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Examining Anxiety Sensitivity as an Explanatory Construct Underlying HIV-Related Stigma: Relations to Anxious Arousal, Social Anxiety, and HIV Symptoms Among Persons Living with HIV

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There are over 35 million people worldwide infected with the Human Immunodeficiency Virus (HIV) and its progression to Acquired Immunodeficiency Syndrome (AIDS; WHO, 2015). With the advent of combined antiretroviral therapy (cART) in 1996, persons living with HIV/AIDS (PLHIV) now have much longer life expectancies (Leone et al., 2011). However, living with HIV remains highly personally challenging, as it is associated with a number of significant and recurrent (chronic) stressors including physical pain, side effects of cART, social stigma, and discrimination, among other social stressors (Ammassari et al., 2001; Boisse, Gill, & Power, 2008; Tsao, Dobalian, Moreau, & Dobalian, 2004; Verma, Estanislao, & Simpson, 2005; Whetten, Reif, Whetten, & Murphy-McMillan, 2008). Presumably, as a result of these types of stressors, a disproportionately high number of PLHIV struggle with clinically-significant psychiatric symptoms and disorders. Although much scientific and clinical attention has focused on depressed mood and psychopathology among PLHIV (Cruess et al., 2003; Rabkin, 2008; Sherr, Clucas, Harding, Sibley, & Catalan, 2011), there has been comparably less focus on anxiety and its disorders. The paucity of work in this area is concerning from a public health perspective, as anxiety symptoms and disorders are the most common class of psychiatric disorders and often maintain a large negative impact on life functioning (Gadermann, Alonso, Vilagut, Zaslavsky, & Kessler, 2012; Lee & Rotheram-Borus, 2001). Moreover, rates of anxiety

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symptoms and disorders are markedly elevated among this population relative to persons without HIV/AIDS and those with many types of other physical conditions (Bing et al., 2001; Chandra, Ravi, Desai, & Subbakrishna, 1998; Sewell et al., 2000). Additionally, HIV symptoms are prevalent (e.g., 50–80% of PLHIV and clinically impairing (Ammassari et al., 2001; Boisse et al., 2008).

One construct shown to be related to anxiety and HIV symptoms among PLHIV is HIV-related stigma (Brent, 2016). Stigma is a multifaceted construct referring to one's social identity or status (Goffman, 2009; Herek, 2014; Nyblade, 2006). HIV-related stigma is a global (i.e., overarching) construct theorized as a combination of four distinct sub-factors including 1) negative self-image – feelings of inferiority, shame and/or guilt; 2) enacted stigma – past experiences of rejection or discrimination; 3) concerns with public attitudes – subjective beliefs regarding how others perceive PLHIV; 4) disclosure concerns – beliefs that one's HIV status should remain concealed from others (Bunn, Solomon, Miller, & Forehand, 2007a). Due to the litany of psychosocial stressors and sources of stigmatization often encountered by PLHIV, anxiety often covaries with HIV-related stigma, along with HIV symptoms (e.g., fatigue, muscle aches; Earnshaw, Lang, Lippitt, Jin, & Chaudoir, 2015; Fullilove, 1989; Herek, Saha, & Burack, 2013). For instance, higher rates of HIV-related stigma are associated with greater rates of anxiety among PLHIV (Kamen et al., 2015; Li et al., 2016). Additionally, HIV-related stigma may worsen HIV-related symptoms (Earnshaw et al., 2015). Such relations are evident across cultural groups (Kamen et al., 2015; Li et al., 2016) and gender (Brown, Serovich, Kimberly, & Hu, 2016). Thus, understanding the relationship between HIV related stigma and anxiety and HIV symptoms among PLHIV is of public health importance (Heywood & Lyons, 2016). Although past research has provided consistent evidence that HIV-related stigma is related to poor mental and physical health outcomes among PLHIV (e.g., Herek, Saha, & Burack, 2013), there remains a need to identify mediators of this relation in order to help to understand the mechanisms involved in this relation.

