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Emotion Dysregulation: An Explanatory Construct in the Relation Between HIV-Related Stigma and Hazardous Drinking Among Persons Living With HIV/AIDS

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The prevalence of hazardous alcohol use among people living with HIV/AIDS (PLHIV) is common and related to numerous health problems among individuals in this group. Stigma is associated with hazardous drinking among stigmatized groups, but this relationship has yet to be examined among PLHIV. Moreover, there is a lack of research in identifying the mechanisms underlying this association. Emotion dysregulation is one potential construct that may explain the association between stigma and hazardous alcohol use among PLHIV. The present study examined the indirect effect of HIV stigma and hazardous alcohol use via emotion dysregulation. The sample included 98 PLHIV (60.2% male, M_{age} = 48.40, SD = 7.75). Results indicated significant and medium-sized indirect effects of HIV stigma and its subfacets (enacted stigma and negative self-image) in terms of hazardous alcohol use via emotion dysregulation. Alternative models did not yield significant indirect effects. The results document an indirect association between HIV stigma and hazardous alcohol use via emotion dysregulation. These findings may provide novel, initial empirical insight into the nature of the stigma-hazardous drinking relation among PLHIV.

Keywords: HIV, emotion regulation, stigma, hazardous drinking, comorbidity

Hazardous drinking refers to a pattern of alcohol consumption that is of public health significance regardless of the presence/absence of an alcohol use disorder diagnosis (World Health Organization, 2016). Hazardous drinkers do not necessarily meet full criteria for alcohol-related disorders, but their drinking is characterized by a large intake that increases their risk of health and social problems. Even using conservative definitions (i.e., more than 5 drinks in at least 1 day during previous month), hazardous drinking is common among people living with HIV/AIDS (PLHIV), it is nearly double the rate found in the general population (Conigliaro, Justice, Gordon, Bryant, & the VACS Alcohol and Behavior Change Research Group, 2006; Dew, Elifson, & Sterk, 2007; Doshi et al., 2015; Galvan et al., 2002; Saitz, 2005). Hazardous alcohol use contributes to problems with HIV medication adherence, risky sexual behavior, and psychological problems as well as physical complications (e.g., rapid disease progression, medication toxicities, organ failure, and poor viremic control) and may lead to increased risk of transmission and premature death (Galvan et al., 2002). Hazardous alcohol use is also one of the most important comorbid risk factors for peripheral neuropathy in PLHIV (Ferrari & Levine, 2010). Although it is well-established that hazardous drinking has a marked negative impact among PLHIV, there has been strikingly limited work focused on the role of sociocultural experiences on drinking behavior within this vulnerable population.

One factor that may potentially impact hazardous drinking among PLHIV is stigma. Stigma is an attribute (or "mark") that makes an individual different from others, and put him/her in a less desirable category (Goffman, 2009). HIV-related stigma is the perceived stigma experienced by people living with HIV/AIDS. It is a global (i.e., higher-ordered, overarching) factor theorized as a combination of four distinct subfactors including (a) enacted

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stigma—experiences of rejection or discrimination in the past; (b) negative self-image—feeling inferior, shameful or guilty; (c) concerns with public attitudes—subjective beliefs regarding how others view PLHIV; and (d) disclosure concerns—perceptions that one's HIV status needs to be concealed (Bunn, Solomon, Miller, & Forehand, 2007). Research suggests HIV stigma is associated with poorer mental and physical health (Logie & Gadalla, 2009), lower self-esteem and personal control (Fife & Wright, 2000), greater depressive symptoms (Vanable, Carey, Blair, & Littlewood, 2006), more HIV-related symptoms, and poorer antiviral medication adherence (Langebeek et al., 2014; Vanable et al., 2006). For example, one prospective study has documented that among Asian and Pacific Islanders with HIV/AIDS, HIV/AIDS-related stigma predicted increased psychological distress (including anxiety and depressive symptoms; Kang, Rapkin, & DeAlmeida, 2006). Other work indicates that HIV/AIDS-related stigma is related to decreased global psychological functioning and self-esteem (Preston, D'Augelli, Kassab, & Starks, 2007) and increased levels of anxiety and depression symptoms (Vanable et al., 2006). We are not aware of any direct tests of whether HIV stigma is related to hazardous drinking among PLHIV. However, indirect evidence suggests stigma is associated with alcohol use among stigmatized groups, such as sexual minorities and obese individuals (Baiocco, D'Alessio, & Laghi, 2010; Phelan et al., 2015). Drawing from such work, there is a need to empirically explore the association between HIV stigma and hazardous alcohol use among PLHIV.

