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Modeling the Relationship between Trauma and Psychological Distress among HIV-Positive and HIV-Negative Women

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Abstract

This study investigated the association between cumulative exposure to multiple traumatic events and psychological distress, as mediated by problematic substance use and impaired psychosocial resources. A sample of HIV-positive and HIV-negative women were assessed for a history of childhood and adult sexual abuse and non-sexual trauma as predictors of psychological distress (i.e., depression, non-specific anxiety, and posttraumatic stress), as mediated by problematic alcohol and drug use and psychosocial resources (i.e., social support, self-esteem and optimism). Structural equation modeling confirmed that cumulative trauma exposure is positively associated with greater psychological distress, and that this association is partially mediated through impaired psychosocial resources. However, although cumulative trauma was associated with greater problematic substance use, substance use did not mediate the relationship between trauma and psychological distress.

Key Words: Trauma, HIV, Psychological Distress, Substance Use

Modeling the Relationship between Trauma and Psychological Distress among HIV-Positive and HIV-Negative Women

There is a substantial body of evidence indicating high rates of exposure to traumatic sexual experiences among women (Briere & Elliott, 2003, Finkelhor, 1990), and that women who were sexually or physically abused as children are also likely to be re-victimized as adults (Messman-Moore & Long, 2000; Schumm, Briggs-Phillips & Hobfoll, 2006). Because of the relative frequency of re-victimization, greater attention is being given to the impact of cumulative exposure to multiple traumatic experiences in predicting risk for psychological distress and dysfunction. There is growing evidence that the experience of multiple types of traumatic events is related to increasingly higher levels of posttraumatic stress, anxiety, depressive symptoms, and nonspecific distress, especially when traumatic events are experienced in both childhood and adulthood (Briere, Kaltman, & Green, 2008; Clemmons, Walsh, DiLillo, & Messman-Moore, 2007; Follette, Polusny, Bechtle, & Naugle, 1996; Schumm et al., 2006; Whitmore, Harlow, Quina, & Morokoff, 1999; Williams et al., 2007). Furthermore, as the number of different types of trauma increases, symptom complexity and severity also increase even when the effects of single traumas such as childhood sexual trauma and physical abuse are taken into account (Briere et al, 2008).

Exposure to traumatic events can result in disorders such as major depression (O'Donnell, Creamer, & Pattison, 2004) posttraumatic stress disorder (PTSD) (Molnar, Buka, & Kessler, 2001; Creamer, Burgess, & McFarlane, 2001), and a variety of other clinical outcomes including comorbid PTSD and Major Depression (MD) (Momartin, Silove, Manicavasagar, & Steel, 2004; O'Donnell, Creamer, & Pattison, 2004), mixed subsyndromal disorders, depressive symptoms,

various forms of anxiety (Molnar et al., Trauma and Psychological Distress 4 2001), and substance use and abuse (Boscarino, Adams, & Galea 2006; Min, Farkas, Minnes, & Singer, 2007).

However, the relationship between cumulative trauma exposure and psychological distress is complex and is hypothesized to be mediated both through degradation of psychosocial resources (e.g., social support, self-esteem, and optimism) and through maladaptive coping processes (e.g., substance abuse). Studies of the relationships between trauma exposure and social support are mixed. Lincoln, Chatters, and Taylor (2005) reported no association between trauma burden and perceived social support overall; however, low social support was associated with more depressive symptoms. On the other hand, other studies have shown that the experience of trauma is associated with low social support (Schumm et al., 2006) and that low social support is associated with more depressive symptoms and higher PTSD severity, especially among those with high cumulative trauma burden (Adams & Boscarino, 2006).

Several studies have also shown that positive psychological attributes such as self-esteem and dispositional optimism are important mediators of risk in individuals exposed to childhood trauma. Self-esteem is significantly lower in individuals who have experienced multiple types of childhood trauma than in those who have not, and low self-esteem is associated with higher risk for psychological difficulties following exposure to trauma, including PTSD (Adams & Boscarino, 2006; Higgins & McCabe, 2000). In a cluster analysis of a community sample of women, Whitmore et al. (1999) found that women with the worst functioning, that is those with the lowest esteem, competence, psychosexual functioning and highest levels of distress and powerlessness, were the women with the highest rates of exposure to adult sexual victimization, relationship violence, and unwanted sexual touching during childhood. Also, Brodhagen and

Wise (2008) found that optimism mediated the associations between childhood physical abuse, rape, assault, and fire-related traumas and psychological distress.