One factor that may impact the relations between HIV-related stigma and anxiety as well as HIV symptoms is anxiety sensitivity. Anxiety sensitivity is the extent to which individuals believe anxiety and anxiety-related sensations (e.g., racing heart) have harmful personal consequences (McNally, 2002). Empirically, anxiety sensitivity is distinguishable from the tendency to experience more frequent anxiety symptoms (e.g., trait anxiety) and other negative affect propensity variables (e.g., negative affectivity; Rapee & Medoro, 1994; Zvolensky, Kotov, Antipova, & Schmidt, 2003). Theoretically, anxiety sensitivity may be of particular importance among PLHIV because of the wide array of interoceptive (e.g., aversive bodily sensations, chronic stress) and exteroceptive (e.g., stigma, discrimination) stressors associated with the disease. To date, a few studies have examined anxiety sensitivity in relation to negative affect symptoms among PLHIV. For instance, among 51 PLHIV, anxiety sensitivity was related to anxiety and depressive symptoms (Gonzalez, Zvolensky, Solomon, & Miller, 2010), even when controlling for negative affectivity. Other work found anxiety sensitivity was associated with a wide variety of internal states, such as anxious arousal, bodily vigilance, and interoceptive fear (Gonzalez, Zvolensky, Grover, & Parent, 2012; Gonzalez, Zvolensky, Parent, Grover, & Hickey, 2012). Another investigation found that anxiety sensitivity was related to greater HIV symptom severity among 139

PLHIV (Leyro, Vujanovic, & Bonn-Miller, 2015). These data collectively suggest anxiety sensitivity is an important transdiagnostic risk candidate for anxiety and related symptoms among PLHIV.

Theoretically, anxiety sensitivity may serve to explain the relation of HIV stigma and anxiety as well as HIV symptoms among PLHIV. Indeed, anxiety sensitivity may serve to amplify emotional distress related to stigma by promoting catastrophic thinking and escape and avoidance behavior, thereby maintaining or exacerbating anxiety and HIV symptoms. As one illustrative example, the experience of stigma may be related to an increase in bodily perturbation (e.g., sweating, heart rate increase, bodily tension); a PLHIV with high anxiety sensitivity would be more apt to misinterpret or catastrophize about such internal stress (e.g., “I cannot handle this; I am going to die”). Such anxious reactivity, in turn, may be further associated with escape or avoidance of others in the future, thereby reinforcing the relation between stigma-catastrophic thinking and aversive internal sensations. Similarly, high anxiety sensitivity may amplify the physical effects of HIV-related stigma, which may exacerbate HIV symptoms in a similar cyclical manner (see Figure 1). Accordingly, a forward feed cycle may develop wherein HIV stigma, anxiety sensitivity, and anxious reactivity interplay with one another in feedback loop.

Overall, HIV stigma may be linked to poorer (anxiety-related) mental health among PLHIV, in part, because of anxiety sensitivity. To explore this research question, the present investigation sought to address whether anxiety sensitivity explained the relation between HIV-related stigma and anxiety (anxious arousal and social anxiety) and HIV symptoms among PLHIV. Anxious arousal and social anxiety were chosen as facets of anxiety to examine the *a priori* hypothesis that they may show the greatest reactivity to HIV-related stigma. Specifically, it was hypothesized that greater HIV-related stigma would be associated with greater anxiety symptoms as well as greater HIV-related physical sensations, and that anxiety sensitivity would mediate these associations. As a test of the incremental validity of this theoretical perspective, it was predicted that these effects would be observed above and beyond a host of covariates that have been shown to impact mental and physical health among PLWHIV including: minority status, gender, sexual orientation, time living with HIV and negative affectivity (Brandt, Zvolensky, Daumas, Grover, & Gonzalez, 2016)

Material and Methods

Participants

Participants in the current study included 87 adults with a self-reported diagnosis of HIV/AIDS (60.9% cisgender male (i.e., birth gender corresponding with personal identity of gender) male, 36.8% cisgender female, 2.3% transgender, $M_{\text{age}} = 48.38$, $SD = 7.86$). The sample was ethnically diverse, with 35.6% identifying as European American, 52.9% as Black/Non-Hispanic, 5.7% as Black/Hispanic, 3.4% as Hispanic, and 2.3% as ‘Mixed/Other.’ Although the sample was relatively well-educated (83.9% had at least a high school degree, 50.6% had at least some college) employment was poor (82.8% reported unemployment, 14.9% reported part-time employment). Eighty percent of the sample met criteria for having an axis I psychological disorder. There was also a high rate of comorbidity within our sample ($M_{\text{diagnoses}} = 2.29$, $SD = 2.08$), with 64.4% meeting criteria

for multiple disorders (See Table 1 for diagnosis breakdown). Regarding HIV status, 47.1% of participants reported a diagnosis of HIV, 44.8% reported a diagnosis of AIDS, while 8% did not know their status. On average, participants within our sample reported living with an HIV diagnosis for 17.5 years ($SD = 8.28$). On average, participants reported an average CD4 T-cell count of 565.82 ($SD = 276.73$), ranging from 28–1,325, and 69% reported an undetectable viral load. Eligibility for participation was being between the ages of 18 and 65, a positive diagnosis of HIV/AIDS, and ability to provide informed written consent. Participants were excluded from study participation if they were unable to provide informed consent, could not answer questions accurately due to illiteracy issues, or met criteria for untreated psychotic or bipolar disorder.

