, among PLWHA who identify their race as White, American Indian/Alaskan Native, Asian, or Native Hawaiian/Other Pacific Islander who currently drink alcohol. However, it would be particularly important to consider replacing the construct of "race" with the analysis of other variables for which race may serve as a proxy, such as psychosocial stress, to improve diagnosis and treatment. Moreover, ethnicity had a significant moderating effect on the relationship between IHAS and number of alcoholic drinks consumed per week. Greater levels of IHAS were associated with fewer alcoholic

drinks consumed per week for Latinx participants. Given this finding, clinicians should monitor IHAS, particularly higher levels, among non-Latinx PLWHA who currently drink alcohol.

Additionally, the current study found significant associations between demographic variables and IHAS and alcohol use behaviors. IHAS was associated with: gender, race, and age. Overall, male participants reported greater IHAS than female participants; "other" participants (i.e., American Indian/Alaskan Native, Asian, Native Hawaiian/Other Pacific Islander) reported greater IHAS than Black participants; and, younger participants reported greater IHAS than older participants. Among alcohol use behaviors, there were significant associations between: number of drinks per week and education; heavy drinking and gender; heavy drinking and BMI; binge drinking and gender; binge drinking and sexual orientation; and, binge drinking and BMI. Participants with lower education, lower BMI, female, and identified their sexual orientation as "other" (i.e., bisexual, other) reported more drinks per week, heavy drinking, and binge drinking when compared to participants with higher education, higher BMI, male, and sexual orientations of homosexual and heterosexual. Clinicians should be particularly sensitive to screening for alcohol use among PLWHA who have lower education, lower BMI, are female, and identify their sexual orientation as bisexual/other.

Clinicians should also be aware of alcohol use interventions that exist for PLWHA and utilize them when warranted. Although there have been mixed findings regarding the efficacy of alcohol use interventions among PLWHA (e.g., Brown, DeMartini, Sales, Swartzendruber, & DiClemente, 2013; Madhombiro et al., 2019; Scott-Sheldon, Carey,

Johnson, Carey, & MASH Research Team, 2017), there have been recent studies that have demonstrated promising results.

One recent development is a computerized brief intervention for PLWHA who report heavy or hazardous alcohol use (McCaul et al., 2021). McCaul and colleagues integrated a computerized brief intervention (CBI) in two HIV primary care clinics and provided the intervention to 226 PLWHA (81% male; 51% Black; 4% Hispanic) who reported heavy or hazardous alcohol use as indicated by the AUDIT. The CBI consisted of two 20-minute computerized sessions using cognitive-behavioral techniques. Participants who participated in one or both sessions reported reduced alcohol use and high patient satisfaction with the program when compared to participants who did not participate in either session.

Alcohol reduction interventions that utilize technology are important due to the COVID-19 pandemic, especially among HIV clinics (Mgbako et. al., 2020). Hasin and colleagues (2022) developed a smartphone application to reduce heavy drinking among PLWHA, "HealthCall", which provides brief, between-session patient engagement and, thus, minimizes provider time. Patients engage daily with the HealthCall application for self-monitoring of drinking and health behaviors for sixty days and receive continued positive reinforcement. The authors found that the HealthCall application combined with brief interventions (e.g., motivational interviewing) leads to the most alcohol reduction among PLWHA with alcohol dependence. Moreover, there was high study retention (85-94%), which further shows promise of the HealthCall application, especially when combined with brief interventions.

To the author's knowledge, no studies to date have looked at whether reducing HIV-related stigma then reduces alcohol use. However, there has been a prior study demonstrating

various interventions' efficacy on reducing HIV-related stigma. Singh and colleagues (2020) examined the effectiveness of three different interventions (i.e., individual counseling, group counseling, collective advocacy) on reducing HIV-related stigma among men living with HIV/AIDS who drink alcohol in India. All three interventions led to reductions in HIV-related stigma, including IHAS. Group-based interventions appeared to be the most effective for reducing stigma, which is unsurprising given stigma being rooted in negative interactions with others. Group-based interventions targeting reducing HIV-related stigma should be prioritized due to their increased efficacy and cost effectiveness when compared to individual counseling. Due to the paucity of the current research base, it would be useful for future interventions to examine whether reducing HIV-related stigma, particularly IHAS, leads to reductions in alcohol use among PLWHA.

Study Limitations.

Several study limitations should be noted. First, although the Bronx, New York has been identified as a geographic HIV "hotspot" (i.e., a county with one of the highest numbers of new HIV diagnoses), and thus, a crucial location to study, findings might not be generalizable to other hotspots (e.g., Washington, D.C.; San Francisco, California) or other non-hotspot locations in the U.S. and worldwide. As noted earlier, while the IHAS mean score was comparable to past research, the prevalence of alcohol use was lower in this sample than in other samples and compared to the general HIV population (Chander et al., 2008; Galvan et al., 2002) potentially due to the larger percentage of Latinx individuals in this sample.

Second, all study data was obtained through self-report. Thus, data might have been subjected to recall bias, under-reporting, and social desirability. As the current study asked

participants about HIV/AIDS-related stigma and substance use (i.e., alcohol use behaviors), which can be uncomfortable to report, participants might have been less inclined to provide truthful responses. In order to decrease these issues, the study was approved with oral consent procedures and no participant names were collected, in hopes of increasing feelings of anonymity. Third, the current study was cross-sectional, which did not allow the relationship of IHAS and alcohol use behaviors to be assessed over time. Thus, directionality of associations was not able to be reported. Future studies are needed that can examine the direction of associations between IHAS and alcohol use behaviors (e.g., longitudinal studies).

Fourth, the Internalized AIDS-Related Stigma Scale (IARSS) is only available in English. Consequently, non-English-speaking individuals could not participate in the parent study. In 2018, 27% of new HIV diagnoses in the U.S. were comprised of Latinx individuals (Centers for Disease Control and Prevention, 2020c). As such, generalizability may be further limited as Spanish-speaking Latinx individuals living with HIV/AIDS could not participate in this study. Future research should translate the IARSS into Spanish.

Fifth, the parent study recruited participants from the waiting room in the CPL (i.e., an HIV clinic). PLWHA experiencing the highest rates of HIV/AIDS-related stigma might not have been represented in the sample due to potential avoidance of HIV clinics. In order to include a broader sample of PLWHA, future studies should recruit PLWHA using community outreach outside of primary care settings.

Sixth, it is likely that racial, ethnic, and sexual minority individuals living with HIV/AIDS experience a compounded effect of multiple forms of stigma (i.e., racial, ethnic, and sexual orientation discrimination and HIV/AIDS-related stigma). While the current study was not able to account for other forms of stigma or discrimination that might intensify or

exist along with IHAS, as these measures were not included in the parent study, the moderating roles of race, ethnicity, and sexual orientation were examined within the relationship between IHAS and alcohol use behaviors. Future research should include measures accounting for stigma and discrimination related to race, ethnicity, and sexual orientation (e.g., racial discrimination, racism).

Seventh, there were 88 individuals who reported current drinking within the full sample. However, when participants were asked about specific alcohol use behaviors (i.e., number of drinking days per week, number of alcoholic drinks consumed per week), the sample sizes dropped to 74 participants and 70 participants, respectively. This missing data may be due to bias, such that participants may not have wanted to report this information. As such, those who experienced the greatest IHAS may have been excluded. Future research should consider utilizing a missing value analysis in SPSS to examine potential patterns in the missing data. Lastly, there was not enough power to detect outcomes among the exploratory aims and these questions should continue to be explroed in future studies with larger samples.

Conclusions.

The current study found that IHAS was not significantly associated with alcohol drinking status or quantity and frequency of alcohol use in a sample of PLWHA living in the Bronx, New York. The study did find that greater levels of IHAS was marginally protective against greater drinks consumed per week for White/Other participants and greater levels of IHAS was associated with fewer drinks consumed per week for Latinx participants. The study also found that lower education levels, lower BMI, female gender, and sexual orientation identifications of bisexual/other were linked to greater alcohol use behaviors.

These findings suggest that race, ethnicity, education, BMI, gender, and sexual orientation may be important factors to consider in the implementation of alcohol use reduction or cessation interventions among PLWHA. Future research is needed to examine other factors (e.g., financial stress, other types of stigma) that contribute to increased alcohol use levels, as well as difficulty reducing elevated or problematic alcohol use among PLWHA.

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TABLES

Table 1. *Demographic Characteristics for the Full Sample (N = 287)*

Characteristics	*n* (%)	M (SD)	Min-Max (range)
Age (*n* = 286)		50.6 (11.3)	20-75
BMI (*n* = 283)[a]		28.5 (6.7)	17.1-55.8
Years since HIV diagnosis (*n* = 263)		19.8 (9)	0-50
Gender (*n* = 287)			
Female[b]	128 (44.6)		
Male	159 (55.4)		
Marital status (*n* = 286)			
Single	163 (57.0)		
Married or living with a partner	68 (23.8)		
Combined Other (i.e., separated, divorced, widowed, Other)	55 (19.2)		
Ethnicity (*n* = 240)			
Latinx	132 (55.0)		
Non-Latinx	108 (45.0)		
Race (*n* = 276)			
Black	146 (52.9)		
White	27 (9.4)		
Combined Other (i.e., American Indian/Alaskan Native, Asian, Native Hawaiian/Other Pacific Islander, Other)	103 (35.9)		
Sexual orientation (*n* = 283)			
Heterosexual	204 (72.1)		
Homosexual (i.e., Gay, Lesbian)	51 (18.0)		
Combined Other (i.e., Bisexual, Other)	28 (9.8)		
Education (*n* = 286)			
Less than high school graduate	88 (30.7)		
High school graduate/GED	78 (27.2)		
Some college or more	120 (41.8)		
IHAS level (*n* = 283)[c]		2.3 (1.9)	
Alcohol current use (*n* = 276)			
Yes	88 (30.7)		
No	188 (65.5)		
Alcohol drinking days per week (*n* = 87)[d]			
1-2 days per week	53 (60.9)		
3-7 days per week	34 (39.1)		
Alcohol drinks consumed per week (*n* = 77)[e]			
1-3 drinks	38 (49.4)		
4+ drinks	39 (50.6)		
Heavy drinking (*n* = 78)[f]			

Yes	22 (28.2)
No	56 (71.8)
Binge drinking (n = 97)[g]	
Yes	20 (20.6)
No	77 (79.4)

Key: M, mean; Max, maximum value; Min, minimum value; SD, standard deviation; BMI, Body Mass Index; IHAS, internalized HIV/AIDS stigma; Full sample n = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes.

