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Examining HIV-Related stigma in relation to pain interference and psychological inflexibility among persons living with HIV/AIDS: The role of anxiety sensitivity

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Abstract

Pain is highly prevalent among people living with HIV (PLHIV). Although the association between stigma and pain among stigmatized individuals has been well-established in the non- HIV chronic pain literature, little is known about the association between stigma and pain among PLHIV and the mechanisms that underlie this association. The present study examined the indirect effect of HIV stigma and pain via anxiety sensitivity (fear of anxiety symptoms). The sample included 97 PLHIV (60.2% male, M_{age} = 48.40, SD = 7.75). Results indicated significant and medium-sized indirect effects of HIV stigma on pain severity, pain interference, and psychological inflexibility in pain via anxiety sensitivity. Alternative models did not yield significant indirect effects. The results suggest anxiety sensitivity may explain the association between stigma and pain among PLHIV. These findings provide novel empirical insight into the nature of stigma-pain relation among PLHIV and could be used to guide pain-based intervention development for this population.

Keywords

anxiety sensitivity; HIV; pain interference; psychological inflexibility; stigma

Pain is highly common among people living with HIV (PLHIV) (Cox & Rice, 2008; Parker, Stein, & Jelsma, 2014). PLHIV report pain at a 54% point prevalence and 83% 3-month past prevalence period (Parker et al., 2014). Such pain is often severe and interfering; on average, PLHIV report moderate to severe levels of pain intensity and moderate levels of pain interference (Parker et al., 2014). The source of pain among PLHIV is heterogeneous,

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occurring because of HIV-related conditions (e.g., neuropathy, osteonecrosis), immune suppression and subsequent opportunistic infection, and side effects of antiretroviral treatment (Hewitt et al., 1997; Merlin et al., 2014). Pain also may be due to non-HIV factors (Merlin et al., 2014). Currently, there is strikingly little known about the role of psychological factors in the experience of pain among PLHIV.

Stigma may be one psychological factor that is related to pain among PLHIV. Stigma is an attribute (or commonly labeled a “mark”) of social devaluation (Goffman, 2009); stigma is common among PLHIV (Herek, Capitanio, & Widaman, 2002; Skelton, 2006). Among PLHIV, stigma is associated with more depressive and anxiety symptoms (Kang, Rapkin, & DeAlmeida, 2006; Vanable, Carey, Blair, & Littlewood, 2006), more HIV-related symptoms, and poorer antiviral medication adherence (Langebeek et al., 2014; Vanable et al., 2006). There is limited evidence of the association between stigma and pain among PLHIV. However, indirect evidence from the non-HIV chronic pain literature suggests stigma and social invalidation are associated with more maladaptive pain responses, including pain, catastrophizing, and physical disability (Kool, Van Middendorp, Lumley, Bijlsma, & Geenen, 2012; Waugh, Byrne, & Nicholas, 2014). When stigma identity is concealed, it may be related to greater pain severity (Uysal & Lu, 2011). Other research has found PLHIV with multiple stigmatized identities (e.g., intravenous drug abuser, black HIV-positive persons) tend to report greater pain than those who do not possess additional stigmatized identities (Aouizerat et al., 2010; Del Borgo et al., 2001; Dobalian, Tsao, & Duncan, 2004; Hansen et al., 2011; Martin, Pehrsson, Österberg, Sönnerborg, & Hansson, 1999; Richardson et al., 2009). These data collectively suggest stigma may have a relation with pain among marginalized individuals. Yet, it is presently unclear if stigma is related to the experience of pain among PLHIV.

In addition to the association between stigma and pain among PLHIV, there is a need to examine possible factors that may explain this putative association. One such factor is anxiety sensitivity, defined as the fear of arousal-related sensations, arising from beliefs that sensations would lead to adverse consequences (Reiss & McNally, 1985). Non-HIV studies indicate anxiety sensitivity is related to selective attention bias for somatic threat-related information (Keogh, Dillon, Georgiou, & Hunt, 2001). Individuals with higher levels of anxiety sensitivity also are more likely to catastrophically misinterpret the physiological sensations of anxiety in a pain-provoking situation (Curzik & Jokic-Begic, 2011). Indeed, anxiety sensitivity is associated with a lower pain threshold, greater sensory pain (Keogh & Birkby, 1999; Keogh & Cochrane, 2002), greater pain catastrophizing (Asmundson & Taylor, 1996; Esteve & Camacho, 2008; Roelofs, Peters, McCracken, & Vlaeyen, 2003; Wong et al., 2014), and more pain-related disability (Esteve, Ramírez-Maestre, & López-Martínez, 2012; Keogh, Book, Thomas, Giddins, & Eccleston, 2010; Zvolensky et al., 2017).