Measures

MINI International Neuropsychiatric Interview—(MINI; Lecrubier et al., 1997). The MINI is a semi-structured diagnostic interview used to assess DSM-IV disorders. The MINI was used to index current (i.e., past month to past year) psychological disorders. The MINI has been utilized in prior studies of HIV+ samples (e.g. Breuer et al., 2014) and has sound psychometric properties (see Lecrubier et al., 1997). In the current study, 12.5% of MINI diagnostic interviews were checked for reliability by a trained doctoral-level rater; no discrepancies were noted.

Positive and Negative Affect Schedule—(PANAS; Watson, Clark, & Tellegen, 1988). The PANAS is a well-established self-report measure of affect. For the trait version, each of 20 items (e.g., “disinterested”) is rated on a Likert scale from 1 (*very slightly or not at all*) to 5 (*extremely*) in terms of how the respondent feels generally (i.e., long-term). Items comprise two scales: positive affect (PANAS-PA), including items such as “Strong” and “Inspired” and negative affect (PANAS-NA) including items such as “Scared” or “Nervous”. Past studies indicate good psychometric properties for the PANAS among those with anxiety (Paulus, Talkovsky, Heggeness, & Norton, 2015) as well as among PLHIV (Gonzalez, Zvolensky, Parent, Grover, & Hickey, 2012). In the current sample, negative affectivity was used to index the generalized tendency to experience negative emotions. Internal consistency was good in the current sample ($\alpha = .85$).

HIV/AIDS Stigma Scale—(HASS; Bunn, Solomon, Miller, & Forehand, 2007). The HASS is a self-report assessment of lifetime HIV/AIDS related stigma (e.g., “I worry that people may judge me when they learn I have HIV/AIDS”). The HASS is comprised of 32 items on a Likert-type scale ranging from 1 (‘strongly disagree’) to 4 (‘strongly agree’). The HASS has demonstrated strong psychometric properties (Bunn et al., 2007) in past work. In the current study, internal consistency for the HASS was excellent ($\alpha = .95$).

Anxiety Sensitivity Index-3—(ASI-3; Taylor et al., 2007). The ASI-3 is an 18-item self-report measure on which participants rate the extent to which they are currently concerned about the possible negative consequences of anxiety (e.g. “It scares me when my heart beats fast”) on a Likert-type scale (0 = very little; 4 = very much). The ASI-3 maintains strong psychometric properties (Taylor et al., 2007) and has demonstrated excellent internal

consistency among PLHIV (Brandt, Gonzalez, Grover, & Zvolensky, 2012). In the current sample, internal consistency was excellent ($\alpha = .96$).

Inventory of Depression and Anxiety Symptoms—(IDAS; Watson et al., 2007). The IDAS is a self-report measure of various affective dimensions. There are 10 subscales (suicidality, social anxiety, anxious arousal, lassitude, ill temper, well-being, insomnia, appetite loss, appetite gain, and traumatic intrusions) as well as two broad subscales (general depression and dysphoria). Each item is rated on a Likert scale from 1 (*not at all*) to 5 (*extremely*) over the previous two-week period. In the current study, only the social anxiety (5 items; e.g., “I was worried about embarrassing myself socially”) and anxious arousal (also called “panic” interchangeably; 8 items; e.g., “I felt a pain in my chest”) subscales were used to index anxiety symptoms among this population. IDAS subscales have shown strong internal consistency, convergent and discriminant validity with psychiatric diagnoses and self-report measures as well as short-term retest reliability among samples of both community, and psychiatric patients, respectively (Watson et al., 2007, 2008). These subscales demonstrated good internal consistency among the present sample (Cronbach's α 's = .82 and .88, respectively) consistent with past work among PLHIV (Gonzalez et al., 2012). Moreover, although there are not widely-used cutoff scores for probably anxiety disorder diagnoses, in the current sample having an anxiety disorder was significantly associated with greater IDAS-social anxiety ($r = .39, p < .001$) and IDAS-anxious arousal ($r = .37, p < .001$). More specifically, having a diagnosis of social anxiety on the MINI was significantly associated with greater IDAS-social anxiety ($r = .47, p < .001$) as well as IDAS-anxious arousal $r = .25, p = .019$) and having a diagnosis of panic disorder was significantly associated with greater IDAS-anxious arousal ($r = .37, p < .001$) and IDAS-social anxiety ($r = .41, p < .001$).