There is also little understanding of possible factors that may explain the association between HIV stigma and hazardous drinking among PLHIV. Experimental work in college students suggests that social exclusion increases the likelihood of drinking as a function of emotional response to provocation (i.e., anger; Rabinovitz, 2014). Social exclusion is a major behavioral manifestation of public stigma (Link, 1987), and therefore, HIV stigma may be potentially related to hazardous drinking among PLHIV. Moreover, emotion dysregulation may be a candidate for impacting HIV-related stigma and its putative relation to hazardous drinking; however, this hypothesis has not been tested. Emotion dysregulation encompasses deficiencies in modulation of emotional arousal, awareness, understanding, and acceptance of emotions, and ability to act in desired ways regardless of emotional state (Gratz & Roemer, 2004). Among PLHIV, emotion dysregulation has been shown to explain the relations between distress tolerance and severity of anxiety/depressive symptoms (Brandt, Gonzalez, Grover, & Zvolensky, 2013) and the relation between HIV stigma and disease disclosure (Heggeness, Brandt, Paulus, Lemaire, & Zvolensky, 2017). Other work has found higher emotion dysregulation, in conjunction with greater depressive symptoms, is associated with more severe HIV-related symptoms, greater likelihood of avoidant coping strategies, poorer HIV medication adherence, and lower distress tolerance (Brandt, Bakhshaie, Zvolensky, Grover, & Gonzalez, 2015). Although limited in scope, past work suggest emotion dysregulation may be an important explanatory construct for an array of adverse health behaviors and risk processes among PLHIV.

Notably, coping with stigma requires self-regulation to suppress negative stereotypes (Inzlicht, McKay, & Aronson, 2006), and by extension, the ongoing management of associated negative cognitive-affective states (Ben-Zeev, Fein, & Inzlicht, 2005; Cadinu, Maass, Rosabianca, & Kiesner, 2005). As such, stigmatized individuals' self-control resources and their emotion regulation capacities may diminish as a result of coping with stigma (Hatzenbuehler, 2009). Heightened levels of cognitive-affective distress may consequently be related to a corresponding use of maladaptive affect regulatory strategies, such as hazardous drinking, which are often functionally aimed at escape/avoidance (Allan, Albanese, Norr, Zvolensky, & Schmidt, 2015). Accordingly, from this theoretical perspective, a formative next research step is to evaluate whether emotion dysregulation explains the association between HIV stigma and hazardous alcohol use among PLHIV. Therefore, the present study tested the hypothesis that, among PLHIV, HIV stigma would be associated with hazardous alcohol use, and emotion dysregulation would explain the association between HIV stigma and hazardous alcohol use (see Figure 1). We also hypothesized that these hypothesized associations would be evident after adjusting for the following variables: racial/ethnic minority status, gender, sexual orientation, time since HIV diagnosis, and negative affectivity. These covariates were chosen because they are significantly associated with alcohol consumption in past work among PLHIV (Conen et al., 2009; Hatzenbuehler, Corbin, & Fromme, 2011; Marshal et al., 2008; Nolen-Hoeksema, 2004; Wardian, Wolfersteig, & Schepel, 2013). Different facets of perception of HIV stigma may have different degrees of influence on hazardous drinking. Therefore, post hoc analyses were also conducted to examine the mediating role of emotion dysregulation in the associations of hazardous alcohol use with enacted stigma, negative self-image, public attitude, and disclosure concern. Given experienced stigma (i.e., enacted stigma) and self-stigma (i.e., negative self-image) are more proximal stressors than public stigma (i.e., public attitudes) and behavioral response toward public stigma (i.e., disclosure concern; Pachankis, 2007), and potentially have greater impact on PLHIV's emotions and drinking behavior, it was hypothesized that the indirect effects o would be stronger than those of public attitude and disclosure concern.

Method

Participants

Participants in the present study included 98 adults with a self-reported diagnosis of HIV/AIDS (60.2% male, M_{age} = 48.40, SD = 7.75). Approximately half (46.7%) reported an AIDS diagnosis. The sample was ethnically diverse, with 33.7% identifying as White, 56.1% as Black/Non-Hispanic, 5.1% as Black/Hispanic, 3.1% as Hispanic, and 2.0% as 'Mixed/Other.' Nineteen-point four percent reported less than a high school degree with 33.7% completing high school, and 49.9% with

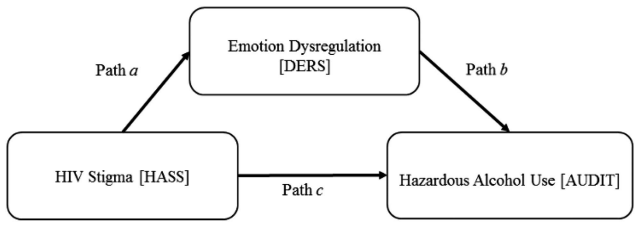

Figure 1. Proposed model examining the indirect association of HIV stigma via emotion dysregulation in relation to hazardous alcohol use.

partial college or more. However, a majority (81.6%) were unemployed with 2.0% working full time, 14.3% working part time, and 2.0% reporting as a dependent, spouse, or student. Most participants (80.6%) were not married or living with someone. On average, participants reported an average CD4 T-cell count of 683.51 (SD = 986.34).