Although research focused on anxiety sensitivity and pain among PLHIV is lacking, one study found anxiety sensitivity is related to the intensity of bodily symptoms and to distress experienced by PLHIV (Gonzalez, Zvolensky, Grover, & Parent, 2012). Experimental studies have found that the experience of social rejection is related to more bodily sensations among PLHIV (Iffland, Sansen, Catani, & Neuner, 2014; Kelly, McDonald, & Rushby,

2012). PLHIV with greater anxiety sensitivity may be more likely to misinterpret the arousal-related sensation as threatening or catastrophize their pain. Thus, PLHIV with higher levels of anxiety sensitivity may experience more severe pain, more pain interference, and more maladaptive pain-related cognitions. From this theoretical perspective, the next formative research step is to evaluate whether anxiety sensitivity explains the association between stigma and pain among PLHIV.

Together, the present study evaluated the hypothesis that, among PLHIV, stigma would be significantly associated with pain severity, pain interference, and psychological inflexibility in pain, and that anxiety sensitivity would explain the association between stigma and pain-related dependent measures (see Figure 1). It also hypothesized that these associations would be evident after controlling for the following covariates: racial/ethnic minority status, gender, sexual orientation, time since HIV diagnosis, and negative affectivity (NA) (tendency to experience negative mood), which have been known to be related to pain severity in past research (Fillingim, King, Ribeiro-Dasilva, Rahim-Williams, & Riley, 2009; Gedney & Logan, 2007; Lawson et al., 2015; Meints, Miller, & Hirsh, 2016; Vigil, Rowell, & Lutz, 2014).

Method

Participants

Participants in the present study included 97 adults with a self-reported diagnosis of HIV/AIDS (60.8% male, M_{age} = 48.2, SD = 7.7). Slightly less than half (43.3%) reported an AIDS diagnosis. Participants reported an average CD4T-cell count of 682.8 (SD = 986.7). The sample was diverse racial/ethnically, with 34.0% identifying as White, 55.7% as Black/Non-Hispanic, 5.2% as Black/Hispanic, 3.1% as Hispanic, and 2.1% as “Mixed/Other.” Less than half (48.4%) reported partial college or more with 35.1% completing high school and 16.5% reporting less than high school education. Most of the sample (81.4%) was unemployed with only 2.1% reporting full-time employment, 14.4% part-time employment, and 2.1% living as a dependent/spouse. Approximately half (49.5%) were single/never married with 18.6% married/living with someone, 23.7% divorced, 6.2% separated, and 2.1% widowed.

Measures

MINI International Neuropsychiatric Interview (MINI; Lecrubier et al., 1997). The MINI is a diagnostic interview used to assess DSM-IV disorders. The MINI has been successfully utilized in prior studies of PLHIV (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 with no discrepancies noted. The observed rate of psychological disorders is presented in Table 1.

Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). The PANAS is a self-report measure of positive and negative affectivity. Each of the 20 items (e.g., “disinterested”) is rated on a Likert-type scale from 1 (*very slightly or not at all*) to 5 (*extremely*) in terms of how the respondent generally feels. Items comprise two scales:

positive affectivity (PA) and NA. Past studies indicate good psychometric properties for the PANAS among PLHIV (Gonzalez, Zvolensky, Parent, Grover, & Hickey, 2012). In the current sample, NA was used to indicate the generalized tendency to experience negative emotions (α = .86).

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 in past work among PLHIV (Bunn et al., 2007). In the current study, internal consistency for the HASS was excellent (α = .96).

Anxiety Sensitivity Index-3 (ASI-3; Taylor et al., 2007). The ASI-3 is an 18-item self-report measure of anxiety sensitivity. Items are rated on a Likert-type scale from 0 (*very little*) to 4 (*very much*) and summed to a total score. 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 for the ASI-3 total scale (α = .95).

The West Haven-Yale Multidimensional Pain Inventory (WHYMPI; Kerns, Turk, & Rudy, 1985). The WHYMPI is a well-established measure assessing various aspects of pain. The current study utilized the pain severity (3 items; e.g., "On average, how severe has your pain been during the last week?") and pain interference (11 items; e.g., "In general, how much does your pain interfere with your day-to-day activities?") subscales of the WHYMPI. Items are rated on various Likert-type scales from 0 (*no interference*) to 6 (*extreme interference*). The WHYMPI has demonstrated good reliability and validity among samples of chronic pain (Kerns et al., 1985) and has been successfully used among PLHIV (Barry et al., 2011). In the current sample, internal consistency was excellent for both the pain severity (α = .93) and pain interference (α = .96).