[a]BMI (Body Mass Index) was calculated using self-reported weight (in pounds) and height (in inches) as follows: ([weight/height]/height) x 703.

[b]Two participants that self-reported as transgender female were combined with the cisgender female participants in the "female" group.

[c]IHAS was measured as a continuous variable using the Internalized AIDS-Related Stigma Scale (Kalichman et al., 2009); scores range from 0-6, with higher scores reflecting higher IHAS.

[d]As number of alcohol drinking days per week had an extreme positive skew, responses (n = 74) were dichotimized into 1-2 days (n = 50) and 3-7 days (n = 24).

[e]As alcohol drinks consumed per week had an extreme positive skew, responses (n =70) were dichotimized into 1-3 drinks (n = 37) and 4+ drinks (n = 33).

[f]Heavy drinking was characterized dichotomously by number of drinks consumed per week according to gender. For female participants, heavy drinking was defined by the consumption of ≥ 8 alcoholic drinks per week. For male participants, heavy drinking was defined by the consumption of ≥ 15 alcoholic drinks per week.

[g]Binge drinking was characterized dichotomously by number of drinks consumed per occasion according to gender. For female participants, binge drinking was defined by the consumption of ≥ 4 alcoholic drinks per occasion. For male participants, binge drinking was defined by the consumption of ≥ 5 alcoholic drinks per occasion.

Table 2. *Demographic Characteristics by Drinking Status (n = 276)*

Characteristics	Drinking Status		Significance (*p*-values)
	Current Alcohol Use (*n* = 88) *n* (%) or M (SD)	Non-Current Alcohol Use (*n* = 188) *n* (%) or M (SD)	
Age (*n* = 275)	47.2 (11.9)	52.2 (10.8)	.028*
BMI (*n* = 272)[a]	27.7 (6.1)	28.8 (6.9)	.376
Gender (*n* = 276)			.002**
Female[b]	52 (59.1)	73 (38.8)	
Male	36 (40.9)	115 (61.2)	
Marital status (*n* = 275)			.569
Single	53 (60.9)	102 (54.3)	
Married or living with a partner	19 (21.8)	46 (24.5)	
Combined Other (i.e., separated, divorced, widowed, Other)	15 (17.2)	40 (21.3)	
Ethnicity (*n* = 230)			.146
Latinx	37 (48.1)	89 (58.2)	
Non-Latinx	40 (51.9)	64 (41.8)	
Race (*n* = 266)			.111
Black	49 (57.6)	92 (50.8)	
White	11 (12.9)	14 (7.7)	
Combined Other (i.e., American Indian/Alaskan Native, Asian, Native Hawaiian/Other Pacific Islander, Other)	25 (29.4)	75 (41.4)	
Sexual orientation (*n* = 272)			.004**
Heterosexual	52 (59.8)	145 (78.4)	
Homosexual (i.e., Gay, Lesbian)	21 (24.1)	28 (15.1)	
Combined Other (i.e., Bisexual, Other)	14 (16.1)	12 (6.5)	
Education (*n* = 275)			.347
Less than high school graduate	24 (27.3)	60 (32.1)	
High school graduate/GED	21 (23.9)	53 (28.3)	
Some college or more	43 (48.9)	74 (39.6)	
IHAS level (*n* = 273)[c]	2.6 (2.0)	2.2 (2.0)	.716

Key: M, mean; SD, standard deviation; *p*, significance; BMI, Body Mass Index; IHAS, internalized HIV/AIDS stigma; Full sample *n* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes. *$p < .05$, **$p < .01$

[a]BMI (Body Mass Index) was calculated using self-reported weight (in pounds) and height (in inches) as follows: ([weight/height]/height) x 703.

[b]Two participants that self-reported as transgender females were combined with the cisgender female participants in the "female" group.

[c]IHAS was measured as a continuous variable using the Internalized AIDS-Related Stigma Scale (Kalichman et al., 2009); scores range from 0-6, with higher scores reflecting higher IHAS.

Table 3. *Demographic Characteristics by Alcohol Drinking Days per Week Among a Sample of PLWHA Who Currently Drink Alcohol (n = 74)*

Characteristics	Alcohol Drinking Days per Week		Significance (*p*-values)
	1-2 days (*n* = 50) *n* (%) or M (SD)	3-7 days (*n* = 24) *n* (%) or M (SD)	
Age (*n* = 74)	46.8 (12.0)	48.4 (13.2)	.512
BMI (*n* = 70)[a]	28.1 (6.2)	27.1 (6.4)	.747
Gender (*n* = 74)			.475
Female[b]	29 (58.0)	16 (66.7)	
Male	21 (42.0)	8 (33.3)	
Marital status (*n* = 73)			.959
Single	30 (61.2)	14 (58.3)	
Married or living with a partner	12 (24.5)	6 (25.0)	
Combined Other (i.e., separated, divorced, widowed, Other)	7 (14.3)	4 (16.7)	
Ethnicity (*n* = 63)			.175
Latinx	19 (42.2)	11 (61.1)	
Non-Latinx	26 (57.8)	7 (38.9)	
Race (*n* = 71)			.053
Black	32 (66.7)	9 (39.1)	
White	6 (12.5)	3 (13.0)	
Combined Other (i.e., American Indian/Alaskan Native, Asian, Native Hawaiian/Other Pacific Islander, Other)	10 (20.8)	11 (47.8)	
Sexual orientation (*n* = 73)			.336
Heterosexual	31 (63.3)	11 (45.8)	
Homosexual (i.e., Gay, Lesbian)	11 (22.4)	7 (29.2)	
Combined Other (i.e., Bisexual, Other)	7 (14.3)	6 (25.0)	
Education (*n* = 74)			.936
Less than high school graduate	15 (30.0)	8 (33.3)	
High school graduate/GED	12 (24.0)	6 (25.0)	
Some college or more	23 (46.0)	10 (41.7)	

Key: M, mean; SD, standard deviation; *p*, significance; BMI, Body Mass Index; IHAS, internalized HIV/AIDS stigma; Full sample *n* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes.

[a]BMI (Body Mass Index) was calculated using self-reported weight (in pounds) and height (in inches) as follows: ([weight/height]/height) x 703.

[b]Two participants that self-reported as transgender female were combined with the cisgender female participants in the "female" group.

Table 4. *Demographic Characteristics by Alcoholic Drinks Consumed per Week Among a Sample of PLWHA Who Currently Drink Alcohol (n = 70)*

Characteristics	Alcoholic Drinks Consumed per Week		Significance (*p*-values)
	1-3 drinks (*n* = 37) *n* (%) or M (SD)	4+ drinks (*n* = 33) *n* (%) or M (SD)	
Age (*n* = 70)	48.2 (11.3)	46.4 (12.7)	.400
BMI (*n* = 66)[a]	28.4 (6.3)	27.6 (6.5)	.698
Gender (*n* = 70)			.395
Female[b]	21 (56.8)	22 (66.7)	
Male	16 (43.2)	11 (33.3)	
Marital status (*n* = 69)			.275
Single	22 (61.1)	19 (57.6)	
Married or living with a partner	7 (19.4)	11 (33.3)	
Combined Other (i.e., separated, divorced, widowed, Other)	7 (19.4)	3 (9.1)	
Ethnicity (*n* = 59)			.735
Latinx	14 (43.8)	13 (48.1)	
Non-Latinx	18 (56.3)	14 (51.9)	
Race (*n* = 67)			.340
Black	22 (62.9)	18 (56.3)	
White	6 (17.1)	3 (9.4)	
Combined Other (i.e., American Indian/Alaskan Native, Asian, Native Hawaiian/Other Pacific Islander, Other)	7 (20.0)	11 (34.4)	
Sexual orientation (*n* = 69)			.284
Heterosexual	24 (66.7)	16 (48.5)	
Homosexual (i.e., Gay, Lesbian)	8 (22.2)	10 (30.3)	
Combined Other (i.e., Bisexual, Other)	4 (11.1)	7 (21.2)	
Education (*n* = 70)			.012*
Less than high school graduate	7 (18.9)	16 (48.5)	
High school graduate/GED	8 (21.6)	8 (24.2)	
Some college or more	22 (59.5)	9 (27.3)	

Key: M, mean; SD, standard deviation; *p*, significance; BMI, Body Mass Index; IHAS, internalized HIV/AIDS stigma; Full sample *n* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes. *$p < .05$

[a]BMI (Body Mass Index) was calculated using self-reported weight (in pounds) and height (in inches) as follows: ([weight/height]/height) x 703.

[b]Two participants that self-reported as transgender female were combined with the cisgender female participants in the "female" group.