Research has also shown that many trauma victims turn to abusing substances as a means of coping with trauma-related distress (Boscarino, Adams, & Galea, 2006; Min, Farkas, Minnes, & Singer, 2007). Indeed, Kendler and colleagues (2000) reported that women who experienced CSA were at greater risk for alcohol dependence than their twin counterparts who had not experienced CSA, and that individuals who experienced CSA were at greater risk for both alcohol and drug dependence. Further, and consistent with the proposed incremental effects of multiple traumas, studies have shown that, as cumulative amount of traumas increases, severity of substance use also increases (Follete, Polusny, Bechtle, & Naugle, 1996).

The present study tests a model of the association between cumulative exposure to traumatic events and the psychological distress that is common to posttraumatic stress, nonspecific anxiety, and depressive symptoms. The model also examines how problematic substance use and impaired psychosocial resources mediate the association between trauma burden and psychological distress. These relationships are modeled in a socioeconomically disadvantaged, multi-ethnic sample of women at risk for or infected with HIV/AIDS, and with varying histories of violence and trauma. The hypothesized model was examined in the overall sample and in the HIV-positive and HIV-negative sub-samples separately given that there may be qualitative and quantitative differences in trauma exposure and response, burden of life stresses, and availability of resources between the two samples (Myers, Sumner, Ullman, Loeb, Carmona, & Wyatt, 2009; Wyatt, Myers, Williams, Kitchen, Loeb, Carmona et al., 2002).

Method

Participants

An urban-resident sample of 490 women were recruited to participate in the UCLA – Charles R. Drew University Women and Family Project (WFP), a 2-year longitudinal study that investigated ethnic and HIV-serostatus differences in psychosocial and behavioral risk and resilience factors. The sample included 155 African-American, 153 Caucasian, and 149 Latina women, and 65.4% (n = 318) were HIV-positive. The sample was relatively young (mean age = 36.1 years), of modest means (i.e. average monthly income = $1,073.57), and had an average of 12 years of education. Approximately 21.7% were married or cohabiting, 39.6% were working or in school, and 35.8% had experienced homelessness.

Participants were recruited from the greater Los Angeles area and were at least 18 years old and self-identified as African-American, Latina, or European-American. HIV status was determined by enzyme-linked immunoabsorbent assay (ELISA) and confirmed by western blot. Random-digit dialing procedures were used to obtain an HIV-negative sample that was matched on ethnicity, age, education, marital/relationship status, and geographic residence to the HIV–positive sample.

Comprehensive demographic, psychosocial and psychiatric interviews and brief medical evaluations were conducted by a team of trained and experienced, ethnically- and linguistically-matched women; and participants were paid $60 for the baseline session and $50 for each subsequent session over two years. For purposes of this study, only baseline data were used. A detailed description of the recruitment and assessment procedures is reported in Wyatt and Chin (1999).

Measures

Predictors. Three measures of trauma were assessed – childhood sexual abuse, adult sexual abuse, and other trauma.

Childhood Sexual Abuse (CSA). CSA was defined as unwanted sexual contact occurring before the age of 18, and measured with nine questions from the Revised Wyatt Sex History Questionnaire (WSHR-R) (Wyatt, Lawrence, Voudounon, & Mickey, 1992) that assess for fondling, frottage, attempted intercourse, intercourse, oral copulation, and digital or object penetration. This variable was dichotomized to indicate whether or not a participant had experienced at least one of these forms of childhood sexual abuse.

Adult Sexual Abuse (ASA). ASA was assessed with four questions on the WSHR-R that asked participants whether anyone had raped or tried to rape them after the age of 18. This variable was dichotomized to indicate whether or not a participant answered affirmatively to any of these four questions.

Other Trauma (OT). OT was measured with nine items that asked about non-sexual traumatic experiences such as being in a life threatening accident, witnessing someone being killed or badly injured, or being affected by a natural disaster. This variable was dichotomized to indicate whether the individual had experienced at least one non-sexual traumatic event.

Hypothesized Mediators. Psychosocial resources and substance use/abuse were assessed as mediating factors of the risks associated with trauma.

Social Support (SS). Social support was assessed with a short (5-item) version of the social support scale used by Vinokur and Vinokur-Kaplan (1990). This scale asked participants to list four people who are important and helpful to them. Each nominee is rated on a five-point Likert-type scale from 1 (not at all) to 5 (a great deal) on the extent to which they provided advice, emotional, affectional, and instrumental support, as well as the degree to which the participant was satisfied with the support received. A reliable (Cronbach $\alpha = 0.86$) average social support score was calculated.