Measures

Positive and negative affect schedule (PANAS; Watson, Clark, & Tellegen, 1988). The PANAS is a self-report measure of positive and negative affectivity. 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 generally feels. Items comprise two scales: positive affectivity (PANAS-PA) and negative affectivity (PANAS-NA). Past studies indicate good psychometric properties for the PANAS among PLHIV (Gonzalez, Zvolensky, Parent, Grover, & Hickey, 2012). In the current sample, negative affectivity was used to indicate the generalized tendency to experience negative emotions (α = .86).

HIV/AIDS Stigma Scale (HASS; Bunn et al., 2007). The HASS (Bunn et al., 2007) is a self-report assessment of perception of HIV/AIDS related stigma. The HASS is comprised of 32 items on a Likert-type scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). The HASS measures global HIV-related stigma via the aggregate of four subtypes of stigma including: Enacted Stigma (HASS-E), Negative Self-Image (HASS-N), Public Attitudes (HASS-P), and Disclosure Concerns (HASS-D). The HASS has demonstrated strong psychometric properties (Bunn et al., 2007) and has been successfully used among samples of PLHIV (Heggeness et al., 2017). In the current study, internal consistency was excellent for the HASS-Total (α = .96) and HASS-E (α = .94) and good for the HASS-N (α = .80), HASS-P (α = .89) and HASS-D (α = .84).

Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). The DERS is a 36-item multidimensional self-report measure of emotion dysregulation. Participants rate each item (e.g., "I experience my emotions as overwhelming and out of control") on a 5-point Likert scale ranging from 1 (*almost never*) to 5 (*almost always*) and summed to a total score. The DERS has demonstrated excellent psychometric properties, including test–retest reliability, construct validity and predictive validity (Gratz & Roemer, 2004) and has been used in samples of PLHIV (Brandt et al., 2013). Internal consistency was excellent in the current study (α = .94).

The Alcohol Use Disorders Identification Test (*AUDIT;* Babor, Higgins-Biddle, Saunders, & Monteiro, 2011). The AUDIT is a 10-item self-report measure that was developed by the World Health Organization to assess problematic alcohol use (Babor et al., 2011). Items (e.g., "How often do you have a drink containing alcohol?") are rated from 0 to 4 and summed to a total score. The AUDIT has strong psychometric properties, including reliability and validity (Saunders, Aasland, Babor, de la Fuente, & Grant, 1993). In the current study, the AUDIT was used as the criterion variable and had good internal consistency in the current sample (α = .87), which is consistent with past work among PLHIV (Saunders et al., 1993).

Procedure

Data for the current study was taken from baseline data from a larger project on medication adherence (Brandt et al., 2017). Eligibility for participation was being between the ages of 18 and 65, having a diagnosis of HIV/AIDS, and an 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 reliably 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 emotion regulation difficulties was examined in relation to hazardous drinking. 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.

Results

Descriptive Statistics

Bivariate correlations are presented in Table 1. HIV stigma was positively correlated with emotion dysregulation, r = .41, p < .001, but not hazardous drinking, r = .09, p = .360. Emotion regulation difficulties were positively associated with hazardous drinking, r = .26, p < .05.

Test of the Indirect Effect

The total effect of HIV-related stigma on hazardous drinking was not significant (B = .04, SE = .04, p = .320; Table 2). However, there was a significant indirect effect of HIV-related stigma via emotion dysregulation (B = .02, SE = .01, 95% CI [.01, .06]), which was of medium effect size (κ^2 = .10). HIV-related stigma was significantly associated with emotion dysregulation (path a; B = .21, SE = .10, p = .038) and emotion dysregulation, in turn, was significantly associated with hazardous drinking, controlling for HIV-related stigma (path b; B = .10, SE = .04, p = .008). There was no significant direct effect of HIV-related stigma after accounting for emotion dysregulation (B = .02, SE = .04,

Table 1
Means, Standard Deviations, Internal Consistencies, and Bivariate Correlations Among Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Minority status	1											
2. Gender	−.09	1										
3. Sexual orientation	.22*	−.49**	1									
4. Time since diagnosis	−.04	.09	−.27**	1								
5. PANAS-NA	−.12	−.09	.09	−.20*	1							
6. HASS-Total	−.04	−.05	.15	−.22*	.37**	1						
7. HASS-Enacted	−.06	−.01	.14	−.20*	.30**	.92**	1					
8. HASS-Negative self	−.02	−.09	.18	−.28**	.35**	.81**	.67**	1				
9. HASS-Disclosure	−.04	−.06	.07	−.09	.28**	.81**	.59**	.55**	1			
10. HASS-Public	.01	−.08	.16	−.20*	.35**	.89**	.78**	.63**	.71**	1		
11. DERS	−.12	.01	.17	−.16	.67**	.41**	.41**	.46**	.19	.33**	1	
12. AUDIT	.10	−.21*	.30**	−.31**	.02	−.05	−.01	.07	−.13	−.10	−.06	1
Mean/n	65	59	51	205.5	24.1	77.4	25.0	15.5	21.3	15.6	91.1	5.3
SD/%	66.3	60.2	52.0	101.6	9.0	20.6	8.6	4.7	5.6	4.8	26.1	6.8