Psychological Inflexibility in Pain Scale (PIPS; Wicksell, Lekander, Sorjonen, & Olsson, 2010; Wicksell, Renöfält, Olsson, Bond, & Melin, 2008). The PIPS is a 12-item self-report measure of psychological inflexibility in relation to pain, and it has two components (i.e., cognitive fusion and avoidance). Sample items are: "It is important to understand what causes my pain (cognitive fusion)" and "Because of my pain, I no longer plan for the future (avoidance)," they are rated on a Likert-type scale from 1 (*never true*) to 7 (*always true*) with higher scores indicating more inflexibility. The PIPS has demonstrated good psychometric properties including internal consistency, preliminary test-retest reliability, and strong relations with pain and disability-related constructs (Wicksell et al., 2010). In the current study, internal consistency was excellent (overall: α = .92; cognitive fusion: α = .82; avoidance: α = .92).

Procedure

Data for the current study was taken from a larger project on medication adherence (Brandt et al., 2016). Eligible participants were between the ages of 18 and 65, had a diagnosis of HIV/AIDS, and the ability to provide informed written consent. Participants were excluded

from the study if they were unable to provide informed consent, could not answer questions accurately due to illiteracy, or could not show up to their scheduled appointments. Interested individuals responded to flyers posted at local HIV/AIDS service organizations 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 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 a mediator (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 resamples was performed to obtain 95% confidence intervals (CI) around the "a*b path." The indirect effect of HIV-related stigma via anxiety sensitivity was examined in relation to (a) pain severity, (b) pain interference, and (c) psychological inflexibility in pain. Effect size (κ^2) was estimated for the indirect effect (Preacher & Kelley, 2011). Models were adjusted for participant racial/ethnic minority status, gender, sexual orientation, time since HIV diagnosis, and negative affectivity. Alternative models were also run, replacing the X and M variables (i.e., testing the indirect effect of anxiety sensitivity via HIV-related stigma) in relation to each dependent measure (Judd & Kenny, 2010). Finally, planned exploratory post-hoc tests evaluated subfactors of psychological inflexibility in pain (i.e., avoidance, fusion) as outcomes to test specificity of psychological inflexibility findings.

Results

Descriptive statistics

Bivariate correlations are presented in Table 2. HIV stigma was positively correlated with anxiety sensitivity ($r = .37$, $p < .001$) as well as pain severity ($r = .24$, $p = .018$), pain interference ($r = .33$, $p < .001$), and psychological inflexibility in pain ($r = .39$, $p < .001$). Anxiety sensitivity was positively associated with pain severity ($r = .35$, $p < .001$), pain interference ($r = .42$, $p < .001$), and psychological inflexibility in pain ($r = .59$, $p < .001$).

Test of the indirect effect

In predicting pain severity, there was a nonsignificant total effect of HIV-related stigma ($B = .01$, $SE = .01$, $p = .163$; Table 3). However, the indirect effect of HIV-related stigma via anxiety sensitivity was significant ($B = .004$, $SE = .003$, 95% *CI [.0001, .01];* completely standardized point estimate = .04), and of medium size ($\kappa^2 = .10$). There was no significant direct effect of HIV-related stigma after accounting for the indirect effect ($B = .01$, $SE = .01$, $p = .317$).

The total effect of HIV-related stigma on pain interference was significant ($B = .02$, $SE = .01$, $p = .022$). There was a significant indirect effect of HIV- related stigma via anxiety

sensitivity (*B* = .01, *SE* = .003, 95% *CI [.0004, .01];* completely standardized point estimate = .05), which was of medium effect size (κ^2 = .13). After accounting for the indirect effect, there was no significant direct effect of HIV-related (*B* = .01, *SE* = .01, *p* = .072).

Likewise, in relation to psychological inflexibility in pain, there was a significant total effect of HIV-related stigma (*B* = .16, *SE* = .08, *p* = .039). After accounting for the indirect effect, there was no direct effect of HIV-related stigma via anxiety sensitivity (*B* = .05, *SE* = .03, 95% *CI [.01, .14];* completely standardized point estimate = .07), which was of medium effect size (κ^2 = .20). There was no direct effect of HIV-related stigma on psychological inflexibility in pain after accounting for the indirect effect (*B* = .11, *SE* = .07, *p* = .153).