Table 5. *Demographic Characteristics by Heavy Drinking Versus No Heavy Drinking Among a Sample of PLWHA Who Currently Drink Alcohol (n = 71)*

Characteristics	Heavy Drinking[a] (*n* = 18) *n* (%) or M (SD)	No Heavy Drinking (*n* = 53) *n* (%) or M (SD)	Significance (*p*-values)
Age (*n* = 71)	47.8 (14.0)	47.1 (11.2)	.830
BMI (*n* = 67)[b]	25.3 (4.8)	29.1 (6.5)	.029*
Gender (*n* = 71)			.001**
Female[c]	17 (94.4)	27 (51.0)	
Male	1 (5.6)	26 (49.0)	
Marital status (*n* = 70)			.898
Single	10 (55.6)	32 (61.5)	
Married or living with a partner	5 (27.8)	13 (25.0)	
Combined Other (i.e., separated, divorced, widowed, Other)	3 (16.6)	7 (13.5)	
Ethnicity (*n* = 60)			.291
Latinx	9 (56.3)	18 (40.9)	
Non-Latinx	7 (43.7)	26 (59.1)	
Race (*n* = 68)			.109
Black	8 (47.1)	32 (62.7)	
White	1 (5.8)	8 (15.7)	
Combined Other (i.e., American Indian/Alaskan Native, Asian, Native Hawaiian/Other Pacific Islander, Other)	8 (47.1)	11 (21.6)	
Sexual orientation (*n* = 70)			.192
Heterosexual	7 (38.9)	33 (63.5)	
Homosexual (i.e., Gay, Lesbian)	7 (38.9)	12 (23.1)	
Combined Other (i.e., Bisexual, Other)	4 (22.2)	7 (13.4)	
Education (*n* = 71)			.771
Less than high school graduate	7 (38.9)	16 (30.2)	
High school graduate/GED	4 (22.2)	12 (22.6)	
Some college or more	7 (38.9)	25 (47.2)	

Key: M, mean; SD, standard deviation; *p*, significance; BMI, Body Mass Index; IHAS, internalized HIV/AIDS stigma; Full sample *n* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes. *$p < .05$, **$p < .01$

[a]Heavy drinking was characterized dichotomously by number of drinks consumed per week according to gender. For female participants, heavy drinking was defined by the consumption of ≥ 8 alcoholic drinks per week. For male participants, heavy drinking was defined by the consumption of ≥ 15 alcoholic drinks per week.

[b]BMI (Body Mass Index) was calculated using self-reported weight (in pounds) and height (in inches) as follows: ([weight/height]/height) x 703.

[c]Two participants that self-reported as transgender female were combined with the cisgender female participants in the "female" group.

Table 6. *Demographic Characteristics by Binge Drinking Versus No Binge Drinking Among a Sample of PLWHA Who Currently Drink Alcohol (n = 80)*

Characteristics	Binge Drinking[a] (*n* = 15) *n* (%) or M (SD)	No Binge Drinking (*n* = 65) *n* (%) or M (SD)	Significance (*p*-values)
Age (*n* = 80)	43.3 (11.6)	48.4 (11.6)	.129
BMI[b] (*n* = 76)	24.7 (4.0)	28.7 (6.3)	.025*
Gender (*n* = 80)			.019*
Female[c]	13 (86.7)	35 (53.9)	
Male	2 (13.3)	30 (46.1)	
Marital status (*n* = 79)			.872
Single	10 (66.7)	38 (59.4)	
Married or living with a partner	3 (20.0)	16 (24.6)	
Combined Other (i.e., separated, divorced, widowed, Other)	2 (13.3)	10 (16.0)	
Ethnicity (*n* = 69)			.581
Latinx	7 (50.0)	23 (41.8)	
Non-Latinx	7 (50.0)	32 (58.2)	
Race (*n* = 77)			.256
Black	9 (64.3)	37 (58.7)	
White	0 (0.0)	10 (15.9)	
Combined Other (i.e., American Indian/Alaskan Native, Asian, Native Hawaiian/Other Pacific Islander, Other)	5 (35.7)	16 (25.4)	
Sexual orientation (*n* = 79)			.015*
Heterosexual	4 (26.7)	42 (65.6)	
Homosexual (i.e., Gay, Lesbian)	6 (40.0)	15 (23.4)	
Combined Other (i.e., Bisexual, Other)	5 (33.3)	7 (11.0)	
Education (*n* = 80)			.057
Less than high school graduate	7 (46.7)	16 (24.7)	
High school graduate/GED	5 (33.3)	14 (21.5)	
Some college or more	3 (20.0)	35 (53.8)	

Key: M, mean; SD, standard deviation; *p*, significance; BMI, Body Mass Index; IHAS, internalized HIV/AIDS stigma; Full sample *n* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes. *$p < .05$

[a]Binge drinking was characterized dichotomously by number of drinks consumed per occasion according to gender. For female participants, binge drinking was defined by the consumption of ≥ 4 alcoholic drinks per occasion. For male participants, binge drinking was defined by the consumption of ≥ 5 alcoholic drinks per occasion.

[b]BMI (Body Mass Index) was calculated using self-reported weight (in pounds) and height (in inches) as follows: ([weight/height]/height) x 703.

[c]Two participants that self-reported as transgender female were combined with the cisgender female participants in the "female" group.

Table 7. *Model Summary of Multiple Linear Regression of IHAS based on Alcohol Consumption (n = 276)*

Model	R	R^2	Adj. R^2	SE of the Estimate
1	.272	.074	.057	.549

Key: R^2 = coefficient of determination; SE = standard error.

Table 8. *ANOVA of Multiple Linear Regression of IHAS based on Alcohol Consumption (n = 276)*

	Sum of Squares	*df*	Mean Square	*F*	*p*
Regression	6.398	5	1.28	4.25	.001**
Residual	80.083	266	.301		
Total	86.481	271			

Key: *df* = degrees of freedom; *F* = F-statistic; *p* = significance.
Notes: *$p < .05$, **$p < .01$

Table 9. *Multiple Linear Regression of IHAS based on Alcohol Consumption (n = 276)*

	Unstandardized Coefficients		Standardized Coefficients			95% CI for *B*		Collinearity Statistics	
	B	SE	Beta	*t*	*p*	Lower Bound	Upper Bound	Tolerance	VIF
Constant	2.269	.170		13.380	.000	1.936	2.603		
Female Gender[a]	-.147	.068	-.130	-2.154	.032*	-.281	-.013	.960	1.042
Black Race[b]	-.213	.071	-.188	-2.992	.003**	-.352	-.073	.878	1.139
White Race[b]	-.222	.123	-.114	-1.808	.072	-.463	.020	.882	1.134
Age	-.007	.003	-.149	-2.470	.014*	-.013	-.001	.952	1.050
Current Alcohol Use	.110	.075	.091	1.466	.144	-.038	.257	.911	1.098

Key: *B* = B coefficient; SE = standard error; *t* = t-test; *p* = significance; CI = confidence interval.

Notes. **p* < .05, ***p* < .01

[a]Male gender was the reference group, and female gender was the indicator group for the gender variable.

[b]"Combined Other" participants (i.e., American Indian/Alaskan Native, Asian, Native Hawaiian/Other Pacific Islander, Other) was the reference group, and Black participants, as well as White participants were the indicator groups for the race variable.

Table 10. *Binomial Logistic Regression of Drinking Days per Week based on IHAS, within the Current Drinking Group (n = 74)*

	B	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
IHAS[a]	-.221	.130	2.921	1	.087	.801	.622	1.033
Constant	-.187	.392	.227	1	.634	.830		

Key: *B* = B coefficient; SE = standard error; Wald = Wald test; *df* = degrees of freedom; *p* = significance; CI = confidence interval; IHAS, internalized HIV/AIDS stigma; Full current drinking sample *n* = 88, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes.

[a]IHAS was measured as a continuous variable using the Internalized AIDS-Related Stigma Scale (Kalichman et al., 2009); scores range from 0-6, with higher scores reflecting higher IHAS.

Table 11. *Binomial Logistic Regression of Alcohol Drinks per Week based on IHAS, within the Current Drinking Group (n = 70)*

	B	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
IHAS[a]	-.116	.129	.815	1	.367	.890	.692	1.146
High School Graduate[b]	-.788	.680	1.345	1	.246	.455	.120	1.723
Some College or More[b]	-1.772	.611	8.416	1	.004**	.170	.051	.563
Constant	1.151	.589	3.824	1	.051	3.162		

Key: *B* = B coefficient; SE = standard error; Wald = Wald test; *df* = degrees of freedom; *p* = significance; CI = confidence interval; IHAS, internalized HIV/AIDS stigma; Full current drinking sample *n* = 88, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes. **$p < .01$

[a]IHAS was measured as a continuous variable using the Internalized AIDS-Related Stigma Scale (Kalichman et al., 2009); scores range from 0-6, with higher scores reflecting higher IHAS.

[b]Less than high school graduate was the reference group, and high school graduate and some college or more were the indicator groups for the educational attainment variable.

Table 12. *Binomial Logistic Regression of Engagement in Heavy Drinking based on IHAS, within the Current Drinking Group (n = 61)*

	B	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
IHAS[a]	-.184	.165	1.251	1	.263	.832	.602	1.149
Female Gender[b]	2.476	1.094	5.120	1	.024*	11.895	1.393	101.602
BMI[c]	-.080	.064	1.574	1	.210	.923	.815	1.046
Constant	-.401	2.135	.035	1	.851	.670		

Key: *B* = B coefficient; SE = standard error; Wald = Wald test; *df* = degrees of freedom; *p* = significance; CI = confidence interval; IHAS, internalized HIV/AIDS stigma; Full current drinking sample *n* = 88, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes. **p* < .05

[a]IHAS was measured as a continuous variable using the Internalized AIDS-Related Stigma Scale (Kalichman et al., 2009); scores range from 0-6, with higher scores reflecting higher IHAS.

[b]Male gender was the reference group, and female gender was the indicator group for the gender variable.

[c]BMI (Body Mass Index) was calculated using self-reported weight (in pounds) and height (in inches) as follows: ([weight/height]/height) x 703.

Table 13. *Binomial Logistic Regression of Engagement in Binge Drinking based on IHAS, within the Current Drinking Group (n = 68)*

	B	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
IHAS[a]	-.070	.170	.168	1	.682	.933	.668	1.302
Female Gender[b]	.528	.937	.317	1	.573	1.695	.270	10.642
BMI[c]	-.122	.074	2.678	1	.102	.885	.765	1.024
Combined Other Sexual Orientation[d]	.639	.822	.605	1	.437	1.895	.379	9.483
Heterosexual[d]	-1.420	.872	2.649	1	.104	.242	.044	1.336
Constant	2.009	2.320	.750	1	.387	7.454		

Key: *B* = B coefficient; SE = standard error; Wald = Wald test; *df* = degrees of freedom; *p* = significance; CI = confidence interval; IHAS, internalized HIV/AIDS stigma; Full current drinking sample *n* = 88, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes.