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 = months since HIV diagnosis; HASS = HIV/AIDS Stigma Scale; Enacted = Enacted Stigma Subscale; Negative Self = Negative Self Image Subscale; Disclosure = Disclosure Concerns; Public = Public Attitudes; DERS = Difficulties in Emotion Regulation Scale; AUDIT = Alcohol Use Disorders Identification Test; Numbers across header correspond with variables numbered 1–10.
* $p < .05$. ** $p < .01$.

$p = .673$). The comparison model testing the indirect effect of emotion dysregulation via HIV-related stigma yielded a nonsignificant indirect effect on hazardous drinking ($B = .01$, $SE = .01$, 95% CI [−.01, .03]). Likewise, the comparison model testing the indirect effect of HIV-related stigma via hazardous drinking in relation to emotion dysregulation yielded a nonsignificant indirect effect ($B = .03$, $SE = .03$, 95% CI [−.02, .10]).

Post Hoc Tests

Follow-up models were run testing the indirect effect of enacted stigma via subdimensions of HIV stigma (i.e., enacted stigma, negative self-image, public attitudes, and disclosure concerns). Due to multiple comparisons, 99% confidence intervals were used to determine statistical significance of indirect effects. The total effect of enacted stigma on hazardous drinking was not significant ($B = .08$, $SE = .08$, $p = .338$). The indirect effect of enacted stigma via emotion dysregulation ($B = .06$, $SE = .03$, 99% CI [.01, .20]), which was medium sized ($\kappa^2 = .10$). The direct effect of enacted stigma was not significant ($B = .02$, $SE = .08$, $p = .832$).

The total effect of negative self-image in relation to hazardous drinking was not significant ($B = .26$, $SE = .16$, $p = .106$). The indirect effect of negative self-image via emotion dysregulation was significant ($B = .13$, $SE = .06$, 99% CI [.01, .40]) and medium in effect size ($\kappa^2 = .10$). The direct effect of negative self-image was not significant ($B = .13$, $SE = .16$, $p = .418$).

The total effect of disclosure concerns in relation to hazardous drinking was not significant ($B = .02$, $SE = .13$, $p = .849$). The indirect effect of disclosure concerns via emotion dysregulation was not significant ($B = -.01$, $SE = .04$, 99% CI [−.15, .09]) and small in effect size ($\kappa 2 = .004$). The direct effect of disclosure concerns was not significant ($B = .03$, $SE = .12$, $p = .826$).

The total effect of public attitude stigma in relation to hazardous drinking was not significant ($B = .10$, $SE = .16$, $p = .503$). The indirect effect of public attitude stigma via emotion dysregulation was not significant ($B = .05$, $SE = .05$, 99%CI [−.07, .26]) and small in effect size ($\kappa 2 = .01$). The direct effect of public attitude stigma was not significant ($B = .06$, $SE = .15$, $p = .714$).

Discussion

The present study examined the mediating role of emotion dysregulation in the association among HIV stigma and hazardous alcohol use among PLHIV. Inconsistent with hypothesis, the bivariate association between HIV stigma and hazardous alcohol use was not significant. However, there was significant indirect effect of HIV stigma on hazardous alcohol use via emotion dysregulation. The indirect effect was medium-sized ($\kappa^2 = .10$), and evident over and beyond the variance provided by the covariates (i.e., racial/ethnic minority status, gender, sexual orientation, time since HIV diagnosis, and negative affectivity). Due to the cross-sectional nature of data, competing models were run to examine potential model misspecification. Specifically, two comparison models were examined (Model 1: emotion dysregulation via HIV stigma in relation to hazardous alcohol use; Model 2: HIV stigma via hazardous alcohol use in relation to emotion dysregulation). Both comparison models yielded nonsignificant indirect effects, providing strong empirical support to the hypothesized model. Similar indirect effects were observed for subfacets of HIV stigma: enacted stigma and negative self-image. Findings suggest that emotion dysregulation may underlie the association of HIV stigma with hazardous drinking among PLHIV. Theoretically, stigma coping involves suppression of negative stereotypes (Inzlicht et al., 2006) and the corresponding management of associated negative cognitive-affective states (Ben-Zeev et al., 2005; Cadinu et al., 2005). PLHIV's emotion regulation capacities may thus be depleted, which, in turn, may be related to more hazardous alcohol use. Future longitudinal research is needed to evaluate this hypothesized model.