Competing models

The comparison models testing the indirect effect of anxiety sensitivity via HIV-related stigma yielded nonsignificant indirect effects on pain severity (*B* = .003, *SE* = .003, 95% *CI [−.002, .01]*), pain interference (*B* = .004, *SE* = .003, 95% *CI [−.0001, .01]*), and psychological inflexibility in pain (*B* = .03, *SE* = .02, 95% *CI [−.003, .10]*), respectively.

Post-hoc tests

When examining the two subscales of psychological inflexibility in pain as outcomes, there was a significant indirect effect of HIV-related stigma via anxiety sensitivity in relation to the avoidance subscale (*B* = .05, *SE* = .03, 95% *CI [.01, .11];* completely standardized point estimate = .10), which was medium-to-large size (κ^2 = .23), but not the fusion subscale (*B* = .004, *SE* = .01, 95% *CI [−.01, .02];* completely standardized point estimate = .01).

Discussion

The present study examined the association between stigma and pain in a sample of PLHIV. As hypothesized, HIV stigma was associated with pain severity, pain interference, and psychological inflexibility in pain. The indirect role of anxiety sensitivity in the association between HIV stigma and pain was also examined, and as expected, there were significant indirect effects of HIV stigma on pain severity, pain interference, and psychological inflexibility in pain via anxiety sensitivity. The indirect effects were medium-sized (κ^2s ranged from .10 to .20), and evident over and beyond the variance accounted for by the covariates (racial/ethnic minority status, gender, sexual orientation, time since HIV diagnosis, and negative affectivity). Due to the cross-sectional nature of the data, competing models were run to examine potential alternative indirect effects. All competing models yielded nonsignificant indirect effects, providing convergent evidence to support the direction of hypothesized models (i.e., HIV stigma via anxiety sensitivity in relation to pain).

The findings in the present study align with the theoretical perspective that anxiety sensitivity may underlie the association between stigma and pain among PLHIV. Past work suggests social rejection is associated with physical pain (Eisenberger & Lieberman, 2004, 2005). Frequent and chronic encounters with stigma may theoretically increase anxiety sensitivity, resulting in an increased probability of arousal-related sensations misinterpreted as threatening. Such misinterpretations may, in turn, be related to the experience of more

severe pain, more pain interference, and higher tendency to engage in behaviors that lead to avoidance of pain and related distress. Interestingly, post-hoc evaluation of subfacets of psychological inflexibility in pain (cognitive fusion and avoidance) revealed a significant indirect effect of HIV stigma via anxiety sensitivity in relation to avoidance, but not cognitive fusion. These findings suggest that the present anxiety sensitivity-based explanatory model is more relevant to avoidance (not engaging in activities due to pain) than cognitive fusion (beliefs about having to control pain to live a valued life) in terms of the studied pain-based dependent measures. These findings are consistent with past non-HIV work that has linked anxiety sensitivity strongly to avoidance behavior for somatic perturbation (Zvolensky & Forsyth, 2002).

The present study may be used to advance the development of interventions for PLHIV suffering from pain. For example, the results may suggest interventions that reduce anxiety sensitivity among stigmatized PLHIV, which may be helpful in alleviating pain symptoms and suffering. Among non-HIV samples, meta-analyses and empirical studies indicate reduced anxiety sensitivity is associated with more pain tolerance/threshold, less pain-related disability, less pain catastrophizing, and less fearful appraisals of pain (Asmundson & Taylor, 1996; Esteve & Camacho, 2008; Esteve et al., 2012; Keogh & Birkby, 1999; Keogh et al., 2010; Keogh & Cochrane, 2002; Ocañez, Kathryn McHugh, & Otto, 2010; Roelofs et al., 2003; Wong et al., 2014). Although there is no such work among PLHIV, a recent study shows an intervention that targets anxiety sensitivity as being effective in reducing pain-related anxiety and pain-related disability in a non-HIV sample (Sharpe et al., 2012). Future study may extend this research and explore the clinical utility of anxiety sensitivity reduction intervention in alleviating pain among PLHIV.