Self-Esteem (SE). Self-esteem was measured using the 10-item Rosenberg Self-esteem scale (Rosenberg, 1965) that is scored on a 4-point Likert-type scale from 1 (strongly agree) to 4 (strongly disagree), and an average self-esteem score was calculated (Cronbach $\alpha = 0.86$).

Optimism (OP). Dispositional optimism was measured using the 10-item Life Orientation Test (Scheier & Carver, 1985), which is scored on a 5-point Likert-type scale from 1 (strongly disagree) to 5 (strongly agree), and an average optimism score was calculated (Cronbach $\alpha = 0.75$).

Alcohol (AL) and Drug Use (DR). Alcohol and drug use/abuse were measured using the alcohol abuse and drug abuse subscales of the University of Michigan Revised Short Form of the Composite Diagnostic Interview Schedule (UM-CIDI) (Kessler, McGonagle, Zhao, Nelson, Hughes, et al., 1994), which assesses problematic alcohol and drug use in the past 12 months. The proportion of problematic alcohol and drug related symptoms was calculated such that higher scores indicate more problematic substance use. The square root of this score was then taken to improve the normality of the variable. To measure polydrug use (PD), each participant was asked to identify the number of different types of drugs she had used in the past 12-months. The number of drugs used was averaged across the number of possible drugs so that higher scores indicate more polydrug use. Again, the square root of this score was taken to improve normality. Alcohol use, drug use and polydrug use were treated as measured variables to estimate overall substance use.

Outcomes. Three indicators of psychological distress were assessed - severity of anxiety, depression and PTSD symptoms.

Anxiety (AN). Anxiety was measured with the 15-item anxiety subscale of the SCL-90 (Derogatis, 1977). This measure asks respondents to rate on a 5-point Likert-type scale how

much they have been bothered in the past 6 months by common symptoms of anxiety. Each participant's average number of anxiety symptoms was calculated (Cronbach $\alpha = 0.95$).

Depression (MD). Depression was assessed using the 20-item Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977). This scale asks participants to indicate on a 4-point Likert-type scale how frequently over the past week they experienced various depressive symptoms. The average number of depression symptoms was calculated (Cronbach $\alpha = 0.93$).

Posttraumatic Stress Disorder (PTSD). PTSD was assessed using the PTSD diagnostic module of the UM-CIDI (Kessler et al., 1994). Participants were only asked about experiencing the 16 symptoms and other indicators typical of PTSD if they had experienced trauma. Each participant's total number of symptoms endorsed was calculated (Cronbach $\alpha = .99$) and averaged across the number of items.

Procedure

Hypothesized model. The hypothesized model is presented in Figure 1. The proposed model has four latent variables: traumatic burden, problematic substance use, psychosocial resources, and psychological distress. The model hypothesizes that psychological distress is directly predicted by problematic substance use, psychosocial resources, and trauma burden. Psychological distress is also predicted indirectly by traumatic burden through problematic substance use and psychosocial resources. Finally, we hypothesize that some of the association between trauma burden and PTSD is qualitatively distinct from the association between trauma burden and general psychological distress. We hypothesized this because, by definition, PTSD only occurs as a result of trauma, while anxiety and depression can occur with or without

traumatic experiences. This hypothesis is examined by allowing the residual for PTSD to covary with the residuals for the trauma burden indicators.

Data Analysis Strategy. We tested the proposed model using a multiple-group structural equation modeling (SEM) approach. SEM is a confirmatory statistical technique which allows researchers to specify a model of relationships between latent and observed variables. The multiple-group analysis allows us to examine the moderating effect of HIV status. To test this series of nested multiple group models, we first tested the model in both HIV-positive and HIV-negative participants separately, to establish that the model fit for both groups. Second, we determined the fit of the model for both HIV-positive and HIV-negative participants simultaneously as the baseline or unconstrained model. In this unconstrained model all the paths were estimated simultaneously but separately for the HIV-positive and HIV-negative samples. Third, we constrained the measurement portion of the model (i.e., the factor loadings) to be equal for both groups. This model allowed us to assess differences in the measurement structure between the groups by comparing this model to the unconstrained model to determine which paths in the measurement model were moderated by HIV status. Finally, we constrained the paths in the structural model (i.e., the paths between the factors) to be equal for both groups. We then compared this model to the unconstrained model to determine which paths in the measurement model were moderated by HIV status.

