Resilience as a Buffer Against Negative Health Sequelae in Older Gay Men Living with

HIV/AIDS: Implications for Research and Practice

By

Kristen Dionne Krause, MPH

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ABSTRACT OF THE DISSERTATION

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Dissertation Director:
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Due to the advancement of biomedical interventions, people living with HIV/AIDS (PLWHA) are living longer. The Centers for Disease Control and Prevention projects that by 2025, older PLWHA over age 50 will make up more than half of the epidemic, with gay, bisexual, and other men who have sex with men remaining the most disproportionally affected. As PLWHA continue to age, they are at increased risk for experiencing neurocognitive, mental health, or psychosocial challenges that impact their overall health and well-being. Limited studies have examined whether resilience, the ability to bounce back or overcome challenging situations, can help to lessen the effect of these challenges. This dissertation has three specific aims: (1) to assess the factor structure and psychometric properties of a newly developed tool examining HIV-related resilience, (2) evaluate mental health and sociodemographic correlates of HIV-related resilience, and (3) examine the self-reported neurocognitive correlates of HIV-related resilience. 250 older gay men age 50-69 living with HIV/AIDS in the New York City area were part of this study. After validating the HIV-related resilience screener, results from the subsequent analyses indicate that higher levels of HIV-related resilience are

associated with better mental and neurocognitive health outcomes. Further research is

necessary to gain a better understanding on the role that resilience has on the holistic

healthcare and health of older gay men living with HIV/AIDS, especially neurocognitive

functioning and mental health outcomes. Shifting towards a strengths-based perspective

is a critical next step for researchers, practitioners, and clinicians alike.

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CHAPTER I: RESEARCH OBJECTIVES AND BACKGROUND INFORMATION

There is a growing body of literature suggesting resilience can be a buffer against biopsychosocial health problems, particularly among people living with HIV/AIDS (PLWHA). Past research on resilience with PLWHA has used a mix of qualitative and quantitative methods to assess its relationship between different health states. However, efforts to measure resilience as it pertains to the nuances of living with HIV/AIDS have been limited, particularly among sexual minority men (SMM).

This program of research sought to address these gaps in the extant literature regarding resilience among older gay men living with HIV/AIDS. Specifically, this work utilized cross-sectional data to: (1) assess the factor structure and psychometric properties of a tool utilized to assess HIV-related resilience, (2) assess the association of HIV-related resilience with mental health (i.e. depression, anxiety, PTSD, substance dependence, and suicidality) and demographic characteristics, and (3) examine the associations of HIV-related resilience with self-reported neurocognitive health outcomes in sample of older (age 50-69) HIV-positive gay men living in the New York City Metropolitan area.

In this chapter, the relevant literature regarding HIV/AIDS and resilience among older gay men, as well as other populations will be discussed. Next, the limitations of the existing body of knowledge will be explained which will provide a rationale for the current program of research. Then, the relevant theoretical framework guiding this research will be explained. Subsequently, a description of the data and analyses detailed

in Chapters 2-4 will be provided. Finally, relevant strengths and limitations of this program of research will be highlighted.

Problem Statement and Contribution

By 2025, people age 50 and older will constitute the majority of those living with HIV/AIDS in the United States.[1] Older PLWHA face myriad social, physical, and mental health stressors not only related to living with HIV/AIDS, but also the aging process in general and the long-term impact of being on antiretroviral treatment.[2] To date, few studies have examined resilience among HIV-positive gay, bisexual, and other MSM,[3-10] and even fewer have looked at resilience specifically among HIV-positive gay men.[11-13] Examining if and how resilience may act as a buffer against these stressors may lead to the development of strength based approaches to clinical services which can have a substantial impact on the quality of life for older gay PLWHA. Too often, deficit-based models have dominated our approaches.[14]

Background

HIV/AIDS in the United States

Since its initial detection in 1981, the HIV/AIDS epidemic has evolved throughout the last four decades.[15] What was originally referred to as gay-related immune deficiency (GRID)[16] because it had predominately affected gay men upon discovery, now knows no bounds with regard to its impact. The term men who have sex with men (MSM) has been used in HIV literature since the early 1990's and the acronym was coined in 1994 by the CDC.[17] The argument for its initial use was driven by two perspectives—(1) epidemiologists sought to avoid complex social and cultural

connotations by using identity-free terms that have little to do with an epidemiological investigation of disease based on a biomedical lens, and (2) social construction posits that sexualities are products of social processes and that a more textured understanding of sexuality does not assume alignments among identity, desire, and behavior.[17] Using an umbrella term like MSM often implies a lack of gay identity with an absence of community and networks in which same-gender relationships mean something more than just sexual behavior.[17] Inherently, being gay is different than being bisexual—while the sexual behavior may be the same, the feelings and salience can be quite distinct.

The Centers for Disease Control and Prevention (CDC) estimates that nearly 1.1 million people are living with HIV/AIDS in the United States[18] and UNAIDS estimates close to 37 million people living with HIV/AIDS in the world.[19] While the epidemic still disproportionally affects gay and bisexual men in the United States, injection drug users and heterosexual women accounted for almost one-third of new HIV diagnoses in 2017.[18] Among the entire U.S. population, young African American/Black MSM (most of whom now identify as gay)[20] now face the most severe burden of HIV-infection in the United States.[21]

While the aforementioned numbers are high, UNAIDS reports that there has been a 51% decrease in AIDS-related deaths and a 47% decrease in new HIV infections since the introduction and implementation of antiretroviral therapy (ART, formally known as HAART) in 1996.[19] Among African Americans, new HIV diagnoses in the United States decreased by 5% from 2012 to 2016 while rates among Hispanics remained stable.[22] Overall, HIV diagnoses are not evenly distributed across the United States with the South accounting for 52% of all new HIV diagnoses in 2017 followed by the West (19%), the

Northeast (16%), and the Midwest (13%).[22] Even though the most recent statistics

indicate that 38.1% of Americans live in the South,[23] the disproportionate burden of HIV

in this region is driven by high levels of poverty and income inequality,[24] in addition to

cultural factors such as transphobia, homophobia, general discomfort discussing

sexuality, and negative attitudes associated with HIV, all of which can limit willingness

to seek testing and prevention services.[25]

Despite the increasing number of new diagnoses in the southern United States, to-

date much of the focus of the epidemic has been centered on larger urban centers

including San Francisco, CA, Washington D.C., Los Angeles, CA, and New York, NY.

San Francisco, CA has one of the largest populations of people living with HIV/AIDS

(PLWHA) in the United States, with gay and bisexual men representing 74% of new

cases, annually.[26] As of 2017, 65% of PLWHA in San Francisco were over 50 years old

compared to only 38% in 2003 which demonstrates the drastic shift in the long-term

landscape of the epidemic.[26] Comparatively, data from Washington D.C. demonstrated

similar trends in the aging shift of the epidemic—in 2015, residents who were aged 50-59

had the highest burden of HIV at 5.3% and residents aged 40-49 followed closely behind

with a 4.2% burden of HIV.[27] New York City has one of the most comprehensive annual

epidemiological HIV surveillance reports in the U.S. Between 2001 and 2017, trends

show a decrease in new HIV diagnoses across most gender, race/ethnicity, and sexual

transmission groups except for transgender people, Asian/Pacific Islanders, and

transgender people with sexual contact.[28] At the end of 2017, more than half (48,000) of

all PLWHA in New York City (NYC) were over 50 years old,[29] and 78% had reached

viral suppression compared to 65% of the 8,300 youth ages 13-29 living with HIV.[30]

In recent years, several states (including New York, California, New Jersey, Illinois, Colorado, Arizona among others) have launched 'Ending the HIV Epidemic' initiatives while several others (including Nevada, Louisiana, Alabama, and the Carolinas) have initiatives in development.[31] In February 2019, the federal government initiated a similar strategy.[22] The federal initiative is built upon four key elements including: (1) diagnosing all individuals with HIV as early as possible after seroconversion, (2) treating HIV rapidly and effectively after diagnoses to attain sustained viral suppression, (3) protecting individuals at risk for HIV using demonstrated prevention approaches, and (4) responding rapidly to detect and respond to growing HIV clusters to prevent new infections.[22] Federal funding will specifically target geographic hotspots through existing programs (e.g. Ryan White HIV/AIDS Program and other federally qualified health centers (FHQCs)), utilize data to identify where HIV is spreading the most rapidly, and provide funding for the creation of a local HIV HealthForce in targeted areas.[32] The proposed HealthForce will be a boots-on-the-ground workforce comprised of culturally and regionally competent public health professionals who will aid in HIV elimination efforts in HIV hot spots.[33]

While this plan is important and a necessary step in the right direction, the drastic paradigm shift to 'ending the epidemic' may leave those who have been living with HIV/AIDS behind. In order to actually end the epidemic, it is vital these initiatives also support PLWHA.[34] Moreover, with projections indicating that by 2020, 65%-70% of PLWHA will be age 50 and older, there is a crucial need to identify mechanisms to support this population to ensure that they not only continue to survive, but also thrive.

HIV/AIDS and Sexual Minority Men

Historically, sexual minority men (SMM), another term used to describe those whose sexual orientation does not adhere to the norms of society, have been disproportionately impacted by the HIV/AIDS epidemic. That trend continues today, although the Centers for Disease Control and Prevention (CDC) renamed the disease from GRID to AIDS in 1983 after evidence emerged that AIDS was impacting other populations including persons with hemophilia, heterosexual Haitians, and PWID.[35,36] By the end of 1983, 71% of all AIDS cases were among MSM and 42% were concentrated in NYC and 12% were concentrated in San Francisco.[37] The early days of the epidemic were fueled by the harsh realities of stigma and discrimination against gay men with some religious leaders publicly calling AIDS 'God's punishment.'[35] Many gay men with AIDS were faced with unemployment, rising medical costs, and unstable living situations due to being evicted.[35] Fear and lack of understanding around transmission mechanisms caused some medical professionals to refuse to provide treatment to PLWHA.[35]

As people continued to die, members of the LGBT community (gay men and lesbian women in particular) realized it was up to them to act or nobody else would. Community- and activist-based organizations like Gay Men's Health Crisis (GMHC),[38] the San Francisco AIDS Foundation,[39] and ACT UP (AIDS Coalition to Unleash Power)[40] emerged to help manage, coordinate, and demand the local and national response to the growing HIV/AIDS epidemic. The early organized response to the epidemic often relied on individuals who knew someone with AIDS while focusing on piecing together networks of support and care.[35] When human trials of azidothymidine (AZT) demonstrated clinical improvements in patients who were receiving the drug over

the placebo, the U.S. Food and Drug Administration (FDA) approved it as the first drug

to treat HIV/AIDS.[35] Shortly after AZT's approval, ACT UP gained momentum and held

its first action on Wall Street to protest the profiteering of pharmaceutical companies on

AIDS drugs.[41] The following year they seized control of the FDA in 1988 to demand a

faster drug approval policy which went into effect soon thereafter.[40] Almost all of the

activism, advocacy, and lobbying in the early days of the AIDS epidemic was led by the

members of the LGBT community.[35]

   Since the onset of the epidemic, a vast body of research has examined the impact

of HIV/AIDS on SMM. From risk behaviors around HIV-acquisition,[42,43] violence,[44,45]

and testing behaviors,[46] researchers have developed a robust knowledge base throughout

the past four decades. For example, a review on HIV testing among MSM found that

stigma from other MSM and society as a whole is a barrier to testing which continues to

fuel the epidemic.[46] Another review examined HIV-related stigma (e.g. the negative

beliefs and attitudes about people living with HIV) and discrimination (e.g. the behavior

of treating people living with HIV differently than those who are not- it results from

stigmatizing attitudes or beliefs).[47] The review highlighted that widespread stigma and

discrimination related to HIV has been associated with risk-taking behaviors (e.g.

unprotected anal intercourse[48,49] and illicit substance use[50]) in both HIV-positive and

HIV-negative MSM.[51] While the increase in research and attention around MSM and

HIV has been formative in helping to reduce the number of new infections since 2008,[52]

some sub-communities are not seeing the same progress. Significant racial disparities

exist between Black[53] and Hispanic[54] MSM compared to their White counterparts. The

most recent statistics from the CDC demonstrate that 38% of newly diagnosed MSM in

the United States were Black/African American and 29% were Hispanic/Latino compared to 29% White.[55] Considerably more work needs to be done in order to address these racial and geographic inequities of HIV.

HIV/AIDS and Aging

Overview

The increased accessibility and widespread use of ART has significantly improved survival rates of those living with HIV/AIDS[56] and the CDC estimates that nearly half of the 1.1 million Americans living with HIV/AIDS are over the age of 50.[1] In 2016, people over 50 accounted for 17% of new HIV diagnoses with black/African Americans accounting for 42% of those new diagnoses.[1] Now that those infected with HIV/AIDS are living longer than before, there are many facets of their health, specifically as it pertains to aging that are under-researched.

There is a robust body of literature outlining the medical, physiological, and mental health outcomes associated with HIV/AIDS among HIV-positive adults over the age of 50.[57,58] The loss of proper immune functioning and the biological process of aging itself, coupled with the long term immune activation due to a variety of factors, including ART-toxicity,[59] substantially increases the risk of HIV-Associated Non-AIDS (HANA) conditions,[60] non-AIDS-defining cancers (NADCs),[61] and HIV-associated neurocognitive disorders (HAND).[62] As the population of PLWHA continues to age, they are at higher risk for comorbidities than their HIV-negative and younger HIV-positive counterparts with more than 80% of HIV-positive people over 50 having at least one comorbidity and more than 40% having two or more comorbidities, resulting in multi-morbidities.[63] Compared to HIV-negative individuals, PLWHA are more likely to experience

accentuated aging[64] and have greater disparities in clinical outcomes with advancing age, such as risk of anal, lung, and liver cancers.[65] One limitation to the program of research on comorbidities among PLWHA is the variance in definitions, inclusion criteria, and measurement across studies.

It is important to highlight the potential cohort differences among those who were diagnosed with HIV/AIDS prior to and after the implementation of antiretroviral treatment (ART, formally known as HAART) in 1996. Those who seroconverted prior to 1996 (pre-ART) came of age during the height of the HIV/AIDS epidemic and likely experienced myriad psychosocial burdens associated with the uncertainty about whether or not they would be the next of their social circle to die. Subsequently, many people of that cohort were confused as they continued living while they witnessed the deaths of many others living with HIV/AIDS.[66] Those living longer with HIV have been found to have a higher prevalence of co-morbidities and multimorbidities as well as poorer survival projections and immunological response than those who have been diagnosed more recently (post-ART).[67,68] Findings from an Italian study indicate that people with a longer duration of HIV-infection show a higher probability of multimorbidity than those who seroconverted later in life.[67] Understanding the nuanced differences between those pre-ART and post-ART individuals can be critically important when developing interventions, policies, and programs that help support PLWHA.

Mental and Psychosocial Health

In addition to the physiological co-morbidities that people living with HIV/AIDS (PLWHA) must overcome, they also face many potential psychological and social challenges. Testing positive for HIV/AIDS can yield different emotions including shock,

anger, and hopelessness.[69] Additionally, anxiety[70] and depression[71,72] are critical mental health co-morbidities facing PLWHA. A representative sample of 2,864 adults seeking HIV-treatment found that 36% of the patients received a depression diagnosis and 16% were diagnosed with anxiety disorder.[73] Findings from a 2-year longitudinal study of anxiety syndromes and symptoms among gay men living with HIV/AIDS indicate a positive relationship between HIV symptoms (e.g. unexplained fever or night sweats), fatigue, and anxiety.[74]

Research among older adults suggests while Major Depressive Disorder (MDD) is less common in later life, it is more chronic among older adults than younger adults.[75] There have been substantial advances in understanding the link between depression and many age-related physical health outcomes (e.g. inflammatory or immune, cardiovascular, and endocrine).[76-78] Evidence strongly refutes the belief that depression experienced in older adulthood is primarily due to psychological reasons but rather supports that this population may experience depression as a result of an interaction between psychological vulnerability and stressful life events.[75] More specifically, among older PLWHA causal evidence between depression and negative health outcomes is limited. Gonzalez and colleagues[72] suggest it is highly plausible that depressive symptoms including feelings of worthlessness, diminished concentration and overall loss of interest can be disruptive to the self-management of activities related to treatment adherence.

Behavioral challenges such as substance use[79] and sexual risk taking[80] may hinder efforts to maintain a healthy lifestyle and/or to make effective treatment decisions around medication adherence. For example, heavy drug or alcohol use can impair judgement

causing someone to skip one or more doses of ART. One participant in a qualitative study examining barriers and facilitators to ART adherence explained, "when I was getting loaded, that's the only thing. I didn't take them [HIV medications]...I skipped a lot of dosages, if not days, I would skip dosages."[81] Additionally, studies have documented a relationship between substance use and sexual risk taking behaviors including unprotected anal insertive intercourse and multiple casual sexual partners.[82,83]

There is also a growing literature examining the association between both post-traumatic stress disorder (PTSD)[84-86] and suicidality[87] among PLWHA. While the prevalence estimates of co-morbid PTSD and HIV/AIDS are hard to ascertain, results from a meta-analysis suggest that the rate of recent PTSD among HIV-positive women is 30.0% (CI = 18.8 - 42.7%) which is five times the estimates of the general population.[88] Other U.S. estimates suggest the rate is between 10% and 74%[89,90] which is a fairly wide range indicating more work needs to be done in this area. Of particular importance is the finding that avoidance of trauma reminders or re-traumatization may hinder ART adherence.[85,91]

Social obstacles facing PLWHA include stigmatizing attitudes surrounding the HIV/AIDS epidemic,[92] fear of workplace discrimination,[93] and risk of social isolation.[94] Turan and colleagues found that those with greater acts of HIV-related social support predicted better HIV treatment self-efficacy.[95] Comparably, in a study looking at psychosocial factors associated with successful transition into HIV-related primary care, researchers found those PLWHA who attended a social support group were significantly more likely to attend an initial case management appointment within six weeks of referral (adjusted OR 1.91 95% CI 1.22–2.97 and OR 1.24 95% CI 1.01–1.54, respectively).[96]

Ensuring PLWHA have access to mental and social health services is vital in experiencing positive health outcomes.

Neurocognitive Health

A well demonstrated body of literature has focused on neurocognitive outcomes among older PLWHA.[62,80,97-99] The extant research provides evidence indicating that older age and HIV independently increase the risk of neurocognitive impairment, particularly in the memory,[100] executive functioning,[101] and processing speed.[102,103] Despite the effectiveness of ART, 30- 50% of adults with HIV perform in the impaired range on neurocognitive batteries.[99,104,105] Halkitis and colleagues found differences in the threshold for impairment varied by domain in that 19% of their sample met the criteria for impairment on processing speed and 12% met the threshold for impairment on executive functioning.[99] Additionally, many PLWHA with neurocognitive challenges are more likely to have a history of substance use.[106]

Among PLWHA, neurocognitive impairments may lead to reduced daily functioning[107,108] and medication adherence[109,110] while also increasing sexual risk taking.[80,111] Other possible factors that could create a synergistic interaction that put older HIV-positive gay men at great risk for cognitive decline including HIV-related dementia,[112] cardio- or cerebrovascular disease,[42,113] and other chronic conditions.[114] For example, Yu and colleagues found significant associations between impaired processing speed and executive functioning with biomarkers of physical health including anemia and chronic kidney disease indicating poor physiologic reserve.[114] Understanding these nuanced relationships and associations will help researchers target interventions more effectively.

While much of the literature is focused on the biopsychosocial and neurocognitive deficits that people living with HIV/AIDS face, there is an important burgeoning body of work focused on coping mechanisms and resilience in this population.[115] Resilience has been suggested as one of many constructs including hardiness, grit, and coping that protect and reduce vulnerability to negative outcomes.[116] Understanding the manifestation of resilience in PLWHA will help inform interventions and policies and help to not only reduce negative influences but also to capitalize on specific resources within a community and/or population.[117] With the potential to add substantial knowledge of applied research methods in the social sciences, it is imperative that studies of resilience are theoretically and methodologically sound.[118] To this end, it is important to understand the theoretical underpinnings of resilience while distinguishing it from other commonly used terms (e.g. coping, adaptive behaviors, mental toughness, invulnerability and stress resistance)[119,120] and how this construct has been applied to HIV/AIDS research to date.

Resilience: Background, Theoretical Underpinnings, and Measurement

As defined by the American Psychological Association (APA), resilience is "the process of adapting well in the face of adversity, trauma, tragedy, threats or significant sources of stress."[121] Other definitions include, "the personal qualities that enables one to thrive in the face of adversity,"[122] and "the capacity of individuals to cope successfully with significant change, adversity, or risk."[123] Because the study of resilience is considered to be an emerging field there is not a consistent definition and/or conceptualization of how resilience is operationalized.[118,124-127] Initially, most resilience-based research occurred within the fields of community and developmental psychology

using a positive, intermediate or negative rating. Positive ratings were given if the study

was adequately designed, executed, and analyzed while also having an appropriate

sample size. Intermediate ratings were given if the published information about the study

was inadequate with regard to design, methods, analyses, and sample size. Negative

ratings were based on unsatisfactory results despite adequate design, execution, analyses,

and sample size.[153]

After further examination, they reported all 15 measures included in their analysis

were missing key psychometric information and while the CD-RISC (Connor-Davidson

Resilience Scale),[122] the RSA (Resilience Scale for Adults),[154] and the Brief Resilience

Scale[155] received the highest ratings, they were only considered moderately acceptable

ways of measuring resilience according to their rating criteria. All of the studies they

examined were lacking in some aspect related to the psychometric properties of the

measure such as responsiveness or reproducibility which was one of the most significant

limitations to their analysis.[153] While the authors do note that the lack of psychometric

data for some of the scales does not mean they are necessarily poor in design, they

encourage researchers to report as much information as possible so that their quality can

be ascertained appropriately.[153] Another critique of the available scales is that very few

examined resilience across multiple levels (e.g. environmental, familial, or individual)

given that adapting to change is considered a dynamic process.[153,156] These reviews

highlight the need for more innovative measures that may be tailored for specific health

outcomes and further psychometric testing in diverse populations.

Moving past an individualistic method of measuring resilience, Lyons and

colleagues have developed a new measure (Fletcher-Lyons Collective Resilience Scale

(FLCRS)) that examines resilience within communities.[157] They designed the scale while drawing on the idea that collective resilience is a group's ability through a high level of adaptability and agency to withstand or recover quickly from challenging events.[157] Examples of this idea include communities overcoming natural disasters, political parties adapting to changes and/or shifts in public support, families overcoming financial hardship, or friendships withstanding stressful diasgreements.[157]

With an absolute scale range of 5-35, the first testing of the final five-item FLCRS had a mean score of 27.1 (SD = 4.3) and also demonstrated high levels of internal consistency with a Cronbach's alpha of $\alpha = 0.83$.[157] After the scale was administered, one-way ANOVAs were conducted and indicated similar scores across demographic variables except gender where there were significant ($p = 0.04$) differences between women and men with women ($M = 27.4$) scoring slightly higher than men ($M = 26.3$).[157] Furthermore, the FLCRS significantly predicted all mental health and well-being measures with scores on the FLCRS indicating lower psychological distress.[157] While it has not been widely tested, the goal is to identify ways in which people are resilient based on their community affiliations in order to potentially intervene at the policy and public health management levels.

In addition to quantitative methods, measuring resilience through qualitative methods is an alternative way to gain in-depth knowledge on how individuals perceive resilience within themselves. Resilience and vulnerability were examined in a 2013 study conducted by De Santis et al. through interviewing 15 adults living with HIV.[158] Sample interview questions included: *Based on your life experience, how would you describe the relationship of vulnerability and resilience for people with HIV infection?* and *For people*

with HIV infection, when does vulnerability occur? when does resilience occur?[158] Three themes emerged to explain the relationship between resilience and vulnerability in the context of HIV-infection: vacillation, dichotomy, and simultaneity. There was a common perception that vulnerability and resilience can simultaneously occur in PLWHA. One participant noted:

> You are either doing or not doing good. You are either vulnerable or resilient. Yes, you got to be this or that. Depression is isolating and stuff like that makes you vulnerable and makes you sick. People need to have more knowledge of how this affects their life. It's not just what is going on in your body, but your mind too. It's a domino effect. Everything affects a person who has HIV and AIDS. I take care of myself on a daily basis, which is something I never did before. This is what makes me resilient: talking about things that affect you and expressing yourself, getting together with a bunch of people like you helps.[158]

While the study by De Santis and colleagues is a necessary starting point, more work needs to be done to ascertain what resilience means and how it is exhibited in PLWHA.

Older Adults and Resilience

Many studies of resilience have historically focused on at-risk children, adolescents, and veterans who may have prolonged exposure to trauma or other chronic stressors.[159] More recently, a growing body of research has emerged examining resilience among older adults and its role in the successful aging process.[160] While successful aging can have several components, it has been defined as freedom from disability and chronic disease as well as high mental and physical functioning.[161] Being resilient later in life has been associated with reduced levels of depression[161,162] and risk of mortality[163] as well as increased quality of life[164] and improved lifestyle behaviors.[160,165]

In a sample of older adults suffering from chronic disease, Hassani and colleagues[166] found that improvements in resilience were associated with a patient-centered approach after disease diagnosis. More specifically, their participants described personal experiences of resilience as an art of overcoming pain and suffering while adapting to life with chronic diseases and the process of overall senescence.[166] Similar sentiments were highlighted by Tkatch et al.[167] wherein participants discussed bouncing back from difficulties, losses, and challenges. Many also described illness as something they just had to deal with while also not letting it define them.[167]

Other research indicates there are opportunities to help older adults improve resilience later in life.[168] Interventions to strengthen resilience focus on improving self-efficacy, self-esteem, positive relationships, and learning to keep things in perspective.[169] The APA Resilience Toolkit[170] recommends a public health approach to building resilience that involves maintaining strong relationships, becoming active in the community, maintaining hopefulness, and thinking positively—all of which can be done both at the community and individual levels.[160]

LGBTQ Adults and Resilience

It is well documented that LGBTQ individuals have faced lifelong stigma,[171,172] discrimination,[173,174] and other experiences that led to adverse psychosocial outcomes.[175] While these experiences may have been painful to endure, it is important to acknowledge they do not always result in ongoing suffering or pathology.[176] Frequently, older adults have developed a great deal of resistance to and resilience around the negative experiences associated with identifying as LGBTQ,[172] which has led to an emerging body

of research focusing on resilience in this population that is predominantly focused on adolescents/emerging adults[177,178] and older adults.[179-184]

Several studies of older LGBTQ adults have found high degrees of involvement with the LGBTQ community and robust social networks among the population.[183-185] In a study on older LGBTQ adults led by Brennan-Ing and colleagues, they found that 77% of the Chicago-based sample reported having a functional friend with an average of 4.1 friends and 10.6 individuals (friends, family, acquaintances, etc.) in their social networks.[173] Women have significantly larger networks than men which was attributed to their greater likelihood of having children and grandchildren compared to men[173] in addition to having larger friendship groups, which in turn provide numerous advantages to their overall health and well-being.[186]

It would be remiss not to mention that in light of the overwhelming political and social discrimination many LGBTQ older adults faced throughout their lives, members from this generation were very active in fighting for equality and rights of the modern LGBTQ movement.[187,188] Through this activism, they built strategies to endure and overcome the many obstacles they faced—they built resilience. This idea is supported by a study on transgender adults in that many reported using social activism as a resilience strategy.[189] One participant explained:

> A lot of my activism work since I've become an activist has
> definitely contributed to my resilience because you know that you
> can work on something and work on something and put your heart
> and soul into it and then it just doesn't work, it up and dies on you.
> And, you know, there's all these good things and there's all these
> bad things that happen. Being an activist is like being on a roller
> coaster at Six Flags. There's this major ups and major downs,
> emotional highs and emotional lows that is just beyond what normal
> life is about because you're seeing things happen that are not just

important to you, but important to other people that are your friends
and people that you don't even know.[189]

This quote embodies resilience because it highlights the need to keep moving forward despite negative experiences, especially because others can be impacted in ways unbeknownst to an activist. When members from ACT UP took over the FDA office in 1988,[41] they were fighting for faster drug approvals and more equitable access not just for themselves and their immediate community members but for all people impacted by HIV/AIDS.

HIV/AIDS and Resilience

The burgeoning literature on resilience and HIV/AIDS has begun to delineate qualities indicative of resilience that define it as a trait, outcome, or process including: self-acceptance, optimism, will to live, generativity, self-management, relational living, and independence.[190] For many older HIV-positive individuals, resilience helps them overcome life challenges including but not limited to the realities of aging with disease, ageism,[191] HIV-related stigma,[192] and for numerous members of the population, discrimination due to socioeconomic status or social class,[193] racism,[194] and sexual stigma coupled with homophobia.[195] Siegel et al. conducted semi-structured interviews with older HIV-infected adults to identify their perceived advantages and disadvantages around living with HIV/AIDS.[196] While the participants outlined several disadvantages ranging from having more frail bodies to feeling more socially isolated, they also felt like they were advantageous because they had more wisdom, they were less psychologically threatened by disability and fatigue, and that they could focus more on their own needs.[196] The maturity these participants possessed enabled them to temper their response

in order to overcome negative or uncontrollable situations within the face of their diagnosis.[196] While these perceived advantages could be understood as resilience, these factors are often not included in available measures of resilience.

Within the specific context of HIV-infection, De Santis and colleagues define resilience as "the process by which an individual accesses internal motivation (e.g. desire to survive) and external motivation (e.g. psychosocial support) that provide a basis for him or her to learn or manage the physical and psychological aspects of HIV infection."[197] Once individuals living with HIV/AIDS can manage the biopsychosocial aspects of the infection, a sense of mastery starts to develop from achieving positive health outcomes and advocacy, and thus the end result is resilience.[197]

It is important to understand whether those who are resilient react to challenges through invoking processes which may mitigate the impact of adverse life circumstances on their health.[198] Masten and Schmidtberger posit that resilience in the wake of multiple losses from the AIDS epidemic involves living in a way that does not deny the loss felt in addition to not feeling over-consumed by grief.[199,200] Within the context of HIV/AIDS, becoming resilient in the face of loss and grief is a significant aspect of adapting to the changing course of the epidemic,[199] especially as more people infected continue to age successfully. Furthermore, Garcia-Dia and colleagues suggest that PLWHA are resilient because becoming aware of their diagnosis can be considered a traumatic event and thus coming to terms with their own mortality and potential fatality requires dynamic adaptation.[201] Among those living with HIV/AIDS, being resilient can be viewed as the ability to be adherent with ART, reaching out and supporting others who are infected, and consciously avoiding risky behaviors (e.g. protecting sexual partners from HIV-exposure

or acquiring sexually transmitted infections (STIs).[201] Based on the increasing body of work around HIV/AIDS and resilience, it is important to examine the current state of the literature in order to delineate how resilience is manifested in PLWHA and whether scholars are contextualizing their definition of resilience as a trait, process, outcome, and/or a combination of the three.

Resilience in Older Adults Living with HIV/AIDS

Across many health indicators, the CDC categorizes individuals 65 and older as 'older adults' however, 50 has historically been the demarcation point for being an 'older PLWHA' by the CDC[1] and other scholars studying HIV and aging.[190,202-204] While limited in scope, themes of resilience have been delineated in some of the literature on older adults living with HIV/AIDS. Optimism (thinking positively) and the will to live were two themes outlined in Emlet and colleagues' work on older PLWHA.[190] One participant in that study recalled, "it's [HIV] not really a big thing to me. I mean, I take my medicine, I go on with my life. I don't think about the AIDS anymore."[190] Improvements in treatment options also gave participants a positive outlook: "I've noticed that the medications have improved so much that I'm not so stressful as far as being ill or dying from it as I used to be."[190] Other participants explained that life is worth living and that they wanted to live as long as possible.[190] Similar sentiments were echoed in a different study on older HIV-positive MSM living in Quebec in that most respondents reported an appreciation for life, a positive attitude, and feeling lucky despite their HIV-diagnosis.[9] As PLWHA continue to age, it is imperative to build upon the exiting work on resilience in older adults so that interventions and programs can be tailored appropriately for this population.

Resilience in Older Gay Men Living with HIV/AIDS

As previously mentioned, sexual identity is a key element in peoples' lives. Because resilience is partially rooted in social support and networks, examining the construct among men who self-identify as gay and not something else on the sexual orientation spectrum[205] is particularly important. In one of the few studies specifically examining resilience among HIV-positive gay men, King and Orel utilized rank correlation coefficients in an effort to establish a relationship between resilience while living with HIV/AIDS and different mental health outcomes and physical health indicators in older ($\geq$ 50 years of age) HIV-positive gay men.[11] They found that having lower self-reported resilience scores was associated with higher instances of clinical depression, suicidal thoughts, attempted suicide, and higher mental health distress. Furthermore, having lower levels of resilience was also associated with being aware of unmet health needs and delay in seeking care.[11] These limited findings underpin the need to build on the scant body of work by focusing on older, self-identified gay men living with HIV/AIDS and not everyone under the MSM umbrella.