[a]IHAS was measured as a continuous variable using the Internalized AIDS-Related Stigma Scale (Kalichman et al., 2009); scores range from 0-6, with higher scores reflecting higher IHAS.

[b]Male gender was the reference group, and female gender was the indicator group for the gender variable.

[c]BMI (Body Mass Index) was calculated using self-reported weight (in pounds) and height (in inches) as follows: ([weight/height]/height) x 703.

[d]Homosexual participants were the reference group, and Combined Other (i.e., Bisexual, Other) participants and heterosexual participants were the indicator groups for the sexual orientation variable.

Table 14. *Hierarchical Binomial Logistic Regression Exploring Race as a Moderator Between IHAS and Number of Drinking Days per Week, within the Current Drinking Group (n = 71)*

Block	Variables	*B*	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
								Lower	Upper
Block 1	Race[a]	-1.299	.554	5.500	1	.019*	.273	.092	.808
	IHAS[b]	-.251	.140	3.219	1	.073	.778	.592	1.023
	(Constant)	-.054	.379	.020	1	.887	.947		
Block 2	Race[a]	-1.360	.576	5.574	1	.018*	.257	.083	.794
	IHAS[b]	-.155	.186	.694	1	.405	.856	.594	1.234
	Race x IHAS	-.215	.289	.549	1	.459	.807	.458	1.423
	(Constant)	-.083	.375	.049	1	.826	.921		

Key: *B* = B coefficient; SE = standard error; Wald = Wald test; *df* = degrees of freedom; *p* = significance; CI = confidence interval; IHAS, internalized HIV/AIDS stigma; Full current drinking sample *n* = 88, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes. **p* < .05

[a]White/Combined Other (*n* = 30) was the reference group and Black race (*n* = 41) was the indicator group for the race variable.

[b]IHAS was measured as a continuous variable using the Internalized AIDS-Related Stigma Scale (Kalichman et al., 2009); scores range from 0-6, with higher scores reflecting higher IHAS.

Table 15. *Hierarchical Binomial Logistic Regression Exploring Race as a Moderator Between IHAS and Number of Alcoholic Drinks Consumed per Week, within the Current Drinking Group (n = 67)*

Block	Variables	*B*	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
								Lower	Upper
Block 1	Race[a]	-.313	.505	.383	1	.536	.731	.272	1.968
	IHAS[b]	-.071	.120	.350	1	.554	.931	.736	1.179
	(Constant)	.109	.391	.078	1	.780	1.115		
Block 2	Race[a]	-.478	.536	.794	1	.373	.620	.217	1.774
	IHAS[b]	-.390	.222	3.099	1	.078	.677	.439	1.045
	Race x IHAS	.495	.269	3.383	1	.066	1.640	.968	2.779
	(Constant)	.278	.431	.417	1	.519	1.320		

Key: *B* = B coefficient; SE = standard error; Wald = Wald test; *df* = degrees of freedom; *p* = significance; CI = confidence interval; IHAS, internalized HIV/AIDS stigma; Full current drinking sample *n* = 88, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes.

[a]White/Combined Other race (*n* = 27) was the reference group and Black race (*n* = 40) was the indicator group for the race variable.

[b]IHAS was measured as a continuous variable using the Internalized AIDS-Related Stigma Scale (Kalichman et al., 2009); scores range from 0-6, with higher scores reflecting higher IHAS.

Table 16. *Hierarchical Binomial Logistic Regression Exploring Race as a Moderator Between IHAS and Heavy Drinking, within the Current Drinking Group (n = 68)*

Block	Variables	*B*	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
								Lower	Upper
Block 1	Race[a]	-.702	.576	1.488	1	.222	.495	.160	1.531
	IHAS[b]	-.109	.142	.587	1	.443	.897	.678	1.185
	(Constant)	-.702	.409	2.943	1	.086	.495		
Block 2	Race[a]	-.724	.576	1.579	1	.209	.485	.157	1.500
	IHAS[b]	-.281	.220	1.633	1	.201	.755	.490	1.162
	Race x IHAS	.310	.289	1.145	1	.285	1.363	.773	2.403
	(Constant)	-.663	.419	2.507	1	.113	.515		

Key: *B* = B coefficient; SE = standard error; Wald = Wald test; *df* = degrees of freedom; *p* = significance; CI = confidence interval; IHAS, internalized HIV/AIDS stigma; Full current drinking sample *n* = 88, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes.

[a]White/Combined Other race (*n* = 28) was the reference group and Black race (*n* = 40) was the indicator group for the race variable.

[b]IHAS was measured as a continuous variable using the Internalized AIDS-Related Stigma Scale (Kalichman et al., 2009); scores range from 0-6, with higher scores reflecting higher IHAS.

Table 17. *Hierarchical Binomial Logistic Regression Exploring Race as a Moderator Between IHAS and Binge Drinking, within the Current Drinking Group (n = 77)*

Block	Variables	*B*	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
								Lower	Upper
Block 1	Race[a]	.337	.628	.288	1	.592	1.401	.409	4.799
	IHAS[b]	.123	.147	.699	1	.403	1.131	.847	1.510
	(Constant)	-1.747	.510	11.735	1	.001	.174		
Block 2	Race[a]	.181	.633	.082	1	.774	1.199	.347	4.145
	IHAS[b]	-.060	.248	.058	1	.809	.942	.579	1.533
	Race x IHAS	.278	.308	.814	1	.367	1.320	.772	2.415
	(Constant)	-1.615	.503	10.288	1	.001	.199		

Key: *B* = B coefficient; SE = standard error; Wald = Wald test; *df* = degrees of freedom; *p* = significance; CI = confidence interval; IHAS, internalized HIV/AIDS stigma; Full current drinking sample *n* = 88, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes.

[a]White/Combined Other race (*n* = 31) was the reference group and Black race (*n* = 46) was the indicator group for the race variable.

[b]IHAS was measured as a continuous variable using the Internalized AIDS-Related Stigma Scale (Kalichman et al., 2009); scores range from 0-6, with higher scores reflecting higher IHAS.

Table 18. *Hierarchical Binomial Logistic Regression Exploring Ethnicity as a Moderator Between IHAS and Number of Drinking Days per Week, within the Current Drinking Group (n = 63)*

Block	Variables	*B*	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
								Lower	Upper
Block 1	Ethnicity[a]	.804	.582	1.911	1	.167	2.234	.715	6.984
	IHAS[b]	-.213	.149	2.049	1	.152	.080	.604	1.082
	(Constant)	-1.307	.433	9.109	1	.003	.271		
Block 2	Ethnicity[a]	.805	.583	1.911	1	.167	2.238	.714	7.009
	IHAS[b]	-.223	.226	.974	1	.324	.800	.514	1.246
	Ethnicity x IHAS	.018	.300	.004	1	.951	1.018	.566	1.833
	(Constant)	-1.310	.436	9.029	1	.003	.270		

Key: *B* = B coefficient; SE = standard error; Wald = Wald test; *df* = degrees of freedom; *p* = significance; CI = confidence interval; IHAS, internalized HIV/AIDS stigma; Full current drinking sample *n* = 88, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes.

[a]Non-Latinx ethnicity (*n* = 33) was the reference group, and Latinx ethnicity (*n* = 30) was the indicator group for the ethnicity variable.

[b]IHAS was measured as a continuous variable using the Internalized AIDS-Related Stigma Scale (Kalichman et al., 2009); scores range from 0-6, with higher scores reflecting higher IHAS.

Table 19. *Hierarchical Binomial Logistic Regression Exploring Ethnicity as a Moderator Between IHAS and Number of Alcoholic Drinks Consumed per Week, within the Current Drinking Group (n = 59)*

Block	Variables	*B*	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
								Lower	Upper
Block 1	Ethnicity[a]	.191	.527	.132	1	.717	1.211	.431	3.402
	IHAS[b]	-.082	.131	.391	1	.532	.921	.713	1.191
	(Constant)	-.229	.359	.407	1	.523	.795		
Block 2	Ethnicity[a]	.409	.562	.528	1	.467	1.505	.500	4.527
	IHAS[b]	.162	.180	.813	1	.367	1.176	.827	1.672
	Ethnicity x IHAS	-.579	.289	4.025	1	.045*	.560	.318	.987
	(Constant)	-.305	.367	.691	1	.406	.737		

Key: *B* = B coefficient; SE = standard error; Wald = Wald test; *df* = degrees of freedom; *p* = significance; CI = confidence interval; IHAS, internalized HIV/AIDS stigma; Full current drinking sample *n* = 88, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes. * $p < .05$

[a]Non-Latinx ethnicity (*n* = 32) was the reference group, and Latinx ethnicity (*n* = 27) was the indicator group for the ethnicity variable.

[b]IHAS was measured as a continuous variable using the Internalized AIDS-Related Stigma Scale (Kalichman et al., 2009); scores range from 0-6, with higher scores reflecting higher IHAS.

Table 20. *Hierarchical Binomial Logistic Regression Exploring Ethnicity as a Moderator Between IHAS and Heavy Drinking, within the Current Drinking Group (n = 60)*

Block	Variables	*B*	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
								Lower	Upper
Block 1	Ethnicity[a]	.688	.607	1.285	1	.257	1.989	.606	6.533
	IHAS[b]	-.250	.157	2.521	1	.112	.779	.572	1.060
	(Constant)	-1.309	.436	.436	1	.003	.270		
Block 2	Ethnicity[a]	.682	.606	1.267	1	.260	1.977	.603	6.482
	IHAS[b]	-.184	.221	.687	1	.407	.832	.539	1.285
	Ethnicity x IHAS	-.130	.315	.170	1	.680	.878	.474	1.628
	(Constant)	-1.296	.431	9.033	1	.003	.274		

Key: *B* = B coefficient; SE = standard error; Wald = Wald test; *df* = degrees of freedom; *p* = significance; CI = confidence interval; IHAS, internalized HIV/AIDS stigma; Full current drinking sample *n* = 88, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes.

[a]Non-Latinx ethnicity (*n* = 33) was the reference group, and Latinx ethnicity (*n* = 27) was the indicator group for the ethnicity variable.