Data analysis was carried out using EQS 6.1 (Bentler, 1995).

Assumptions. Prior to beginning data analysis, we evaluated the data for missing values. Across all the variables there was minimal missing data, between 0% and 6.73%. The percentage of missing data for each variable is displayed in Table 1. There was evidence to

support the assumption that the data were missing at random, therefore we imputed the missing data with maximum likelihood estimation in EQS (Allison, 2002).

We also evaluated the data for multivariate normality using the normalized estimate of Mardia's coefficient and found that there was evidence of multivariate non-normality, $z = 10.74$, $p < .001$. Given the non-normality of these variables, we used maximum likelihood estimation (ML) and the Yuan-Bentler scaled chi-square (Y-B χ^2) test statistic (Satorra & Bentler, 1988, 1994). The standard errors were adjusted to the extent of the non-normality (Bentler & Dijkstra, 1985). Fit was evaluated with RMSEA and 90% confidence intervals. Good fit is established with a RMSEA < .06 (Ullman, 2007).

Results

Total Sample Model

In the combined sample of HIV-positive and HIV-negative participants, all of the factor loadings and regression coefficients were significant except for the regression of psychological distress on problematic substance use. Also, the covariances of the residual for PTSD with the residual of childhood sexual abuse, adult sexual abuse, and other trauma were all significant. This suggests that some of the variance of PTSD, which is unexplained by the psychological distress construct, is associated with the unexplained variance for the trauma indicators. In addition, we found that psychological resources was an intervening, or partially mediating, variable between traumatic burden and psychological distress (unstandardized indirect effect coefficient = .074, $p<.05$, standardized coefficient = .17). Greater traumatic burden predicted lower psychological resources which, in turn, was associated with greater psychological distress. Overall, traumatic burden, problematic substance use, and psychological resources accounted for 59.1% of the variance in psychological distress.

Separate Sample Model

Next, we examined the model separately for HIV-positive and for HIV-negative participants. We found that the model fit for both groups of participants. For HIV-positive participants the chi-square and fit statistics are: Y-B χ^2 (46, N = 318) = 60.71, p >.05; RMSEA = .03, 90%CI [.00-.05]. For HIV-negative participants the chi-square and fit statistics are: Y-B χ^2 (46, N = 172) = 60.77, p >.05; RMSEA = .04, 90%CI [.00-.07].

Nested Multiple Group Models

Baseline Model. Then, we examined the model simultaneously for the HIV-negative and HIV-positive groups, allowing all of the paths in the models for both groups to be estimated freely (i.e. the unrestricted model). Examining this model allows us to see if the model fits well for the overall sample and provides a necessary comparison model when examining more restrictive models for the moderation hypotheses. The results of this analysis indicated that, when the baseline, unrestricted model is tested, there is good fit: Y-B χ^2 (92, N = 490) = 74.68, p > .05; RMSEA <.01, 90%CI [.00-.02].

Testing measurement invariance in the HIV-positive and HIV-negative samples. Next, the measurement portion of the model (i.e. the factor loadings) was constrained (forced to be equal) across groups. This more restricted model also fit the data well: Y-B χ^2 (101, N= 490) = 96.37, p >.05; RMSEA <.01, 90% CI [.00-.03]. This restricted model (with the factor loadings set to be equal across groups) was compared to the baseline (unrestricted) model, using a chi-square difference test, to examine if HIV-status moderates factor loadings. The chi-squared difference statistic was significant, $\chi^2_{difference}$ (9, N = 490) = 21.70, p < 05. This indicates that HIV status moderates the actual measurement models in the two groups.

To determine which paths in the measurement model are moderated by HIV status, constrained paths were released one at a time based on guidance from the Lagrange Multiplier test, which indicates which constraints, if released, would make the largest difference in the model chi-square, and thus, which corresponding factor loadings are significantly different between groups, i.e., moderated by HIV status. After releasing each constraint, the new model chi-square value was compared to the unconstrained model using a chi-square difference test. Two path coefficients differed significantly between the groups: social support predicted from the construct of psychosocial resources and anxiety predicted from psychological distress. Results, as presented in Figure 2, indicated that HIV status moderated these two factor loadings such that social support was a stronger contributor to psychosocial resources (unstandardized coefficient = .46 vs. .22, $p<.05$), and anxiety was a stronger component of psychological distress (unstandardized coefficient = 1.81 vs. .95, $p < .05$) in the HIV-positive women compared to the HIV-negative women. This partially measurement invariate model fit the data well: Y-B χ^2 (99, N = 490) = 82.65, $p >.05$; RMSEA <.01, 90%CI [.00 -.02] and was not significantly worse than the baseline model, $\chi^2_{difference}$ (10) = 11.75, $p > .05$.