Although a significant correlation between predictor and the criterion variable has conventionally been considered as a prerequisite of indirect effect tests, modern analytic theory and research

Table 2
Unstandardized Coefficients

Y	Model	*B*	*SE*	*t*	*p*	*LLCI*	*ULCI*
1	HASS-Total → DERS (a)	.21	.10	2.10	.038	.01	.42
	DERS → AUDIT (b)	.10	.04	2.73	.008	.03	.17
	HASS-Total → AUDIT (c)	.04	.04	1.00	.320	−.04	.11
	HASS-Total → AUDIT (c′)	.02	.04	.42	.673	−.06	.09
	HASS-Total → DERS → AUDIT (a*b)	.02	.01			.01	.06
2	HASS-Enacted → DERS (a)	.64	.23	2.72	.008	.02	1.25
	DERS → AUDIT (b)	.10	.04	2.72	.008	.01	.20
	HASS- Enacted → AUDIT (c)	.08	.08	.96	.338	−.14	.30
	HASS- Enacted → AUDIT (c′)	.02	.08	.21	.832	−.20	.24
	HASS- Enacted → DERS → AUDIT (a*b)	.06	.03			.01	.20
3	HASS-Negative Self → DERS (a)	1.37	.44	3.15	.002	.23	2.53
	DERS → AUDIT (b)	.09	.04	2.49	.015	−.01	.19
	HASS- Negative Self → AUDIT (c)	.26	.16	1.63	.106	−.16	.67
	HASS- Negative Self → AUDIT (c′)	.13	.16	.81	.418	−.29	.56
	HASS- Negative Self → DERS → AUDIT (a*b)	.13	.06			.01	.40
4	HASS-Disclosure → DERS (a)	−.03	.37	−.08	.940	−1.00	.94
	DERS → AUDIT (b)	.10	.04	2.86	.005	.01	.19
	HASS- Disclosure → AUDIT (c)	.02	.13	.19	.849	−.31	.36
	HASS- Disclosure → AUDIT (c′)	.03	.12	.22	.826	−.30	.35
	HASS- Disclosure → DERS → AUDIT (a*b)	−.01	.04			−.15	.09
5	HASS-Public → DERS (a)	.49	.44	1.11	.272	−.68	1.66
	DERS → AUDIT (b)	.10	.04	2.81	.006	.01	.19
	HASS- Public → AUDIT (c)	.10	.16	.67	.503	−.30	.51
	HASS- Public → AUDIT (c′)	.06	.15	.37	.714	−.34	.45
	HASS- Public → DERS → AUDIT (a*b)	.05	.05			−.07	.26

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 Y_i controlling for M; HASS-Total (HIV/AIDS Stigma Scale) is the predictor in model 1 with HASS subscales of Enacted Stigma and Negative Self Image serving as predictors in models 2, and 3, respectively; DERS (difficulties in emotion regulation scale) is the explanatory variable; AUDIT (Alcohol Use Disorders Identification Test) is the outcome in all models. LLCI = lower bound of confidence interval; ULCI = upper bound; → = affects. In model 1, 95% confidence intervals were used; 99% confidence intervals were used for post-hoc tests (models 2–3).

suggests this prerequisite is not essential (e.g., Hayes, 2013; Rucker, Preacher, Tormala, & Petty, 2011). In the present study, there were nonsignificant direct (i.e., controlling for emotion dysregulation) and total effects of HIV stigma in relation to hazardous drinking. The lack of a direct/total effect of HIV stigma on hazardous drinking may suggest that hazardous alcohol use is not a proximal consequence of HIV stigma, and additional factors may be present linking HIV stigma to hazardous alcohol use among this group. The current findings suggest that emotion dysregulation partially account for this link. However, other factors, such as drinking to cope with negative affect and alcohol expectancies may serve as intermediate processes in the association between HIV stigma and hazardous alcohol use (Hatzenbuehler, 2009; Hatzenbuehler et al., 2011) and should be evaluated in future work.

The present study has practical implications. Specifically, this basic research knowledge about HIV stigma and hazardous drinking may be translated to advance the development of interventions for PLHIV suffering from hazardous drinking. In particular, the findings may suggest that interventions targeting at emotion dysregulation may help address hazardous alcohol use among PLHIV. Although evidence has been limited among PLHIV, such interventions have been shown effective in reducing alcohol use problems among non-HIV samples (e.g., Berking et al., 2011; Stasiewicz et al., 2013).

The current study has several limitations. First, the cross-sectional design of the study precludes making causal inferences. Although the rejection of comparison models provided some confidence to the hypothesized directional associations, future studies should reexamine the proposed model with a longitudinal design to explicate the temporal effects, especially the transactional association between perceived stigma and emotion dysregulation. Second, while the sample was ethnically diverse, it was primarily male, older adults. Future studies may benefit from replicating and extending this work to more heterogeneous samples of PLHIV to increase the generalizability of findings. Relatedly, people with multiple stigmatized identities may respond differently to stigma compared with others who possess only one stigmatized identity (Lelutiu-Weinberger, Gamarel, Golub, & Parsons, 2015; West, Vayshenker, Rotter, & Yanos, 2015). Therefore, it is possible that the effect of HIV stigma may have different manifestations among sexual minorities, ethnic minorities, people with mental illness, and other minority identities. Unfortunately, the sample size of the present study was not large enough to perform tests on moderated mediation effects (i.e., additional stigmatized identities as moderators). Future research could usefully employ larger and more diverse samples, and examine such potential moderated mediation effects.