[b]IHAS was measured as a continuous variable using the Internalized AIDS-Related Stigma Scale (Kalichman et al., 2009); scores range from 0-6, with higher scores reflecting higher IHAS.

Table 21. *Hierarchical Binomial Logistic Regression Exploring Ethnicity as a Moderator Between IHAS and Binge Drinking, within the Current Drinking Group (n = 69)*

Block	Variables	*B*	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
								Lower	Upper
Block 1	Ethnicity[a]	.362	.607	.356	1	.551	1.437	.437	4.724
	IHAS[b]	-.057	.153	.141	1	.708	.944	.700	1.274
	(Constant)	-1.520	.418	13.239	1	.000	.219		
Block 2	Ethnicity[a]	.424	.609	.483	1	.487	1.527	.463	5.042
	IHAS[b]	.075	.221	.128	1	.720	1.078	.714	1.630
	Ethnicity x IHAS	-.274	.306	.802	1	.370	.760	.417	1.385
	(Constant)	-1.532	.421	13.219	1	.000	.216		

Key: *B* = B coefficient; SE = standard error; Wald = Wald test; *df* = degrees of freedom; *p* = significance; CI = confidence interval; IHAS, internalized HIV/AIDS stigma; Full current drinking sample *n* = 88, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes.

[a]Non-Latinx ethnicity (*n* = 39) was the reference group, and Latinx ethnicity (*n* = 30) was the indicator group for the ethnicity variable.

[b]IHAS was measured as a continuous variable using the Internalized AIDS-Related Stigma Scale (Kalichman et al., 2009); scores range from 0-6, with higher scores reflecting higher IHAS.

Table 22. *Hierarchical Binomial Logistic Regression Exploring Sexual Orientation as a Moderator Between IHAS and Number of Drinking Days per Week, within the Current Drinking Group (n = 73)*

Block	Variables	*B*	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
								Lower	Upper
Block 1	Sexual Orientation[a]	.862	.529	2.656	1	.103	2.369	.840	6.683
	IHAS[b]	-.254	.133	3.626	1	.057	.776	.598	1.007
	(Constant)	-1.122	.367	9.352	1	.002	.326		
Block 2	Sexual Orientation[a]	.868	.533	2.650	1	.104	2.382	.838	6.775
	IHAS[b]	-.267	.194	1.894	1	.169	.766	.523	1.120
	Sexual Orientation x IHAS	.025	.267	.009	1	.924	1.026	.608	1.731
	(Constant)	-1.130	.378	8.944	1	.003	.323		

Key: *B* = B coefficient; SE = standard error; Wald = Wald test; *df* = degrees of freedom; *p* = significance; CI = confidence interval; IHAS, internalized HIV/AIDS stigma; Full current drinking sample *n* = 88, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes.

[a]Heterosexual orientation (*n* = 42) was the reference group and Homosexual/Bisexual/Combined Other (*n* = 31) orientation was the indicator group for the sexual orientation variable.

[b]IHAS was measured as a continuous variable using the Internalized AIDS-Related Stigma Scale (Kalichman et al., 2009); scores range from 0-6, with higher scores reflecting higher IHAS.

Table 23. *Hierarchical Binomial Logistic Regression Exploring Sexual Orientation as a Moderator Between IHAS and Number of Alcoholic Drinks Consumed per Week, within the Current Drinking Group (n = 69)*

Block	Variables	*B*	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
								Lower	Upper
Block 1	Sexual Orientation[a]	.830	.508	2.668	1	.102	2.294	.847	6.210
	IHAS[b]	-.113	.122	.863	1	.353	.893	.703	1.134
	(Constant)	-.422	.326	1.682	1	.195	.656		
Block 2	Sexual Orientation[a]	.832	.511	2.646	1	.104	2.298	.843	6.261
	IHAS[b]	-.110	.163	.451	1	.502	.896	.651	1.234
	Sexual Orientation x IHAS	-.008	.245	.001	1	.974	.992	.614	1.603
	(Constant)	-.422	.326	1.671	1	.196	.656		

Key: *B* = B coefficient; SE = standard error; Wald = Wald test; *df* = degrees of freedom; *p* = significance; CI = confidence interval; IHAS, internalized HIV/AIDS stigma; Full current drinking sample *n* = 88, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes.

[a]Heterosexual orientation (*n* = 40) was the reference group and Homosexual/Bisexual/Combined Other (*n* = 29) orientation was the indicator group for the sexual orientation variable.

[b]IHAS was measured as a continuous variable using the Internalized AIDS-Related Stigma Scale (Kalichman et al., 2009); scores range from 0-6, with higher scores reflecting higher IHAS.

Table 24. *Hierarchical Binomial Logistic Regression Exploring Sexual Orientation as a Moderator Between IHAS and Heavy Drinking, within the Current Drinking Group (n = 70)*

Block	Variables	*B*	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
								Lower	Upper
Block 1	Sexual Orientation[a]	1.121	.581	3.729	1	.053	3.068	.983	9.575
	IHAS[b]	-.166	.143	1.348	1	.246	.847	.640	1.121
	(Constant)	-1.603	.426	14.165	1	.000	.201		
Block 2	Sexual Orientation[a]	1.105	.576	3.677	1	.055	3.019	.976	9.339
	IHAS[b]	-.094	.212	.197	1	.658	.910	.601	1.379
	Sexual Orientation x IHAS	-.128	.286	.200	1	.654	.880	.502	1.542
	(Constant)	-1.572	.424	13.768	1	.000	.208		

Key: *B* = B coefficient; SE = standard error; Wald = Wald test; *df* = degrees of freedom; *p* = significance; CI = confidence interval; IHAS, internalized HIV/AIDS stigma; Full current drinking sample *n* = 88, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes.

[a]Heterosexual orientation (*n* = 40) was the reference group and Homosexual/Bisexual/Combined Other (*n* = 30) orientation was the indicator group for the sexual orientation variable.

[b]IHAS was measured as a continuous variable using the Internalized AIDS-Related Stigma Scale (Kalichman et al., 2009); scores range from 0-6, with higher scores reflecting higher IHAS.

Table 25. *Hierarchical Binomial Logistic Regression Exploring Sexual Orientation as a Moderator Between IHAS and Binge Drinking, within the Current Drinking Group (n = 79)*

Block	Variables	*B*	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
								Lower	Upper
Block 1	Sexual Orientation[a]	1.662	.649	6.565	1	.010**	5.269	1.478	18.782
	IHAS[b]	-.005	.150	.001	1	.972	.995	.741	1.336
	(Constant)	-2.352	.524	20.155	1	.000	.095		
Block 2	Sexual Orientation[a]	1.666	.647	6.636	1	.010**	5.292	1.490	18.803
	IHAS[b]	.029	.256	.013	1	.911	1.029	.623	1.701
	Sexual Orientation x IHAS	-.052	.316	.027	1	.870	.950	.511	1.764
	(Constant)	-2.348	.524	20.114	1	.000	.096		

Key: *B* = B coefficient; SE = standard error; Wald = Wald test; *df* = degrees of freedom; *p* = significance; CI = confidence interval; IHAS, internalized HIV/AIDS stigma; Full current drinking sample *n* = 88, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes. $^{**}p < .01$

[a]Heterosexual orientation (*n* = 46) was the reference group and Homosexual/Bisexual/Combined Other (*n* = 33) orientation was the indicator group for the sexual orientation variable.

[b]IHAS was measured as a continuous variable using the Internalized AIDS-Related Stigma Scale (Kalichman et al., 2009); scores range from 0-6, with higher scores reflecting higher IHAS.

Table 26. *Independent Samples T-Test Comparing IHAS and Gender within Full Sample*

	F	Sig.	*t*	*df*	*p*	Mean Difference	*SE* Difference	95% CI for Odds Ratio	
								Lower	Upper
IHAS[a]	.133	.716	-1.971	281	.050	-.46674	.23684	-.93294	-.00053

Key: *F* = F-statistic; *t* = *t*-test; *df* = degrees of freedom*; p* = significance; *SE* = standard error; CI = confidence interval; IHAS, internalized HIV/AIDS stigma; Full sample *N* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes.

[a]IHAS was measured as a continuous variable using the Internalized AIDS-Related Stigma Scale (Kalichman et al., 2009); scores range from 0-6, with higher scores reflecting higher IHAS.

Table 27. *Independent Samples T-Test Comparing IHAS and Ethnicity within Full Sample*

	F	Sig.	*t*	*df*	*p*	Mean Difference	*SE* Difference	95% CI for Odds Ratio	
								Lower	Upper
IHAS[a]	1.062	.304	1.910	234	.057	.49525	.25930	-.01561	1.00612

Key: *F* = F-statistic; *t* = *t*-test; *df* = degrees of freedom*; p* = significance; *SE* = standard error; CI = confidence interval; IHAS, internalized HIV/AIDS stigma; Full sample *N* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes.

[a]IHAS was measured as a continuous variable using the Internalized AIDS-Related Stigma Scale (Kalichman et al., 2009); scores range from 0-6, with higher scores reflecting higher IHAS.

Table 28. *One-Way ANOVA Comparing IHAS and Marital Status within Full Sample*

	Sum of Squares	*df*	Mean Square	*F*	*p*
IHAS[a]	2.172	2	1.086	.273	.761

Key: *F* = F-statistic; *df* = degrees of freedom*; p* = significance; IHAS, internalized HIV/AIDS stigma; Full sample *N* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes.

[a]IHAS was measured as a continuous variable using the Internalized AIDS-Related Stigma Scale (Kalichman et al., 2009); scores range from 0-6, with higher scores reflecting higher IHAS.

Table 29. *One-Way ANOVA Comparing IHAS and Race within Full Sample*

	Sum of Squares	*df*	Mean Square	*F*	*p*
IHAS[a]	30.006	2	15.003	3.870	.022*

Key: *F* = F-statistic; *df* = degrees of freedom; *p* = significance; IHAS, internalized HIV/AIDS stigma; Full sample *N* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes. * $p < .05$

[a]IHAS was measured as a continuous variable using the Internalized AIDS-Related Stigma Scale (Kalichman et al., 2009); scores range from 0-6, with higher scores reflecting higher IHAS.