AIDS Clinical Trials Group Symptoms Distress Module—(ACTG-SDM; Justice et al., 2001). The ACTG-SDM is a 20-item self-report measure developed to examine the presence and impact of HIV-related symptoms among PLHIV exposed to cART in the past month. The ACTG-SDM indexes the most commonly reported HIV-related symptoms including: muscle aches, fatigue, and nausea. Each item was rated on a Likert scale with an option for “I do not have this symptom” (scored as ‘0’) and degrees of impact (i.e.; 1 = *this symptom does not bother me*; 4 = *It bothers me a lot*). The ACTG-SDM has demonstrated excellent reliability, both in past work ($\alpha = .92$; Brandt et al., 2012) and in the current sample ($\alpha = .95$).

Procedure

Data for the current study were taken from the baseline visit from a larger project examining the effectiveness of an anxiety-reduction program developed for PLHIV (Heggeness, Brandt, Paulus, Lemaire, & Zvolensky, 2016). Interested individuals responded to flyers posted at HIV/AIDS Service Organizations in the City of Houston and contacted research staff. Potential participants were screened for eligibility via phone, and if deemed eligible, were scheduled for a baseline appointment. Upon completion of the appointment, participants were compensated with a \$20 gift card. The University of Houston's Institutional Review Board (IRB) approved all study procedures.

Data Analytic Plan

Statistical analyses were conducted using the PROCESS macro for SPSS version 20 (Hayes, 2012), which calculates the indirect effect of a predictor (X) on an outcome (Y) via some mediating factor (M; West & Aiken, 1997). Specifically, the indirect effect ('path a*b') is calculated as the product of the 'a path' (the regression weight of X in predicting M, controlling for covariates) multiplied by the 'b path' (the regression weight of M predicting Y, controlling for effects of X and covariates). Bootstrapping with 10,000 re-samples was performed to obtain 95% confidence intervals (CI) around the 'a*b path'. The indirect effect of HIV-related stigma via AS was examined in relation to social anxiety (IDAS-SOC), anxious arousal (IDAS-ANX), and HIV-related symptoms (ACTG-SDM). Effect size (κ^2) was estimated for the indirect effects (Preacher & Kelley, 2011). For all models, covariates included racial-ethnic minority status, gender, sexual orientation, time since HIV diagnosis, and negative affectivity. Finally, in order to more accurately understand the potential directionality of results, reverse models were tested wherein HIV-related stigma was examined as a mediator of the relations between anxiety sensitivity and outcome variables.

Results

Descriptive Statistics

Bivariate correlations are presented in Table 2. In instances where variables were not dichotomous (e.g., gender, race), the variable with the highest percentage was chosen as the comparison group (see Table 2). HIV stigma was positively correlated with anxiety sensitivity ($r = .40, p < .001$) as well as social anxiety ($r = .45, p < .001$), anxious arousal ($r = .26, p = .016$), and HIV symptoms ($r = .24, p = .029$). Anxiety sensitivity was positively associated with social anxiety ($r = .71, p < .001$), anxious arousal ($r = .59, p = .016$), and HIV symptoms ($r = .45, p < .001$).

Mediation Analyses

HIV-related stigma was significantly associated with social anxiety symptoms ($B = .07, SE = .02, p = .005$). The indirect association of HIV-related stigma via anxiety sensitivity was statistically significant ($B = .03, SE = .01, CI [.01, .06]$) and large ($\kappa^2 = .27$). After accounting for anxiety sensitivity, the direct association of HIV-related stigma for social anxiety was not significant ($B = .04, SE = .02, p = .063$). A comparison model evaluating the indirect effect of anxiety sensitivity via HIV-related stigma on social anxiety yielded a non-significant indirect effect ($B = .01, SE = .01, CI [-.01, .04]$), adding confidence to the hypothesized pathway. See Table 3.