<div align="center">Rationale</div>

The extant literature of resilience among older PLWHA is limited in several ways. First, because of the relatively new advancements in medication (ART) over the last 15-20 years, people are now starting to age with HIV, thus making research on HIV and aging a relatively new field of study.[206,207] Two other factors attributed to the 'graying of HIV' is that the burden has been shifted to older individuals as incidence has decreased in younger populations and older adults are engaging in risk behaviors linked

to HIV-acqusition.[207,208] More recently, visibility around the needs of those aging with HIV has increased. Leading HIV-practitioners and researchers have called for multiple points of intervention and research around aging in order to inform policy, clinical practice, and programs.[207]

Second, little is known about the drivers of resilience among older PLWHA. To date, many of the studies examining resilience have either focused on children/adolescents or PLWHA of all ages so given the growing number of PLWHA over 50, it is important to have a better understanding on how resilience is enacted in this group. PLWHA. This could lead to further research on whether resilience is substantially different between younger PLWHA and older More specifically, understanding how mental, neurocognitive, physical, and psychosocial states may or may not be associated with resilience is essential in determining whether it can protect against negative health sequalae associated with HIV/AIDS.[2] Emlet and colleagues have explored resilience among older PLWHA and found that many themes emerged from their initial examinations including independence, will to live, optimism, and self-acceptance among others.[190]

Other studies examining resilience in older PLWHA have found that higher levels of resilience are associated with stronger perception of social relationships,[209-211] better quality of life,[212] and lower mental health and psychosocial burdens.[12] The extant literature has also documented aging gay men experience greater psychosocial burdens measured by stigma, loneliness, level of outness, and attachment compared to their heterosexual conuterparts.[213-215] Further investigation into these psychosocial drivers of resilience may provide more contextual understandings than what currently exists.

Third, efforts to adequately and accurately assess resilience among PLWHA have been limited. Presently, several studies examining resilience in this population have utilized qualitative methods[3-5,9,158,190,211,216-219] which is helpful in describing resilience but also limits the ability to generalize findings to other populations or draw any casual associations. Similarly, in quantitative studies examining resilience in PLWHA, there are several inconsistencies with how resilience is measured. Many utilized the Connor-Davidson Resilience Scale[122] (CD-RISC),[7,12,210,220,221] while others utilized some version of the Wagnild-Young Resilience Scale[134] (RS-25 or RS-14).[11,209] Other studies have utilized abstract and/or unclear measures of resilience[222-224] or have conflated it with other constructs such as coping,[6,212] when in reality positive coping behaviors may contribute to resilience. Moreover, because the early investigations around resilience were primarily centered around children, creating a new measurement tool that is both more nuanced and focuses on strengths of living with HIV rather than deficits is important.

Finally, there are only two known studies[11,12] that examine resilience among HIV-positive gay men, and one of the two studies draws from a larger sample of sexual minority men for their analysis.[12] While the aforementioned studies examining aging and resilience among PLWHA have laid important groundwork, this study will be one, if not the first to examine resilience in a cohort of older HIV-positive gay men. Additionally, this study will provide a more robust sample size than King and Orel's study which only had 38 HIV-positive participants out of their total n=316.[11] While Lyons and colleagues had a larger sample (n=357),[12] their assessment was conducted online and may be subjected to sampling bias. Of the two studies, only King and Orel limited their sample to

men over 45 years old.[11] This gap in the literature prevents a greater understanding on whether resilience is evident in older HIV-positive gay men.

Data drawn from a pilot study of 250 older HIV-positive gay men aged 50-69, known locally in New York City as GOLD III, will serve as the data source for the following proposed analyses:

Assessing the Factor Structure and Psychometric Properties of a Tool Developed to Assess HIV/AIDS-Related Resilience

When the study team (Halkitis, Kapadia, and Krause) came together to design the GOLD III study, there was concern around the lack of a consistent conceptualization of resilience in PLWHA. After many discussions, we decided to create our own tool designed to assess HIV-related resilience in addition to the existing Brief Resilience Scale.[155] The 10-item scale includes statements such as 'I can bounce back from difficult situations caused by HIV/AIDS,' 'I have learned to live my life with HIV/AIDS,' 'HIV-related issues are difficult for me to deal with,' 'surviving HIV/AIDS is important to me,' and 'HIV/AIDS dictates how I live my life,' among others. Before including it in the survey, we piloted the items with 10 older gay men living with HIV/AIDS with previous connections to our research center, the Center for Health, Identity, Behavior, and Prevention Studies (CHIBPS), to ensure the questions made sense and were able to be easily answered. Because the tool is new, it is important to assess its factor structure and psychometric properties to determine whether it can be validated and utilized in future studies examining resilience among PLWHA. Additionally, by examining discriminant validity through physical health proxies (e.g. blood pressure and Body Mass Index), we can demonstrate that the scale is unrelated to these constructs.

Mental Health Correlates of HIV/AIDS-Related Resilience Among Gay Men age 50 - 69 Living with HIV/AIDS

There is limited information available on the correlates of resilience among PLWHA outside of social support,[3,225,226] community building,[211] and cultural connections.[217,218] This analysis will help fill in a critical gap by examining mental (depression, PTSD, suicidality, and substance use) and resilience among older gay HIV-positive men. Understanding these drivers can help providers, policy makers, and researchers implement new and innovative programming that supports older gay men living with HIV/AIDS.

Neurocognitive Correlates of HIV/AIDS Resilience Among Gay Men aged 50 - 69 Living with HIV/AIDS

Presently, very studies have examined the association between neurocognitive functioning and resilience in PLWHA, and of those that have, only two have done so in an aging population.[227,228] Fazeli and colleagues found resilience to be significantly associated with better neurocognitive functioning across most domains including working memory, learning, executive functioning, verbal fluency, executive functioning, and speed of information processing in addition to global neurocognitive functioning ($rho = 0.31$, $p < 0.01$) in a sample ranging from age 40-73 with 61% over age 50.[227] The proposed study will build upon these findings in a unique sample of older gay HIV-positive men in order to promote successful aging.

Significance

First, services for older gay adults are limited.[229] More specifically, few are tailored to meet the needs of gay men. Organizations such as SAGE (Services &

Advocacy for GLBT Elders) are helping to bridge these gaps by advocating with and behalf of the older LGBTQ community but one organization cannot be responsible for and to all LGBTQ individuals in the United States. Understanding how resilience can be both utilized and/or capitalized on will help organizations and institutions build more effective programming and allocate their resources most efficiently.

Second, accurately assessing resilience is critically important and to date, has been very inconsistent generally and more specifically in the literature on PLWHA. Without a 'gold standard' scale to measure the general conceptualization of resilience, it is difficult to make conclusions and recommendations. By presenting the psychometric properties and factor structure of an innovative and relatively short scale specifically tailored for those living with HIV, researchers and practitioners can utilize the scale in future studies examining different aspects of health pertaining to PLWHA.

Third, understanding the associations of HIV-related resilience can have implications for interventions such as digital or adaptive tools that can help improve health outcomes among PLWHA. Examples of digital tools include geospatial or satellite navigation to necessary facilities, mobile applications, financial services, social media applications among many others.[230] Additionally, policy makers play an important role in strengthening resilience by utilizing scientific knowledge to build out programming and services that may not be adequately addressing the needs of communities and individuals.

Finally, incorporating resilience and moving towards a strengths-based approach is a necessary next step for public health. Other fields have been using this paradigm throughout the past half century including social work[231] and psychology through the positive psychology movement.[232] Community psychologists have also adopted a

strengths-based approach in what is contemporarily referred to as post-traumatic

growth.[233] The field of social work has been using this paradigm since the early 1990s,

but it is imperative that public health researchers and practitioners incorporate resilience

and other strengths-based concepts into their work moving forward. The social

determinants and drivers of health conditions has been well documented in the literature

so now it is time to build upon the existing research to help ascertain the mechanisms

behind which someone not only survives, but also thrives. With a deep-rooted history of

uncertainty, ambiguity, and turmoil, grounding this work in the experiences of older

PLWHA provides a unique opportunity to honor those who did not make it to this point

in time.

Theoretical Framework of Dissertation

To address the gaps in knowledge surrounding HIV and resilience, Halkitis,

Krause, and Vieira[2] outline a model that establishes resilience as a trait of some older

HIV-positive people that enables them to enact resilient processes (e.g. coping or

establishing normative patterns)[143] to ameliorate the impact of life stressors on overall

health. Through this relationship, it is implied that the resilient nature of the individual is

further bolstered as these processes bestow beneficial effects on health.[2]

Figure 1.1 Resilience and Health Paradigm for Older PLWHA
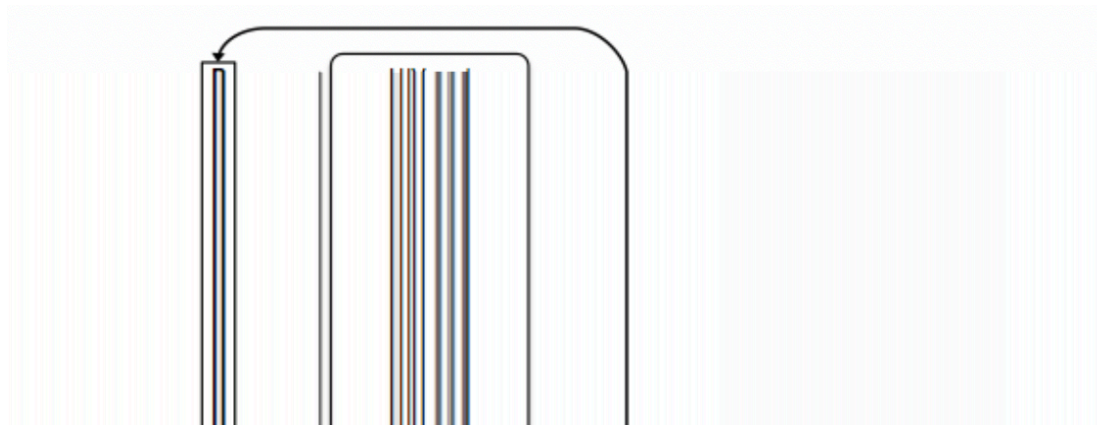
This model suggests that resilience acts as a buffer between adverse physical and
mental health outcomes in older HIV-positive gay and bisexual men. Furthermore, it is
suspected that different resilient processes may be activated at different timeframes
following diagnosis and length of treatment.

This paradigm served as the foundation for the development and implementation
of the GOLD III study. Each measure was carefully chosen to map on to one of the
constructs within the model thus making it a central basis of this dissertation. The
analyses proposed in this body of work will lay the foundation to perform a structural
equation model/analysis between the different paths of the model and make stronger
recommendations for future research and programming for PLWHA.

Specific Aims

**AIM 1: To determine the psychometric properties and factor structure of the
HIV/AIDS Resilience Scale in a sample of gay men age 50 - 69 living with HIV/AIDS**

- Hypothesis 1.1: Based on the factor structure(s), the factors that compromise the
  HIV/AIDS and resilience scale will consist of items with high internal
  consistency.

- Hypothesis 1.2: The HIV/AIDS Resilience tool will produce scores that are discriminant from other physical health proxies (blood pressure and body mass index) are highly associated with other psychosocial measures including grit, general resilience, attachment, loneliness, and stigma.

AIM 2: To assess the mental health (depression, anxiety, PTSD, suicidality, and substance use/misuse) and sociodemographic correlates (age, race/ethnicity, perceived financial situation, educational attainment, and pre/post ART status) with HIV-related resilience in a sample of gay men age 50 - 69 living with HIV/AIDS

- Hypothesis 2.1: In this sample of older HIV-positive gay men, those with higher HIV-related resilience scores will have better mental health states as measured by lower levels of depression, PTSD, anxiety, suicidality, and substance use/misuse.

- Hypothesis 2.2: In this sample of older HIV-positive gay men, there may be potential differences in HIV-related resilience occurring between sociodemographic categories (age, race/ethnicity, socioeconomic status, educational attainment, and epoch of diagnosis (pre/post ART)).

- Hypothesis 2.3: Controlling for significant demographic states, variability in resilience is explained by mental health states.

AIM 2a: To assess whether HIV-related resilience mediates the impact of HIV-related stigma and number of mental health challenges (calculated by summing total diagnoses of depression, PTSD, anxiety, suicidality, and substance use/misuse)

- Hypothesis 2a.1: In this sample of older HIV gay men, HIV-related resilience will at least partially mediate the impact of HIV-related stigma on total mental health outcomes.

AIM 3: To assess the self-reported neurocognitive (memory, language & communication, use of hands, sensory-perceptual, and higher level cognitive & intellectual functioning) correlates of HIV-related resilience in a sample of gay men age 50 - 69 living with HIV/AIDS

- Hypothesis 3.1: In this sample of older HIV-positive gay men, those with higher resilience scores will have better self-reported neurocognitive outcomes controlling for epoch time of HIV diagnosis (pre/post ART).

Description of Three Manuscripts

Description of Data Source

Data for the following manuscripts will come from the third iteration of the GOLD Studies known as *GOLD III: Testing a Model of Resilience to Develop an Intervention for Healthy Aging in Older HIV-Seropositive Adults.* Between April 2017 and October 2018, 581 individuals were screened for the cross-sectional study and were eligible to participate if they: were aged 50 to 69, assigned male at birth and identified as male at time of screening, gay, proficient in English, willing to have blood drawn, did not have a history of Traumatic Brain Injury (TBI) or loss of consciousness for more than thirty minutes, lived in the New York City metropolitan area, and currently reported a positive HIV serostatus, no matter the year of diagnosis. Additionally, during the screening process potential participants were asked if they were comfortable talking about their mental and physical health (yes/no). We included this screening prompt in previous the previous GOLD studies to ensure participants were willing to answer questions that may be sensitive to think about. All study activities occurred in-person at the CHIBPS research office on the campus of New York University in New York, NY. Participants were recruited via many different methods including dating/sex mobile websites and applications (Craigslist, Grindr, Daddyhunt, etc.), community-based organizations and health clinics, and gay-related events throughout NYC. We also had participants contact us based on word of mouth and friends, colleagues, or neighbors.

A total of N = 308 people screened eligible for the study however, 37 people did not attend the study visit and 21 people were duplicates, yielding the final target/analytic sample of N=250. The most common reason individuals were not eligible was due to

anyone self-identifying as anything other than gay (bisexual, queer, sexually fluid, etc.).

Participants who were eligible and provided written informed consent were enrolled into

the study.

Figure 1.2 Flowchart of GOLD III Study Recruitment
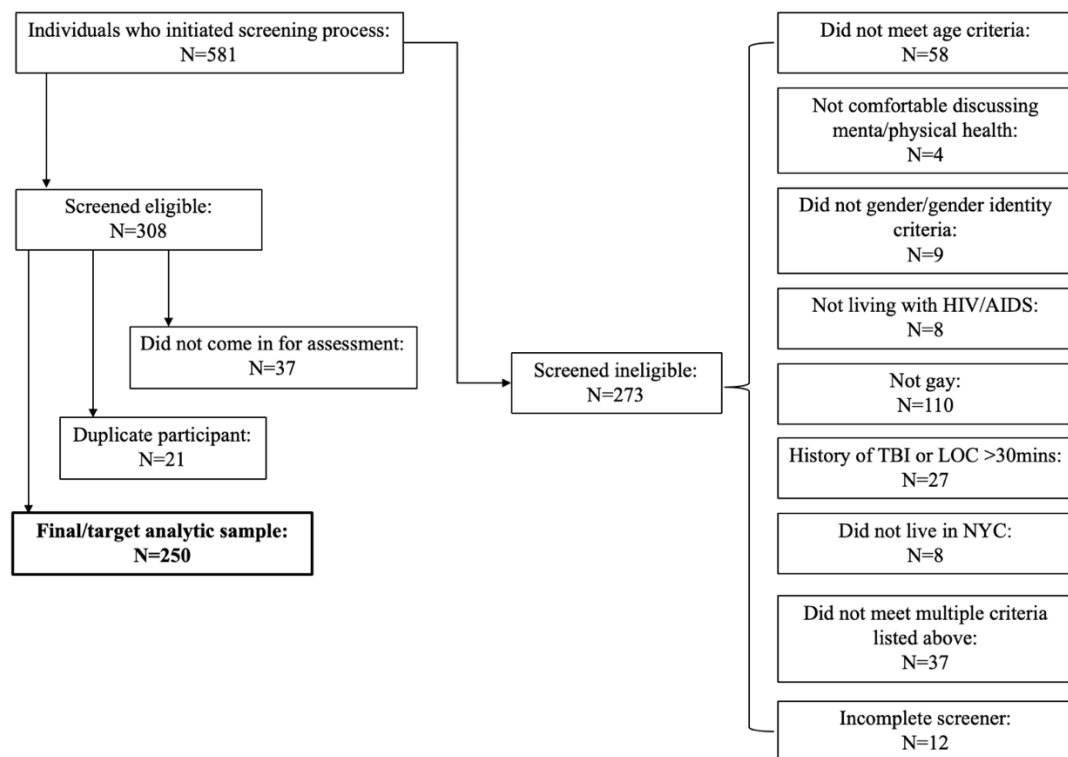
At the beginning of the assessment, proof of HIV serostatus was confirmed via

medication bottle (other than Truvada), ADAP card, doctors note, and/or lab results by

trained staff members prior to consent. Participants completed an audio computer-

assisted self-interviewing (ACASI) survey and a staff-administered co-morbidity

inventory and MINI International Neuropsychiatric Interview (MINI). The MINI was

administered after participants took the ACASI survey by study staff who received

training by one of two mental health counselors employed at CHIBPS. Participants also

had three tubes of blood drawn examining CRP, ESR, and baseline cortisol at the beginning of the study visit and one tube of blood drawn examining change in cortisol levels at the end of the study visit. The average time of the study visit was two hours and all participants were compensated $50 in cash at the end of the assessment. All protocols were initially approved by the New York University Institutional Review Board (IRB-FY2017-327) and subsequently by the Rutgers University Institutional Review Board (Pro20170001986).

Description of Sample

As demonstrated in Table 1.1, the GOLD III sample is sociodemographically diverse. The median age of the participants was 56. Regarding race/ethnicity, 41.2% of participants identify as black non-Hispanic, 32% as white non-Hispanic, 17.6% as Hispanic/Latino, 3.6% as mixed race, 1.2% as Asian/Pacific Islander, and 2.4% were categorized as other race/ethnicity. Educational attainment was pretty evenly dispersed with 29.6% of participants having a Bachelor's degree, 24% having a high school diploma, 18.4% having an Associate's, 17.6% having some type of graduate degree, and 9.6% having less than a high school education. Compared to the general population, Census estimates between 2013-2017 indicate that 30.1% of adults aged 45-64 have and 25.9% of adults 65 and older have a Bachelor's degree or higher,[234] which is relatively similar to the GOLD III sample. More than half of the participants did not feel financially stable with only 34.4% of them feeling like they have enough money to live comfortably. 49.6% of participants stated that they can barely get by on the money they have and the remaining 14.8% said they cannot get by on the financial resources they have. Finally, a majority of the GOLD III participants had never been married (76%) while 11.2% are

currently married, 6% had previously been married, 4.4% are widowed, and 2% are

separated.

Table 1.1 Basic Demographic Characteristics of the GOLD III Study Participants
(n=250)

	n (%)
Age (median)	56
Race/Ethnicity	
White, non-Hispanic	80 (32.0)
Black, non-Hispanic	103 (41.2)
Hispanic	44 (17.6)
Mixed, non-Hispanic	9 (3.6)
Asian, non-Hispanic	3 (1.2)
Other, non-Hispanic	6 (2.4)
Missing	5 (2.0)
Educational Attainment	
High School or Less	24 (9.6)
High School Diploma or GED	60 (24.0)
Associate's Degree	46 (18.4)
Bachelor's Degree	74 (29.6)
Graduate Degree	44 (17.6)
Missing	2 (0.8)
Perceived Financial Situation	
I have enough money to live comfortably	86 (34.4)
I can barely get by on the money I have	124 (49.6)
I cannot get by on the money I have	37 (14.8)
Missing	3 (1.2)
Current Marital Status	
Single, never married	190 (76.0)
Married, domestic partnership, or civil union	28 (11.2)
Widowed	11 (4.4)
Separated	5 (2.0)
Previously married	15 (6.0)
Missing	1 (0.4)

Table 1.2 highlights some of the different HIV- and health-related indicators

collected from the GOLD III participants. The median year of HIV diagnosis was 1992

and almost two-thirds of participants were diagnosed prior to or in 1995, prior to the

implementation of ART. The remaining 37.6% were diagnosed after 1996 (post-ART).

While 52.4% of participants had received an AIDS diagnosis, only 43.2% disclosed a

history of at least one opportunistic infection. With regard to CD4 count, 50% of

participants had more than 500 cells/mm^3, 36.8% had between 201 and 500 cells/mm^3,

9.6% had less than 200 cells/mm^3, and 3.2% were unsure. Historically, those with less

than 200 CD4 cells/mm^3 were at an increased risk for acquiring opportunistic infections

including *Pneumocystis jirovecii* or Kaposi sarcoma (KS)[235] and having more than 500

cells/mm^3 is what is typical of a healthy HIV-negative person. Other studies examining

CD4 count in relation to other HIV-related outcomes have used similar cutoffs.[236,237] A

majority of the participants had an undetectable HIV viral load (82%) with 12% having

less than 500 copies/ml, 3.6% had between 500 and 5,000 copies/ml, and 1.2% had more

than 5,000 copies/ml, indicating high levels of viremia. Finally, almost 70% of the

sample rated their health as excellent (12.8%), very good (29.6%), or good (26.8%), with

17.6% of participants suggesting their health was fair and 2.8% thought they were in poor

health.

Table 1.2 Health Indicators of the GOLD III Study Participants (n=250)

	n (%)
Year of HIV diagnosis, median	1992
Time of Diagnosis	
Pre-ART	152 (60.8)
Post-ART	94 (37.6)
Missing	4 (1.6)
AIDS Diagnosis	
No	118 (47.2)
Yes	131 (52.4)
Missing	1 (0.4)

History of Opportunistic Infection

No	141 (56.4)
Yes	108 (43.2)
Missing	1 (0.4)

Most Recent CD4 Count

< 200	24 (9.6)
201 to 500	92 (36.8)
> 500	125 (50.0)
Don't Know	8 (3.2)
Missing	1 (0.4)

Most Recent Viral Load

Undetectable	205 (82.0)
Under 500	30 (12.0)
500 to 5,000	9 (3.6)
Over 5,000	3 (1.2)
Don't Know	2 (0.8)
Missing	1 (0.4)

Self-Rated Health

Excellent	32 (12.8)
Very Good	74 (29.6)
Good	92 (26.8)
Fair	44 (17.6)
Poor	7 (2.8)
Missing	1 (0.4)

Description of Manuscript 1: Assessing the Psychometric Properties and Factor Structure of the HIV/AIDS Resilience Scale

The first manuscript included in this dissertation will utilize the dataset to assess the psychometric properties (validity and reliability) of the HIV Resilience Scale. Understanding this information will help determine whether this more nuanced way of examining resilience can be implemented in other studies working with PLWHA, and more specifically gay men living with HIV/AIDS.

Sample: Data for this manuscript will come from the GOLD III cross-sectional study of n=250 gay, HIV-positive men living in the greater New York City area aged 50-69.

Measures: The central measure of this analysis is the 10-item CHIBPS HIV-resilience scale. Items include: *(1) I can bounce back from difficult situations caused by HIV/AIDS, (2) I have learned to live my life with HIV/AIDS, (3) HIV-related issues are difficult for me to deal with, (4) Living with HIV/AIDS is normal to me, (5) I can deal with setbacks caused by HIV/AIDS, (6) I have hope for the future despite the fact that I am living with HIV/AIDS, (7) HIV/AIDS dictates how I live my life, (8), Surviving HIV/AIDS is important to me, (9) I can manage my HIV/AIDS, (10) It is difficult for me to live with HIV/AIDS.* Convergent validity will be assessed utilizing the Brief Resilience Scale, [155] and short grit scale[238] in addition to other psychosocial measures including outness, loneliness, attachment, and different stigma constructs. Outness will be assessed via the 11-item Outness Inventory[239] (Cronbach's $\alpha = 0.72$).[240] Loneliness will be assessed by the 20-item revised UCLA loneliness scale (Cronbach's $\alpha = 0.94$).[241] Attachment/close relationships will be assessed using the 20-item Experiences in Close Relationship Scale-short (ECR-S) form (Cronbach's $\alpha = 0.95$).[242] HIV-related and gay-related stigma will also be examined. The 5-item gay-related scale has not yet been validated in the literature however, the 40-item HIV stigma scale has an $\alpha = 0.96$.[243] Discriminant validity will be assessed using body mass index (BMI) scores and systolic and diastolic blood pressure readings.

Analytic Plan: First using Mplus version 8.4.,[244] an exploratory factor analysis (EFA) will be conducted to determine whether there are multiple factor loadings or just

one. Principal components analyses using an oblique rotation (Geomin) will be utilized. Eigen values and model fit indices will be examined to evaluate the appropriate number of factors. After examining the results of the EFA, a second-order confirmatory factor analysis (CFA) will be ran to evaluate the overall fit of the proposed factor solution. and tests for configural and metric invariance will be conducted. Next, configural and factorial invariance will be assessed by race/ethnicity and epoch of diagnosis. Using Statistical Package for Social Sciences for Macintosh (SPSS) version 25,[245] internal consistency will be assessed using Cronbach's alpha. Next, convergent validity will be assessed by zero-order correlations between the CHIBPS HIV resilience tool and other measures including the Brief Resilience Scale and grit-S among other psychosocial constructs including loneliness, outness, attachment, and stigma. The presence of convergent validity will be established if the correlation coefficients are above (-)0.70.

Description of Manuscript 2: Mental Health Correlates of HIV/AIDS Resilience Among Gay Men aged 50 - 69 Living with HIV/AIDS

The second manuscript in this dissertation will examine mental health correlates of HIV/AIDS Resilience among the GOLD III sample.

Sample: Data for this manuscript will come from the GOLD III cross-sectional study of n=250 gay, HIV-positive men living in the greater New York City area aged 50-69.

Measures: After validating the HIV/AIDS-related resilience tool in the first manuscript, this will be the only measure of resilience included here. In addition to the individual level factors highlighted in the first manuscript, mental health measures will include PTSD, and a battery of other constructs from the MINI. PTSD will be assessed

utilizing the civilian version of the 17-item PTSD CheckList (PCL-C) (Cronbach's α = 0.94).[246] The items in the PCL-C can be added up to ascertain the total severity score, or it can be dichotomized as symptomatic (score = 44-85) or non-symptomatic (score = 17-43). The following components of the MINI were included in the study: Major Depressive Disorder, Dysthymia, Suicidality, Panic Disorder, Social Phobia, Obsessive Compulsive Disorder, Generalized Anxiety Disorder, Antisocial Personality Disorder, and Substance Use. Sociodemographic variables include age (two groups: 50-59 and 60-69), race/ethnicity, perceived financial situation, educational attainment, and pre/post ART status.

Analytic Plan: Univariate analyses will be utilized to examine all of the variables of interest in this analysis. Bivariable associations will then be examined to determine independent associations between resilience and the mental health and sociodemographic covariates of interest. After the factor structure of the HIV/AIDS resilience scale is determined, we will either use a multinomial logistic or a series of hierarchical linear regressions to assess the multilevel mental health and sociodemographic factors associated with HIV-related resilience. If the HV/AIDS resilience scale produced one factor, tertile cut scores will be made at the 25th, 50th, and 75th percentile representing low, medium and high levels of resilience. Finally, a mediation analysis will examine whether HIV-related resilience may mediate the relationship between a psychosocial stressor, HIV-related stigma, and mental health outcomes. For this mediation analysis, a mental health sum score will be created totaling the number of participants who endorsed PTSD, depression, suicidality, substance dependence, and generalized anxiety disorder. A Sobel test will assess the significance of the mediation effect.

Description of Manuscript 3: Neurocognitive Correlates of HIV/AIDS Resilience Among Gay Men aged 50 - 69 Living with HIV/AIDS

The third and final manuscript to be included in this dissertation will build upon the findings from the first two manuscripts to examine the neurocognitive correlates of overall and HIV-related resilience among the GOLD III sample.

Sample: Data for this manuscript will come from the GOLD III cross-sectional study of n=250 gay, HIV-positive men living in the greater New York City area aged 50-69.

Measures: After validating the HIV/AIDS resilience scale in the first manuscript, this will be the only measure included here. Neurocognitive functioning will be assessed by the Patient Assessment of Own Functioning Inventory (PAOFI), a self-report measure.[247] With five subscales including memory, language and communication, use of hands, sensory-perception, and higher level cognitive and intellectual functions, the PAOFI was designed to elicit patients' self-perceptions of their executive functioning. Currently, there is no normative data for PAOFI scores.[248] Utilizing this type of self-reported neurocognitive assessment in the GOLD III study was intentional as it was significantly less burdensome than other neurocognitive batteries that involve activities.

Analytic Plan: After the scores of the five subscales of the PAOFI are computed, univariate analyses will be utilized to examine all of the variables of interest in this analysis. Bivariable associations will then be examined to determine independent associations between resilience and the five PAOFI subscales (memory, language and communication, use of hands, sensory-perception, and higher level cognitive and intellectual functions). Similar to the second manuscript, after the factor structure of the

HIV/AIDS resilience scale is determined, we will either use a multinomial logistic or a series of hierarchical linear regressions to assess the multilevel neurocognitive factors associated with HIV-related resilience controlling for epoch time of HIV diagnosis (pre/post ART). If the HV/AIDS resilience scale produced one factor, tertile cut scores will be made at the 25th, 50th, and 75th percentile representing low, medium and high levels of resilience.

Strengths and Limitations

The major strength of this dissertation is that it draws from a robust sample of self-identified gay men allowing for conclusions to be drawn based on this more salient identity rather than by behaviors classified under an umbrella terms such as MSM or sexual minority male. Additionally, the study included multiple ways to measure the construct of resilience (the Brief Resilience Scale, HIV/AIDS Resilience Scale, and grit) that will allow for unique validity and reliability testing in this population, something that has not been done to date. Finally, this body of work will lay the groundwork to test a theory of resilience in PLWHA that has not been examined up until this point in time.

Despite this study's innovation, this dissertation also has some important limitations. First, because of the cross-sectional study design, casual inferences cannot be made but rather only associations and correlations can be presented. Second, the GOLD III study is a cohort study of older HIV-positive gay men living in the greater New York City area. As such, findings from this sample may not be generalizable to all HIV-positive MSM living in NYC or gay HIV-positive men in other areas outside of this jurisdiction. Finally, this is a sample that is comprised of mostly-non-white participants. Though this is a strength with regard to understanding resilience and its associations

among racial/ethnic minority gay men, this sample is not totally representative of all gay

men living with HIV/AIDS in the United States.

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CHAPTER II: ASSESSING THE FACTOR STRUCTURE AND PSYCHOMETRIC PROPERTIES OF THE HIV-RELATED RESILIENCE SCREENER (HIV-RRS)

Abstract

In the United States, people age 50 and older will constitute the majority of those living with HIV/AIDS (PLWHA) by 2025 and similar projections are expected globally within the next decade. Compared to their HIV-negative and younger HIV-positive counterparts, this aging population of PLWHA face different physical, mental, and psychosocial health challenges related to living with HIV/AIDS, the general aging process, and the long-term impact of being on antiretroviral treatment. Resilience may act as a buffer to the negative impact of these challenges although measuring it among PLWHA has been inconsistent. Given the range of approaches to understanding and conceptualizing resilience in PLWHA, theoretically designed and validated instruments are needed within population. To address this gap in the literature, a new instrument was developed and the initial factor structure and psychometric properties of the 10-item HIV-Related Resilience Screener (HIV-RRS) were examined. Data for the present study are drawn from 250 HIV-positive gay men age 50-69 living in New York City. Participants were sociodemographically diverse with regard to race/ethnicity, perceived financial situation, age, and educational attainment. Exploratory and Confirmatory Factor Analyses along with tests of reliability and validity of the HIV-RRS were conducted in this sample. The EFA indicated that a three-factor model was the most parsimonious solution based on eigenvalues and model fit. The items were examined for their

underlying relationships and the three factors were labeled: adaptive coping, optimism, and effective coping. Taken together, the 10 items produced a Cronbach's α of 0.84. Additionally, the adaptive coping subscale produced an α of 0.78, the optimism subscale produced an α 0.80, and the effective coping subscale produced a Cronbach's α of 0.72. Convergent and discriminant validity were established using other psychosocial (e.g. grit, loneliness, outness, etc.) and physical (e.g. Body Mass Index and blood pressure) outcomes. The HIV-RRS is a psychometrically sound instrument to assess resilience among PLWHA. Findings from the second-order confirmatory factor analysis adequately supported the three-factor solution ($\chi^2 = 55.87$, df $= 30$, $p = 0.003$, RMSEA $= 0.059$ (90% CI $= 0.034, 0.083$), CFI $= 0.958$, TLI $= 0.937$, SRMR $= 0.049$). Looking forward, we recommend continued pilot testing in different populations of PLWHA to ascertain its stability within other groups, geographic locations, and over time. The multidimensional HIV-RRS has the potential to help public health practitioners, mental health clinicians, and researchers, move towards a more holistic strengths-based approach to working with PLWHA.