Table 30. *One-Way ANOVA Comparing IHAS and Sexual Orientation within Full Sample*

	Sum of Squares	*df*	Mean Square	*F*	*p*
IHAS[a]	5.794	2	2.897	.735	.480

Key: *F* = F-statistic; *df* = degrees of freedom*; p* = significance; IHAS, internalized HIV/AIDS stigma; Full sample *N* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes.

[a]IHAS was measured as a continuous variable using the Internalized AIDS-Related Stigma Scale (Kalichman et al., 2009); scores range from 0-6, with higher scores reflecting higher IHAS.

Table 31. *One-Way ANOVA Comparing IHAS and Education within Full Sample*

	Sum of Squares	*df*	Mean Square	*F*	*p*
IHAS[a]	.537	2	.269	.067	.935

Key: *F* = F-statistic; *df* = degrees of freedom*; p* = significance; IHAS, internalized HIV/AIDS stigma; Full sample *N* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes.

[a]IHAS was measured as a continuous variable using the Internalized AIDS-Related Stigma Scale (Kalichman et al., 2009); scores range from 0-6, with higher scores reflecting higher IHAS.

Table 32. *Correlation Table for IHAS and Age and BMI within Full Sample*

		IHAS[a]	Age	BMI
IHAS[a]	Pearson Correlation	1	-.129	-.006
	p (2-tailed)		.030*	.922
	N	283	282	279
Age	Pearson Correlation	-.129	1	.077
	p (2-tailed)	.030*		.198
	N	282	286	282
BMI	Pearson Correlation	-.006	.077	1
	p (2-tailed)	.922	.198	
	N	279	282	283

Key: *p* = significance; IHAS, internalized HIV/AIDS stigma; BMI, Body Mass Index; Full sample *N* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes. * $p < .05$

[a]IHAS was measured as a continuous variable using the Internalized AIDS-Related Stigma Scale (Kalichman et al., 2009); scores range from 0-6, with higher scores reflecting higher IHAS.

Table 33. *Chi-Square Tests of Independence Comparing Gender and Alcohol Drinking Days per Week within PLWHA Who Currently Drink Alcohol*

	Value	*df*	Asymptotic *p* (2-sided)	*p* (2-tailed)	*p* (2-sided)
Pearson Chi-Square	.511	1	.475		
Continuity Correction	.212	1	.645		
Likelihood Ratio	.517	1	.472		
Fisher's Exact Test				.612	.325
Linear-by-Linear Association	.504	1	.478		
N of Valid Cases	74				

Key: *p* = significance; *df* = degrees of freedom; Full sample *N* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Table 34. *Chi-Square Tests of Independence Comparing Gender and Alcoholic Drinks Consumed per Week within PLWHA Who Currently Drink Alcohol*

	Value	*df*	Asymptotic *p* (2-sided)	*p* (2-tailed)	*p* (2-sided)
Pearson Chi-Square	.723	1	.395		
Continuity Correction	.365	1	.546		
Likelihood Ratio	.726	1	.394		
Fisher's Exact Test				.465	.273
Linear-by-Linear Association	.713	1	.399		
N of Valid Cases	70				

Key: *p* = significance; *df* = degrees of freedom; Full sample *N* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Table 35. *Chi-Square Tests of Independence Comparing Gender and Heavy Drinking within PLWHA Who Currently Drink Alcohol*

	Value	*df*	Asymptotic *p* (2-sided)	*p* (2-tailed)	*p* (2-sided)
Pearson Chi-Square	10.789	1	.001**		
Continuity Correction	9.022	1	.003**		
Likelihood Ratio	13.138	1	.000**		
Fisher's Exact Test				.001**	.001**
Linear-by-Linear Association	10.637	1	.001**		
N of Valid Cases	71				

Key: *p* = significance; *df* = degrees of freedom; Full sample *N* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes. ** $p < .01$

Table 36. *Chi-Square Tests of Independence Comparing Gender and Binge Drinking within PLWHA Who Currently Drink Alcohol*

	Value	*df*	Asymptotic *p* (2-sided)	*p* (2-tailed)	*p* (2-sided)
Pearson Chi-Square	5.470	1	.019**		
Continuity Correction	4.188	1	.041**		
Likelihood Ratio	6.177	1	.013**		
Fisher's Exact Test				.021**	.017**
Linear-by-Linear Association	5.402	1	.020**		
N of Valid Cases	80				

Key: *p* = significance; *df* = degrees of freedom; Full sample *N* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes. ** $p < .01$

Table 37. *Chi-Square Tests of Independence Comparing Ethnicity and Alcohol Drinking Days per Week within PLWHA Who Currently Drink Alcohol*

	Value	*df*	Asymptotic *p* (2-sided)	*p* (2-tailed)	*p* (2-sided)
Pearson Chi-Square	1.839	1	.175		
Continuity Correction	1.160	1	.282		
Likelihood Ratio	1.847	1	.174		
Fisher's Exact Test				.264	.141
Linear-by-Linear Association	1.810	1	.179		
N of Valid Cases	63				

Key: *p* = significance; *df* = degrees of freedom; Full sample *N* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Table 38. *Chi-Square Tests of Independence Comparing Ethnicity and Alcoholic Drinks Consumed per Week within PLWHA Who Currently Drink Alcohol*

	Value	*df*	Asymptotic *p* (2-sided)	*p* (2-tailed)	*p* (2-sided)
Pearson Chi-Square	.114	1	.735		
Continuity Correction	.006	1	.940		
Likelihood Ratio	.114	1	.736		
Fisher's Exact Test				.797	.470
Linear-by-Linear Association	.112	1	.738		
N of Valid Cases	59				

Key: *p* = significance; *df* = degrees of freedom; Full sample *N* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Table 39. *Chi-Square Tests of Independence Comparing Ethnicity and Heavy Drinking within PLWHA Who Currently Drink Alcohol*

	Value	*df*	Asymptotic *p* (2-sided)	*p* (2-tailed)	*p* (2-sided)
Pearson Chi-Square	1.116	1	.291		
Continuity Correction	.582	1	.446		
Likelihood Ratio	1.112	1	.292		
Fisher's Exact Test				.382	.223
Linear-by-Linear Association	1.097	1	.295		
N of Valid Cases	60				

Key: *p* = significance; *df* = degrees of freedom; Full sample *N* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Table 40. *Chi-Square Tests of Independence Comparing Ethnicity and Binge Drinking within PLWHA Who Currently Drink Alcohol*

	Value	*df*	Asymptotic *p* (2-sided)	*p* (2-tailed)	*p* (2-sided)
Pearson Chi-Square	.304	1	.581		
Continuity Correction	.062	1	.803		
Likelihood Ratio	.302	1	.583		
Fisher's Exact Test				.764	.399
Linear-by-Linear Association	.300	1	.584		
N of Valid Cases	69				

Key: *p* = significance; *df* = degrees of freedom; Full sample *N* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Table 41. *Chi-Square Tests of Independence Comparing Marital Status and Alcohol Drinking Days per Week within PLWHA Who Currently Drink Alcohol*

	Value	*df*	Asymptotic *p* (2-sided)
Pearson Chi-Square	.085	2	.959
Likelihood Ratio	.084	2	.959
Linear-by-Linear Association	.081	1	.776
N of Valid Cases	73		

Key: *p* = significance; *df* = degrees of freedom; Full sample *N* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Table 42. *Chi-Square Tests of Independence Comparing Marital Status and Alcoholic Drinks Consumed per Week within PLWHA Who Currently Drink Alcohol*

	Value	*df*	Asymptotic *p* (2-sided)
Pearson Chi-Square	2.583	2	.275
Likelihood Ratio	2.631	2	.268
Linear-by-Linear Association	.836	1	.361
N of Valid Cases	69		

Key: *p* = significance; *df* = degrees of freedom; Full sample *N* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Table 43. *Chi-Square Tests of Independence Comparing Marital Status and Heavy Drinking within PLWHA Who Currently Drink Alcohol*

	Value	*df*	Asymptotic *p* (2-sided)
Pearson Chi-Square	.216	2	.898
Likelihood Ratio	.214	2	.899
Linear-by-Linear Association	.162	1	.688
N of Valid Cases	70		

Key: *p* = significance; *df* = degrees of freedom; Full sample *N* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Table 44. *Chi-Square Tests of Independence Comparing Marital Status and Binge Drinking within PLWHA Who Currently Drink Alcohol*

	Value	*df*	Asymptotic *p* (2-sided)
Pearson Chi-Square	.275	2	.872
Likelihood Ratio	.280	2	.870
Linear-by-Linear Association	.107	1	.744
N of Valid Cases	79		

Key: *p* = significance; *df* = degrees of freedom; Full sample *N* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Table 45. *Chi-Square Tests of Independence Comparing Race and Alcohol Drinking Days per Week within PLWHA Who Currently Drink Alcohol*

	Value	*df*	Asymptotic *p* (2-sided)
Pearson Chi-Square	5.876	2	.053
Likelihood Ratio	5.755	2	.056
Linear-by-Linear Association	5.695	1	.017
N of Valid Cases	71		

Key: *p* = significance; *df* = degrees of freedom; Full sample *N* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Table 46. *Chi-Square Tests of Independence Comparing Race and Alcoholic Drinks Consumed per Week within PLWHA Who Currently Drink Alcohol*

	Value	*df*	Asymptotic *p* (2-sided)
Pearson Chi-Square	2.159	2	.340
Likelihood Ratio	2.182	2	.336
Linear-by-Linear Association	1.450	1	.229
N of Valid Cases	67		

Key: *p* = significance; *df* = degrees of freedom; Full sample *N* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Table 47. *Chi-Square Tests of Independence Comparing Race and Heavy Drinking within PLWHA Who Currently Drink Alcohol*

	Value	*df*	Asymptotic *p* (2-sided)
Pearson Chi-Square	4.424	2	.109
Likelihood Ratio	4.302	2	.116
Linear-by-Linear Association	3.639	1	.056
N of Valid Cases	68		