Testing HIV status as moderator of the structural paths. The next series of nested models examined the potential moderating effects of HIV status on the regression paths linking the constructs. The model with all of the structural paths forced to be equal in both groups (constrained) fit the data well: Y-B χ^2 (104, N = 490) = 95.53, $p >.05$; RMSEA <.01, 90%CI [.00-.03]. This model was then compared to the unrestricted model and was significantly worse, $\chi^2_{difference}$ (12, N = 490) = 20.89, $p < 05$. Using the same process described in reference to the measurement model, we identified two paths that were moderated by HIV status (i.e., the paths between psychological distress and psychological resources and between cumulative trauma

burden and problematic substance use) and allowed them to be estimated separately in the two groups. This less restricted model fit the data: Y-B χ^2 (102, N = 490) = 86.92, p >.05; RMSEA <.01, 90%CI [.00-.02]. The chi square difference test that compared this model with the unrestricted model indicated that allowing these two paths to be estimated separately created a model that was not significantly worse than the less constrained model: $\chi^2_{difference}$ (10) = 12.24, p > .05. For the HIV-positive women, the regression of problematic substance use on cumulative trauma burden is unstandardized coefficient = .1, p <.05, and the regression of psychological distress on psychosocial resources is unstandardized coefficient = -.47, p < .05. For the HIV-negative women, the regression of problematic substance use on cumulative trauma burden is unstandardized coefficient =.04, p <.05, and the regression of psychological distress on psychosocial resources is unstandardized coefficient = -.77, p < .05.

Discussion

The purpose of this study was to examine the relationship between cumulative lifetime trauma and psychological distress as influenced by substance use and psychosocial resources. The results supported our hypothesis in that greater cumulative traumatic exposure was associated with greater psychological distress and negatively related to psychosocial resources. In addition, as predicted, psychosocial resources mediated the cumulative trauma-psychological distress relationship, such that women with greater trauma burden had lower psychosocial resources and, in turn, experienced greater psychological distress. However, the predicted relationship between problematic substance use and psychological distress was not supported. It is possible that we were unable to find this relationship because there were relatively low levels of substance use in this sample. It is also possible that some women use alcohol and drugs to reduce the psychological distress that they experience in the wake of trauma. Women who use

substances more heavily may report less psychological distress, thereby reducing the relationship between substance use and psychological distress (Khantzain, 1997; Sinha, 2001).

The model also assessed for the moderating effect of HIV-status, both in terms of the contributions of the measured variables to the latent constructs of psychosocial resources and substance use, as well as whether HIV-status moderated the paths between psychosocial resources and substance use and psychological distress. Our results indicated that social support is more strongly associated with psychosocial resources among the HIV-positive women than in the HIV-negative women. One explanation for this is the fact that living with HIV involves many complicated social aspects such as disclosure and stigma, and the development of active social support networks comprised of other HIV-positive individuals and health and social services providers that they interact with on a more regular basis than the HIV-negative women (Wohl, Galvan, Myers, Garland, George, et al., in press).

HIV status also moderated the factor loading of anxiety on psychological distress such that the factor loading is higher for the HIV-positive women than for the HIV-negative women. This result is supported by the fact that the HIV-positive women reported significantly more anxiety symptoms than the HIV-negative women, $t(482) = 4.08$, $p < .01$, which is consistent with previous studies indicating higher rates of mood and anxiety disorders among HIV-positives compared to the general population (Morrison, Petitto, Have, Gettes, Chiappini, et al., 2002; Pence, Miller, Whetten, Eron, & Gaynes, 2006).

Our results also showed that while the association between psychosocial resources and psychological distress was significant for both the HIV-negative women and HIV-positive women, the relationship was stronger for the HIV-negative women. One possible explanation for this difference may be the fact that those who are HIV-positive generally have access to and

interact regularly with a host of health and social services resources (HIV physicians, nurses, counselors, and HIV support groups) that help them to more easily compensate for impaired psychosocial resources than HIV-negative individuals who do not have these resources available. This is especially true for those who are low income. Therefore, becoming HIV-positive has the unexpected benefit of improving access to care and counseling support that are not as readily available to their counterparts (George, Garth, Wohl, Galvan, Garland & Myers, 2009; Serovich, Kimberly, Mosack, & Lewis, 2010; Wohl et al., in press).