For anxious arousal, the total ($B = .03, SE = .03, p = .465$) and direct ($B = -.01, SE = .03, p = .754$) associations of HIV-related stigma were not significant. However, there was a statistically significant indirect association of HIV-related stigma via anxiety sensitivity ($B = .04, SE = .02, CI [.01, .08]$). The indirect effect was medium to large ($\kappa^2 = .23$). The comparison model yielded a non-significant indirect effect of anxiety sensitivity via HIV-related stigma in relation to anxious arousal ($B = -.01, SE = .01, CI [-.03, .02]$). See Table 3.

In terms of HIV symptoms, there were non-significant total ($B = .10$, $SE = .11$, $p = .359$) and direct ($B = .03$, $SE = .11$, $p = .784$) associations of HIV-related stigma. Again, there was a statistically significant indirect association of HIV-related stigma via anxiety sensitivity ($B = .07$, $SE = .04$, $CI [.01, .20]$) and a non-significant indirect association of anxiety sensitivity via HIV-related stigma ($B = .01$, $SE = .04$, $CI [-.07, .09]$) in relation to HIV symptoms. The indirect association of HIV-related stigma via anxiety sensitivity was moderate ($\kappa^2 = .16$; see Table 3).

Discussion

Although PLHIV are at-risk for anxiety symptoms and disorders (Bing et al., 2001; Chandra, Ravi, Desai, & Subbakrishna, 1998; Sewell et al., 2000), there is little understanding of the processes helping to explain why this group has such disproportioned rates of anxiety pathology. Additionally, there is little research into factors that impact HIV-related symptoms that affect 50–80% of PLHIV (Ammassari et al., 2001). HIV-related stigma is one factor that is linked to greater anxiety (Kamen et al., 2015; Li et al., 2016) and HIV symptoms (Earnshaw et al., 2015), although it is presently unclear what mechanisms may explain such relations. Accordingly, the present study examined the mediating role of anxiety sensitivity on the relations between HIV-related stigma and social anxiety symptoms, anxious arousal, and HIV symptoms.

The current results supported a priori predictions, indicating that anxiety sensitivity did indeed mediate these relations. Importantly, effect sizes were examined in the form of kappa squared (κ^2), which were utilized to indicate the indirect effects of HIV-related stigma via anxiety sensitivity on the study dependent variables. Results indicated that effect sizes on anxiety outcomes were large ($\kappa^2 = .23-.27$), whereas the effect size on HIV symptoms was moderate ($\kappa^2 = .16$). Such results are broadly consistent with past work indicating that both stigma and anxiety sensitivity are negatively related to physical and mental health among PLHIV (Bunn et al., 2007; Gonzalez et al., 2012), and extends this work to indicate that anxiety sensitivity may serve as a mechanistic construct in these relations. Importantly, reverse models were tested wherein HIV-related stigma was examined as a mediator of the relations between anxiety sensitivity and outcome variables. There was no significant evidence for this model, providing further evidence that the examined results were not simply due to an interrelation between the study variables.

The present data suggest the experience of HIV stigma may be related to adverse anxiety-related states and HIV symptoms by virtue of fears about the possible negative consequences of interoceptive sensations. These observations are consistent with a forward feed cycle wherein stigma, anxiety sensitivity, and anxious reactivity interplay with one another in feedback loop. The present findings provide novel insight into the processes by which PLHIV may experience adverse anxiety and HIV symptoms. These results have implications for improving the mental health of PLHIV. For example, clinically, the results indicate that mental health interventions for PLHIV may potentially benefit from the addition of exercises aimed at reducing an individual's fear about internal sensations. That said, prospective studies are needed to examine the effects of HIV stigma, anxiety sensitivity, and anxiety and

HIV symptoms over time to more comprehensively assess the directionality of these observed relations.

Although not primary study aims, at least two other observations warrant brief comment. First, the sample was characterized by high rates of psychopathology (see Table 1). These findings are consistent with past studies documenting particularly high rates of psychological disorders among PLHIV, which are apt to play an important role in HIV management and quality of life (e.g., Bing et al., 2001). Second, anxiety sensitivity and HIV-related stigma shared approximately 16% variance with one another in the present sample. Thus, while these constructs are related, they do not fully overlap.