Key: *p* = significance; *df* = degrees of freedom; Full sample *N* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Table 48. *Chi-Square Tests of Independence Comparing Race and Binge Drinking within PLWHA Who Currently Drink Alcohol*

	Value	*df*	Asymptotic *p* (2-sided)
Pearson Chi-Square	2.728	2	.256
Likelihood Ratio	4.488	2	.106
Linear-by-Linear Association	.306	1	.580
N of Valid Cases	77		

Key: *p* = significance; *df* = degrees of freedom; Full sample *N* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Table 49. *Chi-Square Tests of Independence Comparing Sexual Orientation and Alcohol Drinking Days per Week within PLWHA Who Currently Drink Alcohol*

	Value	*df*	Asymptotic *p* (2-sided)
Pearson Chi-Square	2.184	2	.336
Likelihood Ratio	2.157	2	.340
Linear-by-Linear Association	2.113	1	.146
N of Valid Cases	73		

Key: *p* = significance; *df* = degrees of freedom; Full sample *N* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Table 50. *Chi-Square Tests of Independence Comparing Sexual Orientation and Alcoholic Drinks Consumed per Week within PLWHA Who Currently Drink Alcohol*

	Value	*df*	Asymptotic *p* (2-sided)
Pearson Chi-Square	2.515	2	.284
Likelihood Ratio	2.532	2	.282
Linear-by-Linear Association	1.413	1	.120
N of Valid Cases	69		

Key: *p* = significance; *df* = degrees of freedom; Full sample *N* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Table 51. *Chi-Square Tests of Independence Comparing Sexual Orientation and Heavy Drinking within PLWHA Who Currently Drink Alcohol*

	Value	*df*	Asymptotic *p* (2-sided)
Pearson Chi-Square	3.298	2	.192
Likelihood Ratio	3.280	2	.194
Linear-by-Linear Association	2.630	1	.105
N of Valid Cases	70		

Key: *p* = significance; *df* = degrees of freedom; Full sample *N* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Table 52. *Chi-Square Tests of Independence Comparing Sexual Orientation and Binge Drinking within PLWHA Who Currently Drink Alcohol*

	Value	*df*	Asymptotic *p* (2-sided)
Pearson Chi-Square	8.434	2	.015**
Likelihood Ratio	8.186	2	.017**
Linear-by-Linear Association	8.227	1	.004**
N of Valid Cases	79		

Key: *p* = significance; *df* = degrees of freedom; Full sample *N* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes. ** $p < .01$

Table 53. *Chi-Square Tests of Independence Comparing Education and Alcohol Drinking Days per Week within PLWHA Who Currently Drink Alcohol*

	Value	*df*	Asymptotic *p* (2-sided)
Pearson Chi-Square	.133	2	.936
Likelihood Ratio	.133	2	.936
Linear-by-Linear Association	.131	1	.717
N of Valid Cases	74		

Key: *p* = significance; *df* = degrees of freedom; Full sample *N* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Table 54. *Chi-Square Tests of Independence Comparing Education and Alcoholic Drinks Consumed per Week within PLWHA Who Currently Drink Alcohol*

	Value	*df*	Asymptotic *p* (2-sided)
Pearson Chi-Square	8.773	2	.012**
Likelihood Ratio	9.013	2	.011**
Linear-by-Linear Association	8.359	1	.004**
N of Valid Cases	70		

Key: *p* = significance; *df* = degrees of freedom; Full sample *N* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes. ** $p < .01$

Table 55. *Chi-Square Tests of Independence Comparing Education and Heavy Drinking within PLWHA Who Currently Drink Alcohol*

	Value	*df*	Asymptotic *p* (2-sided)
Pearson Chi-Square	.519	2	.771
Likelihood Ratio	.514	2	.773
Linear-by-Linear Association	.459	1	.498
N of Valid Cases	71		

Key: *p* = significance; *df* = degrees of freedom; Full sample *N* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Table 56. *Chi-Square Tests of Independence Comparing Education and Binge Drinking within PLWHA Who Currently Drink Alcohol*

	Value	*df*	Asymptotic *p* (2-sided)
Pearson Chi-Square	5.714	2	.057
Likelihood Ratio	6.054	2	.048*
Linear-by-Linear Association	5.598	1	.018*
N of Valid Cases	80		

Key: *p* = significance; *df* = degrees of freedom; Full sample *N* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes. * $p < .05$

Table 57. *Independent Samples T-Tests Comparing Age and BMI and Alcohol Drinking Days per Week within PLWHA Who Currently Drink Alcohol*

	F	Sig.	*t*	*df*	*p*	Mean Difference	*SE* Difference	95% CI for Odds Ratio	
								Lower	Upper
Age	.435	.512	-.499	72	.619	-1.535	3.075	-7.665	4.595
BMI	.105	.747	.625	68	.534	1.0038	1.6049	-2.1988	4.2063

Key: *F* = F-statistic; *t* = *t*-test; *df* = degrees of freedom*; p* = significance; *SE* = standard error; CI = confidence interval; BMI, Body Mass Index; Full sample *N* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Table 58. *Independent Samples T-Tests Comparing Age and BMI and Alcohol Drinks Consumed per Week within PLWHA Who Currently Drink Alcohol*

	F	Sig.	*t*	*df*	*p*	Mean Difference	*SE* Difference	95% CI for Odds Ratio	
								Lower	Upper
Age	.716	.400	.657	68	.513	1.880	2.861	-3.830	7.589
BMI	.152	.698	.488	64	.627	.7678	1.5732	-2.3751	7.633

Key: *F* = F-statistic; *t* = *t*-test; *df* = degrees of freedom*; p* = significance; *SE* = standard error; CI = confidence interval; BMI, Body Mass Index; Full sample *N* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Table 59. *Independent Samples T-Tests Comparing Age and BMI and Heavy Drinking within PLWHA Who Currently Drink Alcohol*

	F	Sig.	*t*	*df*	*p*	Mean Difference	*SE* Difference	95% CI for Odds Ratio	
								Lower	Upper
Age	1.641	.205	-.216	69	.830	-.702	3.254	-7.194	5.790
BMI	1.958	.167	2.229	65	.029*	3.8412	1.7233	-.3995	7.2829

Key: *F* = F-statistic; *t* = *t*-test; *df* = degrees of freedom*; p* = significance; *SE* = standard error; CI = confidence interval; BMI, Body Mass Index; Full sample *N* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes. * $p < .05$

Table 60. *Independent Samples T-Tests Comparing Age and BMI and Binge Drinking within PLWHA Who Currently Drink Alcohol*

	F	Sig.	*t*	*df*	*p*	Mean Difference	*SE* Difference	95% CI for Odds Ratio	
								Lower	Upper
Age	.000	.988	1.535	78	.129	5.087	3.315	-1.512	11.687
BMI	2.760	.101	2.290	74	.025*	4.0438	1.7657	.5256	7.5621

Key: *F* = F-statistic; *t* = *t*-test; *df* = degrees of freedom*; p* = significance; *SE* = standard error; CI = confidence interval; BMI, Body Mass Index; Full sample *N* = 287, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes. * $p < .05$

Table 61. *Binomial Logistic Regression of Engagement in Heavy Drinking based on IHAS, within the Current Drinking Group (n = 67)*

	B	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
IHAS[a]	-.191	.152	1.572	1	.210	.826	.613	1.114
BMI[b]	-.134	.064	4.376	1	.036*	.875	.772	.992
Constant	2.995	1.750	2.929	1	.087	19.992		

Key: *B* = B coefficient; SE = standard error; Wald = Wald test; *df* = degrees of freedom; *p* = significance; CI = confidence interval; IHAS, internalized HIV/AIDS stigma; Full current drinking sample *n* = 88, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes. **p* < .05

[a]IHAS was measured as a continuous variable using the Internalized AIDS-Related Stigma Scale (Kalichman et al., 2009); scores range from 0-6, with higher scores reflecting higher IHAS.

[b]BMI (Body Mass Index) was calculated using self-reported weight (in pounds) and height (in inches) as follows: ([weight/height]/height) x 703.

Table 62. *Binomial Logistic Regression of Engagement in Binge Drinking based on IHAS, within the Current Drinking Group (n = 75)*

	B	SE	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
IHAS[a]	-.076	.168	.207	1	.649	.927	.667	1.287
BMI[b]	-.133	.073	3.368	1	.066	.875	.759	1.009
Combined Other Sexual Orientation[c]	.694	.817	.722	1	.395	2.002	.404	9.922
Heterosexual[c]	-1.592	.823	3.743	1	.053	.203	.041	1.021
Constant	2.773	1.931	2.062	1	.151	16.011		

Key: *B* = B coefficient; SE = standard error; Wald = Wald test; *df* = degrees of freedom; *p* = significance; CI = confidence interval; IHAS, internalized HIV/AIDS stigma; Full current drinking sample *n* = 88, Specific numbers for each variable lists the final analytic sample for that variable after listwise deletion for missing data.

Notes.

[a]IHAS was measured as a continuous variable using the Internalized AIDS-Related Stigma Scale (Kalichman et al., 2009); scores range from 0-6, with higher scores reflecting higher IHAS.

[b]BMI (Body Mass Index) was calculated using self-reported weight (in pounds) and height (in inches) as follows: ([weight/height]/height) x 703.

[c]Homosexual participants were the reference group, and Combined Other (i.e., Bisexual, Other) participants and heterosexual participants were the indicator groups for the sexual orientation variable.