Introduction

The Centers for Disease Control and Prevention (CDC) estimates nearly half of people living with HIV/AIDS (PLWHA) in the United States are age 50 and older.[1] The widespread introduction and implementation of antiretroviral treatment (ART) in 1996, considered to be one of the great public health successes of the past four decades, is the main contributor to the increased survival of PLWHA.[2] In 2016, the Prevention Access Campaign launched the Undetectable = Untransmittable (U=U) slogan to communicate that people infected with HIV who are virally suppressed cannot transmit the virus to anyone else.[3] A year later, the CDC endorsed the 'treatment as prevention' (TasP) movement[4] and identified resources for providers to maximize the effectiveness of prevention strategies and to update prevention messages to those who provide treatment and preventive services.[5] Taken together, ART implementation and TasP have improved the long-term health outcomes among PLWHA. As such, as PLWHA age, it is important that practitioners, clinicians, and researchers help this population to not just survive, but to be resilient.

There is not one consistent definition or conceptualization of resilience as it is still considered to be a relatively emerging domain of study.[6-10] It can be understood as a trait, outcome, process, or a combination.[11] The American Psychological Association defines resilience as the "the process of adapting well in the face of adversity, trauma, tragedy, threats or significant sources of stress."[12] As a trait, resilience refers to a temperament or ability to meet the challenges of life.[13] Other definitions support the notion that individuals are resilient if they can cope successfully with significant risk, adversity, or change.[14]

Historically, many resilience-based inquiries have focused on at-risk children, youth, or veterans who may have prolonged exposure to chronic stressors or trauma.[15] There is a developing body of literature focusing on resilience among older adults and its role in the successful aging process.[16-18] In a longitudinal study of aging adults, findings indicate a decrease in resilience was associated with an increase in fatigue and depression while increased levels of resilience were also correlated with improved sleep quality.[17] Another study focused on older adults found higher levels of resilience to be associated with greater quality of life outcomes and feeling a stronger sense of purpose in life compared to those with lower resilience scores.[19]

While older (50 and up) PLWHA, tend to face many different physical, mental, psychosocial, and neurocognitive health challenges,[13] there is a growing body of work demonstrating their overall sense of optimism and will to live in the face of these difficulties.[20-22] These qualities are evocative of resilience as they encompass the idea of adapting to and overcoming adversity, challenges, and changes.[12,23] For many older PLWHA, resilience helps them overcome myriad challenges including the realities of aging and ageism[24] and HIV-related stigma.[25] Other members of this aging population may also experience structural forms of discrimination due to socioeconomic status or social class,[26] homophobia,[27] and racism.[28] Given the adversities faced by PLWHA, fostering resilience may enable them to overcome negative effects of adversity.[29-31] However, in order to better understand how resilience is enacted, assessing how it is measured in different populations is important. Having tools with strong psychometric properties that can be applied across studies and sub-populations is also critical.

To date, many efforts to measure resilience have focused on individual, biological, interpersonal, familial, or community-based resources.[32] There are many different validated tools that measure the construct of resilience,[23,33-35] however, there is no gold standard tool in existence.[36] Other critiques of resilience measurement include a lack of participant involvement in measure development.[37] More nuanced ways to measure resilience in relationship to other health outcomes, exposures, or events such as natural disasters,[38] traumatic stress,[39] and chronic pain[40] provide more precise modes of intervention. As such, it is important to create innovative measures that can be tailored for specific health outcomes while seeking the input and guidance of diverse populations.

The need to develop a new measurement tool to assess resilience in PLWHA is two-fold. First, because the early investigations around resilience were primarily centered around children, the availability of valid and reliable tools for adults,[36] and more so for older adults[41] is lacking. Second, creating a more nuanced measurement tool that focuses on the positive aspects of living with HIV instead of deficits is imperative as the number of people impacted continues age. Thus, the primary goal of the present study is to present the factor structure and psychometric prosperities of a newly established tool for measuring resilience specifically in PLWHA.

Current Study: Development and pilot-testing of the HIV-Related Resilience Screener

Given the different conceptualizations of resilience in PLWHA, theoretically designed and validated instruments would help to measure resilience specifically within this context. The HIV-Related Resilience Screener (HIV-RRS) was designed to assess resilience among a population that has faced profound adversity through historical

marginalization and ostracism, while collectively overcoming many of the trauma-induced experiences of their generation.[42] To address this gap in the literature, we developed the HIV-RRS and I examined its initial factor structure of in a sample of older HIV-positive gay men.

To generate items for the tool, we reviewed all available literature on how resilience has been assessed among PLWHA,[43-53] as well as a number of general resilience and resilience-informed measures. While writing original items for this tool, the study team used the short and direct items in the Brief Resilience Scale (BRS)[33] and the Resilience Scale for Adults (RSA) as a model.[34] It is important to note that we did not review two other popular scales including the Resilience Scale (RS)[35] and the Connor-Davidson Resilience Scale (CD-RISC)[23] due to the prohibitive cost associated with accessing the full versions of them. We wanted to ensure our tool could be used by a variety of audiences and researchers working with PLWHA.

Once an initial draft of the tool was created, further commentary and revisions were sought from members of the Community Advisory Board at the Center for Health, Identity, Behavior and Prevention Studies (CHIBPS) and other older PLWHA with previous connections to the research center ($n = 10$). CHIBPS is a well-known and respected research center founded at New York University and is now housed at Rutgers University School of Public Health. These individuals were asked to review the 12-item draft instrument with an eye for clarity of items and overall face and content validity. Based on the feedback from these expert reviewers, two items were dropped, and one item was altered in an effort to clarify its intent, thus creating a 10-item tool that was

implemented in the GOLD III study in order to assess the factor structure and psychometric properties.

The HIV-RRS was developed with timing in mind to minimize the potential for participant fatigue. As such, it was kept to 10 items in an effort to promote uptake and dissemination in future research projects. The current investigation was designed to examine (a) explore the underlying factorial structure, (b) the internal-consistency reliability of the HIV-RRS, (c) measurement invariance based on race/ethnicity and time of HIV diagnosis (pre-ART development and implementation and post-ART), and (d) the manifestation of convergent and discriminant validity by examining correlations with similar and dissimilar existing measures.

Methods

Procedures

Data for the present study are drawn from the third iteration of the GOLD Studies known as *GOLD III: Testing a Model of Resilience to Develop an Intervention for Healthy Aging in Older HIV-Seropositive Adults* (GOLD III).[54] Participants were recruited from community-based outreach organizations (Gay Men's Health Crisis (GMHC), Services & Advocacy for GLBT Elders (SAGE) , health clinics, etc.), dating/sex mobile apps and websites (Craigslist, Grindr, Daddyhunt, etc.), gay-related events throughout New York City (NYC) (Pride parades and festivals, book talks, parties, etc.) and word of mouth. In total, 581 individuals were screened between April 2017 and October 2018. They were eligible to participate if they met the following criteria: between the ages of 50-69, currently reported a positive HIV serostatus, irrespective of the year of diagnosis, assigned male at birth, and identified as male at the time of

screening, self-identified as gay, live in the New York City metropolitan area, willing to have blood drawn and to discuss aspects of their physical and mental health, proficient in English, and did not have a history of Traumatic Brain Injury (TBI) or loss of consciousness for more than thirty minutes. Sample screener questions included 'are you comfortable participating in a survey about your physical, mental, and social health?' and 'are you willing to have blood drawn as part of the study?' All study activities took place in-person at the CHIBPS research office on the campus of New York University.

A total of N = 308 people screened eligible for the cross-sectional study however, 21 people had screened eligible and/or completed the study at another point in time and 37 people did not attend the study visit yielding a final analytic/target sample of 250 participants. At the beginning of the assessment, participants were asked to provide proof of HIV serostatus through a doctor's note, lab results, ADAP card, or medication bottle (other than Truvada, which is also used as Pre-Exposure Prophylaxis (PrEP)). After serostatus was verified, trained researchers administered the consent documentation and answered any questions. During the study visit, participants completed an audio computer-assisted self-interviewing (ACASI) survey, a staff-administered co-morbidity inventory, and the MINI International Neuropsychiatric Interview (MINI).[55] The MINI was administered after participants completed the ACASI survey by study staff who received training by one of two mental health counselors employed at CHIBPS. At the end of the study visit, participants were compensated $50 for their time and effort. All study protocols were initially approved by the New York University Institutional Review Board in 2017 and subsequently by the Rutgers University Institutional Review Board in 2018.

Sample

The GOLD III sample is sociodemographically diverse with regard to race/ethnicity, socioeconomic status, age, and educational attainment. Table 2.1 provides a breakdown of the key demographics of interest. The median age of the sample was 56 years old at the time of assessment. Regarding race/ethnicity, 41.2% (n = 103) of participants identify as black non-Hispanic, 32% (n = 80) as white non-Hispanic, 17.6% (n = 44) as Hispanic/Latino, 3.6% (n = 9) as mixed race, 1.2% (n = 3) as Asian/Pacific Islander, and 2.4% (n = 6) were self-identified as another race/ethnicity. Educational attainment was distributed across the five categories with 9.6% (n = 24) reporting less than a high school diploma, 24% (n = 60) having at least a high school diploma or GED, 18.4% (n = 46) holding an Associate's degree, 29.6% (n = 74) having a Bachelor's degree, and the remaining 17.6% (n = 44) having a graduate degree (including Master's, doctoral, law, etc.). Over two-thirds of the sample (n = 161) reported that they could not or could barely get by on the money they have with the remaining 34.4% (n = 86) saying they had enough money to get by on a daily basis. The median year of HIV diagnosis was 1992 and almost two-thirds (n = 152) of participants were diagnosed prior to or in 1995, prior to the introduction of ART. The remaining 37.6% (n = 94) were diagnosed in or after 1996 (post-ART).

Measures

Individual Characteristics

Participants self-reported information on racial/ethnic identity, perceived financial situation, educational attainment, and year of HIV. Additionally, age was verified with

proof of identification (driver's license, passport, state-issued identification, etc.). For the

present study, a few variables were collapsed or re-coded for analytic purposes.

Race/ethnicity was categorized as 'white, non-Hispanic,' 'Black, non-Hispanic,'

'Hispanic,' and all other groups were categorized as 'Mixed, Asian, and other, non-

Hispanic.' Educational attainment was categorized as 'high school or less,' 'high school

diploma or GED,' 'Associate's degree', 'Bachelor's degree,' and all Master's and other

terminal (PhD, JD, MD, etc.) degrees were collapsed into one 'Graduate degree'

category. Perceived financial situation was assessed by asking whether participants had

enough money to get by on. For the present study, answers were dichotomized into 'I

have enough money to live comfortably,' and 'I can barely/I cannot get by on the money

I have.' Time of diagnosis was dichotomized as 'pre-ART,' with those diagnosed with

HIV/AIDS prior to or in 1995, and 'post-ART' which included those who were

diagnosed in or after 1996.

Resilience, Grit, and Other Psychosocial Correlates

HIV Resilience: The 10-item HIV-Related Resilience Screener was utilized to examine

HIV-related resilience. Scale items include statements such as 'I can bounce back from

difficult situations caused by HIV/AIDS,' 'I have hope for the future despite the fact that

I am living with HIV/AIDS,' 'I can manage my HIV/AIDS,' and 'it is difficult for me to

live with HIV/AIDS' among others. Participants were asked to respond to each item on a

5-point Likert scale with responses including 1, 'strongly disagree,' 2, 'disagree,' 3,

'neutral,' 4, 'agree' and 5 indicating, 'strongly agree.' The neutral category was included

so that participants did not feel forced to having an option. The odd-number of items thus

yielding a neutral category is also exhibited in other resilience scales.[23,33,56] Three items required reverse coding. Table 2.2 presents the frequency, percent, and mode for each individual item. Scores for the overall measure ranged from 2.0 to 5.0 and he modal response for all of the items was either '4.0' or '5.0.'

After three of the items were reverse coded, respondent's scores for the individual items were averaged to create a total score with higher scores indicating higher levels of HIV-related resilience.

To ascertain convergent validity with similar constructs, I included measures of general resilience, grit, and other psychosocial experiences including stigma (HIV-related and gay-related), outness, attachment, and loneliness.

Resilience: The 6-item Brief Resilience Scale (BRS)[33] was utilized to assess resilience after experiencing adversity and stress. Items include statements such as 'I tend to bounce back quickly after hard times,' 'I usually come through difficulty times with little trouble,' and 'I tend to take a long time to get over set-backs in my life' and are answered using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). After reverse coding three items, the total score is calculated by summing the mean scores for all six items with a higher score indicating higher levels of resilience. The BRS has been demonstrated to have good validity and reliability in previous studies[33] and exhibits good psychometric properties in the current study with a coefficient $\alpha = 0.83$.

Grit: The 8-item short Grit scale (Grit-S)[57] was implemented to examine grit, which has been defined as "trait-level perseverance and passion for long-term goals."[58] Those with greater levels of grit are inherently more determined to overcome obstacles.[59] Items

include 'I am a hard worker,' 'I finish whatever I begin,' and 'my interests change from year to year. Respondents select answers based on a five-point Likert scale ranging from 1 (very much like me) to 5 (not like me at all). After reverse coding four items, the total score is calculated by summing the mean scores of all eight items with higher scores indicating one is very gritty and lower scores indicate one is not at all gritty. In previous studies, the Grit-S has exhibited good psychometric properties[57] and the reliability for the current study was $\alpha = 0.75$.

HIV Stigma: HIV-related stigma was assessed using the 40-item Berger HIV Stigma scale.[60] This measure was created to examine self-perceived stigma around the experience of living with HIV/AIDS. Some items include 'I feel set apart, isolated from the rest of the world,' 'I regret having told some people that I have HIV,' and 'most people believe a person who has HIV is dirty.' After reverse coding two of the items, the HIV stigma scale is scored by totaling responses from a four-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree) and higher scores represent higher levels of stigma. After initial psychometric testing, Berger and colleagues[60] concluded that there were four sub-scales congruent with the literature on HIV stigma including: disclosure concerns, enacted stigma, concern with public attitudes about people with HIV, and negative self-image with α coefficients ranging from 0.90 to 0.97 and 0.95 for the whole scale.[60] In the current study, our reliability was almost identical to those previous findings with a coefficient α of 0.96 for the whole scale.

Gay-Related Stigma: We assessed gay-related stigma by using an adapted and shortened version of the Berger HIV stigma scale.[60,61] The adapted gay-related stigma used three

items from the personalized stigma sub scale (e.g. 'I have stopped socializing with some people because of their reactions of my being gay/bisexual') and two items from the public attitudes sub scale (e.g. 'most people who are gay/bisexual are rejected when others find out'). Similar to the HIV stigma scale, both sub-scales were scored by totaling responses from a four-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree) with higher scores representing higher levels of gay-related stigma. In our sample, the reliability of the personalized stigma sub scale is $\alpha = 0.88$ and the reliability of the public attitudes sub-sale was $\alpha = 0.84$.

Outness: Level of outness was assessed using the 11-item Outness Inventory (OI) developed by Mohr and colleagues.[62] This measure examines the degree in which LGB-identified individuals are public about their sexual orientation to different groups of people. More specifically, the OI also looks not only whether a respondent's sexual orientation is known by someone else but also if it is discussed. Using a seven-point Likert scale from 1 (person definitely does NOT know about your sexual orientation status) to 7 (person definitely knows about your sexual orientation status, and it is OPENLY talked about), participants selected options for various people in their lives (e.g. father, friends, religious groups, etc.) The OI can be scored in a few different ways but for the purposes of this analysis, the average of 11-items were summed to create one overall outness score with higher scores signifying a greater degree of outness to the world. In previous studies, the OI has exhibited strong psychometric properties[62] and in our current study, the reliability was $\alpha = 0.86$.

*Attachment: A*ttachment style was measured by using the Experiences in Close Relationship Scale (ECR)-S scale.[63] Two dimensions are measured within the 12-item ECR (6-items per dimension): avoidance (e.g., 'I want to get close to my partner, but I keep pulling back'), and anxiety (e.g., 'I am nervous when partners get too close to me'). Participants assess their level of agreement with each statement on a 7-point Likert scale (ranging from 1 = disagree strongly to 7 = agree strongly) with higher scores representing higher levels of avoidant or anxious attachment within their close relationships. In the current sample, the reliability of the avoidance sub scale was $\alpha = 0.65$ and the reliability of the anxiety sub sale was $\alpha = 0.74$.

Loneliness: In the current study, loneliness was measured using the original version of the 20-item UCLA Loneliness Scale (LS) developed by Russell and colleagues.[64] The LS includes items such as 'There is no one I can turn to ,' 'I have nobody to talk to,' and 'I feel starved for company.' Answer options are based on 4-point Likert scale ranging from 1 (I never feel this way) to 4 (I often feel this way). The answers are summed to create a continuous score with higher values suggesting higher levels of loneliness. The LS scale had demonstrated strong psychometric properties in the past,[64,65] and the reliability for the current study was $\alpha = 0.97$.

Physical Health Correlates

To ascertain discriminant validity with constructs purportedly unrelated to resilience, we examined participant Body Mass Index (BMI) scores and blood pressure readings (both systolic and diastolic).

Body Mass Index: Prior to taking the ACASI survey, participants were asked to have their weight and height recorded to calculate Body Mass Index (BMI). Using a medical scale, weight was recorded in pounds (lbs) and using a stadiometer, height was recorded in inches (in). For the present study, we calculated BMI using the following formula as provided by the Centers for Disease Control and Prevention:[66]

$$\text{weight (lb)} / [\text{height (in)}]^2 \text{ x } 703$$

Blood Pressure: Systolic and diastolic blood pressure were ascertained using the 5 Series ® OMRON Upper Arm Blood Pressure Monitor.[67] Research staff members asked participants to sit straight up in the chair with both feet firmly planted on the ground while their left arm rested on the chair extension. After tight clothing was removed, the blood pressure cuff was applied to the left arm and participants were asked to breathe normally and remain quiet and still while the automated cuff inflated so that measurements could be taken. The measurement was taken one time and study staff left the room while the device was in the process of doing the reading. After the machine provided the reading, research staff noted the measurements and provided them to participants who asked.

Analytic Plan

Of the 250 participants who participated in the GOLD III pilot study, only two participants were missing data from any of the 10 items included in the HIV-RRS yielding an analytic sample of $n = 248$ for the psychometric analyses. Because the HIV-RRS is early in its development, an exploratory factor analysis (EFA) was conducted to examine the underlying structures. The recommended sample size for the study exceeded

the minimum sample recommendations by Bryant and Yarnold[68] for a sufficient factor analysis with a 25 to 1 subject to item ratio and at least 100 cases with 250 participants and 10 items in the scale. EFA with maximum likelihood estimation (MLE) extraction and Geomin rotation was used. As an oblique rotation, the Geomin rotation allows extracted factors to correlate, which was postulated given the similar conceptualization of items. Eigen values were also examined to assess the adequate number of factors to retain. The most accepted threshold for eigen values is greater than one.[69]

Using EFA and Confirmatory Factor Analyses (CFA) along with tests for configural and factorial invariance were completed using Mplus version 8.4.[70] Maximum likelihood parameter estimation (MLM) with standard errors was used because of the fairly distributional nature of the items (See Table 2.2 and Table 2.5). This standard approach is optimal in estimation as it provides complete information about the parameter of interest within its MLE estimator and the lowest-possible variance of parameter estimates.[71]

To assess the fit of the model to the data in the EFA, multiple fit indices were examined. The chi-square test of model fit tests the fit of the model against the model extracted from the EFA and assumes minimal difference between the population covariances and the model.[72] In this case, goodness of fit for the extracted model can be seen with a non-significant model chi-square test. The root mean square error of approximation (RMSEA) rescales the non-centrality parameter from the chi-square test of model fit. In other words, it adjusts for the sample size and estimates the discrepancy between the population covariance matrices and the model. Per Hu and Bentler, a good RMSEA fit is between 0.05 and 0.08.[73] A 90% confidence interval (90% CI) of the

RMSEA estimate is also provided by Mplus in addition to the Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) estimations. Both the CFI and TLI compare the extracted model to the fit of the baseline model with the data and values ≥ 0.95 indicate acceptable model fit.[73] Finally, the Standardized Root Mean Square Residual (SRMR) measures the square root of the residuals of the sample and hypothesized covariance matrix and values < 0.08 are considered to be a good fit.[73]

To confirm the factor structure, I also ran a CFA and tested the invariance of the factor structure (configural invariance) and the factor loadings (metric invariance) across participants based on race/ethnicity and epoch of diagnosis in the GOLD III study using the GROUPING and MLE commands in Mplus. Finally, a structural equation model was created to validate the final factor solution.

After the scale and sub-scales were confirmed, I examined all descriptive data, internal consistency, and validity which were conducted using Statistical Package for Social Sciences for Macintosh (SPSS) version 25.[74] Internal consistency was examined using the Cronbach's α coefficient. Additionally, convergent and discriminant validity were assessed using the Pearson's correlation r coefficient. Finally, after considering sample size, power of the statistical tests being used, and anticipated Type I and Type II error rates, I specified a 0.05 significance level for all tests.[75]

Results

Factor Analyses

I examined eigenvalues, factor loadings, scree plots and item error variance in the model to determine the ideal number of factors to retain. Two factors were extracted based on eigenvalues greater than one (4.32 and 1.46). The third factor had an eigenvalue

of 0.94; therefore, the model fit of the one-, two-, and three-factor structures were examined. After an initial review to decide if any items needed to be dropped using a high error variance cutoff of >0.70 and significant cross loading cutoff of >0.350, it was determined that all 10-items should remain in the scale. A three-factor model was the most parsimonious solution to demonstrate model goodness of fit ($\chi^2 = 49.78$, df = 18, $p < 0.001$) when compared to the one-factor ($\chi^2 = 263.40$, df = 35, $p < 0.001$) and two factor ($\chi^2 = 123.21$, df = 26, $p < 0.001$) models. As shown in Table 2.3, other indices adequately supported the three-factor solution as well with RMSEA = 0.084 (90% CI[1] = 0.057, 0.113), CFI = 0.965, TLI = 0.913, SRMR = 0.027.

I reviewed the 10-items for their underlying relationships and labeled the factors accordingly. Table 2.4 presents the descriptive statistics (Mean, SD), exploratory factors, and factor loadings for each of the items. The four items that loaded onto the first factor were related to bouncing back and learning to live with HIV/AIDS and thus it was labeled *Adaptive Coping*. As such, adaptive coping can refer to a conscious and active process that allows one to adjust in the face of stressors.[76] These four items conform well to this idea through dealing with setbacks and living a new normal life in spite of having HIV/AIDS. Factor Two was labeled *Optimism* because the three items indicate a sense of survival and hope in the face of living with HIV/AIDS. It is important to note that while one of the items in this factor has a standardized coefficient greater than 1.0, Jöreskog[77] and Deegan[78] indicate that while rare, it is not problematic when highly correlated variables are loaded onto the same factor. In this case, the correlations between the 8th and 6th item was 0.58 and the 8th and 9th item was 0.63, which were both higher than

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[1] A 90% confidence interval (CI) is the standard in Mplus output as the lower value of the CI includes or is near zero and the upper value is not very large (i.e. it is < 0.08).

almost all of the other inter-item correlations. Finally, the third factor contained the three items that were related to overcoming difficulties and despair related to living with HIV/AIDS. These items were also reverse coded so higher scores indicated that HIV did not dictate life trajectories and difficulties and thus was named *Effective Coping*. Research on effective coping suggests some of the main criteria that can be used to define it are resolution of stressful situations, normative social functioning, and return to prestress activities.[76] By not letting HIV dictate life circumstances or contribute to further difficulties, these three items fit well into this construct. The biggest distinction between adaptive coping and effective coping is that adaptive coping may involve learning how to live with the realities of HIV/AIDS through some type of change. Effective coping can lead to handling situations as they come without additional stress or burden being placed on an individual.

I then ran a second-order Confirmatory Factor Analysis (CFA) in an effort to evaluate the overall fit of the data to the proposed three factor solution. After examining the modification indices for the three-factor model, I added two cross-loadings (one within factor one and one within factor two) to improve model fit. More specifically, we allowed correlated error variance of items that were in the same factor, which is logical given that items within a factor may have correlated error variance. Subsequently, findings were similar with the three-factor EFA ($\chi^2 = 55.87$, df $= 30$, $p = 0.003$) with the χ^2 increasing slightly in the CFA. While a lower value may indicate a stronger fit, other indices adequately supported the three-factor solution for the CFA as well with RMSEA $= 0.059$ (90% CI $= 0.034$, 0.083), CFI $= 0.958$, TLI $= 0.937$, SRMR $= 0.049$. While there

was variability across factors, all ten items had strong standardized factor loadings (averaging > 0.70) (see Figure 1).

Configural and metric (factorial) invariance were assessed by race/ethnicity (see Table 2.5) and pre/post ART status (see Table 2.6). For this particular analysis of race/ethnicity, only members of three racial/ethnic groups were included: White, non-Hispanic, Black-non-Hispanic, and Hispanic/Latino so that distinct conclusions could be made. I ran bivariate analyses between the full HIV-RRS and the three sub-scales by both race/ethnicity and pre/post ART status. As indicated in Table 2.7, there were significant differences by race/ethnicity for the full HIV-RRS, and the adaptive coping and effective coping sub-scales where the Black, non-Hispanic participants scored significantly higher ($p < 0.05$) across the board. All participants were included in the pre/post ART analysis of configural and metric invariance.

The test of configural invariance across race/ethnicity produced an adequate overall model fit, $\chi^2 = 162.59$, df = 118, $p = 0.004$ with the indices supporting this as well, RMSEA = 0.072 (90% CI = 0.042, 0.097), CFI = 0.934, TLI = 0.924. All loadings were positive and loaded onto the three factors in a similar pattern across groups (e.g. White, Black, Hispanic/Latino). Using a nested model where all loadings were constrained to be equal across groups, I also tested for metric invariance by race/ethnicity. The model fit for the nested metric model for race/ethnicity was nearly satisfactory, $\chi^2 = 213.60$, df = 142, $p < 0.001$, with the indices supporting this as well, RMSEA = 0.083 (90% CI = 0.059, 0.105), CFI = 0.894, TLI = 0.899. The robust χ^2 test difference indicated that the loadings of the indicators were significantly different across groups $\chi^2_{diff} = 51.01$, $df_{diff} = 24$, $p = 0.003$.

tools or processes to overcome different challenges, especially related to living with HIV/AIDS.

Reliability

Analyses of internal reliability revealed Cronbach's α of at least 0.72 for the three factors (Factor 1, Adaptive Coping = 0.78; Factor 2, Optimism = 0.80 and Factor 3, Effective Coping = 0.72) all of which indicate acceptable values for newly developed scales.[79] Taken together, the 10 items produced a Cronbach's α of 0.84, all of which demonstrate good internal consistency reliability for the full scale and sub-scales. As seen in Table 2.8, the summed scores were inter-correlated ranging from $r = 0.34$ to $r = 0.59$ (each $p < 0.001$). In general, the factor totals were strongly correlated with the total measure score ranging from $r = 0.75$ to $r = 0.86$ (each $p < 0.001$). The Optimism sub-scale had the highest overall endorsed rating with a score of 4.29 (SD = 0.70) followed by the Adaptive Coping scale (3.90, SD = 0.75), and the Effective Coping scale (3.71, SD = 0.97). The average score of the full scale is 3.96 (SD = 0.64).

Validity

Convergent and discriminant validity was examined by comparing how the HIV-RRS and its three sub-scales were associated with other study variables through bivariate Pearson's correlations (see Table 2.9). There were significant moderately positive correlations between the HIV-RRS and its subscales with general resilience (Full, $r = 0.58$; Adaptive Coping, $r = 0.45$, Optimism, $r = 0.44$, Effective Coping, $r = 0.50$, all $p < 0.001$). The correlations between grit and the HIV-RRS were also significantly moderately positive (Full, $r = 0.36$; Adaptive Coping, $r = 0.25$, Optimism, $r = 0.33$,

Effective Coping, $r = 0.30$, all $p < 0.001$). When examining HIV-related stigma, both

sub-scales of gay-related stigma and attachment, and loneliness and the relationship with

the HIV-RRS scales, we can infer that higher levels of resilience are significantly

associated with lower levels of each of the aforementioned psychosocial outcomes (all at

least $p < 0.05$), with the exception of the *Optimism* sub-scale of the HIV-RRS and the

Attachment: Anxiety measure. Similarly, level of overall outness had a weak-moderate

correlation between the HIV-RRS scales (Full, $r = 0.31$; Adaptive Coping, $r = 0.34$,

Optimism, $r = 0.23$, Effective Coping, $r = 0.18$, all $p < 0.001$). Finally, there were no

statistically significant associations between any of the HIV-RRS scales and BMI,

diastolic, or systolic Blood Pressure which was to be expected given they are unrelated

constructs.

Discussion

The primary goal of this analysis was to develop a resilience assessment tool and

examine the underlying factor structure and psychometric properties of the 10-item HIV-

RRS to assess the extent to which PLWHA exhibit resilience specifically related to living

with HIV/AIDS. From the initial pool of 12 items, two of the items were removed prior

to the initial pilot testing of the instrument. After implementing it in the GOLD III pilot

study, all of the 10 remaining items loaded onto three distinct factors that were

subsequently labeled, adaptive coping, optimism, and effective coping. A second-order

confirmatory factor analysis supported the three-factor exploratory solution. The internal

consistency statistics for the full scale and each of the three sub-scales supported the

measure's internal reliability. While there was evidence for configural invariance, there

was no evidence of metric invariance. Findings also indicate construct validity due to the

significant association between the HIV-RRS and the Brief Resilience Scale[33] and HIV-related stigma.[60] Additionally, nonsignificant associations between BMI and blood pressure with the HIV-RRS provide evidence for the measure's discriminant validity.

This tool fills a gap in the literature as it was specifically designed with PLWHA in mind.[30] Measuring resilience among PLWHA provides information to clinicians, researchers, and community stakeholders so that they can help organizations and institutions build more effective programming. Capitalizing on resilience can also help allocate limited resources more efficiently.[80] More specifically, resilience may result in an increased capacity to access and participate in existing support systems. This could also lead to the development of early-intervention programs for newly diagnosed PLWHA. Additionally, operationalizing resilience in the context of living with HIV/AIDS will help researchers understand whether it mediates the relationship between health outcomes and adversities faced by PLWHA.[13]

The three factors that emerged from the analysis (adaptive coping, optimism, and effective coping) of this tool are consistent with previous studies on resilience among PLWHA.[20,53] Emlet et al.[20] initially conducted semi-structured qualitative interviews with 25 PLWHA aged 50 and older to examine experiences of ageism and stigma yet the topic of resilience and strengths-based living emerged spontaneously. Many of the participants expressed positive outlooks on aging with HIV/AIDS and remained optimistic about achieving future goals and maintaining good health practices.[20] Similar results were found in an analysis conducted by Fang and colleagues[53] where they utilized four indicator variables consisting of coping self-efficacy, hope/optimism, active coping, and social support to make up resilience in order to examine health related quality of life in a

sample of PLWHA over 50 years old. The results from their structural equation model supported this multifaceted approach to resilience. Participants with greater resilience had better well-being and physical health outcomes; moreover, the negative impacts of stressors were mitigated by the presence of resilience.[53]

There is also an emerging body of work that has examined both adaptive and maladaptive coping strategies among PLWHA.[81-84] Gibson and colleagues found that a greater use of maladaptive coping strategies was associated with lower mental health quality of life and that is also acted as a moderator between stressors and mental health.[83] Interestingly, Earnshaw et al.[84] also examined adaptive coping strategies and its relationship to HIV stigma and found that neither adaptive coping or emotional social support acted as a resilience resource in relation to anticipated HIV stigma or symptoms related to living with HIV. These findings support the need for a multidimensional approach to HIV-related resilience.

The notion of effective coping has also been examined across several different cohorts of PLWHA.[85-87] A Danish study on PLWHA found those who had greater coping self-efficacy scores reported lower levels of depression and they were more likely to disclose their HIV status to others instead of living in secret.[86] Research also suggests that learning from experience and direct action may lead to more effective coping mechanisms.[85] In other words facing a problem directly instead of letting it dictate thoughts or actions is indicative of effective coping. The items compromising the effective coping sub-scale of the HIV-RRS are aligned with this conceptualization.