There are a number of limitations of the present study. First, although the sample was diverse in terms of ethnicity, it was limited to an older adult male and largely unemployed group of PLHIV who volunteered to participate in a study for monetary reward. Future studies may do well to examine a more heterogeneous sample of PLHIV. Second, the cross-sectional design of the present study does not allow for causal inferences. As such, we cannot infer the directionality between HIV-related stigma, anxiety sensitivity, and anxiety and HIV symptoms. Future work should test these relations prospectively to understand their directional effects. Third, the present study focused on multiple facets of anxiety symptoms (i.e., social anxiety and anxious arousal) as opposed to clinical anxiety disorder diagnoses. Future work may do well to examine the effect of these relations on anxiety disorder outcomes and newer transdiagnostic anxiety measures linked to anxiety disorder diagnoses (e.g., Smith, Paulus, & Norton, 2016). Fourth, the current study relied heavily on self-report data. Future work should examine more behavioral or observable tasks to better understand these relations.

Overall, PLHIV are a health disparity population for many health problems, including for anxiety and its disorders. The results of the current investigation highlight the importance of HIV-related stigma and anxiety sensitivity in terms of the expression of anxiety and HIV symptoms among PLHIV. Findings indicated that HIV-related stigma was significantly related to social anxiety symptoms, anxious arousal, and HIV symptoms and that anxiety sensitivity mediated these associations. The present results thereby offer novel empirical evidence that anxiety sensitivity may be important in better understanding the links between HIV-related stigma and certain negative emotional and physical symptoms among PLHIV.

References

- Ammassari A, Murri R, Pezzotti P, Trotta MP, Ravasio L, De Longis P, Antinori A. Self-reported symptoms and medication side effects influence adherence to highly active antiretroviral therapy in persons with HIV infection. *J Acquir Immune Defic Syndr*. 2001; 28(5):445–449. [PubMed: 11744832]
- Brandt CP, Gonzalez A, Grover KW, Zvolensky MJ. The Relation Between Emotional Dysregulation and Anxiety and Depressive Symptoms, Pain-Related Anxiety, and HIV-Symptom Distress Among Adults with HIV/AIDS. *Journal of Psychopathology and Behavioral Assessment*. 2012; 35(2):197–204. <http://doi.org/10.1007/s10862-012-9329-y>.
- Brandt CP, Zvolensky MJ, Dumas SD, Grover KW, Gonzalez A. Pain-related anxiety in relation to anxiety and depression among persons living with HIV/AIDS. *AIDS Care*. 2016; 28(4):432–435. [PubMed: 26477684]