Overall, the present study served as an initial attempt to examine the associations among HIV stigma, emotion dysregulation, and hazardous alcohol use in a sample of PLHIV. Findings documented a novel indirect association between HIV stigma and hazardous alcohol use via emotion dysregulation. If replicated,

future research may benefit by exploring the clinical utility of addressing emotion dysregulation among PLHIV to offset the risks associated with hazardous drinking among this group.

References

Allan, N. P., Albanese, B. J., Norr, A. M., Zvolensky, M. J., & Schmidt, N. B. (2015). Effects of anxiety sensitivity on alcohol problems: Evaluating chained mediation through generalized anxiety, depression and drinking motives. *Addiction, 110,* 260–268. http://dx.doi.org/10.1111/add.12739

Babor, T. F., Higgins-Biddle, J. C., Saunders, J. B., & Monteiro, M. G. (2011). *The Alcohol Use Disorders Identification Test: Guidelines for use in primary care*. Geneva, Switzerland: World Health Organization, Department of Mental Health and Substance Dependence.

Baiocco, R., D'Alessio, M., & Laghi, F. (2010). Binge drinking among gay, and lesbian youths: The role of internalized sexual stigma, self-disclosure, and individuals' sense of connectedness to the gay community. *Addictive Behaviors, 35,* 896–899. http://dx.doi.org/10.1016/j.addbeh.2010.06.004

Ben-Zeev, T., Fein, S., & Inzlicht, M. (2005). Arousal and stereotype threat. *Journal of Experimental Social Psychology, 41,* 174–181. http://dx.doi.org/10.1016/j.jesp.2003.11.007

Berking, M., Margraf, M., Ebert, D., Wupperman, P., Hofmann, S. G., & Junghanns, K. (2011). Deficits in emotion-regulation skills predict alcohol use during and after cognitive-behavioral therapy for alcohol dependence. *Journal of Consulting and Clinical Psychology, 79,* 307–318. http://dx.doi.org/10.1037/a0023421

Brandt, C. P., Bakhshaie, J., Jardin, C., Lemaire, C., Kauffman, B. Y., Sharp, C., & Zvolensky, M. J. (2017). The moderating effect of smoking status on the relation between anxiety sensitivity and sexual compulsivity and suicidality among persons living with HIV/AIDS. *International Journal of Behavioral Medicine, 24,* 92–100.

Brandt, C. P., Bakhshaie, J., Zvolensky, M. J., Grover, K. W., & Gonzalez, A. (2015). The examination of emotion dysregulation as a moderator of depression and HIV-relevant outcome relations among an HIV+sample. *Cognitive Behaviour Therapy, 44,* 9–20. http://dx.doi.org/10.1080/16506073.2014.950323

Brandt, C. P., Gonzalez, A., Grover, K. W., & Zvolensky, M. J. (2013). 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, 35,* 197–204. http://dx.doi.org/10.1007/s10862-012-9329-y

Bunn, J. Y., Solomon, S. E., Miller, C., & Forehand, R. (2007). Measurement of stigma in people with HIV: A reexamination of the HIV Stigma Scale. *AIDS Education and Prevention, 19,* 198–208. http://dx.doi.org/10.1521/aeap.2007.19.3.198

Cadinu, M., Maass, A., Rosabianca, A., & Kiesner, J. (2005). Why do women underperform under stereotype threat? Evidence for the role of negative thinking. *Psychological Science, 16,* 572–578. http://dx.doi.org/10.1111/j.0956-7976.2005.01577.x

Conen, A., Fehr, J., Glass, T. R., Furrer, H., Weber, R., Vernazza, P., . . . the Swiss HIV Cohort Study. (2009). Self-reported alcohol consumption and its association with adherence and outcome of antiretroviral therapy in the Swiss HIV Cohort Study. *Antiviral Therapy, 14,* 349–357.