Limitations

Some limitations should be considered. These data were collected from a sample of gay HIV-positive men who live in the New York City metropolitan area where there are community-based resources such as SAGE and GMHC that are easily accessible. Therefore, these findings may not be generalizable for PLWHA who live in parts of the country and world and where health-related resources and services for sexual minority individuals may not be as abundant. I was also limited in our ability to employ test-rest approaches to analyzing the data given the cross-sectional study design. Additionally, the presence of metric variance between racial/ethnic and pre-/post-ART groups warrants further examination. One possible explanation for its presence in the current analysis is the relatively low sample size per each sub-group compared to the recommended minimum of at least 100[88] but with more than 200 participants per sub-group being ideal.[89] It is also important to note that age may be confounded with epoch of diagnosis although for this analysis epoch is a proxy for age given the main outcomes of interest.

The post-secondary education level of our sample is higher than the general population of the United States.[90] Further investigation should examine whether educational level is associated with HIV-related resilience. Finally, the HIV-RRS could be improved via additional item development centering around environmental, community-based and other multilevel factors of resilience, all of which are frequently lacking in many measures of resilience.[30,36]

These limitations were balanced by some noteworthy strengths. This is one of the first explorations on HIV/AIDS and resilience among gay-identified men and not 'gay, bisexual, and other men who have sex with men (MSM).' While MSM has been used in HIV-related literature since the early 1990's after being coined by the CDC in 1994,[91] it

was important to make this distinction as using umbrella terms such as MSM implies a

lack of specificity around social identity as it is behaviorally defined. Inherently, being

gay is much different than being bisexual or just engaging in same-sex behaviors while

identifying as straight—while the sexual behavior may be very similar, the feelings and

salience are quite different. Additionally, our sample was very diverse with regard to

race/ethnicity, educational attainment, financial situation, and epoch of diagnosis. Finally,

several robust psychosocial measures were also included in this analysis which allow for

unique validity and reliability testing in this population, which is something that has not

been done to date.

In this paper, I provide support for the HIV-RRS. This tool is the first of its kind

to provide a meaningful way to assess resilience in a specifically tailored way among

PLWHA, which may be helpful to clinicians and researchers working with this

population. An imperative next step is to implement the instrument in other sub-groups of

PLWHA (people who inject drugs, women, transgender individuals, etc.) to determine

the stability of the measure over time and across other diverse populations. Another step

is to assess these constructs of HIV-resilience with other health-related outcomes

including mental, neurocognitive and physical health. Furthermore, as PLWHA age, it is

critically important to harness a strengths-based approach to health and care and move

away from the deficits-based approaches that have historically dominated the promotion

of population and public health.[92]

Conclusions

The HIV- Related Resilience Screener is a psychometrically sound instrument to

assess resilience among PLWHA. With three sub-scales, adaptive coping, optimism, and

effective coping, the multidimensional HIV-RRS can be used in future research studies

and clinical settings. Looking forward, we recommend continued testing in different populations of PLWHA to ascertain its stability across different groups, geographic locations, and over time. The HIV-RRS will help clinicians, researchers, and practitioners move towards a more holistic strengths-based approach to working with PLWHA.

Tables and Figures

Table 2.1 Basic Demographics of GOLD III Study Sample (*n* = 250)

Demographic	n (%)
Age (median)	56
Race/Ethnicity (n = 245)	
White, non-Hispanic	80 (32.0)
Black, non-Hispanic	103 (41.2)
Hispanic	44 (17.6)
Mixed/Asian/Other, non-Hispanic	18 (7.2)
Educational Attainment (n = 248)	
High School or Less	24 (9.6)
High School Diploma or GED	60 (24.0)
Associate's Degree	46 (18.4)
Bachelor's Degree	74 (29.6)
Graduate Degree	44 (17.6)
Perceived Financial Situation (n = 247)	
I have enough money to live comfortably	86 (34.4)
I can barely/I cannot get by on the money I have	161 (64.4)
Time of Diagnosis (n = 246)	
Pre-ART	152 (60.8)
Post-ART	94 (37.6)

Table 2.2 Item Response Distribution of the HIV-Related Resilience Screener ($n = 250$)

Item	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
			Frequency (%)		
1. I can bounce back from difficult situations caused by HIV/AIDS^	7 (2.8)	22 (8.8)	50 (20.0)	**126 (50.4)**	43 (17.2)
2. I have learned to live my life with HIV/AIDS†	6 (2.4)	4 (1.6)	14 (5.6)	102 (40.8)	**123 (49.2)**
3. HIV-related issues are difficult for me to deal with [R]†	74 (29.6)	**102 (40.8)**	36 (14.4)	31 (12.4)	6 (2.4)
4. Living with HIV/AIDS is normal to me†	14 (5.6)	21 (8.4)	38 (15.2)	**108 (43.2)**	68 (27.3)
5. I can deal with setbacks caused by HIV/AIDS†	7 (2.8)	15 (6.0)	52 (20.8)	**129 (51.6)**	46 (18.4)
6. I have hope for the future despite the fact that I am living with HIV/AIDS†	6 (2.4)	9 (3.6)	31 (12.4)	**103 (41.2)**	100 (40.0)
7. HIV/AIDS dictates how I live my life [R]^	70 (28.0)	**76 (30.4)**	34 (13.6)	47 (18.8)	21 (8.4)
8. Surviving HIV/AIDS is important to me†	4 (1.6)	1 (0.4)	19 (7.6)	95 (38.0)	**130 (52.0)**
9. I can manage my HIV/AIDS†	3 (1.2)	3 (1.2)	16 (6.4)	111 (44.4)	**116 (46.4)**
10. It is difficult for me to live with HIV/AIDS [R]†	**89 (35.6)**	86 (34.4)	27 (10.8)	31 (12.4)	16 (6.4)

[R] = Reverse coded items, bolded represent modal responses, ^ = two responses missing, † = one response missing

Table 2.3 Exploratory Factor Analyses and Model Fit Statistics

Factors in Solution	Model x^2 fit test	RMSEA	90% CI of RMSEA	CFI	TLI	SRMR
1	263.40***	0.162	0.144, 0.181	0.751	0.680	0.089
2	123.21***	0.123	0.101, 0.145	0.894	0.816	0.049
3	49.78***	0.084	0.057, 0.113	0.965	0.913	0.027
4	24.69**	0.071	0.033, 0.108	0.985	0.939	0.018

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

Table 2.4 Descriptive statistics and exploratory factor analysis results run as continuous variables for the HIV-Related Resilience Screener

Exploratory Factor	Mean (SD)^	Factor 1: Adaptive Coping	Factor 2: Optimism	Factor 3: Effective Coping
1. I can bounce back from difficult situations caused by HIV/AIDS	3.71 (0.95)	**0.599***	0.015	0.085
2. I have learned to live my life with HIV/AIDS	4.33 (0.85)	**0.458***	0.297*	-0.012
4. Living with HIV/AIDS is normal to me	3.78 (1.12)	**0.569***	0.059	0.142
5. I can deal with setbacks caused by HIV/AIDS	3.77 (0.92)	**0.838***	-0.088	-0.008
Factor 1: Adaptive Coping Total	3.90 (3.90)	-	-	-
6. I have hope for the future despite the fact that I am living with HIV/AIDS	4.13 (0.94)	0.012	**0.587***	0.256*
8. Surviving HIV/AIDS is important to me	4.39 (0.78)	-0.370	**1.153***	-0.004
9. I can manage my HIV/AIDS	4.34 (0.76)	0.177	**0.621***	0.041
Factor 2: Optimism Total	4.29 (0.70)	-	-	-
3. HIV-related issues are difficult for me to deal with [R]	3.83 (1.06)	0.185	-0.013	**0.496***
7. HIV/AIDS dictates how I live my life [R]	3.51 (1.31)	-0.187	0.003	**0.807***
10. It is difficult for me to live with HIV/AIDS [R]	3.81 (1.23)	0.009	0.002	**0.774***
Factor 3: Effective Coping Total	3.71 (0.97)	-	-	-
HIV Resilience Scale Total	3.96 (0.64)	-	-	-

[R] = Reverse coded items, ^ = the range for all items, including sum-scores was 1 – 5, * significant at $p = < 0.05$, bolded represent factor loadings < 0.400

Figure 2.1 Standardized Parameter Estimates of the Second-Order Three-Factor Model of HIV-Related Resilience ($n = 247$)

.089 (.127)

.709 (.050)

hivres2

hivres1

.567 (.086)

-.371 (.131)

.497 (.071)
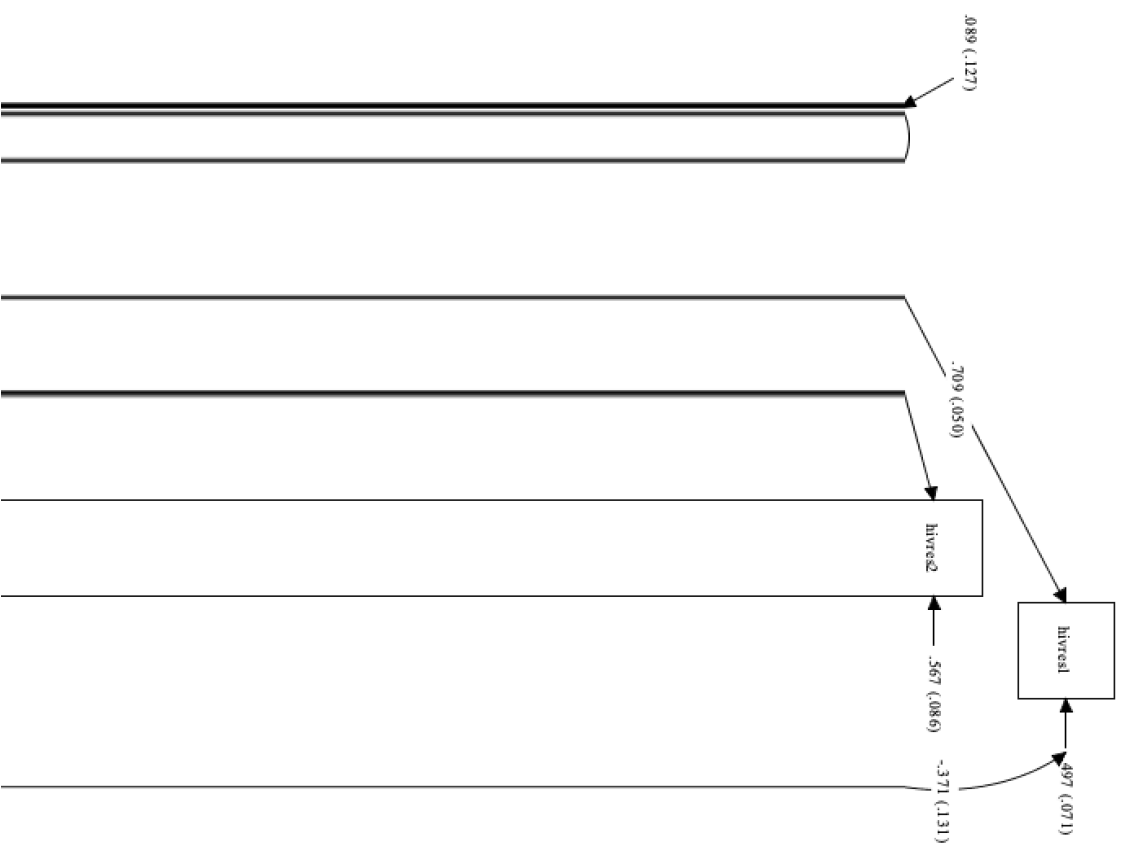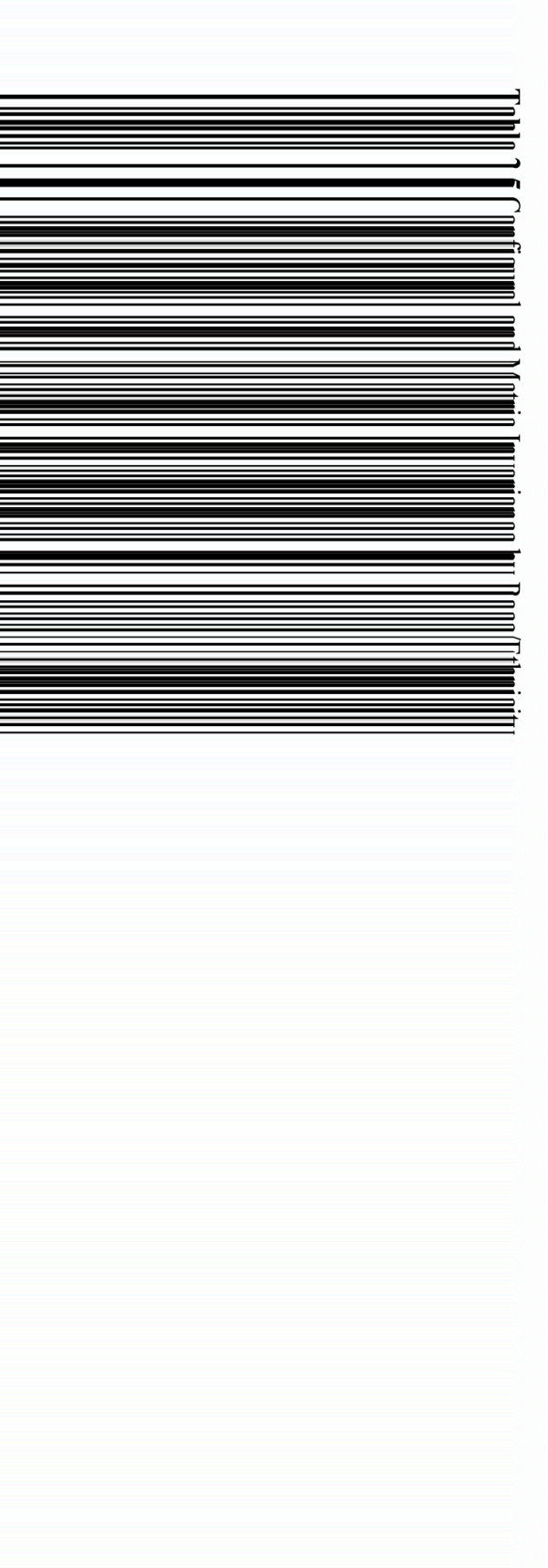
Table 2.6 Configural and Metric Invariance by Epoch of Diagnosis

Exploratory Factor	Original Factor Loading	Configural Invariance Loading (SE)*		Metric Invariance Loading (SE)*	
		Pre-ART	Post-ART	Pre-ART	Post-ART
Factor 1: Adaptive Coping					
1. I can bounce back from difficult situations caused by HIV/AIDS	0.599	0.665 (0.057)	0.813 (0.046)	0.713 (0.045)	0.714 (0.044)
2. I have learned to live my life with HIV/AIDS	0.458	0.678 (0.062)	0.670 (0.092)	0.668 (0.069)	0.669 (0.069)
4. Living with HIV/AIDS is normal to me	0.569	0.719 (0.050)	0.756 (0.064)	0.745 (0.047)	0.746 (0.050)
5. I can deal with setbacks caused by HIV/AIDS	0.838	0.693 (0.054)	0.806 (0.037)	0.737 (0.046)	0.738 (0.038)
Factor 2: Optimism					
6. I have hope for the future despite the fact that I am living with HIV/AIDS	0.587	0.802 (0.057)	0.950 (0.066)	0.888 (0.041)	0.859 (0.054)
8. Surviving HIV/AIDS is important to me	1.153	0.756 (0.068)	0.636 (0.054)	0.685 (0.074)	0.633 (0.057)
9. I can manage my HIV/AIDS	0.621	0.929 (0.053)	0.950 (0.064)	0.968 (0.053)	0.958 (0.070)
Factor 3: Effective Coping					
3. HIV-related issues are difficult for me to deal with	0.496	0.581 (0.065)	0.635 (0.075)	0.577 (0.059)	0.533 (0.074)
7. HIV/AIDS dictates how I live my life	0.807	0.593 (0.052)	0.642 (0.066)	0.616 (0.052)	0.572 (0.061)
10. It is difficult for me to live with HIV/AIDS	0.774	0.795 (0.051)	0.924 (0.036)	0.890 (0.029)	0.867 (0.038)

* All standardized loadings were significant at 0.05

Table 2.7 Mean HIV-Related Resilience Scores by Race/Ethnicity and Epoch of Diagnosis

	n (%)	Full Scale	Adaptive Coping	Optimism	Effective Coping
Race/Ethnicity (*n* = 227)					
Hispanic	44 (17.6)	3.78 (0.65)	3.66 (0.78)	4.21 (0.68)	3.50 (1.01)
Black, non-Hispanic	103 (41.2)	4.01 (0.62)	3.98 (0.76)	4.39 (0.71)	3.89 (0.92)
White, non-Hispanic	80 (7.2)	3.95 (0.64)	3.95 (0.64)	4.27 (0.66)	3.60 (1.00)
p-value		**0.030**	**0.036**	0.283	**0.036**
Epoch of Diagnosis (*n* = 249)					
Pre-ART	152 (60.8)	3.96 (0.64)	3.89 (0.74)	4.33 (0.73)	3.69 (0.96)
Post-ART	94 (37.6)	3.95 (0.64)	3.89 (0.75)	4.21 (0.64)	3.77 (0.96)
p-value		0.898	0.969	0.185	0.522

Table 2.8 HIV-Related Resilience Total Scale and Sub-Scale Correlations

	1	2	3	4
1. HIV Resilience: Full Scale	-			
2. HIV Resilience: Adaptive Coping	0.86*	-		
3. HIV Resilience: Optimism	0.75*	0.59*	-	
4. HIV Resilience: Effective Coping	0.78*	0.46*	0.34*	-

*$p < 0.001$

Table 2.9 Correlations of Major Convergent and Discriminant Variables of Interest with HIV-Related Resilience

	HIV-Related Resilience			
	Full Scale	Adaptive Coping	Optimism	Effective Coping
Brief Resilience Scale	0.58*	0.45*	0.44*	0.50*
Grit-S Scale	0.36*	0.25*	0.33*	0.30*
HIV-Related Stigma	-0.54*	-0.44*	-0.34*	-0.50*
Gay-Related Stigma: Personalized Stigma	-0.36*	-0.26*	-0.25*	-0.35*
Gay-Related Stigma: Public Attitudes	-0.29*	-0.30*	-0.13***	-0.25*
Outness	0.31*	0.34*	0.23*	0.18*
Attachment: Anxiety	-0.24*	-0.17*	-0.08	-0.29*
Attachment: Avoidance	-0.17**	-0.17**	-0.16**	-0.09
Loneliness	-0.44*	-0.30*	-0.32*	-0.43*
Body Mass Index (BMI)	-0.02	-0.02	0.09	-0.08
Systolic Blood Pressure	0.01	-0.05	-0.02	0.09
Diastolic Blood Pressure	0.00	-0.05	-0.06	0.09

*$p < 0.001$, **$p < 0.01$, ***$p < 0.05$

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CHAPTER III: MENTAL HEALTH CORRELATES OF HIV-RELATED RESILIENCE AMONG GAY MEN AGE 50 – 69 LIVING WITH HIV/AIDS

Abstract

Of all people living with HIV/AIDS (PLWHA), those who are 50 and older will soon represent greatest proportion in the United States by 2025. Sexual minority men (e.g. gay, bisexual, and other men who have sex with men) continuing to be disproportionally impacted. As HIV-positive gay men continue to age, they face multiple mental and psychosocial health challenges that may impact their overall health and well-being. An emerging body of literature suggests that resilience may act as a buffer to the negative impact of these challenges. Testing positive for HIV/AIDS can yield different emotions including shock, anger, and hopelessness. Additionally, anxiety, depression, PTSD, and suicidality are critical mental health conditions facing older PLWHA. Coupled together, the aging process along with the long-term impact of HIV treatments, fragmented social networks, and potential structural barriers in attaining and adhering to care may also impact these synergistic health states. In this study, we utilized a newly developed and psychometrically tested HIV-related resilience screener (HIV-RRS) to examine mental health associations among older (age 50 – 69) HIV-positive gay men in the New York City metropolitan area. On average, our results from multivariate analyses indicate that those who had higher levels of HIV-related resilience were significantly more likely to have lower levels of PTSD and substance dependence and were also more likely to feel financially secure. While further research is warranted to better understand the role that resilience has on the overall health and well-being of older gay men living

with HIV/AIDS, utilizing this perspective in research can yield important insights that

can be used to shift towards strengths-based service and programmatic approaches.

Introduction

It is well documented that PLWHA experience higher rates of mental health
disorders as compared to the general population,[1-7] and testing positive for HIV/AIDS
can generate different emotional responses including hopelessness, anger, and shock.[8]
According to the National Institute of Mental Health (NIMH), nearly one in five adults in
the United states are living with a mental illness.[9] The World Health Organization
elucidates that mental health is a state of well-being in which an individual can cope with
the normal stresses of life and work productively by realizing his or her own abilities
while also making a contribution to the community.[10] Common mental illnesses include
anxiety disorders, major depression and other mood disorders, substance use disorders,
and posttraumatic stress disorder (PTSD).[11] While research on mental health has greatly
improved over the last 20 years, only two of the 15 objectives for the Healthy People
2020 mental health indicators have improved or met/exceeded targets with nine
indicators remaining the same or getting worse.[12] More specifically, improvements have
not been seen in the areas of suicide prevention or sufficient employment opportunities
for adults with serious mental illness.[12] Mental health and physical health are closely
linked—individuals who struggle with illnesses such as anxiety and depression may have
trouble participating in health-promoting behaviors.[13] Moreover, having chronic health
conditions such as diabetes,[14] cardiovascular disease,[15] and HIV/AIDS have been
associated with increased likelihood of experiencing mental health diagnoses.[8,16]

In the United States, the Centers for Disease Control and Prevention (CDC)
estimates that nearly 1.1 million people are living with HIV/AIDS.[17] While the epidemic
still disproportionally affects gay and bisexual men, injection drug users and heterosexual

women accounted for almost one-third of new HIV diagnoses in 2018.[18] Due to the

advancement of biomedical technology to both treat and prevent the transmission of

HIV/AIDS,[19,20] there is a push of 'getting to zero' new HIV infections by 2030 by setting

ambitious goals around treatment and prevention.[21] While this effort is incredibly

important, not addressing the mental health challenges many people living with

HIV/AIDS (PLWHA) face, it will be difficult if not impossible to achieve these goals.[16]

Implied in these mental health challenges are the major structural and systemic barriers

(e.g. HIV-related stigma,[22] food insecurity,[23] and poverty[24]) that hinder equitable access

to mental and HIV-related healthcare.

Major depression[3,5] and generalized anxiety disorder[4] are very common mental

health co-morbidities facing PLWHA. In a representative sample of 2,864 adults seeking

treatment of HIV, researchers found that 36% of the patients received a depression

diagnosis and 16% were diagnosed with generalized anxiety disorder.[1] Similarly, findings

from a 2-year longitudinal study of anxiety syndromes and symptoms among gay men

living with HIV/AIDS highlight a linear relationship between HIV symptoms (e.g.

unexplained fever or night sweats), anxiety, and fatigue.[6] While causal evidence between

depression and negative health outcomes in PLWHA is limited, findings from a meta-

analysis suggest it is highly probable that depressive symptoms, including diminished

concentration, overall loss of interest and feelings of worthlessness, can be disruptive to

treatment adherence.[5]

There is also a growing body of work documenting the impact of both post-

traumatic stress disorder (PTSD)[25-29] and suicidality[30] among PLWHA. Results from a

meta-analysis found that the rate of recent PTSD among HIV-positive women is close to

30.0% (CI=18.8-42.7%) which is five times the estimates of the general population.[31]

Other estimates in the United States suggest the rate is between 10% and 74%.[32-34] which

indicates more research needs to be conducted in this area in order to ascertain a more

accurate estimate. Moreover, psychosocial stressors such as HIV-related stigma have

been associated with different mental health outcomes including depression,[35]

suicidality,[36] and increased PTSD symptomology[37] in PLWHA. Similar to depression and

anxiety, other research found that avoidance of trauma reminders or re-traumatization

may hinder ART adherence.[26,38] Widespread disruption in ART adherence will make

ending the epidemic by 2030 considerably more challenging.

HIV-related stigma has also been documented to be associated with poorer mental

health outcomes among PLWHA.[39,40] In a meta-analysis of demographic correlates of

stigma and health, higher levels of stigma was significantly associated with adverse

mental health ($p < 0.001$) and while many of the other demographic correlations

examined were medium, individuals would be impacted on a daily basis. Limited

research suggests that resilience may mitigate the impact of HIV-related stigma among

PLWHA.[41,42] Understanding whether dimensions of HIV-related resilience have the same

effect is an important point of investigation.

PLWHA demonstrate an increased likelihood of depressive symptoms, substance

use disorders, and mania compared to age-matched HIV-negative cohorts.[43,44] A review

of substance use among older PLWHA found that this population remains

disproportionally impacted by substance use, especially as they age.[45] These findings are

supported by Ompad and colleagues[46] who found that the majority (94.8%) of older

PLWHA were at medium or high risk for alcohol use disorder and almost half (48.4%) of

participants had used other illicit substances (e.g. cocaine, crack, heroin, etc.) within the last 12 months. With regard to other mental health outcomes, a recent study examining depression and aging with HIV, researchers found that 58% of PLWHA had elevated depressive symptoms compared to 38% of HIV-negative individuals.[47] In the same study, the oldest cohort of PLWHA who did not endorse depressive symptoms had the highest scores on psychological factors including self-rated successful aging, grit, and resilience.[47] These findings highlight the need to examine resilience and its association with mental health outcomes more closely.

There are many different definitions of resilience that exist within the literature as it can be understood as a trait, process, outcome, or a combination of all three.[48] Halkitis et al.[49] explain that, as a trait, resilience refers to strength of character, determination, grit, and resourcefulness. It is an innate ability or temperament that allows one to meet the challenges of life that expressed via action (or inaction) in response to a stressful situation.[49] An emerging program of literature suggests that resilience can be a protective factor against negative mental health stressors.[50-52] While, King & Orel[53] found that older gay men living with HIV/AIDS with higher levels of resilience indicated fewer mental health burdens, there is very scarce literature available that examines the relationship between resilience and mental health outcomes among PLWHA.

Understanding the mental health correlates of resilience in HIV-positive individuals will help inform interventions and policies and help to not only reduce negative outcomes but also to capitalize on specific resources within a community and/or population.[54] Through this analysis, a newly developed assessment tool of HIV-related resilience will be utilized to assess mental health associations in a cohort of older, aged

50-69, gay men living with HIV/AIDS. I hypothesize that our findings will be consistent with previous work in that participants with higher resilience scores will have lower levels of depression, PTSD, anxiety, suicidality, and substance use/misuse. I also hypothesize there may be there may be potential differences in HIV-related resilience occurring between sociodemographic categories (age, race/ethnicity, perceived financial situation, educational attainment, and epoch of diagnosis (pre/post ART)) based on previous investigations that found differences.[55,56] Further, I will examine whether HIV-related resilience mediates the relationship between HIV-related stigma and mental health outcomes. Understanding these drivers can help researchers, practitioners, and policy makers implement new and innovative programming that supports older PLWHA.

Methods

Target Population, Study Eligibility, and Study Recruitment

The target population for this study was HIV-positive gay men living in the New York City metropolitan area. Study inclusion criteria included a documented HIV+ status, between the ages of 50-69, assigned male at birth, and currently identify as male, TBI-negative (or loss of consciousness < 30 minutes), proficient in English, and self-identify as gay. In addition, participants had to be comfortable discussing aspects of their physical and mental health with study staff members. We recruited participants from dating/sex mobile apps and websites (e.g. Daddyhunt, Grindr, Craigslist, etc.), gay-related events throughout New York City (NYC) (Pride parades, festivals and events in all boroughs, book bar nights, book talks, etc.), community-based organizations (SAGE, Health Clinics, GMHC, etc.) and word of mouth. Between April 2017 and October 208, a total of N = 581 individuals screened for the GOLD III study. While a total of N = 308

people screened eligible for the study however, 37 people did not come in for the study visit and 21 people had screened eligible and/or completed the study at another point in time which generated a final analytic/target sample of N = 250 participants.

Study Procedures

To confirm eligibility, participants were asked to provide proof of age (through valid identification) and HIV status via medication bottle (other than Truvada, which is also used as Pre-Exposure Prophylaxis (PrEP)), AIDS Drug Assistance Program (ADAP) card, doctor's note, or lab results. After eligibility was confirmed, informed consent was obtained by trained researchers and they answered any questions participants had. During the study visit, participants completed an audio computer-assisted self-interviewing (ACASI) survey. Upon completion of the ACASI, the MINI International Neuropsychiatric Interview (MINI)[57] was administered by a member of the study staff who received training by one of two mental health counselors employed at the Center for Health, Identity, Behavior, and Prevention Studies (CHIBPS), a research center at New York University. Participants were paid a $50 stipend at the end of the interview and were also offered condoms, lubricant, and a community resource referral packet. All project staff completed research ethics and compliance training through the CITI program in accordance with the National Institutes of Health (NIH) guidelines for working with human subjects. The study protocol was initially approved by the New York University Institutional Review Board in 2017 and subsequently by the Rutgers University Institutional Review Board in 2018.

Measures

Demographics

Participants were asked to verify their age with a valid piece of identification (driver's license, birth certificate, passport, etc.). For the present study, the age variable has been dichotomized with one group being aged 50-59 and the other 60-69. Next, participants self-reported their race/ethnicity, educational attainment, and perceived financial situation. Race/ethnicity was categorized as 'White, non-Hispanic,' 'Black, non-Hispanic,' 'Hispanic,' and all other groups racial/ethnic groups were categorized as 'Mixed, Asian, and other, non-Hispanic.' Educational attainment was categorized as 'high school or less,' 'high school diploma or GED,' 'Associate's degree', 'Bachelor's degree,' and all Master's and other terminal (PhD, JD, MD, etc.) degrees were collapsed into a single 'Graduate degree' category. Socioeconomic status was assessed by asking whether participants had enough money to get by on. For the present study, answers were dichotomized into 'I have enough money to live comfortably,' and 'I can barely/I cannot get by on the money I have.' Finally, participants were asked about information related to their HIV-diagnoses including the year in which they were diagnosed and whether they have ever received an AIDS diagnosis or history of Opportunistic Infections. Time of diagnosis was dichotomized as 'pre-ART,' with those diagnosed with HIV/AIDS prior to or in 1995, and 'post-ART' which included those who were diagnosed in or after 1996. For both the history of AIDS diagnosis or Opportunistic Infection, participants could select 'no' or 'yes'.

Resilience

HIV Resilience: I utilized the recently validated (see Chapter 2) 10-item HIV-Related

Resilience Screener (HIV-RRS) to examine HIV-related resilience in a sample of older

HIV-positive gay men. Scale items include statements such as 'I can bounce back from

difficult situations caused by HIV/AIDS,' 'Surviving HIV/AIDS is important to me,' and

'HIV/AIDS dictates how I live my life.' Participants responded to each item on a 5-point

Likert with 1 being 'strongly disagree' and 5 being 'strongly agree.' After three of the

items were reverse coded, respondent's scores for the individual items were averaged and

summed to create a total score with higher scores indicating higher levels of HIV-related

resilience. The full tool and its three sub-scales (Adaptive Coping, Optimism, and

Effective Coping) all have strong psychometric properties with the full scale having a

coefficient α of 0.84. The sub-scales also had strong reliability statistics with the

following α scores: Adaptive Coping = 0.78; Optimism = 0.80 and Effective Coping =

0.72.

Mental Health and Psychosocial Stressors

Post-Traumatic Stress Disorder: To evaluate PTSD, the PTSD Checklist-Civilian (PCL-

C)[58] was utilized. This tool is a self-report measure that asks about symptoms in relation

to generic 'stressful experiences' that have bothered subjects in the past month. Items

include 'repeated, disturbing memories, thoughts, or images of a stressful experience

from the past,' 'feeling very upset when something reminded you of a stressful

experience from the past,' and 'feeling emotionally numb or being unable to have loving

feelings for those close to you.' Participants would respond to each item on a 5-point

Likert scale ranging from 1, 'not at all' to 5, 'extremely.' The PCL-C can be scored in a

couple of different ways but in an effort to keep scoring consistent with other mental health measures included in the present study, responses were totaled and coded as 'symptomatic' or 'non-symptomatic.' To be considered symptomatic, respondents needed to endorse at least one question from the first five items, three questions from items 6-12, and at least two questions from items 13-17 with a response of moderate (3) or above (4-5). The PCL-C has demonstrated adequate specificity and sensitivity as a screening instrument within civilian (non-military) populations.[59]

MINI International Neuropsychiatric Interview (MINI): To assess the other Axis I disorders in addition to PTSD, we used four of the mental health modules of the Mini International Neuropsychiatric Interview (MINI)[57] to ascertain suicidality in addition to the lifetime and recent occurrence of Major Depressive Disorder, Substance Dependence, and Generalized Anxiety Disorder (GAD). The MINI is a semi-structured clinician-administered interview with documented reliability and validity,[57,60] and as such is considered the gold-standard structured diagnostic tool for clinicians and researchers. The module on suicide investigates recent (past month) suicidal ideation, including its frequency and intensity, and includes questions about lifetime suicide plans and attempts. For all of the modules, negative responses to the first 1–2 screening questions rule out the diagnoses of the disorder. The total administration time for the MINI was 10-15 minutes.