The present study has several limitations. First, while the rejection of competing models may provide greater confidence to the hypothesized directional associations among examined variables, causal inferences cannot be made because of the cross-sectional design of the study. Future research should examine the proposed model with a longitudinal design to explicate the temporal effects. Second, although the sample was ethnically diverse, it was primarily older male adults. To increase the generalizability of findings in this study, future research may benefit from replicating and extending this work to more heterogeneous samples of PLHIV. Previous studies show that PLHIV with stigmatized identities in addition to HIV status (e.g., intravenous drug abuser, black persons) tend to experience more pain than others who do not have further stigmatized intersectionalities (Aouizerat et al., 2010; Dobalian et al., 2004; Hansen et al., 2011; Martin et al., 1999; Richardson et al., 2009). These findings suggest the effect of stigma on pain may have different manifestations among PLHIV with multiple stigmatized identities; multiple stigmatized identities may also have different implications on PLHIV's levels of anxiety sensitivity. Third, due to the monomethod measurement approach, method variance may influence the current findings. Thus, future work should consider multimethod assessment approaches to index the primary constructs. Fourth, our study documented that the pain PLHIV experience, regardless of its cause, existed in the presence of stigma and anxiety sensitivity. However, the lack of information on the cause of pain (e.g., neuropathic, nociceptive) in our sample may limit our understanding of the experience among PLHIV. Future studies should take the sources into consideration, and examine their potential moderating roles. Finally, while negative affect

was measured and controlled in analysis, depression was highly prevalent among PLHIV (Ciesla & Roberts, 2001). It is possible that the pain PLHIV experience may be a somatic expression of depression and/or other mood disorders (Evans et al., 1998), and that depression may moderate the associations among HIV stigma, anxiety sensitivity, and pain experience. To tease apart the actual experience of pain and the somatic experience of depression, future study should include a measure of depressive symptoms, and have the levels of depressive symptoms controlled in analysis.

In summary, the present study represents the first empirical evaluation of the association between HIV stigma and an array of clinical pain processes among a sample of PLHIV. Findings indicated an indirect association between HIV stigma and pain-related outcomes via anxiety sensitivity. If replicated, future research may benefit by exploring the clinical utility of addressing stigma and anxiety sensitivity to reduce the pain burden among PLHIV.

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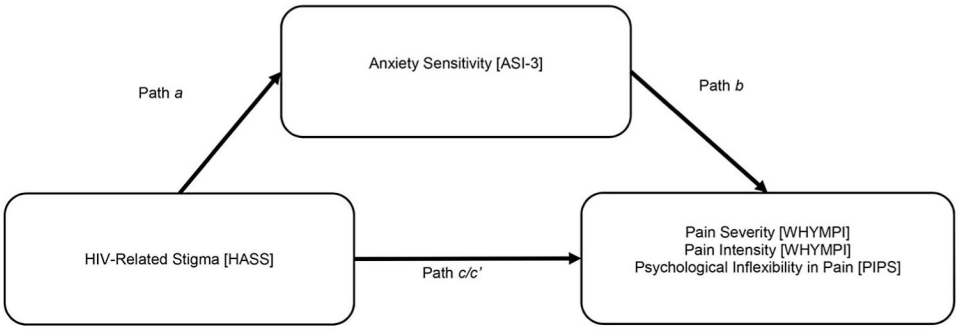

Figure 1.

Proposed model examining the indirect association of HIV stigma via anxiety sensitivity in relation to pain severity, pain interference, and psychological inflexibility in pain.

Table 1

Current psychological disorders.

Diagnosis	***N* (%)**
Generalized anxiety disorder	30 (30.9%)
Major depressive disorder	28 (28.9%)
Agoraphobia	23 (23.7%)
Other substance use disorders	21 (21.6%)
Panic disorder	21 (21.6%)
Dysthymia	17 (17.5%)
Post-traumatic stress disorder	15 (15.5%)
Alcohol use disorders	14 (14.4%)
Social phobia	10 (10.3%)
Obsessive compulsive disorder	4 (4.1%)
Mania/hypomania	3 (3.1%)

Table 2

Means, standard deviations, internal consistencies, and bivariate correlations among variables.