Conigliaro, J., Justice, A. C., Gordon, A. J., & Bryant, K., & the VACS Alcohol and Behavior Change Research Group. (2006). Role of alcohol in determining human immunodeficiency virus (HIV)-relevant outcomes: A conceptual model to guide the implementation of evidence-based interventions into practice. *Medical Care, 44*(8, Suppl. 2), S1–S6. http://dx.doi.org/10.1097/01.mlr.0000223659.36369.cf

Dew, B. J., Elifson, K. W., & Sterk, C. E. (2007). Differences in HIV sexual risk behaviors between heterosexual and nonheterosexual male users of methamphetamine. *Journal of Drug Issues, 37,* 281–298. http://dx.doi.org/10.1177/002204260703700203

Doshi, R. K., Milberg, J., Isenberg, D., Matthews, T., Malitz, F., Matosky, M., . . . Cheever, L. W. (2015). High rates of retention and viral suppression in the U.S. HIV safety net system: HIV care continuum in the Ryan White HIV/AIDS Program, 2011. *Clinical Infectious Diseases, 60,* 117–125. http://dx.doi.org/10.1093/cid/ciu722

Ferrari, L. F., & Levine, J. D. (2010). Alcohol consumption enhances antiretroviral painful peripheral neuropathy by mitochondrial mechanisms. *European Journal of Neuroscience, 32,* 811–818. http://dx.doi.org/10.1111/j.1460-9568.2010.07355.x

Fife, B. L., & Wright, E. R. (2000). The dimensionality of stigma: A comparison of its impact on the self of persons with HIV/AIDS and cancer. *Journal of Health and Social Behavior, 41,* 50–67. http://dx.doi.org/10.2307/2676360

Galvan, F. H., Bing, E. G., Fleishman, J. A., London, A. S., Caetano, R., Burnam, M. A., . . . Shapiro, M. (2002). The prevalence of alcohol consumption and heavy drinking among people with HIV in the United States: Results from the HIV Cost and Services Utilization Study. *Journal of Studies on Alcohol, 63,* 179–186. http://dx.doi.org/10.15288/jsa.2002.63.179

Goffman, E. (2009). *Stigma: Notes on the management of spoiled identity*. New York, NY: Simon & Schuster.

Gonzalez, A., Zvolensky, M. J., Parent, J., Grover, K. W., & Hickey, M. (2012). HIV symptom distress and anxiety sensitivity in relation to panic, social anxiety, and depression symptoms among HIV-positive adults. *AIDS Patient Care and STDs, 26,* 156–164. http://dx.doi.org/10.1089/apc.2011.0309

Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in Emotion Regulation Scale. *Journal of Psychopathology and Behavioral Assessment, 26,* 41–54. http://dx.doi.org/10.1023/B:JOBA.0000007455.08539.94

Hatzenbuehler, M. L. (2009). How does sexual minority stigma "get under the skin"? A psychological mediation framework. *Psychological Bulletin, 135,* 707–730. http://dx.doi.org/10.1037/a0016441

Hatzenbuehler, M. L., Corbin, W. R., & Fromme, K. (2011). Discrimination and alcohol-related problems among college students: A prospective examination of mediating effects. *Drug and Alcohol Dependence, 115,* 213–220. http://dx.doi.org/10.1016/j.drugalcdep.2010.11.002

Hayes, A. F. (2012). *PROCESS: A versatile computational tool for observed variable mediation, moderation, and conditional process modeling* (White paper). Retrieved from http://www.afhayes.com/public/process2012.pdf

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York, NY: Guilford Press.

Heggeness, L. F., Brandt, C. P., Paulus, D. J., Lemaire, C., & Zvolensky, M. J. (2017). Stigma and disease disclosure among HIV+ individuals: The moderating role of emotion dysregulation. *AIDS Care, 29,* 168–176.

Inzlicht, M., McKay, L., & Aronson, J. (2006). Stigma as ego depletion: How being the target of prejudice affects self-control. *Psychological Science, 17,* 262–269. http://dx.doi.org/10.1111/j.1467-9280.2006.01695.x

Kang, E., Rapkin, B. D., & DeAlmeida, C. (2006). Are psychological consequences of stigma enduring or transitory? A longitudinal study of HIV stigma and distress among Asians and Pacific Islanders living with HIV illness. *AIDS Patient Care and STDs, 20,* 712–723. http://dx.doi.org/10.1089/apc.2006.20.712

Langebeek, N., Gisolf, E. H., Reiss, P., Vervoort, S. C., Hafsteinsdóttir, T. B., Richter, C., . . . Nieuwkerk, P. T. (2014). Predictors and correlates of adherence to combination antiretroviral therapy (ART) for chronic HIV infection: A meta-analysis. *BMC Medicine, 12,* 142. http://dx.doi.org/10.1186/s12916-014-0142-1

Lelutiu-Weinberger, C., Gamarel, K. E., Golub, S. A., & Parsons, J. T. (2015). Race-based differentials in the impact of mental health and stigma on HIV risk among young men who have sex with men. *Health Psychology, 34,* 847–856. http://dx.doi.org/10.1037/hea0000192

Link, B. G. (1987). Understanding labeling effects in the area of mental disorders: An assessment of the effects of expectations of rejection. *American Sociological Review, 52,* 96–112. http://www.jstor.org/stable/2095395. http://dx.doi.org/10.2307/2095395