HIV-related Stigma: HIV-related stigma was evaluated using the 40-item Berger HIV Stigma scale.[61] Berger and colleagues created this measure to assess self-perceived stigma among PLWHA, specifically related to HIV/AIDS. Some items include 'some people act as though it's my fault I have HIV,' 'some people who know have grown more

distant,' and 'in many areas of my life, no one knows I have HIV.' After reverse coding two of the items, the HIV stigma scale is scored by totaling responses from a four-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree) with higher scores representing higher levels of stigma. In the current study, our reliability testing indicated that the scale has a coefficient α of 0.96.

Data Analysis

First, exploratory data analyses were undertaken to examine all independent and dependent variables of interest. Next, t-tests and one-way analysis of variance (ANOVA) tests were utilized to examine differences in key sociodemographics of interest (age, race/ethnicity, educational attainment, perceived familial situation, time of diagnosis, and history of AIDS diagnosis or opportunistic infection) and mental health outcomes (PTSD, depression, suicidality, substance dependence, and anxiety). Subsequently, hierarchical multiple regression (HMR) analyses examined the independent associations of HIV-related resilience and each of the sub-scales (adaptive coping, optimism, and effective coping) with mental health outcomes after controlling for the significantly associated demographics.

After considering anticipated Type I and Type II error rates, sample size, and the power of the statistical tests being used, a $p < 0.05$ significance level was specified for all tests.[62] For each separate analysis, predictor variables were grouped and entered into separate blocks; sociodemographic variables with p-values < 0.05 (e.g., perceived financial situation and history of AIDS diagnosis) were entered into the first block and mental health variables (e.g., PTSD, general anxiety disorder, substance dependence, suicidality, and depression) with p-values < 0.05 were entered into the second block.

There was little missing data because all study activities occurred in-person which is a

key strength of this study. While participants could refuse to answer any question, they

could not select 'don't know' or utilize any other method of skipping an item. For all

multivariate analyses, the maximum number of missing cases was n=3. Despite the

potential for multicollinearity between the mental health outcomes, especially PTSD and

depression, PTSD retained its significance while controlling for depression in the

multivariate analyses. Additionally, bivariate associations were conducted to examine the

associations between these variables. All univariate, bivariate, and regression analyses

were conducted using Statistical Package for Social Sciences for Macintosh (SPSS)

version 25.[63]

A mediation analysis was also undertaken to determine whether HIV-related

resilience may mediate the relationship between a psychosocial stressor, HIV-related

stigma, and mental health outcomes. A mental health sum score was created totaling the

number of participants who endorsed PTSD, depression, suicidality, substance

dependence, and generalized anxiety disorder. Under half of the sample ($n = 101$, 40.4%)

did not meet the criteria for any mental health diagnoses, 29.2% ($n = 73$) endorsed one

diagnosis, 16.0% ($n = 40$) endorsed two diagnoses, 8.4% ($n = 21$) endorsed three

diagnoses, 5.2% ($n = 13$) endorsed four diagnoses and 0.8% ($n = 2$) met the criteria for all

five of our measured mental health outcomes. HIV-related stigma and HIV-related

resilience were assessed utilizing the full scales for both variables. Using Mplus version

8.4,[64] the weighted least square mean and variance adjusted (WLSMV) estimator was

applied as it does not assume normally distributed variables[65] which was appropriate

given the slightly skewed distribution of the mental health outcome variable. A Sobel test was performed to test the significance of the mediation effect.

Results

Sample Characteristics

The GOLD III study cohort was very diverse with regard to the key sociodemographic characteristics of interest as demonstrated in Table 3.1. A majority of the sample (70.0%, $n = 175$) were between the ages of 50 - 59 and the remaining 29.6% ($n = 74$) were between 60 – 69. With regard to race/ethnicity, Black, non-Hispanics (41.2%, $n = 103$) were the most represented racial group followed by White, non-Hispanics (32%, $n = 80$), Hispanic/Latinos (17.6%, $n = 44$), and all other racial groups (Asian, mixed race, and other-racial identity) (7.2%, $n = 18$), respectively. Educational attainment was relatively distributed across all levels of education with a majority of participants completing at least a Bachelor's degree (29.6%, $n = 74$) followed by a high school diploma or General Education Diploma (GED) (24.0%, $n = 60$), Associate's Degree (18.4%, $n = 46$), graduate degree (17.6%, $n = 44$), and less than a high school diploma (9.6%, $n = 24$), respectively. A majority of the sample (64.4%, $n = 161$) indicated that they could barely or could not get by on the money they have and the remining members of the sample (34.4%, $n = 86$) could get by on the money they have. The median year of HIV diagnosis was 1992 and almost two-thirds (60.8%, $n = 152$) of participants were diagnosed prior to or in 1995, prior to the implementation of ART. The remaining (37.6%, $n = 94$) were diagnosed in or after 1996 (post-ART). History of an AIDS or Opportunistic Infection (OI) were both relatively evenly distributed with 52.0%

(n = 130) reporting an AIDS diagnosis and 109 (n = 109) reporting history of having an

Opportunistic Infection.

Most participants did not endorse any of the five mental health outcomes of

interest (see Table 2), 16.4% (n = 41) were symptomatic for PTSD, 14.0% (n = 35) met

the criteria for a current major depressive episode, 32.8% (n = 82) endorsed risk for

suicidality, 18.0% (n = 45) met the criteria for current substance dependence, and 18.0%

(n = 45) met the criteria for current generalized anxiety disorder.

Bivariate Associations

Table 3.1 also provides a summary of the bivariate associations between our key

demographics of interest and their association with the full HIV-RRS scale in addition to

the three sub-scales (adaptive coping, optimism, and effective coping). Age,

race/ethnicity/ educational attainment, time of diagnosis (Pre/Post ART), and history of

opportunistic infections did not have any significant associations with the HIV-RRS or

sub-scales (Table 3.1). Perceived financial situation was significantly associated with the

full HIV-RRS scale (t (207) = 3.97, p < 0.001), the adaptive coping sub-scale (t (218) =

3.21, p = 0.002) and the effective coping (t (214) = 4.63, p < 0.001) sub-scale but not

with the optimism sub-scale. There was also a significant association between the

effective coping sub-scale and history of having an AIDS diagnosis (t (247) = 2.71, p =

0.007).

Table 3.2 provides the summary of bivariate associations between the mental

health outcomes and the full HIV-RRS scale in addition to the three sub-scales (adaptive

coping, optimism, and effective coping). The full HIV-RRS scale and all sub-scales were

associated with PTSD (full scale: t (247) = 6.22, p < 0.001, adaptive coping: t (247) =

4.32, $p < 0.001$, optimism: t (247) = 4.03, $p < 0.001$, effective coping: t (247) = 6.03, $p <$

0.001). Depression was associated with the full scale (t (247) = 3.16, $p = 0.002$), the

optimism sub-scale (t (247) = 2.12, $p = 0.035$), and the effective coping sub-scale (t (247)

= 3.49, $p = 0.001$). Current risk of suicidality was associated with the full scale (t (136) =

2.51, $p = 0.013$), the optimism sub-scale (t (247) = 2.72, $p = 0.007$), and the effective

coping sub-scale (t (247) = 3.06, $p = 0.002$). Substance dependence was the only other

mental health outcome in addition to PTSD associated with the adaptive coping sub-scale

(t (247) = 2.41, $p = 0.017$), and it was also associated with the effective coping sub-scale

(t (247) = 2.36, $p = 0.002$). Finally, generalized anxiety disorder was associated with the

full scale (t (247) = 2.95, $p = 0.004$), the optimism sub-scale (t (247) = 2.61, $p = 0.010$),

and the effective coping sub-scale (t (247) = 2.75, $p = 0.006$).

Multivariate Modeling

Results from the four multivariate models are presented in Table 3.3. For the full

HIV-RRS, we explored the impact of perceived financial situation, PTSD, depression,

generalized anxiety disorder, and suicidality on HIV-related resilience. The first block

included the demographic characteristics and explained 5.4% of variability in HIV-

related resilience, $R^2 = 0.054$, $F(1, 245) = 13.90$, $p < 0.001$. The second block added the

mental health outcomes to the HMR model which explained 17.9% of the total variance,

$\Delta R^2 = 0.125$, $F(5, 241) = 10.49$, $p < 0.001$. Holding all variables constant, perceived

financial situation ($\beta = -0.18$, $p = 0.002$) and PTSD ($\beta = -0.31$, $p < 0.001$) had significant,

independent associations with higher levels of overall HIV-related resilience.

Next, impact of perceived financial situation, PTSD, and substance dependence

on adaptive coping to HIV was explored. The first block included the demographic

characteristics and explained 3.4% of variability in adaptive coping to HIV, $R^2 = 0.034$, $F(1, 245) = 8.71$, $p = 0.003$. The second block added PTSD and substance dependence which then explained 11.6% of the total variance, $\Delta R^2 = 0.082$, $F(3, 243) = 10.65$, $p < 0.001$. Holding all variables constant, all of the variables had significant independent associations of higher levels of adaptive coping to HIV: perceived financial situation ($\beta = -0.14$, $p = 0.023$), PTSD ($\beta = -0.25$, $p < 0.001$), and substance dependence ($\beta = -0.14$, $p = 0.019$).

I then examined the independent associations between PTSD, depression, substance dependence, generalized anxiety disorder, and suicidality on optimism in the face of living with HIV. As none of the demographic factors were significant with this sub-scale at the bivariate level, there was only one block entered which accounted for 9.7% of the variability in optimism related to HIV ($R^2 = 0.097$, $F(5, 243) = 5.29$, $p < 0.001$). Holding all other variables constant, PTSD ($\beta = -0.21$, $p = 0.003$) and substance dependence ($\beta = -0.14$, $p = 0.023$) had significant, independent associations of higher levels of optimism related to living with HIV.

Finally, the impact of having an AIDS diagnosis, perceived financial situation, PTSD, depression, generalized anxiety disorder, and suicidality on effective coping in relation to HIV/AIDS was examined. The first block included the demographic characteristics and explained 8.7% of the variability in effective coping with HIV, $R^2 = 0.087$, $F(2, 244) = 11.68$, $p < 0.001$. The second block added the significant mental health outcomes which explained 18.2% of the variance ($\Delta R^2 = 0.115$, $F(6, 240) = 10.13$, $p < 0.001$). Holding the other variables in the model constant, perceived financial situation (β

= -0.20, $p = 0.001$) and PTSD (β = -0.29, $p < 0.001$) had significant, independent

associations with having increased levels of effective coping related to living with HIV.

Mediation Analysis

Standardized results of the mediation analysis (see Figure 3.1) support the

hypothesized relationship as having higher levels HIV-related stigma was a significant

predictor of having lower levels of HIV-related resilience (B = -0.451, SE = 0.066, $p <$

0.001) and having lower levels of HIV-related resilience was a significant predictor of

having more mental health diagnoses (B = -0.292, SE = 0.065, $p < 0.001$). Approximately

14.0% of the variance in total mental health diagnoses was accounted for by the predictor

variables ($R^2 = 0.14$). The fit indices demonstrated a good model fit: $\chi^2 = 91.56$, df = 3, p

< 0.001, RMSEA = 0.000, CFI = 1.00, TLI = 1.00, SRMR = 0.00. The results of the

Sobel test indicated that the mediation effect is statistically significant (Z = 3.75, SE =

0.35, $p < 0.001$).

Discussion

This is one of the first analyses to examine factors specifically bestowed by

resilience on social conditions (i.e. feeling more financially secure) and fewer mental

health challenges. In this analysis, the HIV-RRS, a screener developed and

psychometrically tested within the context of the study was utilized. First, when

examining the full HIV-RRS, I found that those with higher levels of HIV-related

resilience were more financially secure and had lower levels of PTSD. These findings are

consistent with previous work on the impact of resilience on buffering PTSD and other

experiences of trauma,[66-69] however these studies are more limited among PLWHA.[70]

However, with inconsistent data on the prevalence of PTSD among PLWHA,[31-33] ascertaining more reliable information is imperative. This will help clinicians and practitioners determine the most effective strategies to use to intervene, with building resilience being one necessary possibility.

In addition, for both of the effective coping and optimism sub-scales, I found that an increase in HIV-related resilience was significantly associated with a decrease in substance dependence. As demonstrated in the literature, substance use is a common coping mechanism[71] against stressors including chronic stress,[72] discrimination[73] and living with chronic health conditions such as HIV/AIDS.[7,74] In a study conducted among HIV-positive individuals in the Southeast United States, Pence and colleagues[74] found those who implemented stronger adaptive coping strategies (e.g. seeking social support, being physically active, positive reframing, etc.) were less likely to use substances as a maladaptive coping strategy. While I do not know what other strategies our participants may have implemented to cope with stressors, our results are consistent with these findings in that those who utilize adaptive coping mechanisms were less likely to be dependent on substances.

The findings also support the need to target PTSD and substance dependence and use among older PLWHA and to further examine whether utilizing resilience as a tool can also increase ART adherence, a key component of the federal[75-77] as well as state[78,79] 'ending the epidemic' initiatives. Dale et al.[80] examined abuse, trauma, and resilience among women living with HIV/AIDS. They found increased levels of resilience-abuse interactions to be significantly associated with ART adherence, meaning those who historically experienced trauma or abuse and had more resilience also had increased odds

of being > 95% adherent to antiretroviral treatment.[80] A latent class analysis conducted among women living with HIV/AIDS in Canada produced similar results with regard to trauma and substance use.[81] Women who experienced a recent occurrence of violence were more likely to abuse substances; moreover, women who abused multiple - substances who had lower levels of resilience did not reach optimal adherence to ART.[81] Building resilience among PLWHA who experience increased mental health challenges and stressors is a necessary step towards achieving optimal biopsychosocial health outcomes.

The multivariate results also indicate that an increase in overall HIV-related resilience as well as adaptive and effective coping approaches is significantly associated with a decrease in financial burden, meaning those who were more resilient may have also felt more comfortable with their financial situation. Currently, the literature is scant with regard to examining resilience in relation to income or socioeconomic status, specifically among PLWHA. In the research that is available, results are inconsistent and demonstrate that resilience can also be exhibited among PLWHA of different socioeconomic strata.[82-84] For example, Fang et al.[83] did not detect any differences in resilience outcomes based on income whereas Dale and colleagues[85] found higher income to be positively correlated with resilience in bivariate analyses. Jaiswal and colleagues[82] undertook a qualitative investigation examining beliefs around ART in disengaged low-income people of color living with HIV and the main theme that emerged was around resilience and the will to live. In fact, several participants noted their own resilience contributed to their re-engagement in ART because they did not want to die.[82] Altogether, these findings highlight the importance of capitalizing on and building resilience

processes irrespective of socioeconomic status. Moreover, additional research on the association between mental health outcomes, socioeconomic factors and resilience would tremendously help focus these efforts.

Interestingly, I did not detect differences in depression and resilience in the multivariate models despite other recent examinations showing significant relationships between higher levels of resilience and lower levels of depression among PLWHA.[86,87] One possible explanation for this is that members of this cohort who met the criteria for current depression were assessed based on the 30 days prior to the assessment. As such, they may not have developed tools that could combat the negative impact of being depressed at the time of assessment. This is also an important point of investigation because Mehta and colleagues[88] found that with increasing age, resilience became less salient with regard to depression in later age. Their results suggest that as older PLWHA continue to age into later life (>80 years old), it is possible that the protective effect of resilience may reach its maximum impact.[88] If this is the case, it will be important to identify whether accentuated aging among PLWHA reduces the age threshold of impact and to both develop mechanisms to build resilience up until that point and try to maintain it after.[89]

A recent study on resilience and newly diagnosed HIV-positive MSM suggests that resilience partially mediates making positive sense of adversity to living with HIV/AIDS and posttraumatic growth.[90] Similar results were found in Rzeszutek and colleagues'[91] work on coping strategies, social support, resilience, and posttraumatic growth in Polish PLWHA. Their findings indicate resilience is positively associated with social support and increasing posttraumatic growth over time.[91] Taken together, our

findings support the need for identifying different points of intervention utilizing

resilience as a necessary instrument in curtailing both the short- and long-term impact of

PTSD among PLWHA. For example, focusing on modifiable protective factors through

community or caregiver support is particularly relevant in aging PLWHA. Other

interventions that shape effective coping strategies such as physical exercise or emotion

regulation[92] could also help buffer against the negative impact of PTSD among older

PLWHA.

Limitations

The following limitations should be taken into consideration when interpreting the

results of these analyses. First, causal inferences between HIV-related resilience and

mental health cannot be made because this was a cross-sectional study by design. Second,

while the MINI mental health examination is a useful diagnostic tool, the yes-no format

to endorsing symptoms and ultimately meeting the criteria for different mental health

outcomes can be limiting. Additionally, the MINI was an interviewer-administered

assessment, and as such there is a possibility for measurement bias if participants did not

answer some of the questions honestly for fear of being judged. We made an effort to

alleviate this as much as possible during the introduction to the interview and also by

asking participants if they were comfortable discussing their physical and mental health

during the screening process. Third, these results may not be generalizable to other

geographies given the availability of support and resources in addition to the diverse

sociodemographic make-up of the New York City metropolitan area. Conducting similar

research in different localities both in the United States and global in addition to different

sub-populations of PLWHA (e.g., people who inject drugs, children/adolescents, women, etc.) is a necessary next phase and would be extremely beneficial.

While these limitations are important to consider, the study is robust in several meaningful ways. To our knowledge, this is among the first studies to examine HIV-related resilience and mental health outcomes in a sample of gay-identified HIV-positive men. To this point, the term 'men who have sex with men (MSM)' has been used in HIV-related literature for almost three decades after being devised by the CDC in 1994.[93] The salience of self-identifying as gay is rather different than identifying as bisexual or straight, while engaging in same-sex behaviors. Additionally, this is one of the first studies to use a validated and reliable (see Chapter 2) tool to assess HIV-related resilience, specifically designed with PLWHA in mind. This screener may be better at assessing the different types of resilience among PLWHA. Finally, our participants were very diverse with regard to their sociodemographic characteristics including race/ethnicity, perceived familial income, epoch of diagnosis, history of AIDS diagnosis, and educational attainment.

In the future, it is important to conduct more tailored research in order to better understand the relationship between mental health challenges and resilience, specifically among older PLWHA. For example, using a more nuanced tool to assess resilience among PLWHA, such as the HIV-RRS, may help researchers, practitioners, and clinicians target precise points of interventions based on optimism and/or different coping strategies. Moreover, it would be helpful to understand whether resilience changes over time and what that impact may be on mental health outcomes among PLWHA. This would also help determine an ideal timeline of intervention. Additionally, it is also

essential to continue to implement and utilize models of biopsychosocial health to ensure successful aging among PLWHA.[94] In Vance and colleagues'[94] updated model of successful aging with HIV/AIDS, mental health is just as important to facilitate productivity or life satisfaction as it is cognitive functioning. This model of aging[94] will also be a critical component in ensuring those facing mental health challenges continue to engage and be retained in all facets of health care,[95] and maintain viral suppression to stay on track to reaching many of the 'getting to zero' new HIV-seroconversion goals.[21]

Implications

Fostering resilience cannot happen in health or healthcare-related silos—it must happen across fields and disciplines. While psychologists, social workers, and other clinicians have had an underlying strengths-based perspective guiding their education and work for many years,[96-98] it is necessary for public health educators and practitioners to shift towards this perspective and training as well. Together, those who focus more on the individual (e.g. therapists, social workers, other mental health clinicians, etc.) and those who focus more on the community (i.e. community health workers, public health nurses, health educators, etc.) can have a substantial impact on the biopsychosocial health and well-being of PLWHA if resilience-based programs, policies, and interventions are introduced. More specifically, ensuring the development of strong communities through culturally competent and relevant initiatives (e.g. providing programs or materials in multiple languages, having diverse peer-led support groups based on different identities, etc.) can help PLWHA build resilience through different approaches, especially as they continue to age. It is also important for researchers to incorporate a resilience-based

approached in future investigations. This investigation uses a novel tool to assess HIV-related resilience and mental health outcomes among older gay men living with HIV/AIDS and can be replicated within other sub-groups of PLWHA. Finally, acknowledging both the individual and collective experiences of PLWHA is critical to shifting to a strengths-based approach to care. It is essential that mental health and public health practitioners do not undercut the complex history of HIV/AIDS epidemic but rather to recognize that PLWHA, especially those who are members of the AIDS generation,[99] are resilient in spite of challenges faced throughout their lives.

Conclusions

PLWHA may face mental health challenges, especially as they continue to age yet, resilience may be a possible buffer from the impact of these outcomes. The results from these analyses emphasize positive associations between different categories of HIV-resilience and lower levels of PTSD and substance dependence in addition to feeling more financially secure. A crucial next point of inquiry should examine how resilience can be utilized as a point of intervention to negate the impact of mental health stressors and whether these changes occur over time. Moreover, there is a collective responsibility of both public and mental health practitioners to help PLWHA be resilient, especially as they enter later life.

Tables

Table 3.1 Baseline Sample Characteristics and Associations with HIV-Related Resilience in the GOLD III Study Sample (*n* = 250)

	n (%)	Full Scale	Adaptive Coping Mean (SD)	Optimism	Effective Coping
Total HIV Resilience Scores		3.95 (0.64)	3.90 (0.75)	4.29 (0.70)	3.71 (0.97)
Age (*n* = 249)					
50 - 59	175 (70.0)	3.96 (0.66)	3.88 (0.77)	4.25 (0.73)	3.77 (0.97)
60 - 69	74 (29.6)	3.96 (0.60)	3.92 (0.68)	4.37 (0.61)	3.58 (0.98)
p - value		0.233	0.198	0.156	0.964
Race/Ethnicity (*n* = 245)					
White, non-Hispanic	80 (32.0)	3.95 (0.64)	3.96 (0.64)	4.27 (0.66)	3.60 (1.00)
Black, non-Hispanic	103 (41.2)	4.01 (0.62)	3.98 (0.76)	4.39 (0.71)	3.89 (0.92)
Hispanic/Latino	44 (17.6)	3.77 (0.65)	3.66 (0.76)	4.21 (0.68)	3.50 (1.01)
Mixed/Asian/Other non-Hispanic	18 (7.2)	3.82 (0.69)	3.66 (0.78)	4.06 (0.87)	3.70 (1.08)
p - value		0.051	0.066	0.202	0.087
Educational Attainment (*n* = 248)					
High School or Less	24 (9.6)	3.72 (0.71)	3.63 (0.91)	4.13 (1.03)	3.43 (0.94)
High School Diploma or GED	60 (24.0)	3.91 (0.60)	3.79 (0.77)	4.19 (0.68)	3.78 (1.01)
Associate's Degree	46 (18.4)	3.97 (0.64)	3.92 (0.69)	4.32 (0.62)	3.70 (1.02)
Bachelor's Degree	74 (29.6)	4.03 (0.67)	4.00 (0.75)	4.32 (0.69)	3.77 (0.91)
Graduate Degree	44 (17.6)	4.03 (0.63)	4.01 (0.64)	4.41 (0.59)	3.68 (1.02)
p - value		0.286	0.156	0.395	0.631
Perceived Financial Situation (*n* = 247)					
I have enough money to live comfortably	86 (34.4)	4.16 (0.54)	4.09 (0.60)	4.36 (0.62)	4.06 (0.79)
I can barely/I cannot get by on the money I have	161 (64.4)	3.85 (0.67)	3.80 (0.80)	4.24 (0.73)	3.52 (1.02)
p - value		**<0.001**	**0.002**	0.224	**<0.001**
Time of Diagnosis (*n* = 246)					
Pre-ART	152 (60.8)	3.96 (0.64)	3.89 (0.74)	4.33 (0.73)	3.69 (0.96)
Post-ART	94 (37.6)	3.95 (0.64)	3.89 (0.75)	4.21 (0.64)	3.77 (0.96)
p - value		0.898	0.969	0.185	0.522
AIDS Diagnosis (*n* = 249)					
No	119 (47.6)	4.03 (0.58)	3.92 (0.66)	4.32 (0.65)	3.89 (0.90)
Yes	130 (52.0)	3.89 (0.69)	3.87 (0.82)	4.25 (0.75)	3.55 (1.02)
p - value		0.087	0.620	0.425	**0.007**
History of Opportunistic Infection (*n* = 249)					
No	140 (56.0)	3.97 (0.63)	3.90 (0.71)	4.26 (0.73)	3.79 (0.91)
Yes	109 (43.6)	3.93 (0.67)	3.90 (0.80)	4.31 (0.65)	3.61 (1.04)
p - value		0.614	0.950	0.549	0.139

Table 3.2 Mental Health Outcomes and Associations with HIV-Related Resilience in the GOLD III Study Sample (*n* = 250)

| | | HIV-Related Resilience | | | |
	n (%)	Full Scale	Adaptive Coping Mean (SD)	Optimism	Effective Coping
Total HIV Resilience Scores		3.95 (0.64)	3.90 (0.75)	4.29 (0.70)	3.71 (0.97)
PTSD (*n* = 249)					
Not-Symptomatic	208 (83.2)	4.06 (0.59)	3.98 (0.71)	4.37 (0.67)	3.87 (0.90)

Table 3.3 Hierarchical Multiple Regression Model Predicting HIV-Related Resilience by Mental Health Outcomes in the GOLD III Study Sample

	Block 1				Block 2			
	B (SE)	95% CI	β	p - value	B (SE)	95% CI	β	p - value
HIV Resilience: Full Scale								
Intercept	4.47 (0.14)	4.19, 4.76	-	<0.001	4.68 (0.21)	4.27, 5.09	-	<0.001
Perceived Financial Situation	-0.31 (0.08)	-0.48, -0.15	-0.23	<0.001	-0.25 (0.08)	-0.40, -0.09	-0.18	0.002
PTSD	-	-	-	-	-0.54 (0.12)	-0.77, -0.31	-0.31	<0.001
Depression	-	-	-	-	-0.07 (0.12)	-0.31, 0.17	-0.04	0.555
Generalized Anxiety Disorder	-	-	-	-	-0.02 (0.12)	-0.24, 0.21	-0.01	0.891
Suicidality	-	-	-	-	-0.09 (0.08)	-0.26, 0.08	-0.07	0.282
$R^2 = 0.054$								
$\Delta R^2 = 0.125$								
HIV Resilience: Adaptive Coping								
Intercept	4.38 (0.17)	4.05, 4.71	-	<0.001	4.67 (0.20)	4.27, 5.07	-	<0.001
Perceived Financial Situation	-0.29 (0.10)	-0.48, -0.10	-0.19	0.003	-0.22 (0.10)	-0.41, -0.03	-0.14	0.023
PTSD	-	-	-	-	-0.51 (0.12)	-0.75, -0.27	-0.25	<0.001
Substance Dependence	-	-	-	-	-0.28 (0.12)	-0.51, -0.05	-0.14	0.019
$R^2 = 0.034$								
HIV Resilience: Optimism^								
Intercept	4.95 (0.23)	4.51, 5.40	-	<0.001	-	-	-	-
PTSD	-0.40 (0.13)	-0.65, -0.14	-0.21	0.003	-	-	-	-
Depression	-0.04 (0.14)	-0.32, 0.23	-0.02	0.754	-	-	-	-
Substance Dependence	-0.26 (0.12)	-0.48, -0.04	-0.14	0.023	-	-	-	-
Generalized Anxiety Disorder	-0.04 (0.13)	-0.30, -0.22	-0.02	0.740	-	-	-	-
Suicidality	-0.15 (0.10)	-0.34, 0.04	-0.10	0.127	-	-	-	-
$R^2 = 0.082$								
$\Delta R^2 = 0.097$								
HIV Resilience: Effective Coping								
Intercept	4.68 (0.22)	4.25, 5.11	-	<0.001	5.01 (0.31)	4.39, 5.62	-	<0.001
AIDS Diagnosis	-0.26 (0.12)	-0.50, -0.03	-0.13	0.031	-0.22 (0.12)	-0.44, -0.01	-0.11	0.057
Perceived Financial Situation	-0.50 (0.13)	-0.75, -0.25	-0.25	<0.001	-0.41 (0.12)	-0.64, -0.17	-0.20	0.001
PTSD	-	-	-	-	-0.75 (0.17)	-1.10, -0.42	-0.29	<0.001
Depression	-	-	-	-	-0.14 (0.19)	-0.52, 0.22	-0.06	0.414
Generalized Anxiety Disorder	-	-	-	-	0.05 (0.17)	-0.29, 0.39	0.02	0.784
Suicidality	-	-	-	-	-0.20 (0.13)	-0.45, 0.05	-0.10	0.116
$R^2 = 0.087$								
$\Delta R^2 = 0.115$								

^ Given there was not a statistically significant relationship between the optimism sub-scale of the HIV-RRS and any of the sociodemographic characteristics of interest, all mental health variables were entered into the first block.

Figure 3.1. Hypothesized Model Testing the Mediating Effect of HIV-Related Resilience on the Relationship Between HIV-Related Stigma and Mental Health Outcomes
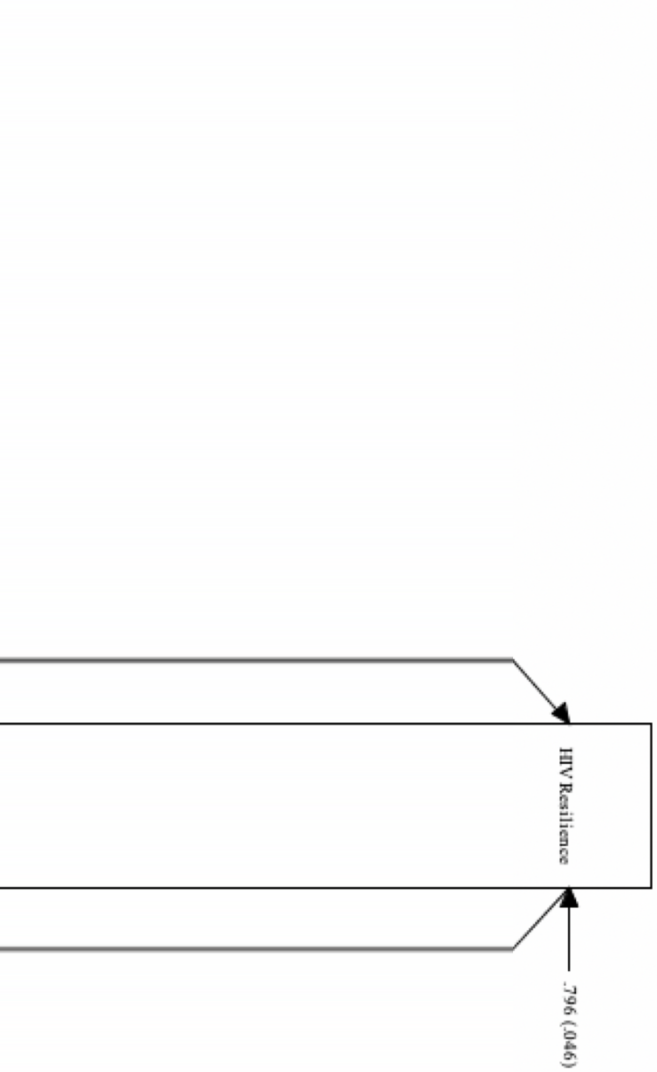
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CHAPTER IV: CORRELATES OF HIV/AIDS-RELATED RESILIENCE AND SELF REPORTED NEUROCOGNITIVE OUTCOMES AMONG GAY MEN AGE 50 – 69 LIVING WITH HIV/AIDS

Abstract

With the advancement of biomedical interventions, people living with HIV/AIDS (PLWHA) are living longer. The Centers for Disease Control and Prevention projects that by 2025, older PLWHA over age 50 will make up more than half of the epidemic, with gay, bisexual, and other men who have sex with men remaining the most disproportionally affected. As PLWHA age, they are at increased risk for being diagnosed with HIV associated neurocognitive disorder (HAND), ranging from being mildly to severely impaired. Limited studies have examined whether resilience, the ability to bounce back or overcome challenging situations, is associated with neurocognitive decline. In the present analysis, we used a new and psychometrically sound HIV-related resilience screener (HIV-RRS) in order to assess its relationship to self-perceived neurocognitive functioning among older (age 50 – 69) HIV-positive gay men living in New York City. The cognitive domains that were assessed include language & communication, memory, sensory & motor skills, and higher-level executive functioning. Findings from multivariate analyses suggest that resilience is significantly associated with higher levels of sensorimotor and language skills in addition to cognitive and intellectual functioning. Further research is necessary to gain a better understanding

on the role that resilience has on the neurocognitive health of older gay men living with HIV/AIDS.