Variable	Mean/*n* (*SD*/%)	1	2	3	4	5	6	7	8	9	10	11
1. Minority status	64 (66.0%)	1										
2. Gender	59 (60.8%)	−.13	1									
3. Sexual orientation	51 (52.6%)	.23*	−.55**	1								
4. Years since diagnosis	16.8 (8.3)	−.05	.13	−.27**	1							
5. PANAS-NA	24.1 (9.0)	−.10	−.15	.08	−.19	1						
6. HASS-Total	77.5 (20.5)	−.05	−.10	.14	−.21*	.37**	1					
7. ASI-3	27.0 (18.3)	−.09	−.08	.02	−.14	.55**	.37**	1				
8. WHYMPI-Severity	2.3 (2.0)	−.04	−.25*	.14	.08	.34**	.24*	.35**	1			
9. WHYMPI-Interference	2.4 (1.9)	−.03	−.26**	.15	.05	.37**	.33**	.42**	.87**	1		
10. PIPS-Total	48.6 (17.7)	−.15	−.06	.06	−.11	.62**	.39**	.59**	.33**	.38**	1	
11. PIPS-Avoidance	29.1 (13.0)	−.13	−.10	.11	−.11	.65**	.39**	.66**	.35**	.40**	.96**	1
12. PIPS-Fusion	19.5 (6.4)	−.14	.04	−.05	−.09	.39**	.27**	.28**	.21*	.24*	.81**	.61**

Note: Minority status (1 = racial/ethnic minority, 0 = not a racial/ethnic minority); gender (1 = male, 0 = not male); sexual orientation (1 = heterosexual, 0 = not heterosexual); time since diagnosis = years since HIV diagnosis; HASS = HIV/AIDS Stigma Scale; ASI-3 = Anxiety Sensitivity Index-3; WHYMPI = West Haven Yale Multidimensional Pain Index; severity = WHYMPI-Pain Severity Subscale; interference = WHYMPI-Pain Interference Subscale; PIPS = Psychological Inflexibility in Pain Scale; avoidance = PIPS-Avoidance Subscale; fusion = PIPS-Fusion Subscale Numbers across header correspond with variables numbered 1–12.

* $p < .05$;

** $p < .01$.

Table 3

Unstandardized coefficients.

Y	Model	*B*	SE	*t*	*p*	LLCI	ULCI
1	HASS → ASI-3 (a)	.17	.08	2.02	.047	.002	.34
	ASI-3 → WHYMPI-Severity (b)	.02	.01	1.87	.065	−.002	.05
	HASS → WHYMPI-Severity (c)	.01	.01	1.41	.163	−.01	.03
	HASS → WHYMPI-(c′)	.01	.01	1.01	.317	−.01	.03
	HASS → ASI-3 → WHYMPI-Severity (a*b)	.004	.003			.0001	.01
2	ASI-3 → WHYMPI-Interference (b)	.03	.01	2.58	.012	.01	.05
	HASS → WHYMPI-Interference (c)	.02	.01	2.33	.022	.003	.04
	HASS → WHYMPI-Interference (c′)	.01	.01	1.82	.072	−.002	.04
	HASS → ASI-3 → WHYMPI-Interference (a*b)	.01	.003			.0004	.01
3	ASI-3 → PIPS-Total (b)	.32	.09	3.51	<.001	.14	.49
	HASS → PIPS-Total (c)	.16	.08	2.09	.039	.01	.31
	HASS → PIPS-Total (c′)	.11	.07	1.44	.153	−.04	.25
	HASS → ASI-3 → PIPS-Total (a*b)	.05	.03			.01	.14
4	ASI-3 → PIPS-Avoidance (b)	.29	.06	4.86	<.001	.17	.41
	HASS → PIPS-Avoidance (c)	.11	.05	2.09	.040	.01	.22
	HASS → PIPS-Avoidance (c′)	.06	.05	1.27	.206	−.04	.16
	HASS → ASI-3 → PIPS-Avoidance (a*b)	.05	.03			.01	.11
5	ASI-3 → PIPS-Fusion (b)	.02	.04	0.50	.615	−.06	.10
	HASS → PIPS-Fusion (c)	.05	.03	1.41	.161	−.02	.11
	HASS → PIPS-Fusion (c′)	.04	.03	1.27	.206	−.02	.11
	HASS → ASI-3 → PIPS-Fusion (a*b)	.004	.01			−.01	.02

Note: a = effect of X on M; b = effect of M on Yi; c = total effect of X on Yi; c′ = direct effect of X on Yi controlling for M; HASS (HIV/AIDS Stigma Scale) is the predictor in all models; ASI-3 (Anxiety Sensitivity Index-3) is the explanatory variable; WHYMPI (West Haven Yale Multidimensional Pain Inventory) pain severity subscale is the outcome in Model 1; WHYMPI Pain Interference is the outcome in Model 2; PIPS (Psychological Inflexibility in Pain) total score is the outcome in model 3. Post-hoc tests evaluated PIPS Avoidance and Fusion subscales as outcomes in models 4 and 5, respectively. LLCI = lower bound of confidence interval; ULCI = upper bound; → = affects.