Published in final edited form as:

Addict Behav. 2012 October ; 37(10): 1084–1092. doi:10.1016/j.addbeh.2012.05.001.

The Contribution of Emotion Regulation Difficulties to Risky Sexual Behavior within a Sample of Patients in Residential Substance Abuse Treatment

Matthew T. Tull¹, Nicole H. Weiss², Claire E. Adams³, and Kim L. Gratz¹

¹Department of Psychiatry and Human Behavior, University of Mississippi Medical Center, Jackson, Mississippi, USA

²Department of Psychology, Jackson State University, Jackson, Mississippi, USA

³Department of Health Disparities Research, The University of Texas MD Anderson Cancer Center, Houston, Texas, USA

Abstract

The present study examined the unique contribution of emotion regulation difficulties to past-year risky sexual behavior (RSB) among substance use disorder (SUD) patients (above and beyond other known RSB risk factors). A sample of 177 SUD patients completed a series of questionnaires. At the zero-order level, emotion regulation difficulties, were significantly positively associated with the number of commercial sexual (i.e., the exchange of sex for drugs or money) partners with which penetrative sex occurred and significantly negatively associated with the likelihood of using a condom when having sex with a commercial partner under the influence of drugs. Emotion regulation difficulties also significantly predicted these RSB indices above and beyond other RSB risk factors, including demographics, depression, sensation seeking, traumatic exposure, and substance use severity. The specific emotion regulation difficulty of lack of emotional clarity emerged as a unique predictor of RSB. The implications of these findings for understanding motivations for RSB and developing targeted interventions for RSB among SUD patients are discussed.

Keywords

emotion dysregulation; HIV/AIDS; risk factors; risk-taking; substance use disorders

© 2012 Elsevier Ltd. All rights reserved.

Address correspondence to: Matthew T. Tull, Ph.D., Department of Psychiatry and Human Behavior, University of Mississippi Medical Center, 2500 North State Street, Jackson, MS 39216; Tel: 601-815-6518; Fax: 601-984-4489; mtull@umc.edu.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Contributors

The first author designed the study from which these data were drawn, and the second author assisted with data collection. All authors contributed to the conceptualization of the present study. The first and third authors ran preliminary analyses, and the first author wrote the first draft of the manuscript. The first and last author conducted the statistical analyses. All authors contributed to drafts of this manuscript and have approved the final manuscript.

Conflict of Interest

All authors declare that they have no conflicts of interest.

1. Introduction

Despite significant advances in prevention efforts, more than 1,000,000 individuals in the United States are living with HIV/AIDS, and an estimated 42,959 more continue to contract HIV each year (Centers for Disease Control and Prevention [CDC], 2011). Throughout the United States, risky sexual behavior (RSB) is the primary mode of HIV transmission (CDC, 2011). Engagement in commercial sex (i.e., the exchange of sex for drugs or money) is one form of RSB that has been found to be associated with heightened risk for HIV/AIDS and other sexually transmitted diseases (McKeganey, 1994; Rosenheck, Ngilangwa, Manongi, & Kapiga, 2010; Wood et al., 2007). Indeed, studies have found that unprotected sex is common within commercial sex, especially among individuals with a substance use disorder (SUD; Bellis, 1990; McGowan et al., 2004; Patterson et al., 2009).

The substantial economic, societal, and personal costs associated with HIV/AIDS (e.g., Hellinger, 1998; Holtgrave & Pinkerton, 1997; Hutchinson et al., 2006) have consequently contributed to a rapidly growing body of research focused on identifying the factors that may be associated with heightened risk for engaging in RSB, with the goal of developing targeted intervention and prevention programs. Such research has identified a number of risk factors for RSB, including age (Lopez, Krueger, & Walters, 2010; Xia et al., 2006), male gender (Browne, Clubb, Wang, & Wagner, 2009; Hittner & Kryzanowski, 2010), marital status (Harned, Pantalone, Ward-Ciesielski, Lynch, & Linehan, 2011), Latino/a or African-American racial/ethnic background (Xia et al., 2006), a history of traumatic exposure (Messman-Moore, Walsh, & DiLillo, 2010), sensation seeking (Fulton, Marcus, & Payne, 2010), depression (Mazzaferro et al., 2006), and substance use (Browne et al., 2009; Scott-Sheldon, Carey, & Carey, 2010; Simons, Maisto, & Wray, 2010). However, few studies to date have explored the role of emotion regulation difficulties in RSB.