Introduction

The Centers for Disease Control and Prevention (CDC) defines cognition as a "combination of mental processes that includes the ability to learn new things, intuition, judgement, language, and remembering."[1] While people of any age can experience cognitive impairment,[1] some degree of cognitive decline is often part of the aging process.[2] Data from the 2015 – 2017 Behavioral Risk Factor Surveillance System (BRFSS) indicate one in nine people over the age of 45 have self-reported memory problems that have worsened over the past year.[3] Of those experiencing subjective cognitive decline (SCD), 40% had to give up day-to-day activities and 35% reported needing help with household tasks.[3] Neurocognitive disorders (NCDs) can affect social cognition, memory, language, learning, attention, and perception.[4] While some cognitive impairments are related to treatable health issues, other conditions such as HIV/AIDS are associated with greater likelihood of cognitive deficiencies.[1,5]

Due to the advancement of antiretroviral treatment (ART) throughout the past two and one-half decades, people living with HIV/AIDS (PLWHA) are living longer and the CDC approximates that of the 1.1 million PLWHA in the United States,[6] nearly half are over the age of 50.[7] In more recent years, there has been a widespread push of 'getting to zero' new HIV infections by 2030 through ambitious goal setting around prevention and treatment.[8] A big part of the '90-90-90' plan involves 90% of all PLWHA to know their HIV status, 90% of those living with HIV/AIDS to receive sustained ART, and 90% of

people on ART achieving viral suppression by 2020.[9] Given the importance of this effort, it is also imperative to address the other health-related challenges, PLWHA face, such as neurocognitive decline[10] or it will be difficult to meet any of these goals.[11]

The term HIV associated neurocognitive disorder (HAND), has been used to categorize the three most common levels of neurocognitive impairment among PLWHA: asymptomatic neurocognitive impairment, mild neurocognitive disorder, and HIV-associated dementia.[12] The mildest form of HAND is asymptomatic neurocognitive impairment with reduced performance on neuropsychological test while affected individuals often report independence in performing day-to-day activities and tasks.[12] Those experiencing mild neurocognitive disorder may have minor interreferences with everyday functioning whereas those who have HIV-associated dementia often cannot complete daily tasks independently.[12] It is important to note that HAND conditions are not necessarily progressive.[12] Someone who has asymptomatic neurocognitive impairment may not automatically progress to mild neurocognitive disorder or HIV-associated dementia.[12]

There is a robust body of literature that has focused on neurocognitive health among PLWHA, especially among older adults.[13-16] In particular, compared to their younger counterparts, older PLWHA are at a three-fold risk for HAND.[17] Evidence indicates that older age and HIV independently increase the risk of neurocognitive impairment, particularly in executive functioning,[18] processing speed[19,20] and memory.[21] Ances and colleagues[22] found evidence to support the idea that HIV accelerates brain aging and this can have an impact on overall neurocognitive functioning and outcomes.

Poor neurocognitive functioning can have an impact on adherence to antiretroviral treatment (ART).[23] Despite the effectiveness of ART, 30-50% of adults living with HIV/AIDS have scores in the impaired range on neurocognitive batteries.[16,23,24] For example, Halkitis and colleagues found that differences in the threshold for impairment were different by domain—19% of their sample of PLWHA between 50 and 70 without history of traumatic brain injury met the criteria for processing speed impairment and 12% met the threshold for impairment on executive functioning.[16] Moreover for 15 of the 17 neurocognitive tests administered, the mean score of participants failed to exceed the population threshold mean of 100.[16] Despite these findings, longitudinal investigations of neurological impairment among PLWHA have not seen a decline of scores on neuropsychometric testing over time[25] or if they have, it has occurred at a sub-clinical rate.[26] Examining resilience in relationship to cognition is important because resilience has a positive impact on multiple domains of functioning that likely span beyond mental and physical health and well-being.

Within the literature, there are many different definitions and viewpoints of resilience. From one perspective, as a trait, it refers to grit, resourcefulness, strength of character, and determination.[27] Resilience has also been understood as a "developmental process characterized by a hierarchical integration of behavioral systems"[28] whereby individuals participate in the process by building on historical interactions or situations to develop new attitudes, expectations and feelings around experiences.[28] Other definitions of resilience suggest that it may be understood as a combination of all three—a process, trait, and/or outcome.[29]

To date, relatively little is known about whether resilience may be associated with better neurocognitive outcomes though emerging findings suggest that it may be.[30-32] In one cross-sectional study of highly traumatized civilians, Wingo and colleagues[30] found resilience to be significantly associated with better nonverbal memory. Similar findings were observed in a cohort of older adults with late-life depression in that higher language performance was associated with increased levels of resilience.[33] Using a related construct of resilience, Gawronski et al.[34] assessed dispositional optimism cross-sectionally in a national sample of older adults and found those who had the highest levels of optimism had the lowest odds of cognitive impairment. Exploring whether resilience is a potential protective factor to mitigate neurocognitive decline is an important frontier of research, especially among older adults who are more susceptible to these challenges.

There is a gap in the literature examining the relationship between resilience and neurocognitive outcomes specifically among PLWHA. In the Deep South (historically including Georgia, Alabama, South Caroline, Mississippi, and Louisiana), a cross-sectional investigation by Fazeli and colleagues[35] found that resilience was associated with better functional and cognitive outcomes of aging PLWHA. Similarly in another cross-sectional investigation, DJ Moore et al.[36] discovered that compared to older HIV-negative individuals, older PLWHA who had similar levels of positive psychological functioning also had lower scores on completed measures of neurocognition. RC Moore and colleagues[37] examined grit and its association with neurocognitive functioning among PLWHA and found that higher grit scores were related to better neurocognitive

outcomes. While grit may be a similar construct to resilience, it focuses more on passion

and perseverance to achieve a goal,[38] rather than bouncing back from adverse situations.

Understanding the neurocognitive correlates of HIV-related resilience in PLWHA will

help inform interventions and policies that will seek to capitalize on specific resources

within this community.[39]

This analysis seeks to utilize a new screening tool of HIV-related resilience

to assess associations with self-perceived neurocognitive functioning based on the five

domains—memory, language and communication, use of hands, sensory perception, and

higher level cognitive and intellectual functioning in a cohort of older, aged 50-69, gay

men living with HIV/AIDS. I hypothesize that these findings will be consistent with

previous work in that participants with higher resilience scores will endorse fewer self-

perceived neurocognitive challenges. Further, I believe there may be there may be

potential differences in HIV-related resilience occurring by epoch of diagnosis (pre/post

ART) or age as those who have been living with HIV/AIDS for longer may experience

HAND-related complications.[21,40,41] Understanding these associations will help direct

practitioners, researchers, and policy makers to design and implement programming and

interventions that support older PLWHA. It is important to note that this analysis does

not seek to examine other sociodemographic correlates of neurocognitive functioning and

HIV-related resilience. The intent of the HIV-RRS is to provide another dimension in

which to assess resilience that spans other sociodemographics such as race/ethnicity,

educational attainment, and perceived financial situation. As demonstrated in Chapter 3,

there were not significant associations by many of the sociodemographics of interest and

HIV-related resilience except perceived financial situation. Moreover, these demographic factors do not account for the impact of psychosocial stressors or structural barriers.[42]

Methods

Study Design

Data from this study are drawn from a sample of New York City based HIV-positive gay men. In order to qualify for the study, participants needed to meet the following eligibility criteria: self-identify as gay, assigned male at birth, and currently identified as male at the time of screening, live in the New York City metropolitan area, be willing to discuss aspects of mental and physical health with study staff, be TBI (traumatic brain injury)-negative (or loss of consciousness for more than 30 minutes), aged 50-69, and be proficient in English. Additionally, participants had to report an HIV-positive serostatus which was then confirmed via AIDS Drug Assistance Program card, medication bottle (other than Truvada, which is also used as Pre-Exposure Prophylaxis (PrEP)), lab results, or doctor's note. We implemented many different recruitment techniques including connecting with community-based outreach organizations (Housing Works, Callen-Lorde, Gay Men's Health Crisis (GMHC) and Services & Advocacy for GLBT Elders (SAGE), etc.), attending gay-related events throughout New York City (NYC) (Pride festivals and parades in all boroughs, book bar nights, book talks, etc.) and relying on word of mouth from past and present participants in other studies conducted at the Center for Health, Identity, Behavior and Prevention Studies (CHIBPS). Additionally, we were successful in recruiting participants from several different dating/sex mobile apps and websites including Daddyhunt Grindr, and Craigslist.

In total, of N = 308 people screened eligible for the study between April 2017 and October 2018. The final target/analytic sample of N = 250 participants was a result of 37 eligible people not attending the study visit and 21 duplicate participants due to previously screening eligible and/or completed the study at another point in time. All study activities took place in-person at the CHIBPS research office on the campus of New York University. At the beginning of the study visit, age and HIV-serostatus were confirmed and informed consent was obtained by trained researchers. During the study visit, participants completed an audio computer-assisted self-interviewing (ACASI) survey that assessed demographic characteristics, HIV-related resilience, and self-reported neurocognitive outcomes. Upon completion of the ACASI, the MINI International Neuropsychiatric Interview (MINI)[43] was administered by a trained member of the CHIBPS staff. At the end of the interview, participants received a $50 stipend and were also offered condoms, lube, and a community resource referral packet. All study protocols and procedures were initially approved by the New York University Institutional Review Board in 2017 and subsequently by the Rutgers University Institutional Review Board in 2018.

Measures

Sociodemographic Characteristics

Participants were asked to self-report information on personal demographic characteristics including age, race/ethnicity, perceived financial situation, educational attainment, and epoch of diagnosis. At the beginning of the assessment, participants were asked to verify their age with a valid piece of identification (driver's license, passport,

etc.) and this was also recorded in the ACASI. For the present study, the age variable was examined continuously (range 50 – 69 years old). Race/ethnicity has been collapsed and re-coded for analytic purposes to include 'White, non-Hispanic,' 'Black, non-Hispanic,' 'Hispanic,' and all other groups were categorized as 'Mixed, Asian, and other, non-Hispanic.' Educational attainment was categorized as: 'high school or less,' 'high school diploma or GED,' 'Associate's degree', 'Bachelor's degree,' and 'Graduate degree' which includes all Master's and other terminal degrees (PhD, JD, MD, etc.) that were collapsed into one category. Participants were asked whether they had enough money to get by on with answers including 'I have enough money to live comfortably,' 'I can barely get by on the money I have,' and 'I cannot get by on the money I have.' For the present analysis, I collapsed the latter two answers into one 'I can barely/I cannot get by on the money I have' category. Epoch of diagnosis was assessed by asking participants the year in which they received their HIV-diagnosis. Those who were diagnoses with HIV/AIDS prior to or in 1995 were classified as 'pre-ART' and those who were diagnosed in or after 1996 were classified as 'post-ART.'

Resilience

HIV Resilience: To examine HIV-related resilience in the present study, we utilized the recently validated (Chapter 2) 10-item HIV-Related Resilience Screener (HIV-RRS). Scale items include statements such as 'I can deal with setbacks caused by HIV/AIDS,' 'It is difficult for me to live with HIV/AIDS,' and 'Living with HIV/AIDS is normal to me.' Each item was assessed on a 5-point Likert with 1 being 'strongly disagree' and 5 being 'strongly agree.' After three of the items were reverse coded, the scores for the

individual items were averaged to create a total score with higher scores indicating higher levels of HIV-related resilience. The full tool and its three sub-scales (Adaptive Coping, Optimism, and Effective Coping) demonstrated good reliability with the full scale having a coefficient α of 0.84. The sub-scales also demonstrated good reliability with the following α scores: Adaptive Coping α = 0.78; Optimism α = 0.80 and Effective Coping α = 0.72.

Neurocognitive Health

Patient Assessment of Own Functioning Inventory (PAOFI): Designed to elicit patients' self-perceptions regarding their functioning in everyday activities and tasks, the PAOFI is a 32-item multidimensional battery.[44] Within this battery, the PAOFI covers five main constructs: memory, language and communication, use of hands, sensory perception, and higher level cognitive and intellectual functioning. Consistent with its original use,[44] for the present study the items for the 'sensory perception' and 'use of hands' sub-scales were combined to form a 'sensorimotor' scale. Example items from each of the domains of the PAOFI include: memory, 'how often do you forget events which have occurred in the last day or two?,' language and communication, 'how often do you have difficulties understanding what is said to you?,' use of hands, 'how often do you have difficulty performing tasks with your left hand,' sensory-perceptual, 'how often do you have difficulty feeling things with your left hand,' and higher level cognitive and intellectual functioning, 'how often do your thoughts seem confused or illogical?' Participants endorsed each item using a 6-point Likert scale with 1 indicating 'almost always' and 6 indicating 'almost never.' Items for each sub-scale were totaled to create four separate

mean scores. Higher scores indicated higher executive functioning. Historically, this tool has demonstrated strong psychometric properties,[44,45] and in the present study the coefficient α for each of the sub-scales was: memory ($\alpha = 0.91$), language and communication ($\alpha = 0.89$), sensorimotor ($\alpha = 0.73$), and higher level cognitive and intellectual function ($\alpha = 0.93$).

Analytic Strategy

Initially, I examined the distribution of all independent and dependent variables of interest. Next, using the Pearson's correlation r coefficient, the bivariate relationship between the HIV-RRS and its subscales (adaptive coping, optimism, and effective coping) and the four sub-scales of the PAOFI: memory, language and communication, sensorimotor, and higher level cognitive and intellectual functioning and pre/post ART status were examined. Finally, a hierarchical multiple regression (HMR) to examine the independent associations of resilience (HIV-RRS) with neurocognitive outcomes after controlling for epoch of diagnosis (pre-/post-ART) was implemented. For each separate analysis, predictor variables were grouped and entered into separate blocks with epoch of diagnosis entered into the first block and significant neurocognitive outcomes entered into the second block. This method was utilized as epoch of diagnosis is the only demographic of interest for the present analysis.

A strength of the study design is that all activities occurred in-person and while participants could refuse to answer any question, they could not select 'don't know' or utilize any other method of skipping an item. For all of the multivariate analyses, the maximum number of missing cases was n=3. Additionally, A high degree of association

between the sub-scales of the PAOFI is expected given its goal is to provide an overall composite of self-reported neurocognitive functioning. Despite the potential for multicollinearity, significant associations with our outcomes of interest were found in the multivariate analyses across the full HIV-RRS and its sub-scales. Finally, after considering power of the statistical tests being used, anticipated Type I and Type II error rates and sample size, a 0.05 significance level specified for all tests.[46]

Results

Demographic Characteristics

As demonstrated in Table 4.1, the GOLD III study cohort is sociodemographically diverse with regard to the key identities of interest. At the time of assessment, the median age of the sample was 56 years (mean = 57.18, SD = 4.68, range = 50 – 69). Black, non-Hispanics (41.2%, n = 103) were the most represented racial/ethnic group in the cohort followed by White, non-Hispanics (32%, n = 80), Hispanic/Latinos (17.6%, n = 44), and all other racial groups (Asian, mixed race, and other-racial identity) (7.2%, n = 18), respectively. Educational attainment was relatively distributed across the categories with 29.6% (n = 74) having a Bachelor's degree, 24% (n = 60) holding at least a high school diploma or GED, 18.4% (n = 46) holding an Associate's degree, 17.6% (n = 44) having a graduate degree (including Master's, doctoral, law, etc.), and the remaining 9.6% (n = 24) reporting less than a high school diploma. A majority of the sample (64.4%, n = 161) indicated that their financial situation was strained by endorsing that they could barely or could not get by on the

money they have and the remining members of the sample (34.4%, *n* = 86) reported that

could get by on the money they have. The median year of HIV diagnosis was 1992 and

almost two-thirds (60.8%, *n* = 152) of participants were diagnosed prior to or in 1995,

which was prior to the implementation of ART. The remaining (37.6%, *n* = 94) were

diagnosed in or after 1996 (post-ART).

On the PAOFI, the average score for on the memory sub-scale was 43.37 (*SD* =

8.47, range 11.0 – 54.0). The language and communication sub-scale had an average

score of 46.06 (*SD* = 7.53, range 9.0 – 54.0). The average score on the sensorimotor sub-

scale was 25.96 (*SD* = 4.54, range 5.0 – 30.0). Finally, the mean score of the cognitive

and intellectual functioning scale was 46.87 (*SD* = 4.54, range 9.0 – 54.0). With regard to

HIV-related resilience, the mean score on the full HIV-RRS was 3.95 (*SD* = 0.64). The

average score on the adaptive coping sub-scale was 3.90 (*SD* = 0.75), optimism was 4.29

(*SD* = 0.70), and effective coping was 3.71 (*SD* = 0.97).

Bivariate Analysis

As presented in Table 4.2, associations were detected between the full HIV-RRS

and its sub-scales with all of the PAOFI sub-scales. The full HIV-RRS demonstrated

moderately positive associations across the board with the PAOFI sub-scales (memory, *r*

= 0.44; language and communication, *r* = 0.42, sensorimotor, *r* = 0.37, cognitive and

intellectual function, *r* = 0.52, all *p* < 0.001). The adaptive coping sub-scale of the HIV-

RRS also had moderately positive correlations with the PAOFI sub-scales (memory, *r* =

0.33; language and communication, *r* = 0.30, sensorimotor, *r* = 0.36, cognitive and

intellectual function, *r* = 0.43, all *p* < 0.001). The relationship between the optimism sub-

scale of the HIV-RRS and the PAOFI also had significantly positive correlations

(memory, $r = 0.30$; language and communication, $r = 0.26$, sensorimotor, $r = 0.28$,

cognitive & intellectual function, $r = 0.35$, all $p < 0.001$). The effective coping sub-scale

of the HIV-RRS had mostly moderately positive correlations (memory, $r = 0.42$;

language & communication, $r = 0.44$, sensorimotor, $r = 0.24$, cognitive & intellectual

function, $r = 0.45$, all $p < 0.001$). Finally, there were no significant differences between

age, epoch of diagnosis (pre-/post-ART), and any of the neurocognitive outcomes.

Multivariate Analyses

The results from the four different multivariate models are presented in Table 4.3.

As there were significant associations between the full HIV-RRS and its sub-scales with

all of the PAOFI sub-scales, each of the HMR models included all of the PAOFI sub-

scales while controlling for epoch of diagnosis. For the full HIV-RRS analysis, the first

block included only the pre-/post-ART variable which accounted for none of the variance

in the model, $R^2 = 0.000$, $F(1, 244) = 0.02$, $p = 0.898$. The second block added the

neurocognitive outcomes to the HMR model which explained 28.7% of the variance, ΔR^2

$= 0.287$, $F(5, 240) = 19.33$, $p < 0.001$. Holding all variables constant, sensorimotor

capabilities ($\beta = 0.02$, $p = 0.042$) and cognitive and intellectual functioning ($\beta = 0.04$, $p <$

0.001) had significant, independent associations of higher levels of HIV-related

resilience.

I then explored the impact of all of the PAOFI components on adaptive coping to

HIV. The first block only included the epoch of diagnosis and explained none of the

variance in adaptive coping to HIV, $R^2 = 0.000$, $F(1, 244) = 0.002$, $p = 0.969$. The second

block added the neurocognitive outcomes which then explained 21.5% of the variance, $\Delta R^2 = 0.215$, $F(5, 240) = 13.16$, $p < 0.001$. Holding all variables constant, sensorimotor capabilities ($\beta = 0.03$, $p = 0.004$) and cognitive and intellectual functioning ($\beta = 0.02$, $p < 0.001$) had significant, independent associations with adaptive coping to HIV.

Next, I looked at the impact of neurocognitive outcomes on optimism in the face of living with HIV. Similar to the first two models, the first block only included the epoch of diagnosis and explained 0.01% of the variability in optimism as it relates to HIV-resilience, R^2 0.007, $F(1, 244) = 1.77$, $p = 0.185$. The second block added PAOFI outcomes which explained 14.6 % of the variance, $\Delta R^2 = 0.139$, $F(5, 240) = 8.22$, $p < 0.001$. Holding all of the other variables constant, cognitive and intellectual functioning ($\beta = 0.02$, $p = 0.027$) was the only significant, independent association with the optimism sub-scale.

Finally, I examined the impact of the PAOFI outcomes on effective coping in relation to HIV/AIDS. The first predictor block included the epoch of diagnosis and accounted for none of the variability in effective coping with HIV, R^2 0.002, $F(1, 244) = 0.41$, $p = 0.522$. The second block added the significant neurocognitive factors which explained 23.1% of the variance, $\Delta R^2 = 0.229$, $F(5, 240) = 14.41$, $p < 0.001$. Holding the other variables in the model constant, language & communication ($\beta = 0.03$, $p = 0.025$) was the only significant, independent association with the effective coping sub-scale.

Discussion

This study has provided timely and novel knowledge about the associations between HIV-related resilience and self-reported neurocognitive functioning. First, I found that participants who scored higher on the HIV-RRS and the adaptive coping sub-scale had significantly, albeit slightly, higher sensorimotor and cognitive and intellectual functioning outcomes. Comparable results have been demonstrated in studies examining associations of resilience and neurocognitive functioning in other aging populations including women[47] and Chinese centenarians.[48] In a longitudinal investigation Gu and Feng found that those who had high levels of resilience also had 36-55% higher odds of no overall cognitive impairment and increased levels of life satisfaction and self-rated health.[48] Similarly, Lamond et al.[47] studied older community-dwelling women and their results indicate participants with more neurocognitive complaints had significantly lower levels of resilience.

With regard to adaptive coping and cognitive and intellectual functioning outcomes, researchers have started to assess specifically how older adults utilize adaptation strategies to overcome negative health outcomes including neurocognitive decline.[37,49,50] Among older PLWHA, Moore and colleagues[37] found that having higher grit scores and more ambition, two constructs they classified as adaptation, were associated with better global neurocognitive functioning. Additionally, in a study on women living with HIV, results indicate those with higher levels of cognitive impairment

face challenges articulating their care needs and subsequently having them met.[51] Successfully adapting to the challenges of aging with HIV/AIDS is necessary in combating the impact of neurocognitive decline. Adaptive strategies such as yoga,[52,53] exercise,[54] and social engagement through employment[55] or regular social support[56] can help mitigate neurocognitive decline.

Having strong sensorimotor operations is important for functional independence with advancing age.[57,58] Moreover, antiretroviral treatment may have a role in sensorimotor functioning among PLWHA although more investigation is warranted. Bauer et al.[59] evaluated three different groups- those who were HIV-negative, those who were HIV-positive and receiving nucleoside analogue therapy, and those who were HIV-positive and receiving ART in order to assess the impact of ART on sensorimotor functioning. While they did not see difference in balance, their results found that ART may alter sensory and vibrotactile thresholds.[59] However, a systematic review and meta-analysis of observational studies of older PLWHA found that the majority of studies failed to find significant associations to other sensorimotor outcomes regardless of being on ART or not.[60]

Results also indicate that those who scored higher on the optimism sub-scale related to HIV-resilience had better cognitive and intellectual functioning outcomes. These findings are consistent with previous research. For example, Moore and colleagues[36] examined successful cognitive aging among those who were and were not living with HIV/AIDS. Their results indicate that while those who were not HIV-positive had better neurocognitive outcomes, PLWHA who scored higher on optimism and

resilience-related measures had fewer neurocognitive impairments.[36] Similarly, Gawronski and colleagues'[34] found that older adults with higher levels of optimism had the lowest odds of cognitive impairment.[34]

The findings of this analysis also suggest that better language and communication outcomes were significantly associated with the effective coping sub-scale. In a qualitative investigation of PLWHA who were also diagnosed with HAND, researchers sought to understand how this group manages and obtains support for their cognitive challenges.[61] While many participants relied on their friends or other members of their social networks to remind them about and/or attend upcoming appointments, others indicated that their neurocognitive challenges prevented them from forming and maintaining social relationships and friendships.[61] Additionally, several participants had minimal conversations about their cognitive functioning with their HIV specialists and primary care physicians.[61] This communication gap presents a noteworthy point of intervention. Working to close this gap on both sides could help patients develop other effective coping strategies to lessen the overall impact of cognitive decline.

Interestingly, differences in the relationship of neurocognitive functioning and resilience after controlling for epoch of diagnosis were not detected. These findings are consistent an investigation by Halkitis and colleagues[16] where they did not observe differences in neurocognitive challenges between long-term survivors and those who have been diagnosed in more recent years. While we expected to see differences based on other studies demonstrating that history of AIDS diagnosis and living with HIV prior to the implementation of ART,[21,40,41] the fact that we did not may be indicative that

advancements in biomedical interventions such as nonsteroidal anti-inflammatory drugs, vitamin supplements, and pharmacologic treatments for other comorbidities[62] are helping to combat neurocognitive decline.

Limitations

Several limitations should be noted. First, given that this study was cross-sectional in design, causality cannot be ascertained to determine if resilience leads to better neurocognitive outcomes or vice versa. Second, while the use of a self-report measure of neurocognitive functioning is a more efficient use of time and resources, a full neuropsychological battery would produce a comprehensive assessment of overall cognitive functioning. However, the PAOFI has been utilized and validated in other populations,[45,63,64] and can improve the interpretation of neuropsychological diagnostic testing or objective measures if utilized simultaneously.[64] Third,
this sample came from the New York City metropolitan area where there may be more resources for older PLWHA (e.g. GMHC and SAGE) compared to other parts of the United States and globally. There are also several issues pertaining to generalizability. The cohort consisted of participants who did not have a history of traumatic brain injury and thus these findings may not be generalizable to all aging PLWHA. Additionally, this sample was compromised of mostly non-White participants. Although, this is a strength with regard to understanding resilience and its associations among racial/ethnic minority gay men, this sample is not totally representative of all gay men living with HIV/AIDS in the United States. Finally, recruitment for this study came from primarily non-clinical

populations and those who may have more severe neurocognitive deficits may not have participated in this study.

Despite the limitations of this study, there were also some notable strengths. Very few studies have examined neurocognitive functioning among gay-identified HIV-positive men,[65] and to our knowledge, this is the first to examine resilience and neurocognitive outcomes in this group. The term 'men who have sex with men (MSM)' has been used in HIV-related literature since the early 1990's after being coined by the CDC in 1994.[66] We felt that it was important to enroll gay-identified men because the salience of identifying gay is much different than the salience of identifying as bisexual or engaging in same-sex behaviors while identifying as straight. Additionally, our sample was very diverse based on key sociodemographics of interest including educational attainment, financial situation, and time of diagnosis. Finally, this is one of the first analyses to utilize a validated resilience tool specifically designed with PLWHA in mind (see Chapter 2). The nuanced nature of this measurement is ideal to assess different domains of HIV-related resilience among PLWHA.

Future research needs to be conducted in order to better understand the relationship between cognition and resilience among PLWHA in more detail. For example, experimental studies and longitudinal investigations can examine whether self-efficacy can mediate the role of resilience and negative cognitive outcomes.[67] Additionally, studies that utilize larger, population-based samples will allow for more comparisons across not only demographic categories but also structural differences. Examining other variables that influence inequitable health outcomes shifts perspective to

modifiable, multilevel practices and policies that can ultimately improve health.[42] Next, utilizing a more refined HIV-related resilience tool may help to narrow down different points of neurocognitive interventions based on adaptive and effective coping strategies as well as optimism. Moreover, using a clinically-based screening tool of neurocognitive impairment such as the Mini-Mental State Examination[68,69] or the Repeatable Battery for the Assessment of Neuropsychological Status[70] may help to illustrate whether associations between HIV-related resilience and neurocognitive are stronger or weaker than the present study. Finally, elucidating the role of neurocognitive health in relationship to other physical and mental health outcomes among PLWHA and how resilience can be impactful is critical to addressing and creating a more holistic approach to care. This biopsychosocial approach will also be important to ensuring those facing different challenges remain virally suppressed in alignment with the 'getting to zero' initatives.[8]

Implications

The results of this study have applications for public health practitioners, medical providers, clinicians, and researchers. The current analysis demonstrates a cross-sectional association between HIV-related resilience and self-reported neurocognitive functioning. A next logical step of investigation would be to assess whether there are associations between HIV-related resilience and neuropsychological performance as examined through validated clinical screening tools.[68-70] Another point of investigation could examine prospective associations between HIV-related resilience and neuropsychological performance. Finally, understanding whether resilience can be manipulated in a lab

setting or clinical trial and what the possible impact may be is another important point to assess. Taken together, these inquiries would provide a stronger foundation of fundamental research to determine the best way to intervene on cognitive decline using resilience as a tool.

Conclusions

As PLWHA age, they are at increased risk for being diagnosed with a form of HAND. Resilience may be a possible explanation for the slower progression of neurocognitive decline over time among PLWHA. Our results highlight positive associations between HIV-related resilience and different domains of self-reported neurocognitive functioning including sensorimotor outcomes, language and communication, and cognitive and intellectual functioning. Understanding whether resilience can be utilized as a point of intervention to alleviate the negative ramifications of neurocognitive decline is a necessary next step of investigation.

Tables

Table 4.1 Basic Demographic, Self- Reported Neurocognitive Functioning, and HIV-Related Resilience Characteristics of GOLD III Study Sample ($n = 250$)

Demographic	n (%)
Age (median)	56
Race/Ethnicity (n = 245)	
White, non-Hispanic	80 (32.0)
Black, non-Hispanic	103 (41.2)
Hispanic	44 (17.6)
Mixed/Asian/Other, non-Hispanic	18 (7.2)
Educational Attainment (n = 248)	
High School or Less	24 (9.6)
High School Diploma or GED	60 (24.0)
Associate's Degree	46 (18.4)
Bachelor's Degree	74 (29.6)
Graduate Degree	44 (17.6)
Perceived Financial Situation (n = 247)	
I have enough money to live comfortably	86 (34.4)
I can barely/I cannot get by on the money I have	161 (64.4)
Time of Diagnosis (n = 246)	
Pre-ART	152 (60.8)
Post-ART	94 (37.6)
Neurocognitive Outcomes	**Mean (SD)**
Memory	43.37 (8.47)
Language and Communication	46.06 (7.53)
Sensorimotor	25.96 (4.54)
Higher Level Cognitive and Intellectual Function	46.87 (8.06)
HIV-Related Resilience	**Mean (SD)**
Full Scale	3.95 (0.64)
Adaptive Coping	3.90 (0.75)
Optimism	4.29 (0.70)
Effective Coping	3.71 (0.97)

Table 4.2 Neurocognitive Associations with HIV-Related Resilience, Age, and Epoch of Diagnosis in the GOLD III Study Sample

	Neurocognitive Sub-Scales			
	Memory	Language & Communication	Sensorimotor	Cognitive & Intellectual Function
HIV Resilience: Full Scale	0.44*	0.42*	0.37*	0.52*
HIV Resilience: Adaptive Coping	0.33*	0.30*	0.36*	0.43*
HIV Resilience: Optimism	0.30*	0.26*	0.28*	0.35*
HIV Resilience: Effective Coping	0.42*	0.43*	0.24*	0.45*
Age	-0.04	-0.11	0.08	0.02
Time of Diagnosis, Mean (SD) ($n = 246$)				
Pre-ART	42.82 (8.65)	45.48 (8.14)	25.86 (4.78)	46.73 (8.27)
Post-ART	44.18 (8.29)	46.97 (6.38)	26.05 (8.27)	47.09 (7.77)
p - value	0.225	0.133	0.750	0.743

*$p < 0.001$

Table 4.3. Hierarchical Multiple Regression Model Predicting HIV-Related Resilience by Neurocognitive Health Outcomes in the GOLD III Study Sample

	Block 1				Block 2			
	B (SE)	95% CI	β	p - value	B (SE)	95% CI	β	p - value
HIV Resilience: Full Scale								
Intercept	3.97 (0.12)	3.73, 4.22	-	**<0.001**	1.77 (0.26)	1.25, 2.28	-	**<0.001**
Pre/Post ART	-0.01 (0.08)	-0.18, 0.16	-0.01	0.898	-0.04 (0.07)	-0.18, 0.10	-0.03	0.577
Memory	-	-	-	-	0.01 (0.01)	-0.01, 0.02	0.11	0.206
Language & Communication	-	-	-	-	0.004 (0.01)	-0.01, 0.02	0.05	0.607
Sensorimotor	-	-	-	-	0.02 (0.01)	0.01, 0.04	0.13	**0.042**
Cognitive & Intellectual Function	-	-	-	-	0.03 (0.01)	0.01, 0.04	0.34	<0.001

CHAPTER V: CONCLUSION

This set of manuscripts examined several research questions regarding the role of resilience on the biopsychosocial health of older gay men living with HIV/AIDS in the New York City metropolitan area. Using cross-sectional data from the GOLD III study, an investigation aimed at testing a model of HIV-related resilience among PLWHA, the following research aims were examined. Chapter 2 describes the factor structure and psychometric properties of a new screener to assess HIV-related resilience. Next in Chapter 3, using the recently validated HIV-Related Resilience Screener (HIV-RRS) from Chapter 2, correlates of mental health, including depression, PTSD, substance dependence, anxiety, and suicidality with HIV-related resilience were analyzed. Finally, as described in Chapter 4, associations of five key domains of self-perceived neurocognitive functioning including language & communication, memory, sensory & motor skills, and higher level executive functioning, with HIV-related resilience were examined.