Finally, our results also found a stronger association between trauma burden and substance use among the HIV-positive women compared to the HIV-negative women. This may be due to the strong linkages between childhood and adulthood sexual abuse, subsequent substance use and risky sexual behaviors, and risk of HIV infection. Research has shown that childhood sexual abuse is associated with later substance use and risky sexual behaviors, especially for those who have been sexually re-victimized (Brief, Bollinger, Vielhauer, Berger-Greenstien, et al., 2004; Wyatt, et al., 2002), and that these risky sexual and drug use behaviors (i.e. injection drug use) are associated with increased risk for infection (Wyatt et al., 2002).

These results add to the small yet growing body of literature examining the sequelae of traumatic events using SEM. Recent studies that have used SEM to model the effects of traumatic events are limited by the fact that they use only PTSD symptoms as their final outcome, focus on one type of traumatic exposure at a time, or only focus on childhood traumas (i.e., Min et al., 2007; Regehr, Hemsworth, Leslie, Howe, & Chau, 2004; Ullman, Townsend, Filipas, & Starzynski, 2007; Wittman, Moergeli, Martin-Soelch, Znoj, & Schnyder, 2008). The current study avoided these limitations by examining the cumulative effects of lifetime trauma exposure, modeling the outcome in terms of general psychological distress and not only PTSD,

and exploring mediating mechanisms. The study also adds to the trauma literature by modeling these relationships in a relatively low-income, multi-ethnic sample of women at risk for or infected by HIV.

However, a number of limitations of this study are worth noting. There is suggestive evidence that characteristics of traumatic events (e.g., the severity of abuse) contribute to how strongly those trauma experiences confer risk for psychological distress (e.g.,, Molnar et al., 2001; Myers et al., 2006). Therefore, the fact that we used a simple count of the number of traumatic experiences and did not weigh the relative severity of these trauma experiences is an important limitation. We also did not model these relationships over time, and therefore, causal attributions cannot be made, nor can changes in the associations among the predictor and mediators be estimated. Nevertheless, the current study adds to the literature by demonstrating that lifetime trauma exposure is associated with erosion of protective psychosocial factors, increased reliance on substances, and greater general psychological distress.

These findings have implications for more comprehensive and effective interventions for individuals exposed to trauma. It also highlights the factors that should be assessed in order to identify trauma victims that are at great risk for psychological distress, including previous history with trauma, the availability of psychosocial resources, and experience of symptoms other than just PTSD. Given that the relationship between psychosocial resources and psychological distress was the most solid finding, post-trauma exposure interventions should place special emphasis on preventing psychosocial resource erosion.