FIGURES

Figure 1. *Internalized HIV/AIDS Stigma and Associated Variables.*

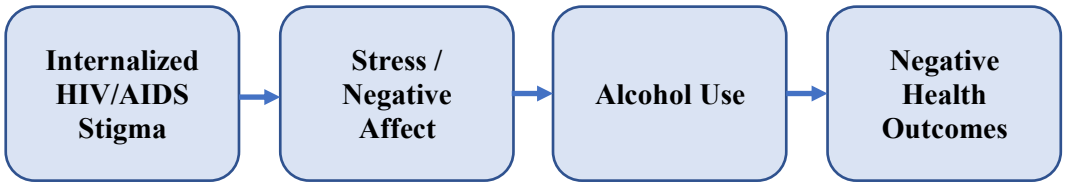
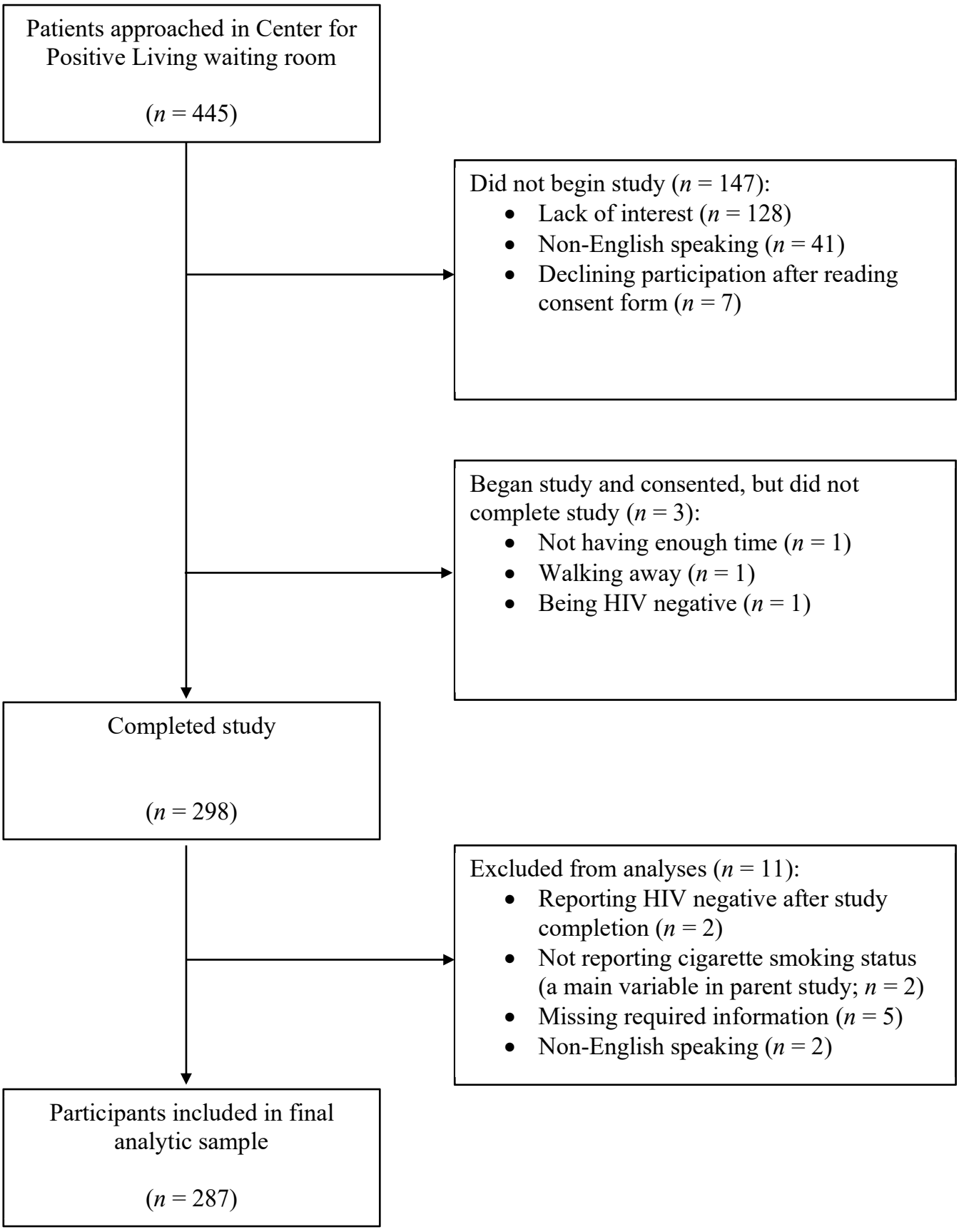
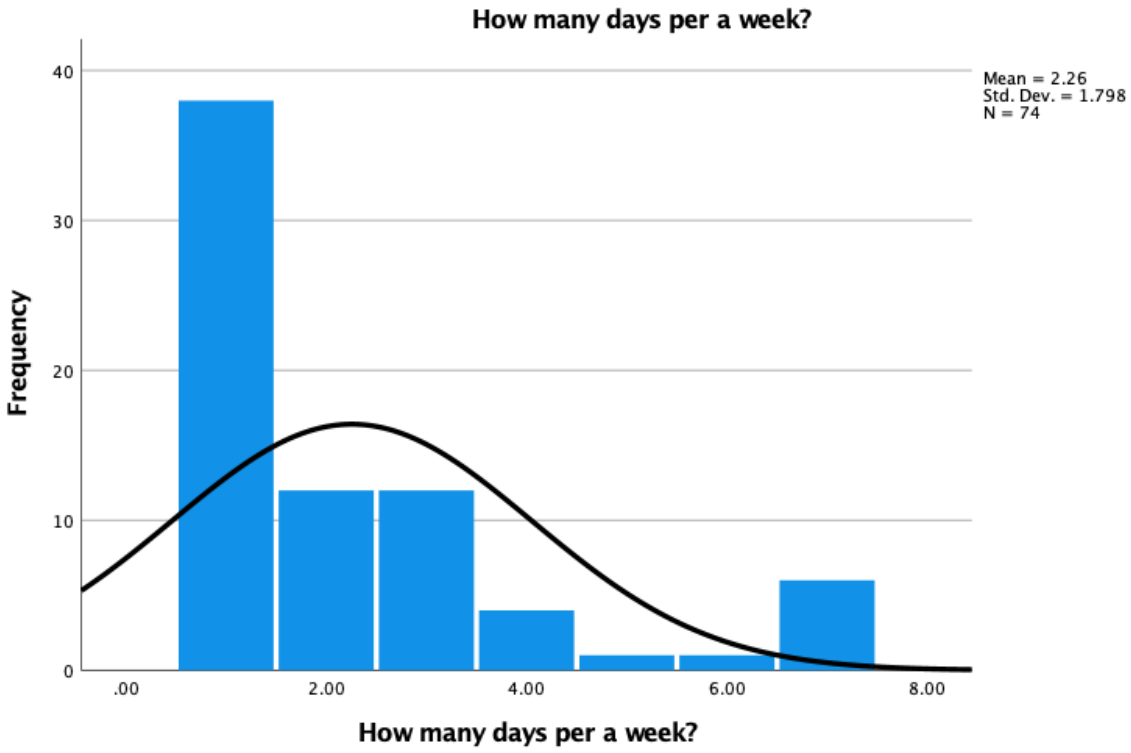


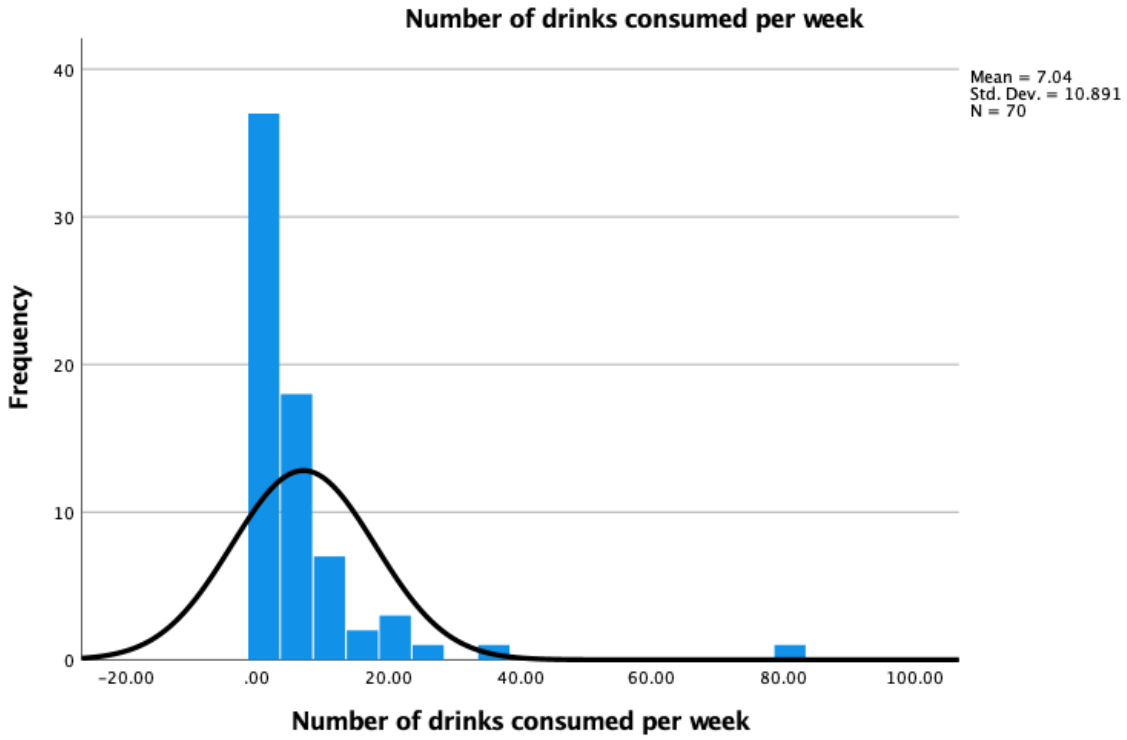
Figure 2. *Flow Diagram of Recruitment Process*



Supplemental Figure 1. *Frequency Histogram of Number of Drinking Days per Week with Normal Curve within the Current Drinking Group (n = 74)*



Supplemental Figure 2. *Frequency Histogram of Number of Alcoholic Drinks Consumed per Week with Normal Curve within the Current Drinking Group (n = 70)*



Supplemental Figure 3. *Frequency Histogram of Internalized HIV/AIDS Stigma within the Full Sample (N = 283)*