In this chapter, the key findings from the three manuscripts examining HIV-related resilience among older HIV-positive gay men will be summarized. Next, these findings will be synthesized and contextualized within existing literature and the theoretical framework on resilience among PLWHA introduced in the first chapter. Subsequently, the strengths and limitations of this body of research will be highlighted. Finally, implications for research, practice, and policy will be presented and proposed.

Summary of Key Findings

The factor structure and psychometric properties of a newly developed screener to evaluate HIV-related resilience (called the HIV-Related Resilience Screener (HIV-RRS)) as described in Chapter 2. Upon initial examination, the HIV-RRS had a three factor solution with adequate model fit indices to support this conclusion. An examination of inter-item associations led to the labeling of three sub-scales as adaptive coping, optimism, and effective coping. Reliability analyses demonstrated scores ranging from $\alpha = 0.72$ to $\alpha = 0.80$ for the sub-scales and $\alpha = 0.84$ for the full tool. Convergent validity was established using a variety of psychosocial measures including general resilience, HIV- and gay-related stigma, loneliness, and level of outness. Overall, the HIV-RRS has strong psychometric properties that support its use in examining HIV-related resilience among PLWHA, which is a very important aspect of moving forwards a more holistic strengths-based approach to working with this population.

With regard to mental health correlates of HIV-related resilience, findings from the second manuscript indicate that higher levels of overall HIV-related resilience is significantly associated with lower levels of PTSD and also feeling more financially secure. When diving deeper into the sub-scales, those who employ better adaptive coping strategies and were more optimistic about living with HIV/AIDS were also significantly less likely to meet the criteria for substance use dependence in addition to having lower levels of PTSD and higher financial security. Similarly, those who engaged more effective coping strategies were also less likely to have PTSD and were more likely to feel secure with their financial resources. Moreover, a mediation model suggested that

HIV-related resilience mediates the impact of HIV-related stigma on the number of endorsed mental health outcomes.

Regarding self-perceived neurocognitive functioning and the association with overall HIV-related resilience among older gay men living with HIV/AIDS, findings from the third manuscript suggest significant although slight increases in sensorimotor and cognitive and intellectual functioning outcomes. Similar associations were demonstrated between the aforementioned neurocognitive outcomes and the adaptive coping sub-scale of the HIV-RRS. In the multivariate analysis of the optimism sub-scale, we found significantly positive associations with cognitive and intellectual functioning holding all other variables constant. Finally, those who scored higher on the effective coping scale were significantly more likely to have higher self-perceived language and communication abilities.

Synthesis of Results

Taken together, these findings indicate that the HIV-RRS demonstrates good psychometric properties and that having higher levels of HIV-related resilience is significantly associated with better mental and self-perceived neurocognitive health outcomes. The present studies add to the existing literature not only by providing a new screening tool to assess HIV-related resilience but also highlight mental and self-perceived neurocognitive health data from a cohort of self-identified gay men living with HIV/AIDS, instead of all men who fall under the 'MSM' umbrella distinction. More importantly, the findings support the need to extend research on how resilience can be enacted among older PLWHA in order to facilitate and support better health outcomes.

The HIV-RRS was designed particularly with the experiences of PLWHA at the forefront.[1] Understanding if and how resilience impacts the relationship between health outcomes and adverse life experiences faced by PLWHA is particularly important in order to mitigate the negative impact of health stressors.[2] In light of adaptive coping, optimism, and effective coping, emerging from the preliminary exploratory factor analysis, researchers, practitioners, and clinicians have more tailored opportunities to intervene. In particular, focusing on adaptive or effective coping strategies that PLWHA have utilized throughout their lives can help inform programs and initiatives most effectively. Moreover, employing a multidimensional approach to HIV-related resilience may have a greater impact on overall holistic health and well-being as a 'one size fits all' method typically does not work, especially for PLWHA.[3]

When I examined the full HIV-RRS, significant associations between those with more limited financial resources and higher scores on the PTSD-civilian checklist and lower levels of HIV-related resilience were detected. These findings are consistent with previous studies on resilience acting as a protective factor of the negative ramifications of PTSD and other traumatic experiences,[4-7] especially among PLHWA.[8] The results from this analysis also support the need to target substance dependence and use among older PLWHA and ascertain whether interventions rooted in resilience can increase ART uptake and adherence. Prior work done within this context has demonstrated that PLWHA with higher levels of resilience also had increased odds of being mostly (>95%) adherent to ART.[9] The interaction of HIV-related therapies and resilience is a key component to ensuring and maintaining better biopsychosocial and holistic health outcomes.

Researching neurocognitive decline and HAND conditions is particularly important among older PLWHA given the role that executive functioning has on overall health outcomes. Findings from this program of research demonstrate those with higher levels of overall HIV-related resilience also had better sensorimotor and cognitive and intellectual functioning outcomes. While the previous research on resilience and neurocognitive outcomes among PLWHA is scarce, our findings are consistent with other studies on other aging populations globally.[10,11] Furthermore, adaptive strategies such as increased social interaction,[12,13] or engaging in physical activities[14-16] can help assuage neurocognitive decline among older PLWHA. Additionally, our findings do not indicate differences in neurocognitive functioning and resilience after controlling for time and length of diagnosis although we did expect to detect some differences based on previous work in this domain.[17-19] Future investigations using full neuropsychological assessments and not a self-reported measure may provide a more comprehensive view of overall functioning and well-being among older PLWHA.

The results from these three analyses demonstrate that HIV-related resilience is multidimensional and is positively associated with better mental and self-reported neurocognitive outcomes. A logical next step of investigation is to assess the impact of HIV-related resilience longitudinally to determine whether it is protective against mental and neurocognitive health challenges over time. In particular, understanding how the individual dimensions of HIV-related resilience expand or contract over many years can provide valuable information on tailoring programs, policies or other interventions.

Finally, these studies also lay the groundwork for testing the Halkitis et al.[2] theoretical model of resilience and biopsychosocial health among older PLWHA (Figure

1). Given no 'gold standard' measurement of resilience currently exists,[20] the HIV-RRS provides an innovative and nuanced mechanism to assess resilience among PLWHA within this framework. Moreover, on a smaller scale, results from the analysis examining the mediating impact of HIV-related resilience between HIV-related stigma and total mental health conditions support testing the full paradigm. Thus, creating and examining a structural equation model of the mental, physical, and social health states and HIV-related resilience among this cohort of older HIV-positive gay men is an important next point of assessment. Utilizing and capitalizing on resilience is a critical aspect of shifting to a strengths-based and also preventive perspective of the biopsychosocial health and well-being of PLWHA.

Figure 1. Resilience and Health Paradigm for Older PLWHA
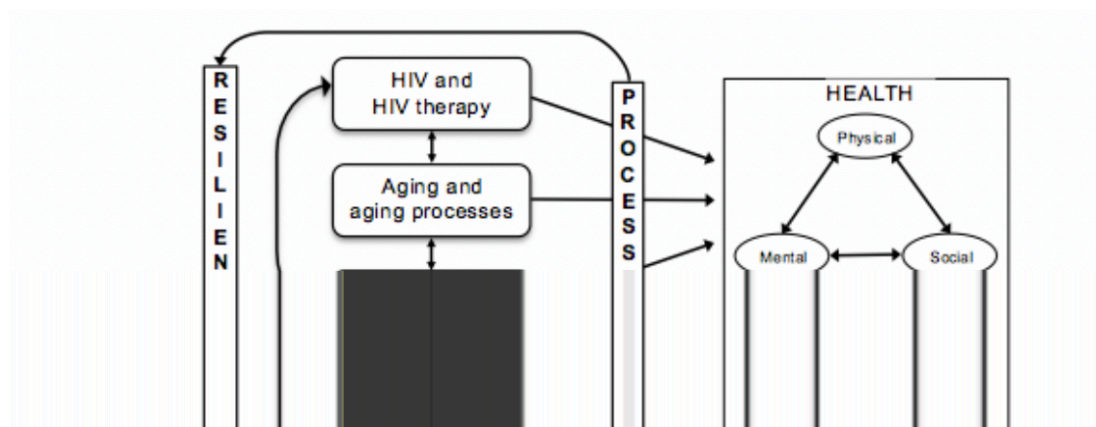
Strengths and Limitations

The studies described in Chapter 2-4 advance the science on HIV and aging in numerous ways. First, most studies on resilience among PLWHA have focused on all men who are classified under umbrella terms such as sexual minority men (SMM) or MSM[21-28] but very few have focused specifically on gay-identified men.[29-31] Using general terms like MSM or SMM demoralize the importance of gay identities.[32] Effective

HIV-related interventions, treatments, or policies should tend to sexual orientation as it does with other cultural, racial, ethnic, or gender identities.[33] As such, the GOLD III study was purposely designed with gay men in mind not only to bridge the gap in research but to also give a stronger voice and perspective to this group that may have been misrepresented in previous research in order to ease epidemiological methods.

Second, the GOLD III study cohort was demographically diverse with regard to race/ethnicity, financial security, and educational attainment. By using a more diverse sample, I was able to capture a wider range of resilience-related experiences among older HIV-positive gay men. Moreover, recruitment for the GOLD III study occurred using many different mediums including community based organizations and venues, pride and other community engagement events, mobile dating and hook-up applications and websites, and advertisements in local LGBTQ newspapers. Additionally, the reputation of CHIBPS and success of previous research studies allowed the team to rely on word-of-mouth with almost 30% of all individuals who screened for the study hearing about it from friends or other community members. This is a testament to the Center leadership, staff, and interns whose commitment to this line of work is both respected and trusted by the communities in which we are a part of and work with.

Finally, the GOLD III study implemented a newly designed and novel instrument in order to better assess HIV-related resilience (now classified as the HIV-RRS). With the inclusion of other robust measures of general resilience, grit, and psychosocial conditions (e.g. stigma, outness, and attachment), the HIV-RRS has been psychometrically tested and validated within this sample of older HIV-positive gay men. Subsequently, it has been utilized to examine the relationship between HIV-related resilience with mental and

neurocognitive health outcomes, something that has not been researched extensively to-date.

Limitations

There are several limitations to these studies that should be discussed. Casual relationships cannot be determined because of the cross-sectional and survey-based nature of the study design. Future research should aim to examine resilience over time through longitudinal investigations to decipher whether resilience causes mental health or neurocognitive challenges to have less of an impact or whether the impact of these challenges causes people to develop resilience, which lessens the impact over time. Conducting randomized control trials of resilience-based interventions is another critical point of investigation. Understanding the directional relationship of resilience and other biopsychosocial health outcomes among older PLWHA is an important next point of inquiry to helping those living with HIV/AIDS age with grace, dignity, and understanding.

Next, the GOLD III cohort may not be generalizable to several other groups of PLWHA for myriad reasons. The experiences of these older gay HIV-positive men living in New York City are likely different from other older gay HIV-positive men living in other geographic areas both in the United States and globally. For example, NYC may offer more resources like social support groups or other services offered by community-based organizations such as SAGE and Housing Works that may not be available in less liberal places such as Dallas, TX or Indianapolis, IN. More specifically, NYC is an HIV epicenter and the birthplace of organizations such as Gay Men's Health Crisis and ACT-UP (AIDS Coalition to Unleash Power). Additionally, because the HIV-RRS has only

been implemented and validated in this particular population, more work needs to be done to determine whether it will hold up in other sub-populations of PLWHA including women, people who inject drugs, transgender individuals, newly diagnosed people, etc.

Furthermore, while this sample is mostly compromised of Black participants and that certainly can be considered a strength, this breakdown may not be totally representative of all gay men living with HIV/AIDS in the United States. In order to complete the multivariate analyses described in Chapters 3-4, participants' race and ethnicity characteristics were collapsed into four categories (i.e., Hispanic/Latin, Black, non-Hispanic, White, non-Hispanic and Mixed/Asian/Other non-Hispanic). Similarly, for the configural and metric analyses in Chapter 2, all participants in the latter group (Mixed/Asian/Other non-Hispanic) were removed. Although these grouping strategies allowed for analyses to be conducted with more ease and interpretability, it is important to disaggregate these categories in future research to gain a better understanding the unique experiences of gay men from different ethnic and racial groups.

Lastly, these studies are subject to a couple of forms of potential bias including interviewer and measurement biases. As the MINI was an interviewer-administered assessment, participants may not have answered questions with total honesty for fear of judgement or discrimination and as such, our findings may be misrepresented and subjected to social desirability bias. It is important to note however, all efforts were made to curtail discomfort prior to and during the MINI assessment by introducing the screener during the consent process and all participants indicated they were comfortable discussing their physical and mental health during the screening process. Similarly, a self-reported measurement of neurocognitive functioning was used to make the best use

of time and resources; however, a full neuropsychological assessment may provide a more holistic perspective of cognitive functioning. While the PAOFI has been validated within other populations,[34-36] using the diagnostic and objective measures simultaneously may help optimize the meaningfulness and overall picture of neurocognitive functioning.[36]

Implications

Public Health: Sifting from a Deficits-Based to a Strengths-Based Approach

For decades, public health practitioners and researchers have predominantly studied health conditions and outcomes from a deficits-based perspective.[37] In general, there is a wide-ranging understanding and consensus around the social conditions and factors—apart from medical ones—that drive health across settings and populations.[38] From poverty to racism, and from educational inequities to homophobia, these structural barriers have often driven public health theory, practice, and policy. However, while these foci are vitally important and necessary, deficit models tend to define individuals and communities negatively while often disregarding what works well and is positive within a particular population.[37]

The majority of research on HIV/AIDS among gay, bisexual and other MSM and in particular those who are aging and members of the AIDS Generation (i.e., those who came of age in the 1980s at the height of the HIV/AIDS epidemic)[39] has focused extensively on risk. Other research has focused on complications and the negative ramifications of being diagnosed and/or living with HIV/AIDS (i.e., what is wrong with living with HIV/AIDS and not what the positive aspects may be). Those who are part of the AIDS Generation are entering uncharted territory—they are living far longer than

many of them expected considering how many of them lost their colleagues, friends, partners, and lovers from AIDS-related complications prior to the development and implementation of ART. Research confirming the myriad challenges and difficulties of living with HIV/AIDS is not needed because they know far too well—these men have lived it for the last three decades in one way or another. The resilience this community exhibits both individually and collectively is unmatched to any other impacted by an epidemic in modern history. As such, it is critically important for public health researchers and practitioners to focus on and refine the resilience paradigm within older PLWHA so that it can serve as a blueprint for a healthier and more meaningful journey of aging.

Resilience as an Underutilized Approach

These findings underscore the need to utilize resilience as a tool among aging populations, especially those living with HIV/AIDS. For example, one way to identify resilience among older PLWHA is to utilize a screener such as the HIV-RRS in clinical settings so medical providers or other clinicians have a clearer picture of the level of strength their clients possess. More specifically, it would allow them to ascertain whether adaptive or effective coping strategies are utilized, or optimism is exhibited in order to determine the most ideal treatment plan. Studies of older adults have found that strong social ties are associated with increased levels of resilience.[40,41] An intervention or program utilizing social support or a group-based activity could help activate untapped resources or harness existing processes to increase resilience among older PLWHA. This also speaks to care that is not just biological but is more biopsychosocial in its approach.

Resilience can also be utilized as a tool to both normalize gay men's health and living with HIV/AIDS. As demonstrated in Chapter 3, HIV-related resilience acted as a mediator between the impact of HIV-related stigma and mental health outcomes. A recent set of meta-analyses found significant associations between HIV-related stigma and fewer social support resources and higher rates of depression.[42] Using resilience as a way to lessen the impact of HIV-related stigma could be a necessary point of intervention. Furthermore, a resilience-based approach enables us to examine gay men's health more holistically with regard to a biopsychosocial approach while not over-focusing solely on sexual health.

Ending the HIV/AIDS Epidemic

Following the lead of several states including New York, New Jersey, and California, and UNAIDS, the United States federal government initiated a nationwide 'Ending the HIV Epidemic (EtE)' initative.[43] Because of biomedical advances in treating and preventing the spread and transmission of HIV/AIDS,[44,45] there is determination to achieve 'zero' new infections by 2030.[46] In order to truly end the epidemic, plans must support PLWHA[47] by addressing mental[48] and neurocognitive[49] health outcomes, especially because these health-related challenges may impact adherence to ART.[50,51] Disruption to antiretroviral treatment will significantly impact the final stage of the HIV continuum of care and will make widespread viral suppression extremely difficult to achieve, especially by 2030. The problem with many of the current EtE plans is that they mainly focus the virus itself and not the person living with the virus. With that, the findings from Chapters 3 and 4 support utilizing resilience as a possible mechanism to lessen the impact of mental and neurocognitive health challenges which can likely have a

direct impact on adherence to ART. This approach supports PLWHA as people and not as incubators of a virus.

Untangling 'LGBTQ' Health

This group of studies helps underscore the importance and set standard for disentangling research that occurs under the broad LGBTQ umbrella. While many LGBTQ people face similar structural inequalities, especially when it comes to health and healthcare access,[52] there are unique experiences among sub-populations that shape the way individuals make decisions and navigate healthcare settings. HIV primarily affects gay, bisexual, transgender, and queer individuals and not lesbian women, yet at times the groups have historically been lumped together as one. The needs of bisexual men living with HIV/AIDS may be similar to gay men living with HIV/AIDS, but there may also be important nuances and distinctions that ultimately create missed opportunities to intervene. Similarly, too often research on gender and sexual minorities is conflated and/or merged together when transgender men and women have different needs than cisgender men and women that are distinct from sexual orientation. There is considerably more work to be done on how resilience is exhibited and manifested within other subpopulations of LGBTQ individuals living with and without HIV/AIDS.

Bridging the Gap: The Health of Populations and Individuals

With the relatively recent movement towards translational research that focuses on fostering more cohesive relationships between basic scientists and clinical researchers,[53] a logical next step is a multidisciplinary approach to research on resilience among older PLWHA. More specifically, public health researchers and practitioners need

to work more intentionally with mental health providers and social workers in order to better address the needs of individuals and the population at large. They need to understand that that a person living with HIV/AIDS is not the virus itself. Combining a dynamic public health model that methodically thinks about how each point of intervention informs the next with a psychological approach that focuses on details and depth of underlying causes of problems can be a formidable balance.[54] While tending to the needs of individuals is crucial to improving the health of populations, there can also be a synergistic relationship by improving structural and population-based impediments of health that has a direct impact on people. This relationship can be fostered by implementing multi-level resilience interventions and programs that address the interplay among individuals, communities, and the environment at-large.

Healthcare for Older PLWHA

As PLWHA age, their biopsychosocial healthcare challenges will become more complex.[55,56] Mugavero and colleagues[55] outline a socioecological perspective of multilevel factors that influence the processes of engagement in care. In this model, individual factors such as mental health, comorbidities, and resiliency are layered with relationships, community (including the healthcare system) and policies (i.e., Ryan White CARE Act, Affordable Care Act, and other quality measures/indicators).[55] Navigating the structural and interpersonal dynamics can be challenging for anyone, but PLWHA may face additional psychosocial burdens such as HIV-related stigma that make it more complicated. In general, the healthcare workforce is not equipped to handle the aging population at-large.[57,58] More specifically, those who work with PLWHA are also overextended and undertrained to manage the aging HIV epidemic.[59,60] The majority of

respondents to a workforce development survey consisting of HIV experts, clinicians, and leaders indicated that 'HIV and mental health' is the most urgent training need for practitioners working with PLWHA.[60] Incorporating resilience and strengths-based perspectives into this training would provide healthcare workers with an important perspective of approaches to holistic care, especially for aging PLWHA.

Conclusions

This culmination of research has made noteworthy contributions to the understanding of HIV-related resilience among older gay men living with HIV/AIDS. In sum, a novel screening tool, the HIV-RRS, is a valid and useful mechanism to assess HIV-related resilience. Results from two distinct multivariate analyses indicate that having higher levels of HIV-related resilience is significantly associated with also having better mental health outcomes, specifically around PTSD and substance dependence and higher self-perceived neurocognitive functioning. Resilience-focused interventions, programs, and policies need to be developed for older gay men living with HIV/AIDS and may be improved by targeting the mental and neurocognitive challenges identified in these studies. Moreover, bringing public health researchers and practitioners together with mental health providers and clinicians will help bridge the gap between disciplines and approaches to care. Furthermore, this re-alignment will help shift conversations within the public health field towards a strengths-based approach instead of focusing predominantly on deficits. Finally, we must acknowledge that the needs of LGBTQ individuals are not monolithic and as such continue to push forward research initiatives that concentrate on the distinct needs of sub-populations instead of outdated and stigmatizing categories that were established out of ease and convenience.

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APPENDICES

List of Appendices

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Appendix 2. Rutgers IRB Approval

Appendix 3. GOLD III Measures List

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Appendix 5. GOLD III Recruitment Flyer

Appendix 1. NYU IRB Approval

mail ask.humansubjects@nyu.edu.

Sincerely,

Alison Dewhurst, CIP
Human Research Compliance Director

—

Perry N. Halkitis, PhD, MS, MPH
Senior Associate Dean for Academic & Faculty Affairs, College of Global Public Health
Interim Chair, Department of Biostatistics
Professor of Global Public Health, Applied Psychology, and Medicine
Director, Center for Health, Identity, Behavior & Prevention Studies (CHIBPS)
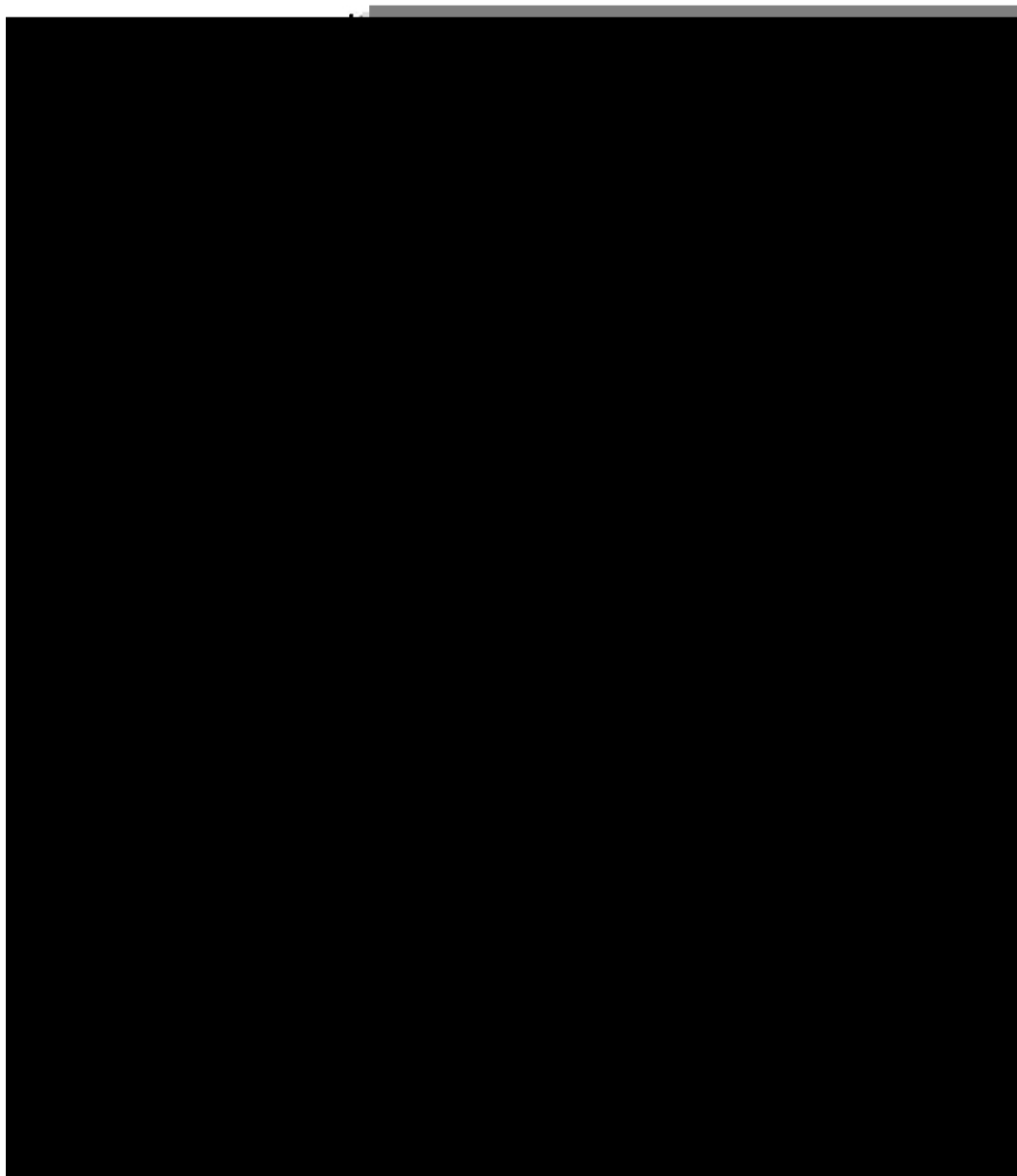Editor in Chief, *Behavioral Medicine*
New York University
212.998.5373
@DrPNHalkitis
www.perrynhalkitis.com

Appendix 2. Rutgers IRB Approval

5.4 Indicate who will dispense subject drug/device/biological to the subject(s):

Not applicable

6. **Data Handling and Storage**

Risk of breach of confidentiality will be minimized in several ways. Any collected information, including first name, phone number, and email address used during the screening and recruitment process, and any materials linking a name to a study number, including the consent form, will be kept in a separate, locked filing cabinet. Only project staff will have access to this filing cabinet. Participants will receive a unique identification number that will be associated with all other data collected for them. This will ensure that participant's personal identifying information will never be linked to collected data.

All information provided by participants will be kept confidential. Other personally identifiable information obtained from the computer-administered survey including demographic information (date of birth, race/ethnicity, sexual orientation, educational attainment, socioeconomic status, and zip code of residence, will never be linked to participant names. Data from the completed surveys will be entered into a database that will be stored on a secure, password-protected network. Confidentiality is enhanced by the use of computer-administered surveys, and data collection will be such that only an encrypted password will allow study researchers to access study data, which will reside on the NYU server.

7. **Sample/Specimen Collection, Processing, Handling and Storage (if applicable)**

Non-invasive biological specimens will be collected for research purposes. A total of four ml of venous whole blood will be collected and accessioned to a send-out lab for the following tests:
- C-reactive protein (CRP)
- Erythrocyte sedimentation rates (ESR)
- Pre- and post-Cortisol

All blood specimens will be collected by a NY certified phlebotomist. Biologics are fully described in the Blood Draw Procedures document, which is attached.

We will also record systolic and diastolic blood pressure using an automated sphygmomanometer.
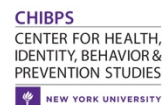
Appendix 3. List of GOLD III Measures

Construct	Name of Measure/Marker	Citations	Variable Name

Construct	Name of Measure/Marker	Citations	Variable Name
Mental Health	MINI: -Major Depressive Disorder -Dysthymia -Suicidality -Panic Disorder -Social Phobia -Obsessive Compulsive Disorder -Generalized Anxiety Disorder -Antisocial Personality Disorder **-Substance Use (MODIFIED)**	Sheehan DV, Lecrubier Y, Harnett-Sheehan K, Amorim P, Janavs J, Weiller E, Hergueta T, Baker R, Dunbar G: The M.I.N.I. International Neuropsychiatric Interview (M.I.N.I.): The Development and Validation of a Structured Diagnostic Psychiatric Interview. J. Clin Psychiatry, 1998;59(suppl 20):22-33.	Non-ACASI
	CES-D	Radloff LS. The CES-D scale: a self-report depression scale for research in the general population. Applied Psychological Measurement. 1977;1:385-401. Eaton WW, Muntaner C, Smith C, Tien A, Ybarra M. Center for Epidemiologic Studies Depression Scale: Review and revision (CESD and CESD-R). In: Maruish ME, ed. The Use of Psychological Testing for Treatment Planning and Outcomes Assessment. 3rd ed. Mahwah, NJ: Lawrence Erlbaum; 2004:363-377.	CESDQ1 -CESD20
	Alcohol (AUDIT)	Babor TF ; de la Fuente JR ; Saunders J ; Grant M. AUDIT: The Alcohol Use Disorders Identification Test. Guidelines for use in primary health care. Geneva : World Health Organization, 1992.	AUDITQ1 - AUDITQ10
	Loneliness (Full)	Russell, D., Peplau, L.A. & Ferguson, M.L. (1978). Developing a measure of loneliness. *Journal of Personality Assessment, 42* , 290-294.	LONEQ1 - LONEQ20
	HIV Stigma	Berger, B.E., Ferrans, C.E., & Lashley, F.R. (2001). Measuring stigma in people with HIV: Psychometric assessment of the HIV stigma scale. Research in Nursing & Health, 24, 518-529.	HIVSSQ1 - HIV SSQ40

		Wright, K., Naar-King, S., Lam, P., Templin, T., & Frey, M. (2007). Stigm...	

	Outness	Mohr, J., & Fassinger, R. (2000). Measuring dimensions of lesbian and gay male experience. Measurement and Evaluation in Counseling and Development, 33(2), 66-66. Wilkerson JM, Noor SW, Galos DL, Rosser BRS. Correlates of a Single-Item Indicator Versus a Multi-Item Scale of Outness About Same-Sex Attraction. Archives of Sexual Behavior. 2016;45(5):1269-77.	OUTQ1 - OUTQ11
	RAND Social Health Survey	Donald CA, Ware JE, Jr. The measurement of social support. Res Community Ment Health 1984;4:325-370	SOCL1Q - SOCLQ11
Neurocognitive	Patient Assessment of Own Functioning Inventory	Chelune GJ, Heaton RK, Lehman RAW. Neuropsychological and Personality Correlates of Patients' Complaints of Disability. In: Goldstein G, Tarter RE, eds. Advances in Clinical Neuropsychology. Boston, MA: Springer US; 1986:95-126.	NAPCQ1 -NAPCQ32
	INTERVIEWER ADMINSTERED for Stressor: Stroop	Golden, C. J. (1978). Stroop Color and Word Test: A Manual for Clinical and Experimental Uses. Chicago, IL: Stoelting.	Non-ACASI
	INTERVIEWER ADMINSTERED for...	Gronwall, D. M., & Sampson, H. (1974). The psychological effects of concussion...	

Appendix 4. GOLD III Assessment Folder

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CHIBPS
CENTER FOR HEALTH,
IDENTITY, BEHAVIOR &
PREVENTION STUDIES
NEW YORK UNIVERSITY

GOLD III INTERVIEW CHECKLIST

Actual Start Time:_____   ID #_____   Interview Date:____/____/_____
Actual End Time:_____   Host_____   DOB:____/____/_____
Room Name:_____

Start at 411 Lafayette:

Prerequisites: CHECK ID and HIV Status. Eligible if born between: tomorrow's date 1967 to today's date 1948 AND has medication bottle other than Truvada, ADAP Card, GMHC registration card, or proof from medical provider

___ Preferred Pronouns (circle one)   she/her   he/him   they/them
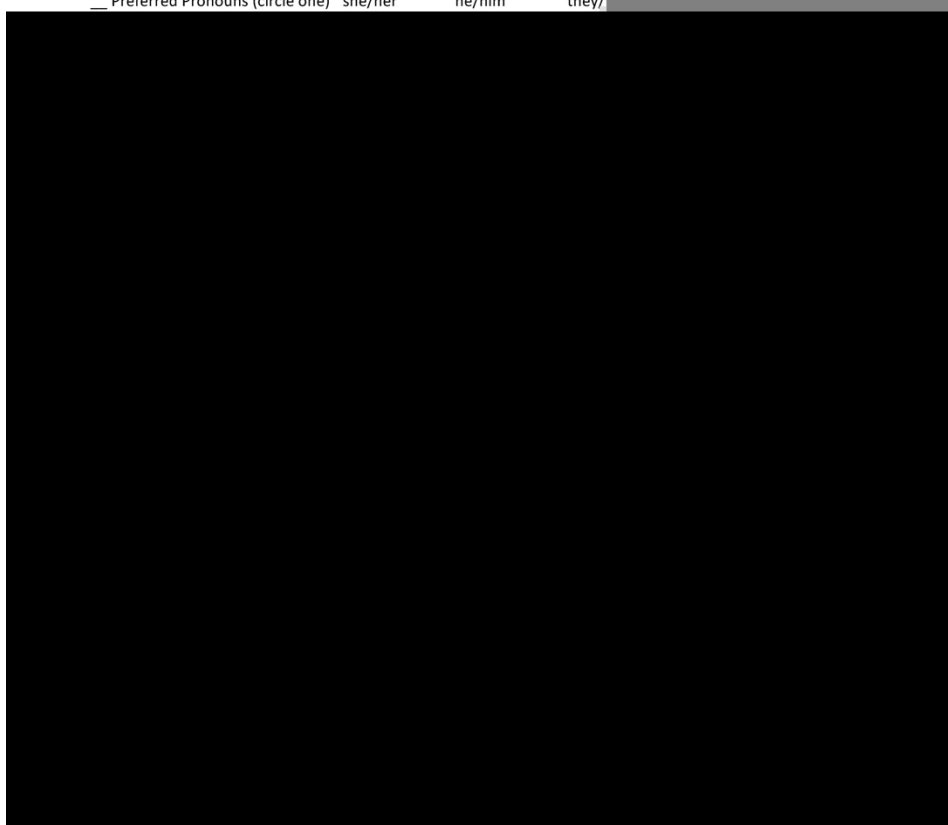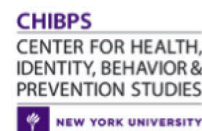
TESTING A MODEL OF RESILIENCE TO DEVELOP AN INTERVENTION FOR HEALTHY AGING IN OLDER HIV-SEROPOSITIVE ADULTS

CONSENT TO PARTICIPATE IN A RESEARCH STUDY

WHY ARE YOU BEING ASKED TO TAKE PART IN THIS RESEARCH?
New York University (NYU)'s Center for Health, Identity, Behavior & Prevention Studies (CHIBPS) is doing a study of the lives of older HIV-positive gay and bisexual men. **By men we mean those individuals who were males assigned at birth.**

WHO IS RUNNING THE STUDY?
The people in charge of this study are Dr. Perry Halkitis and Dr. Farzana Kapadia, Co-Directors of CHIBPS.