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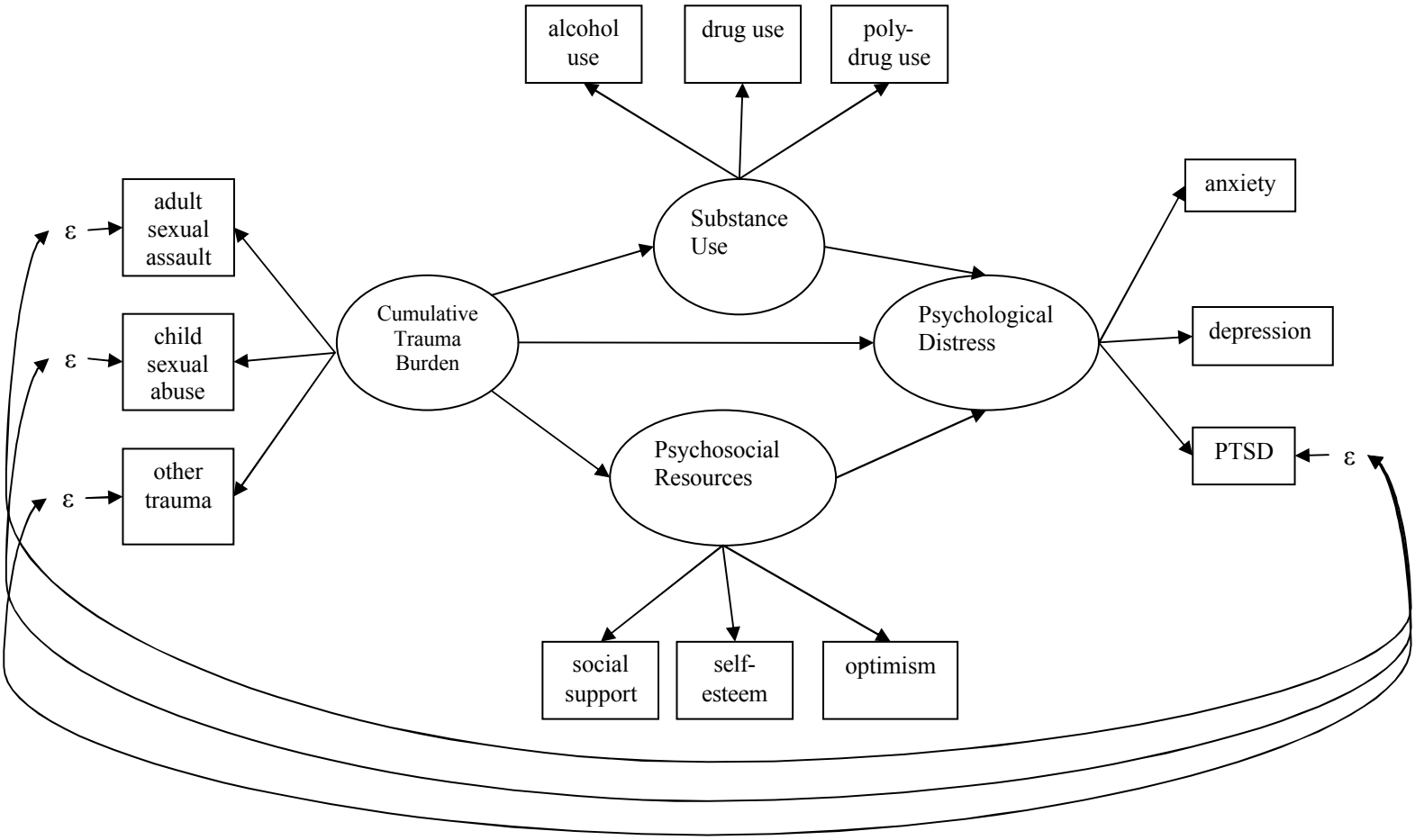
Table 1. Covariance matrix, means, standard deviation, and percentage of missing data for all measured variables

	1	2	3	4	5	6	7	8	9	10	11	12
Childhood sexual abuse	0.250											
Adult sexual abuse	0.067	0.247										
Other trauma	0.051	0.051	0.186									
Social Support	-0.005	-0.020	-0.024	0.382								
Self-esteem	-0.021	-0.013	-0.001	0.075	0.285							
Optimism	-0.036	-0.014	0.002	0.094	0.234	0.429						
Alcohol Use	0.010	0.018	0.016	-0.008	-0.018	-0.028	0.060					
Drug Use	0.010	0.031	0.023	-0.003	-0.015	-0.034	0.038	0.080				
Polydrug Use	0.004	0.016	0.007	0.000	-0.005	-0.009	0.015	0.027	0.024			
Anxiety	0.085	0.063	0.040	-0.042	-0.173	-0.222	0.019	0.035	0.006	0.547		
Depression	0.056	0.051	0.041	-0.048	-0.142	-0.169	0.022	0.041	0.015	0.237	0.319	
Post-traumatic Stress Disorder	0.065	0.061	0.067	-0.015	-0.029	-0.029	0.009	0.010	0.002	0.093	0.062	0.115
Means	0.49	0.44	0.75	4.08	3.18	3.63	0.11	0.13	0.1	0.64	0.99	0.45
Standard Deviation	0.5	0.5	0.43	0.62	0.53	0.66	0.25	0.28	0.16	0.74	0.56	0.34
Percentage of Missing Data	0%	0%	0%	0.61%	0%	0.41%	2.24%	6.73%	0%	1.22%	1.22%	0%

Figure Captions

Figure 1. Hypothesized structural equation model. The majority of error terms and variances are not displayed for ease of presentation.