Emotion regulation difficulties encompass maladaptive ways of responding to emotions (regardless of their intensity/reactivity), including nonaccepting responses, difficulties controlling behaviors in the face of emotional distress, and deficits in the functional use of emotions as information (Gratz & Roemer, 2004). Within the past decade, research on the role of emotion regulation difficulties in psychopathology has been progressing rapidly, providing support for the clinical relevance of this construct. Specifically, emotion regulation difficulties have been found to be associated with a wide range of maladaptive behaviors, including substance use (Bonn-Miller, Vujanovic, & Zvolensky, 2008), deliberate self-harm (Gratz & Roemer, 2008; Gratz & Tull, 2010a), suicidal desire (Anestis, Bagge, Tull, & Joiner, 2011), aggressive behavior (Gratz, Paulson, Jakupcak, & Tull, 2009; Tager, Good, & Brammer, 2010), and disordered eating behaviors (Selby, Ward, & Joiner, 2010). Consequently, there is reason to believe that difficulties in emotion regulation may also inform our understanding of other maladaptive behaviors, such as RSB.

Evidence that heightened levels of negative affect may increase the risk for engagement in RSB (Crepaz & Marks, 2001; Leith & Baumeister, 1996; Lucenko, Malow, Sanchez-Martinez, Jennings, & Dévieux, 2003) has led researchers to theorize that RSB may function to down-regulate negative emotions by alleviating or distracting attention away from negative affective states (Crepaz & Marks, 2001). Individuals with greater emotion regulation difficulties overall may be particularly likely to rely on maladaptive or impulsive strategies (such as RSB) for regulating negative emotions. To date, only one study known to the authors has empirically investigated the association between difficulties in emotion regulation in particular and RSB. Specifically, Messman-Moore et al. (2010) found that emotion regulation difficulties were significantly positively associated with past 6-month RSB within a nonclinical sample of female college students. Unfortunately, however, these authors did not examine other established risk factors for RSB or the specific dimensions of

emotion regulation difficulties associated with RSB, precluding conclusions regarding the unique role of difficulties in emotion regulation (overall and across specific dimensions) in RSB. Further, this study examined RSB only among a sample of female college students. Studies are needed that examine relations between emotion regulation difficulties and RSB in populations previously found to be at heightened risk for contracting HIV and other STDs (e.g., substance users; Klinkenberg & Sacks, 2004).

Consequently, the goal of the present study was to provide a more stringent examination of the unique role of emotion regulation difficulties in recent (i.e., past-year) RSB within a particularly high-risk sample of SUD patients in residential substance abuse treatment. SUD patients have been shown to be at high risk for RSB (Bornovalova, Daughters, & Lejuez, 2010; Reynolds et al., 2010; Subramaniam, Stitzer, Woody, Fishman, & Kolodner, 2009) and to exhibit heightened difficulties in emotion regulation (Fox, Hong, & Sinha, 2008; McDermott, Tull, Gratz, Daughters, & Lejuez, 2009). RSB was defined as having penetrative sex with a commercial partner, as well as failing to use a condom when having penetrative sex with a commercial partner (in general and when under the influence of drugs in particular). In addition to hypothesizing a significant positive association between difficulties in emotion regulation and RSB at a zero-order level, we predicted that emotion regulation difficulties would demonstrate a unique association with RSB above and beyond other well-established risk factors for this behavior, including demographics (i.e., age, gender, racial/ethnic background, and marital status), depression symptom severity, sensation seeking, traumatic exposure, and substance use severity. Exploratory analyses were also conducted to examine unique associations between specific emotion regulation difficulties and RSB.

2. Method

2.1. Participants

Participants were 177 SUD patients consecutively admitted to a residential abuse treatment facility in Mississippi. Participants were predominantly male ($n = 107$, 60.5%), and ranged in age from 18 to 61 ($M_{age} = 35.75$, $SD = 10.20$). In terms of racial/ethnic background, 61.6% of participants self-identified as White, 29.9% as Black/African American, 4% as Native American, 2.3% as multi-racial, 1.7% as Latino/a, and 0.6% as Asian/Pacific-Islander. Approximately half of the participants reported an annual income under \$10,000 ($n = 83$; 46.9%), and the majority reported being single ($n = 120$; 67.8%) and having no higher than a high school education ($n = 108$, 61%).