WHAT IS THE PURPOSE OF THIS STUDY?
The purpose of this study is to examine resilience as it relates to physical, mental, and social health states in a sample of older (50-69) gay or bisexual HIV-positive men. Learning about these things will help CHIBPS understand how older HIV-positive men demonstrate resilience. We will survey about 500 men.

WHERE IS THE STUDY GOING TO TAKE PLACE AND HOW LONG WILL IT LAST?
The study will be done at CHIBPS offices at 726 Broadway, Suite 525. The survey will last approximately 2.5 hours to complete.

If you agree to participate in this study, you will:

1. Complete a survey on the computer that will take about 40 minutes. You will be able to read questions on the computer screen and you will listen to the questions with headphones at the same time. The survey will ask questions about your background, your living arrangements, your mental and physical health, your social relationships, alcohol and other drug use, and resilience.
2. Complete an interviewer-administered survey related to your cognitive (i.e. thinking) functioning, mental wellness, personal and social factors.
3. Take part in testing for C-reactive protein (CRP), Erythrocyte sedimentation rate (ESR), and Diurnal Cortisol. This testing will involve a blood draw.

When you complete the survey, we will give you a list of places where you can go to get tested for other sexually transmitted infections. We will also give you information about other health services available, including a list of mental health providers, counseling and addiction services.

Page 1 of 3 Participant's initials: _____

IRB #
Expiration Date:
Please do not sign if given after the expiration date.

NYU
IRB-FY2017-327
APPROVED: 01/04/17-01/03/18

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IDENTITY, BEHAVIOR &
PREVENTION STUDIES
NEW YORK UNIVERSITY

WHAT ARE THE POSSIBLE RISKS AND DISCOMFORTS OF BEING IN THIS STUDY?
The risks involved in this study are believed to be minimal. The interview asks some questions about health history and behaviors that may make some individuals feel uncomfortable. Other sensitive topics will include drug and alcohol use and mental health history. You do not have to answer questions that make you uncomfortable or embarrass you. It is also possible that you may experience discomfort or have anxiety about getting your blood drawn. You may also stop the interview at any time.

ARE THERE ANY BENEFITS TO YOU BEING IN THIS STUDY?
There are no direct benefits to you from completing the survey. You may enjoy answering
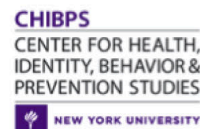
WILL YOU RECEIVE ANY COMPENSATION FROM TAKING PART IN THIS STUDY?
At the completion of the assessment, you will receive $50 in cash for the time and effort involved in taking part in this study.

WHAT SHOULD YOU DO IF YOU HAVE ANY QUESTIONS?
If you did not understand any part of what I just told you, be sure to ask questions before you agree to complete the survey.

If you have any questions about the survey, please call Dr. Perry Halkitis at (212) 998-5373. If you have any concerns about your rights as a participant taking part in a research study, you can contact the New York University Office of Human Subjects via phone at (212) 998-4808, via their office at 665 Broadway, Suite 804, New York, NY 10012, and/or via email at ask.humansubjects@nyu.edu.

CAN I RECEIVE A COPY OF THIS INFORMATION AND CONSENT FORM?
A signed and dated copy of this consent form will be given to you upon your request.

CONSENT
I WANT TO BE IN THIS STUDY. I UNDERSTAND THAT I CAN LEAVE IT AT ANY TIME.

I understand that my survey responses will be stored in a computer database. I also understand that I will be given information about mental health, addiction, and STI services. Being in this study does not mean that there is an employee/employer relationship between me and NYU, or me and the researchers. Being in this study will not affect my being a student, volunteer, or employee at New York University now or in the future.

I also understand that I can be taken out of the study by the researchers if my behavior threatens the study (for example, if I threaten the safety of project staff.)

I have read this consent form or have had it read to me. I have had the chance to ask questions and my questions have been answered. I have been given a copy of this form. I agree to be in this study.

Participant's Signature _____   Date _____

Interviewer's Name _____

Page 3 of 3 Participant's initials: _____

IRB #
Expiration Date:
Please do not sign if given after the expiration date.

NYU
IRB-FY2017-327
**APPROVED: 01/04/17-01/03/18**

Participant ID#: ___ ___ ___ ___

GOLD III: MEDICAL HISTORY CHECKLIST

Directions: Please ask the participant each of the following questions. If they say yes to any of the health conditions, you must also ask if they are currently on medication/treatment for the condition.

"Have you ever been diagnosed by a healthcare professional with:"

	No	Yes	If yes, are you currently on medication/treatment?
Hypertension or high blood pressure			
Diabetes			
Heart condition			
Stroke			
High cholesterol			
Asthma, COPD, or another respiratory condition			
Liver disease, or Hepatitis C			
Kidney disease			
Lupus, rheumatoid arthritis, or autoimmune diseases			
Osteoporosis, fractures, or any other bone condition			
Cancer			
If yes to cancer: Ask participant to specify what type(s) of			

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PREVENTION STUDIES
NEW YORK UNIVERSITY
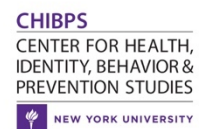
GOLD III: MINI Assessment Instructions

PARTICIPANT ID: |___|___|___|___|

INTERVIEWER INITIALS: |___|___|___|

VISIT DATE: |___|___|-|___|___|-|___|___|___|___|

START TIME: |___|___|:|___|___| am /pm

_____

Please read the following framing statement to the interviewee prior to beginning the assessment:

Next I will be asking you about some problems or difficulties you may have experienced recently or in your lifetime. It is important to remember that everyone experiences problems at times, these questions just address

M.I.N.I.   __ __ __ __

MINI INTERNATIONAL NEUROPSYCHIATRIC INTERVIEW

English Version 5.0.0

DSM-IV

USA: **D. Sheehan, J. Janavs, R. Baker, K. Harnett-Sheehan, E. Knapp, M. Sheehan**
University of South Florida - Tampa

FRANCE: **Y. Lecrubier, E. Weiller, T. Hergueta, P. Amorim, L. I. Bonora, J. P. Lépine**
Hôpital de la Salpétrière - Paris

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DISCLAIMER

Our aim is to assist in the assessment and tracking of patients with greater efficiency and accuracy. Before action is taken on any data collected and processed by this program, it should be reviewed and interpreted by a licensed clinician.

This program is not designed or intended to be used in the place of a full medical and psychiatric evaluation by a qualified licensed physician – psychiatrist. It is intended only as a tool to facilitate accurate data collection and processing of symptoms elicited by trained personnel.

M.I.N.I. 5.0.0 (July 1, 2006)

GENERAL INSTRUCTIONS

The M.I.N.I. was designed as a brief structured interview for the major Axis I psychiatric disorders in DSM-IV and ICD-10. Validation and reliability studies have been done comparing the M.I.N.I. to the SCID-P for DSM-III-R and the CIDI (a structured interview developed by the World Health Organization for lay interviewers for ICD-10). The results of these studies show that the M.I.N.I. has acceptably high validation and reliability scores, but can be administered in a much shorter period of time (mean 18.7 ± 11.6 minutes, median 15 minutes) than the above referenced instruments. It can be used by clinicians, after a brief training session. Lay interviewers require more extensive training.

INTERVIEW:

In order to keep the interview as brief as possible, inform the patient that you will conduct a clinical interview that is more structured than usual, with very precise questions about psychological problems which require a yes or no answer.

GENERAL FORMAT:

The M.I.N.I. is divided into **modules** identified by letters, each corresponding to a diagnostic category.
•At the beginning of each diagnostic module (except for psychotic disorders module), screening question(s) corresponding to the main criteria of the disorder are presented in a **gray box**.
•At the end of each module, diagnostic box(es) permit the clinician to indicate whether diagnostic criteria are met.

CONVENTIONS:

Sentences written in « normal font » should be read exactly as written to the patient in order to standardize the assessment of diagnostic criteria.

Sentences written in « CAPITALS » should not be read to the patient. They are instructions for the interviewer to assist in the scoring of the diagnostic algorithms.

Sentences written in « **bold** » indicate the time frame being investigated. The interviewer should read them as often as necessary. Only symptoms occurring during the time frame indicated should be considered in scoring the responses.

Answers with an arrow above them (➡) indicate that one of the criteria necessary for the diagnosis(es) is not met. In this case, the interviewer should go to the end of the module, circle « **NO** » in all the diagnostic boxes and move to the next module.

When terms are separated by a *slash (/)* the interviewer should read only those symptoms known to be present in the patient (for example, question H6).

Phrases in (parentheses) are clinical examples of the symptom. These may be read to the patient to clarify the question.

RATING INSTRUCTIONS:

All questions must be rated. The rating is done at the right of each question by circling either Yes or No. Clinical judgment by the rater should be used in coding the responses. The rater should ask for examples when necessary, to ensure accurate coding. The patient should be encouraged to ask for clarification on any question that is not absolutely clear.

The clinician should be sure that each dimension of the question is taken into account by the patient (for example, time frame, frequency, severity, and/or alternatives).
Symptoms better accounted for by an organic cause or by the use of alcohol or drugs should not be coded positive in the M.I.N.I. The M.I.N.I. Plus has questions that investigate these issues.

A. MAJOR DEPRESSIVE EPISODE

(➡ MEANS : GO TO THE DIAGNOSTIC BOXES, CIRCLE NO IN ALL DIAGNOSTIC BOXES, AND MOVE TO THE NEXT MODULE)

A1	Have you been consistently depressed or down, most of the day, nearly every day, for the past two weeks?	NO	YES
A2	In the past two weeks, have you been much less interested in most things or much less able to enjoy the things you used to enjoy most of the time?	NO	YES
		➡	
	IS **A1** OR **A2** CODED **YES?**	NO	YES

A3   **Over the past two weeks, when you felt depressed or uninterested:**

a   Was your appetite decreased or increased nearly every day? Did your weight decrease or increase without trying intentionally (i.e., by ±5% of body weight or ±8 lbs. or ±3.5 kgs., for a 160 lb./70 kg. person in a month)?   NO   YES *
IF YES TO EITHER, CODE YES.

b   Did you have trouble sleeping nearly every night (difficulty falling asleep, waking up in the middle of the night, early morning wakening or sleeping excessively)?   NO   YES

c   Did you talk or move more slowly than normal or were you fidgety, restless or having trouble sitting still almost every day?   NO   YES *

d   Did you feel tired or without energy almost every day?   NO   YES

e   Did you feel worthless or guilty almost every day?   NO   YES

f   Did you have difficulty concentrating or making decisions almost every day?   NO   YES

g   Did you repeatedly consider hurting yourself, feel suicidal, or wish that you were dead?   NO   YES

ARE **5** OR MORE ANSWERS (**A1-A3**) CODED **YES?**

NO	**YES ***
MAJOR DEPRESSIVE EPISODE, CURRENT	

IF PATIENT HAS CURRENT MAJOR DEPRESSIVE EPISODE CONTINUE TO A4,
OTHERWISE MOVE TO MODULE B:

                                                           ➡

A4   a   During your lifetime, did you have other episodes of two weeks or more when you felt depressed or uninterested in most things, and had most of the problems we just talked about?   NO   YES

    b   In between 2 episodes of depression, did you ever have an interval of at least 2 months, without any depression and any loss of interest?

NO	**YES**
MAJOR DEPRESSIVE EPISODE, RECURRENT	

* If patient has Major Depressive Episode, Current, use this information in coding the corresponding questions on page 5 (A6d, A6e).

B. DYSTHYMIA

IF PATIENT'S SYMPTOMS CURRENTLY MEET CRITERIA FOR MAJOR DEPRESSIVE EPISODE, DO NOT EXPLORE THIS MODULE.

B1	Have you felt sad, low or depressed most of the time for the last two years?	➡ NO	YES

B2	Was this period interrupted by your feeling OK for two months or more?	NO	➡ YES

B3 **During this period of feeling depressed most of the time:**

a	Did your appetite change significantly?	NO	YES
b	Did you have trouble sleeping or sleep excessively?	NO	YES
c	Did you feel tired or without energy?	NO	YES
d	Did you lose your self-confidence?	NO	YES
e	Did you have trouble concentrating or making decisions?	NO	YES
f	Did you feel hopeless?	NO	YES
	ARE **2** OR MORE **B3** ANSWERS CODED **YES**?	➡ NO	YES

B4 Did the symptoms of depression cause you significant distress or impair your ability to function at work, socially, or in some other important way?

NO	YES
DYSTHYMIA **CURRENT**	

C. SUICIDALITY

In the past month did you:

				Points
C1	Suffer any accident?	NO	YES	0
	IF NO TO C1, SKIP TO C2; IF YES, ASK C1a,:			
C1a	Plan or intend to hurt yourself in that accident either passively or actively?	NO	YES	0
	IF NO TO C1a, SKIP TO C2: IF YES, ASK C1b,:			
C1b	Did you intend to die as a result of this accident?	NO	YES	0
C2	Think that you would be better off dead or wish you were dead?	NO	YES	1
C3	Want to harm yourself or to hurt or to injure yourself?	NO	YES	2
C4	Think about suicide?	NO	YES	6

IF YES, ASK ABOUT THE INTENSITY AND FREQUENCY OF THE SUICIDAL IDEATION:

Frequency		Intensity		
Occasionally	☐	Mild	☐	
Often	☐	Moderate	☐	
Very often	☐	Severe	☐	

→ Can you control these impulses and state that you will not act on them while in this program? Only score 8 points if response is NO. NO YES 8

G. SOCIAL PHOBIA (Social Anxiety Disorder)

(➡ MEANS : GO TO THE DIAGNOSTIC BOX, CIRCLE NO AND MOVE TO THE NEXT MODULE)

G1	In the past month, were you fearful or embarrassed being watched, being the focus of attention, or fearful of being humiliated? This includes things like speaking in public, eating in public or with others, writing while someone watches, or being in social situations.	➡ NO	YES

G2	Is this social fear excessive or unreasonable?	➡ NO	YES

G3	Do you fear these social situations so much that you avoid them or suffer through them?	➡ NO	YES

G4   Do these social fears disrupt your normal work or social functioning or cause you significant distress?

SUBTYPES

Do you fear and avoid 4 or more social situations?

If YES   Generalized social phobia (social anxiety disorder)

If NO   Non-generalized social phobia (social anxiety disorder)

NOTE TO INTERVIEWER: PLEASE ASSESS WHETHER THE SUBJECT'S FEARS ARE RESTRICTED TO NON-GENERALIZED ("ONLY 1 OR SEVERAL") SOCIAL SITUATIONS OR EXTEND TO GENERALIZED ("MOST") SOCIAL SITUATIONS. "MOST" SOCIAL SITUATIONS IS USUALLY OPERATIONALIZED TO MEAN 4 OR MORE SOCIAL SITUATIONS, ALTHOUGH THE DSM-IV DOES NOT EXPLICITLY STATE THIS.

 EXAMPLES OF SUCH SOCIAL SITUATIONSTYPICALLY INCLUDE INITIATING OR MAINTAINING A CONVERSATION, PARTICIPATING IN SMALL GROUPS, DATING, SPEAKING TO AUTHORITY FIGURES, ATTENDING PARTIES, PUBLIC SPEAKING, EATING IN FRONT OF OTHERS, URINATING IN A PUBLIC WASHROOM, ETC.

NO	YES
SOCIAL PHOBIA *(Social Anxiety Disorder)* ***CURRENT***	
GENERALIZED	❑
NON-GENERALIZED	❑

H. OBSESSIVE-COMPULSIVE DISORDER

(➡ MEANS: GO TO THE DIAGNOSTIC BOX, CIRCLE NO AND MOVE TO THE NEXT MODULE)

H1	In the past month, have you been bothered by recurrent thoughts, impulses, or images that were unwanted, distasteful, inappropriate, intrusive, or distressing? (For example, the idea that you were dirty, contaminated or had germs, **or** fear of contaminating others, **or** fear of harming someone even though you didn't want to, **or** fearing you would act on some impulse, **or** fear or superstitions that you would be responsible for things going wrong, **or** obsessions with sexual thoughts, images or impulses, **or** hoarding, collecting, **or** religious obsessions.) (DO NOT INCLUDE SIMPLY EXCESSIVE WORRIES ABOUT REAL LIFE PROBLEMS. DO NOT INCLUDE OBSESSIONS DIRECTLY RELATED TO EATING DISORDERS, SEXUAL DEVIATIONS, PATHOLOGICAL GAMBLING, OR ALCOHOL OR DRUG ABUSE BECAUSE THE PATIENT MAY DERIVE PLEASURE FROM THE ACTIVITY AND MAY WANT TO RESIST IT ONLY BECAUSE OF ITS NEGATIVE CONSEQUENCES.)	NO ↓ SKIP TO **H4**	YES

H2	Did they keep coming back into your mind even when you tried to ignore or get rid of them?	NO ↓ SKIP TO **H4**	YES
H3	Do you think that these obsessions are the product of your own mind and that they are not imposed from the outside?	NO	YES obsessions

H4	In the past month, did you do something repeatedly without being able to resist doing it, like washing or cleaning excessively, counting or checking things over and over, or repeating, collecting, arranging things, or other superstitious rituals?	NO	YES compulsions

	IS **H3** OR **H4** CODED **YES**?	➡ NO	YES
H5	Did you recognize that either these obsessive thoughts or these compulsive behaviors were excessive or unreasonable?	➡ NO	YES

H6	Did these obsessive thoughts and/or compulsive behaviors significantly interfere with your normal routine, your work or school, your usual social activities, or relationships, or did they take more than one hour a day?	**NO** **YES** *O.C.D.* *CURRENT*

K. NON-ALCOHOL PSYCHOACTIVE SUBSTANCE USE DISORDERS

(➡ MEANS : GO TO THE DIAGNOSTIC BOXES, CIRCLE NO IN ALL DIAGNOSTIC BOXES, AND MOVE TO THE NEXT MODULE)

Now I am going to show you / read to you a list of street drugs or medicines.

K1 a **In the past 12 months**, did you take any of these drugs more than once,   ➡   NO   YES
to get high, to feel better, or to change your mood?

CIRCLE EACH DRUG TAKEN:

Stimulants: amphetamines, "speed", crystal meth, "crank", "rush", Dexedrine, Ritalin, diet pills.

Cocaine: snorting, IV, freebase, crack, "speedball".

Narcotics: heroin, morphine, Dilaudid, opium, Demerol, methadone, codeine, Percodan, Darvon, OxyContin.

Hallucinogens: LSD ("acid"), mescaline, peyote, PCP ("angel dust", "peace pill"), psilocybin, STP, "mushrooms",
"ecstasy", MDA, MDMA, or ketamine ("special K").

f Did you spend less time working, enjoying hobbies, or being with family   NO   YES
   or friends because of your drug use?

g Have you continued to use (NAME OF DRUG / DRUG CLASS SELECTED), even though it caused   NO   YES
   you health or mental problems?

ARE **3** OR MORE **K2** ANSWERS CODED **YES**?

SPECIFY DRUG(S): _____

* IF YES, SKIP K3 QUESTIONS, CIRCLE N/A IN THE ABUSE BOX FOR THIS
SUBSTANCE AND MOVE TO THE NEXT DISORDER.
DEPENDENCE PREEMPTS ABUSE.

NO	YES *****
SUBSTANCE DEPENDENCE	
CURRENT	

Considering your use of (NAME THE DRUG CLASS SELECTED)**, in the past 12 months:**

K3 a Have you been intoxicated, high, or hungover from (NAME OF DRUG / DRUG CLASS SELECTED)   NO   YES
       more than once, when you had other responsibilities at school, at work, or at home?
       Did this cause any problem?

       (CODE **YES** ONLY IF THIS CAUSED PROBLEMS.)

    b Have you been high or intoxicated from (NAME OF DRUG / DRUG CLASS SELECTED)   NO   YES
       more than once in any situation where you were physically at risk (for example,
       driving a car, riding a motorbike, using machinery, boating, etc.)?

    c Did you have legal problems more than once because of your drug use, for example,   NO   YES
       an arrest or disorderly conduct?

    d Did you continue to use (NAME OF DRUG / DRUG CLASS SELECTED), even though it caused   NO   YES
       problems with your family or other people?

ARE **1** OR MORE **K3** ANSWERS CODED **YES**?

SPECIFY DRUG(S): _____

NO	N/A	YES
SUBSTANCE ABUSE		
CURRENT		

O. GENERALIZED ANXIETY DISORDER

(➡ MEANS : GO TO THE DIAGNOSTIC BOX, CIRCLE NO, AND MOVE TO THE NEXT MODULE)

O1	a	Have you worried excessively or been anxious about several things over the past 6 months?	➡ NO	YES	
	b	Are these worries present most days?	➡ NO	YES	
		IS THE PATIENT'S ANXIETY RESTRICTED EXCLUSIVELY TO, OR BETTER EXPLAINED BY, ANY DISORDER PRIOR TO THIS POINT?	NO	➡ YES	

O2		Do you find it difficult to control the worries or do they interfere with your ability to focus on what you are doing?	➡ NO	YES

O3   FOR THE FOLLOWING, CODE **NO** IF THE SYMPTOMS ARE CONFINED TO FEATURES OF ANY DISORDER EXPLORED PRIOR TO THIS POINT.

When you were anxious over the past 6 months, did you, most of the time:

a	Feel restless, keyed up or on edge?	NO	YES
b	Feel tense?	NO	YES
c	Feel tired, weak or exhausted easily?	NO	YES
d	Have difficulty concentrating or find your mind going blank?	NO	YES
e	Feel irritable?	NO	YES
f	Have difficulty sleeping (difficulty falling asleep, waking up in the middle of the night, early morning wakening or sleeping excessively)?	NO	YES

ARE **3** OR MORE **O3** ANSWERS CODED **YES**?

NO	YES
GENERALIZED ANXIETY DISORDER **CURRENT**	

P. ANTISOCIAL PERSONALITY DISORDER (optional)

(➡ MEANS : GO TO THE DIAGNOSTIC BOX AND CIRCLE NO.)

P1   **Before you were 15 years old, did you:**

    a   repeatedly skip school or run away from home overnight?   NO   YES

    b   repeatedly lie, cheat, "con" others, or steal?   NO   YES

    c   start fights or bully, threaten, or intimidate others?   NO   YES

    d   deliberately destroy things or start fires?   NO   YES

PARTICIPANT ID: |____|____|____|____|

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PREVENTION STUDIES
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GOLD III: MINI CHECKLIST

	Refuse to Answer	No	Yes	Other information
A. Major Depressive Disorder				

GOLD III: Stroop Assessment Instructions

PARTICIPANT ID: |____|____|____|____|

INTERVIEWER INITIALS: |____|____|____|

VISIT DATE: |____|____|--|____|____|--|____|____|____|____|

STROOP START TIME: |____|____| : |____|____| am /pm

Directions: This is the last part of the assessment before we do the final cortisol blood draw. This is a test of how fast you can read words and colors on the following three pages. You will not be able to point to the page in order to follow along. I am going to explain the directions for all three pages and then we will get started. Do you have any initial questions?

Stroop Word Page (2 minutes)	After I say begin, you are to read down the columns starting with the first one (point to the left-most column) until you complete it (run hand down the left most column) and then continue without stopping down the remaining columns in order (run hand down the 2nd column, then the 3rd, 4th and 5th columns). If you finish all columns before you hear the timer, then return to the first column and begin again (point to the first column). Remember, do not stop reading until I tell you to "Stop" and read out loud as quickly as you can. If you make a mistake, I will say "No" to you and you will start again from the beginning. Are there any questions on this page?
Stroop Color Page (2 minutes)	This next test is similar to the last one but this is a test of how fast you can name the colors on this page. You will complete this page just as you did the previous page, starting with this first column (point to the left-most column). Remember to name the colors out loud as quickly as you can. Are there any questions on this page?
Stroop	This last page is similar to the other two but this

STROOP

COLOR AND WORD TEST
ADULT VERSION

Name: _____

Age: _____ **Sex:** _____ **Date:** _____

FOR PROFESSIONAL USE ONLY

	Raw Score	Age/Ed. Predicted*	Residual	T-Scores**
Word Score (W)				
Color Score (C)				
Color-Word Score (CW)				
CW - Predicted = Interference (Table V) ____ - ____ = _____				

* This comes from Tables I - III.
** This should come from Table IV or VI.

DO NOT OPEN THE BOOKLET UNTIL YOU ARE INSTRUCTED TO DO SO

Word Answer Key

Red	Blue	Green	Red	Blue
Green	Green	Red	Blue	Green
Blue	Red	Blue	Green	Red
Green	Blue	Red	Red	Blue
Red	Red	Green	Blue	Green
Blue	Green	Blue	Green	Red
Red	Blue	Green	Blue	Green
Blue	Green	Red	Green	Red
Green	Red	Blue	Red	Blue
Blue	Greeen	Green	Blue	Green
Green	Red	Blue	Red	Red
Red	Blue	Red	Green	Blue
Green	Red	Blue	Red	Green
Blue	Blue	Red	Green	Red
Red	Green	Green	Blue	Blue
Blue	Blue	Red	Green	Red
Red	Green	Blue	Red	Green
Green	Red	Green	Blue	Blue
Red	Blue	Red	Green	Red
Green	Red	Green	Blue	Green

Color Answer Key

Blue	Red	Blue	Green	Red
Red	Blue	Green	Red	Blue
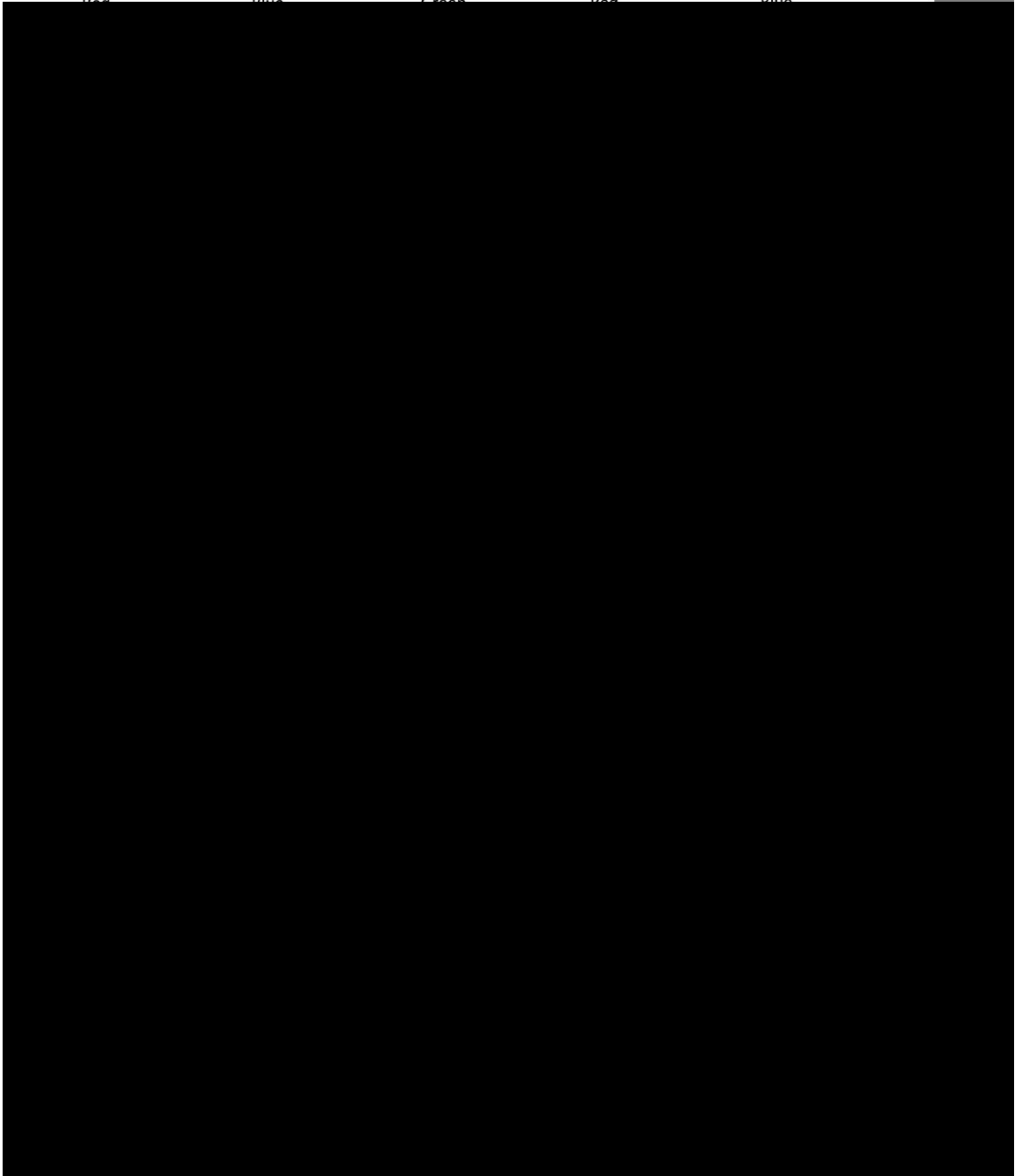
Color Word Answer Key

Blue (R)	Red (B)	Blue (G)	Green (R)	Red (B)
☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
Red (G)	Blue (G)	Green (R)	Red (B)	Blue (G)
☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
Green (B)	Green (R)	Red (B)	Blue (G)	Green (R)
☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
Blue (G)	Red (B)	Blue (R)	Green (R)	Red (B)
☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
Green (R)	Green (R)	Red (G)	Red (B)	Blue (G)
☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
Red (B)	Blue (G)	Green (B)	Blue (G)	Green (R)
☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
Green (R)	Green (B)	Red (G)	Green (B)	Red (G)
☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
Red (B)	Red (G)	Blue (R)	Red (G)	Blue (R)
☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
Blue (G)	Blue (R)	Green (B)	Blue (R)	Green (B)
☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
Red (B)	Red (G)	Red (G)	Green (B)	Blue (G)
☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
Blue (G)	Blue (R)	Green (B)	Blue (R)	Green (R)
☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
Green (R)	Green (B)	Blue (R)	Red (G)	Red (B)
☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
Red (G)	Blue (R)	Red (B)	Blue (R)	Blue (G)
☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
Green (B)	Green (B)	Green (R)	Red (G)	Green (R)
☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
Blue (R)	Red (G)	Blue (G)	Green (B)	Red (B)
☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
Green (B)	Green (B)	Green (R)	Blue (G)	Blue (R)
☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
Blue (R)	Red (G)	Red (B)	Green (R)	Red (G)
☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
Red (G)	Blue (R)	Blue (G)	Red (B)	Green (B)
☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
Green (R)	Red (B)	Green (R)	Blue (G)	Blue (R)
☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
Blue (G)	Green (R)	Blue (G)	Red (B)	Red (G)
☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐

GOLD III
CHIBPS/New York University
PARTICIPANT COPY

Receipt for Participant Payment

I have received a payment of **$50** for my appointment.

Appendix 5. GOLD III Recruitment Flyer

ARE YOU AN HIV+ MAN OVER 50?

CHIBPS, the Center for Health, Identity,