Figure 2. Model in HIV-positive and HIV-negative participants. Paths in bold are moderated by HIV-status and have different path coefficients for HIV-positive and HIV-negative participants. The majority of error terms and variances have been left out of this figure for ease of presentation. *$p<.05$.


alcohol use
drug use
poly-drug use
adult sexual assault
child sexual abuse
other trauma
ε
ε
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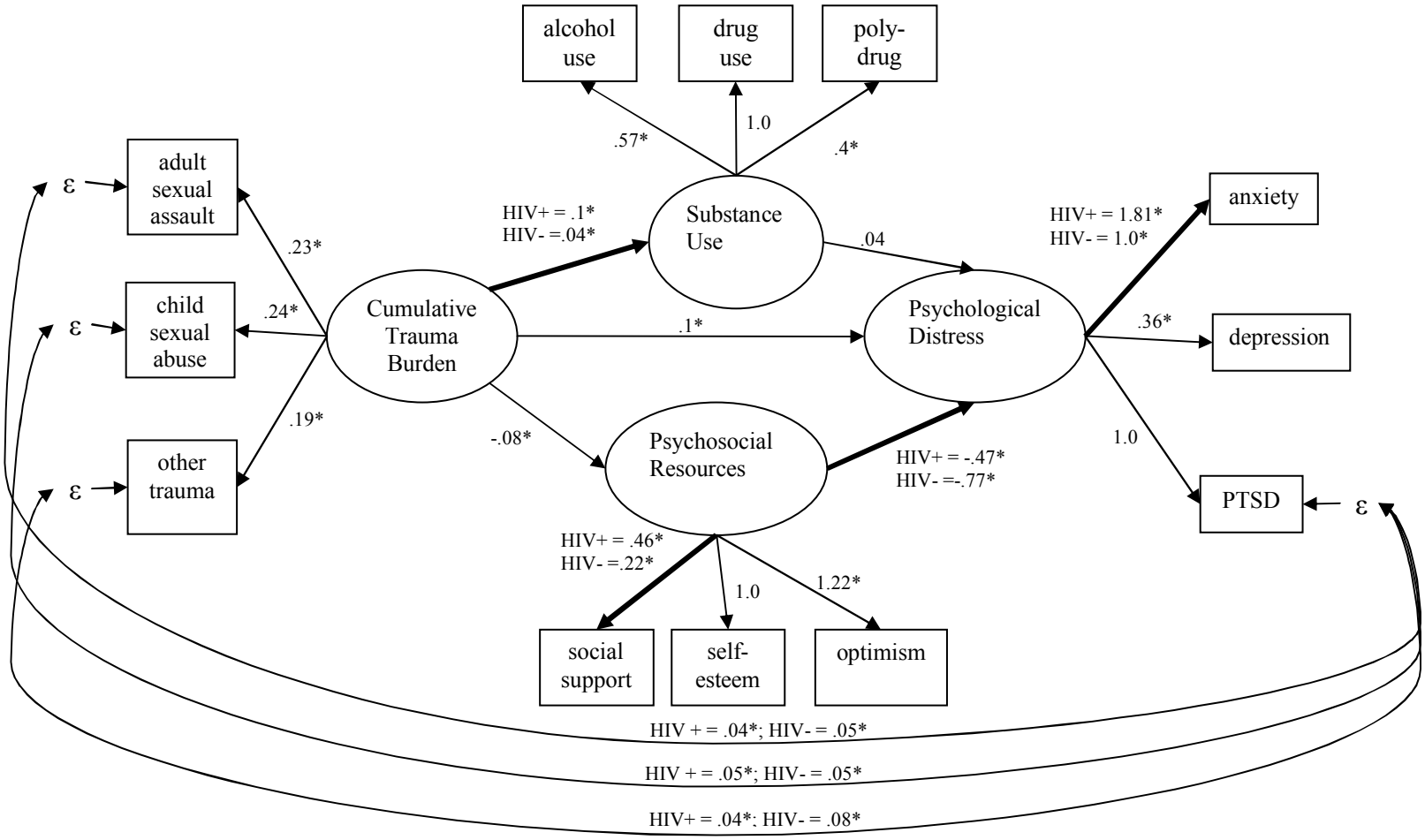
Substance Use
Cumulative Trauma Burden
Psychological Distress
Psychosocial Resources
anxiety
depression
PTSD
ε
social support
self-esteem
optimism


alcohol use
drug use
poly-drug
.57*
1.0
.4*
adult sexual assault
child sexual abuse
other trauma
ε
ε
ε
.23*
.24*
.19*
Cumulative Trauma Burden
HIV+ = .1*
HIV- =.04*
Substance Use
.04
.1*
-.08*
Psychosocial Resources
HIV+ = -.47*
HIV- =-.77*
Psychological Distress
HIV+ = 1.81*
HIV- = 1.0*
anxiety
.36*
depression
1.0
PTSD
ε
HIV+ = .46*
HIV- =.22*
1.0
1.22*
social support
self-esteem
optimism
HIV + = .04*; HIV- = .05*
HIV + = .05*; HIV- = .05*
HIV+ = .04*; HIV- = .08*