- Brent RJ. The value of reducing HIV stigma. *Social Science & Medicine*. 2016; 151:233–240. <http://doi.org/10.1016/j.socscimed.2016.01.014>. [PubMed: 26820574]
- Breuer E, Stoloff K, Myer L, Seedat S, Stein DJ, Joska JA. The validity of the Substance Abuse and Mental Illness Symptom Screener (SAMISS) in people living with HIV/AIDS in primary HIV care in Cape Town, South Africa. *AIDS and Behavior*. 2014; 18(6):1133–1141. <http://doi.org/10.1007/s10461-014-0698-y>. [PubMed: 24452497]
- Bunn JY, Solomon SE, Miller C, Forehand R. Measurement of stigma in people with HIV: A reexamination of the HIV stigma scale. *AIDS Education and Prevention*. 2007a; 19(3):198–208. <http://doi.org/10.1521/aeap.2007.19.3.198>. [PubMed: 17563274]
- Bunn JY, Solomon SE, Miller C, Forehand R. Measurement of stigma in people with HIV: a reexamination of the HIV Stigma Scale. *AIDS Education and Prevention: Official Publication of the International Society for AIDS Education*. 2007b; 19(3):198–208. <http://doi.org/10.1521/aeap.2007.19.3.198>. [PubMed: 17563274]
- Fullilove MT. Anxiety and stigmatizing aspects of HIV infection. *Journal of Clinical Psychiatry*. 1989; 50(11, Suppl):5–8.
- Goffman, E. *Stigma: Notes on the Management of Spoiled Identity*. Simon and Schuster; 2009.
- Gonzalez A, Zvolensky MJ, Parent J, Grover KW, Hickey M. HIV symptom distress and anxiety sensitivity in relation to panic, social anxiety, and depression symptoms among HIV-positive adults. *AIDS Patient Care and STDs*. 2012; 26(3):156–164. <http://doi.org/10.1089/apc.2011.0309>. [PubMed: 22248334]
- Hayes AF. *PROCESS: A versatile computational tool for observed variable mediation, moderation, and conditional process modelling* [White paper]. 2012
- Heggeness LF, Brandt CP, Paulus DJ, Lemaire C, Zvolensky MJ. Stigma and disease disclosure among HIV+ individuals: the moderating role of emotion dysregulation. *AIDS Care*. 2016; 0(0):1–9. <http://doi.org/10.1080/09540121.2016.1204419>.
- Herek, GM. HIV-related stigma. In: Corrigan, PW., Corrigan, PW., editors. *The stigma of disease and disability: Understanding causes and overcoming injustices*. Washington, DC: US: American Psychological Association; 2014. p. 121–138. Retrieved from <http://ezproxy.lib.uh.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=psyh&AN=2013-25091-007&site=ehost-live>
- Herek GM, Saha S, Burack J. Stigma and psychological distress in people with HIV/AIDS. *Basic and Applied Social Psychology*. 2013; 35(1):41–54. <http://doi.org/10.1080/01973533.2012.746606>.
- Heywood W, Lyons A. Hiv and elevated mental health problems: Diagnostic, treatment, and risk patterns for symptoms of depression, anxiety, and stress in a national community-based cohort of gay men living with hiv. *AIDS and Behavior*. 2016 <http://doi.org/10.1007/s10461-016-1324-y>.
- Lecrubier Y, Sheehan Dv, Weiller E, Amorim P, Bonora I, Sheehan KH, Dunbar GC. The Mini International Neuropsychiatric Interview (MINI): A short diagnostic structured interview: Reliability and validity according to the CIDI. *European Psychiatry*. 1997; 12(5):224–231. [http://doi.org/10.1016/S0924-9338\(97\)83296-8](http://doi.org/10.1016/S0924-9338(97)83296-8).
- Nyblade LC. Measuring HIV stigma: Existing knowledge and gaps. *Psychology, Health & Medicine*. 2006; 11(3):335–345. <http://doi.org/10.1080/13548500600595178>.
- Paulus DJ, Talkovsky AM, Heggeness LF, Norton PJ. Beyond negative affectivity: A hierarchical model of global and transdiagnostic vulnerabilities for emotional disorders. *Cognitive Behaviour Therapy*. 2015; 44(5):389–405. <http://doi.org/10.1080/16506073.2015.1017529>. [PubMed: 25734894]
- Preacher KJ, Kelley K. Effect size measures for mediation models: Quantitative strategies for communicating indirect effects. *Psychological Methods*. 2011; 16(2):93–115. <http://doi.org/10.1037/a0022658>. [PubMed: 21500915]
- Taylor S, Zvolensky MJ, Cox BJ, Deacon B, Heimberg RG, Ledley DR, Cardenas SJ. Robust dimensions of anxiety sensitivity: Development and initial validation of the Anxiety Sensitivity Index-3. *Psychological Assessment*. 2007; 19(2):176–188. [PubMed: 17563199]
- Watson D, O'Hara MW, Chmielewski M, McDade-Montez EA, Koffel E, Naragon K, Stuart S. Further validation of the IDAS: Evidence of convergent, discriminant, criterion, and incremental validity.

Psychological Assessment. 2008; 20(3):248–259. <http://doi.org/10.1037/a0012570>. [PubMed: 18778161]

Watson D, O'Hara MW, Simms LJ, Kotov R, Chmielewski M, McDade-Montez EA, Stuart S. Development and validation of the Inventory of Depression and Anxiety Symptoms (IDAS). Psychological Assessment. 2007; 19(3):253–268. <http://doi.org/10.1037/1040-3590.19.3.253>. [PubMed: 17845118]

West, SG., Aiken, LS. Toward understanding individual effects in multicomponent prevention programs: Design and analysis strategies. In: Bryant, KJ.Windle, M., West, SG., editors. The science of prevention: Methodological advances from alcohol and substance abuse research. Washington, DC: US: American Psychological Association; 1997. p. 167-209.

Highlights

- HIV-related stigma is still prevalent among persons living with HIV/AIDS
- HIV-related stigma predicts greater rates of anxiety symptoms and HIV symptoms
- Anxiety sensitivity mediates the relation between HIV-related stigma and these outcomes
- Targeting anxiety sensitivity clinically may help to mitigate the impact of HIV-related stigma

Figure 1.
Proposed model examining the indirect association of HIV-Related Stigma via Anxiety Sensitivity in Relation to Social Anxiety, Anxious Arousal, and HIV Symptoms

Table 1

DSM-IV-TR Diagnostic prevalence of psychological disorders within current sample (n = 87)

Disorder Category	Disorder	Percentage of Sample
Anxiety Disorders		60.90%
	Generalized Anxiety Disorder (GAD)	31.00%
	Panic Disorder (PD)	20.60%
	Agoraphobia	4.60%
	*Post-Traumatic Stress Disorder (PTSD)	15.00%
	Social Anxiety Disorder (SOC)	9.20%
	*Obsessive Compulsive Disorder (OCD)	4.60%
Mood Disorders		54.00%
	Major Depressive Disorder (MDD)	50.50%
	Dysthymia	17.20%
Substance Use Disorders		28.70%
	Alcohol Use Disorders	17.00%
	Other Substance Use Disorders (e.g., cannabis, cocaine, methadone)	27.60%

* Disorders are not anxiety disorders as per the DSM-V.