Logie, C., & Gadalla, T. M. (2009). Meta-analysis of health and demographic correlates of stigma towards people living with HIV. *AIDS Care, 21,* 742–753. http://dx.doi.org/10.1080/09540120802511877

Marshal, M. P., Friedman, M. S., Stall, R., King, K. M., Miles, J., Gold, M. A., . . . Morse, J. Q. (2008). Sexual orientation and adolescent substance use: A meta-analysis and methodological review. *Addiction, 103,* 546–556. http://dx.doi.org/10.1111/j.1360-0443.2008.02149.x

Nolen-Hoeksema, S. (2004). Gender differences in risk factors and consequences for alcohol use and problems. *Clinical Psychology Review, 24,* 981–1010. http://dx.doi.org/10.1016/j.cpr.2004.08.003

Pachankis, J. E. (2007). The psychological implications of concealing a stigma: A cognitive-affective-behavioral model. *Psychological Bulletin, 133,* 328–345. http://dx.doi.org/10.1037/0033-2909.133.2.328

Phelan, S. M., Burgess, D. J., Puhl, R., Dyrbye, L. N., Dovidio, J. F., Yeazel, M., . . . van Ryn, M. (2015). The adverse effect of weight stigma on the well-being of medical students with overweight or obesity: Findings from a national survey. *Journal of General Internal Medicine, 30,* 1251–1258. http://dx.doi.org/10.1007/s11606-015-3266-x

Preacher, K. J., & Kelley, K. (2011). Effect size measures for mediation models: Quantitative strategies for communicating indirect effects. *Psychological Methods, 16,* 93–115. http://dx.doi.org/10.1037/a0022658

Preston, D. B., D'Augelli, A. R., Kassab, C. D., & Starks, M. T. (2007). The relationship of stigma to the sexual risk behavior of rural men who have sex with men. *AIDS Education and Prevention, 19,* 218–230. http://dx.doi.org/10.1521/aeap.2007.19.3.218

Rabinovitz, S. (2014). Drowning your sorrows? Social exclusion and anger effects on alcohol drinking. *Addiction Research & Theory, 22,* 363–370. http://dx.doi.org/10.3109/16066359.2013.857661

Rucker, D. D., Preacher, K. J., Tormala, Z. L., & Petty, R. E. (2011). Mediation analysis in social psychology: Current practices and new recommendations. *Social and Personality Psychology Compass, 5,* 359–371. http://dx.doi.org/10.1111/j.1751-9004.2011.00355.x

Saitz, R. (2005). Clinical practice. Unhealthy alcohol use. *The New England Journal of Medicine, 352,* 596–607. http://dx.doi.org/10.1056/NEJMcp042262

Saunders, J. B., Aasland, O. G., Babor, T. F., de la Fuente, J. R., & Grant, M. (1993). Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO Collaborative Project on Early Detection of Persons with Harmful Alcohol Consumption—II. *Addiction, 88,* 791–804. http://dx.doi.org/10.1111/j.1360-0443.1993.tb02093.x

Stasiewicz, P. R., Bradizza, C. M., Schlauch, R. C., Coffey, S. F., Gulliver, S. B., Gudleski, G. D., & Bole, C. W. (2013). Affect regulation training (ART) for alcohol use disorders: Development of a novel intervention for negative affect drinkers. *Journal of Substance Abuse Treatment, 45,* 433–443. http://dx.doi.org/10.1016/j.jsat.2013.05.012

Vanable, P. A., Carey, M. P., Blair, D. C., & Littlewood, R. A. (2006). Impact of HIV-related stigma on health behaviors and psychological adjustment among HIV-positive men and women. *AIDS and Behavior, 10,* 473–482. http://dx.doi.org/10.1007/s10461-006-9099-1

Wardian, J., Wolfersteig, W., & Schepel, E. (2013). Alcohol consumption in diverse populations: How ethnicity moderates average number of drinks per day and age. *Journal of Substance Use, 18,* 229–237. http://dx.doi.org/10.3109/14659891.2012.721445

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54,* 1063–1070. http://dx.doi.org/10.1037/0022-3514.54.6.1063

West, M. L., Vayshenker, B., Rotter, M., & Yanos, P. T. (2015). The influence of mental illness and criminality self-stigmas and racial self-concept on outcomes in a forensic psychiatric sample. *Psychiatric Rehabilitation Journal, 38,* 150–157. http://dx.doi.org/10.1037/prj0000133

West, S. G., & Aiken, L. S. (1997). Toward understanding individual effects in multicomponent prevention programs: Design and analysis strategies. In K. J. Bryant, M. Windle, & S. G. West (Eds.), *The science of prevention: Methodological advances from alcohol and substance abuse research*. Washington, DC: American Psychological Association. http://dx.doi.org/10.1037/10222-006

World Health Association. (2016). *Lexicon of alcohol and drug terms published by the World Health Organization. (2016)*. Retrieved from http://www.who.int/substance_abuse/terminology/who_lexicon/en/

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