Table 2

Zero-order correlations among study variables

	Minority Status	Gender	Sex Orient.	Time Since Dx	Negative Affect	HIV Stigma	Anxiety Sensitivity	Social Anxiety Symptoms	Anxious Arousal	HIV Symptoms
Minority Status ^a	--	-.06	.18	-.01	-.19	-.05	-.12	-.23	-.15	-.07
Gender ^a	--	--	-.51**	.12	-.11	-.13	-.03	.01	-.06	-.13
Sexual Orientation ^a			--	-.28**	.06	.19	.06	.10	.13	.01
Time Since Diagnosis ^a				--	-.16	-.15	-.12	-.18	-.05	-.05
Negative Affectivity ^a					--	.35**	.55**	.62**	.51**	.43**
HIV-Related Stigma ^b						--	.40**	.45**	.26*	.24*
Anxiety Sensitivity ^c							--	.71**	.59**	.45**
Social Anx. Symp. ^d								--	.60**	.34**
Anxious Arousal ^d									--	.52**
HIV Symptoms ^d										--
Descriptive Statistics	Mean (n)	(53)	(44)	210.24	22.46	74.81	24.88	11.25	5.16	24.82
	SD (%)	(60.9)	(50.6)	99.32	8.28	19.95	18.24	14.08	6.76	19.84

Note: Minority status, coded white = 1; black, Hispanic, other race/ethnicities = 0, descriptives for % white; Gender, coded cisgender male = 1, cisgender female/transgender = 0, descriptives for % cisgender male; ; Sexual Orientation = self-identified sexual orientation, with heterosexual = 0 and sexual minority = 1, with descriptives for % sexual minorities; Time since Diagnosis = time in months since diagnosed with HIV; Negative Affectivity = Positive and Negative Affect Scale; HIV Stigma = HIV/AIDS Stigma Scale; Anxiety Sensitivity = Anxiety Sensitivity Index-3; Social Anxiety Symptoms

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= Inventory of Depression and Anxiety Symptoms; Anxious Arousal = Inventory of Depression and Anxiety Symptoms; HIV Symptoms = ACTG Adherence Questionnaire-HIV Symptoms subscale total score;

a Covariates.

b Predictor.

c Mediator.

d Dependent Variables

Table 3

Mediation analyses

Antecedent	Consequents											
	Mediator (M) Anxiety Sensitivity				Criterion 1: Social Anxiety Symptoms				Criterion 2: Anxious Arousal Symptoms			
	path	Coeff.	SE	p	path	Coeff.	SE	p	path	Coeff.	SE	p
Anx. Sensitivity	-	-	-	-	b	0.132	0.024	< .001	b	0.167	0.039	< .001
HIV Stigma	a	0.214	0.09	0.02	c'	0.038	0.02	0.063	c'	-0.01	0.033	0.754
Race	-	0.846	3.55	0.812	-	1.355	0.767	0.081	-	1.017	1.246	0.417
Gender		2.338	3.921	0.553		1.289	0.849	0.133		0.632	1.379	0.458
Sexual Orient.		0.706	4.038	0.175		1.063	0.872	0.227		2.116	1.417	0.139
Time Since Dx	-	0.002	0.018	0.931	-	0.002	0.004	0.586		0.006	0.006	0.343
Neg. Affectivity	1.02	0.219		< .001		0.182	0.053	0.001		0.221	0.087	0.013
constant	-	14.97	9.885	0.134		1.039	2.165	0.633		3.687	3.517	0.298
$R^2 = .348$ $F(6, 80) = 7.107,$ $p < .001$												
$R^2 = .624$ $F(7, 79) = 18.741,$ $p < .001$												
$R^2 = .423$ $F(7, 79) = 8.267,$ $p < .001$												
$R^2 = .267$ $F(7, 79) = 4.117,$ $p < .001$												