2.2. Measures

2.2.1. Difficulties in Emotion Regulation—The Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) is a 36-item self-report measure that assesses individuals' typical levels of emotion regulation difficulties across six domains: non-acceptance of negative emotions, inability to engage in goal-directed behaviors when distressed, difficulties controlling impulsive behaviors when distressed, limited access to emotion regulation strategies perceived as effective, lack of emotional awareness, and lack of emotional clarity. The DERS has been found to demonstrate good test-retest reliability ($\rho_1 = .88$, $p < .01$) and adequate construct and predictive validity (Gratz & Roemer, 2004; Gratz & Tull, 2010b). Further, the DERS and its subscales have been found to predict performance on behavioral measures of emotion regulation and the willingness to experience emotional distress (Gratz & Tull, 2010b). Items were recoded so that higher scores indicate greater emotion regulation difficulties, and a sum was calculated. Internal consistency in the current sample was good for the overall scale ($\alpha = .93$) and across all subscales (α s = .76 to .89).

2.2.2. Risky Sexual Behavior—Participants completed a modified version of the HIV Risk-taking Behavior Scale (HRBS; Darke, Hall, Heather, Ward, & Wodak, 1991) to assess RSB. The HRBS has been found to have good construct and convergent validity, with high rates of agreement between respondents and their sexual partners on sexual behavior items (average percentage of 96%), as well as strong test-retest reliability ($r = .86$) over a period of 1 week (Darke et al., 1991).

For the purposes of this study, three items pertaining to penetrative sex with a commercial partner were of interest. The first item asked participants to indicate the number of different commercial sexual partners with whom they had engaged in penetrative sex in the past year (with individuals who did not have penetrative sex with a commercial partner in the past year asked to enter a zero). This is a modification of the original HRBS (which utilizes a Likert-type scale to assess number of commercial sexual partners). The second item read as follows: “In the last year prior to treatment, how often was a condom used during penetrative sex with a commercial partner (i.e., where money or drugs were exchanged for sex)?” Participants were asked to respond to this item using a 5-point Likert-type scale (1 = Never; 2 = Rarely; 3 = Sometimes; 4 = Often; 5 = Every time), with a “does not apply” response option available to participants who reported never engaging in penetrative sex with a commercial partner in the past year. The third item stated, “In the last year prior to treatment, when having penetrative sex with a commercial partner and high on drugs...” to which participants responded using a 5-point Likert-type scale (1 = I was much less likely to use a condom than when I was sober; 2 = I was a little less likely to use a condom than when I was sober; 3 = I was just as likely to use a condom than when I was sober; 4 = I was a little more likely to use a condom than when I was sober; 5 = I was much more likely to use a condom than when I was sober). As with the second item, a “does not apply” option was also available for participants with (a) no history of penetrative commercial sex in the past year, or (b) no history of engaging in penetrative commercial sex under the influence of substances in the past year. This final item is not included in the original HRBS, but was included here to better capture the influence of substance use on RSB within this SUD population. Participants who indicated that the second and/or third item did not apply to them were excluded from analyses involving these items. Consistent with past research (Lejuez, Bornoalova, Daughters, & Curtin, 2005), and to obtain a better representation of sexual behavior patterns and the context in which they occur, we lengthened the timeframe of the items to the past year (versus the past 6 months specified in the original HRBS). Although these modifications create a non-standardized version of the HRBS, they allowed us to obtain a more accurate representation of patterns of RSB and the context in which it occurred.

2.2.3. Assessment of Other Risk Factors for Risky Sexual Behavior—The Urgency-Premeditation-Perseverance-Sensation Seeking (UPPS) Impulsive Behavior Scale (UPPS; Whiteside, Lynam, Miller, & Reynolds, 2005) is a 45-item self-report measure that assesses four distinct facets of impulsivity: (lack of) perseverance, negative urgency, (lack of) premeditation, and sensation seeking. Of particular interest to the present study was the sensation seeking scale (previously found to be associated with RSB; Fulton et al., 2010). Participants rate the extent to which each item applies to them on a 4-point Likert-type scale (1 = rarely/never true, 4 = almost always/always true). Each UPPS scale has been found to have good convergent validity across assessment method and good discriminant validity with regard to one another (Cyders & Smith, 2007; Smith et al., 2007). Internal consistency of the sensation seeking subscale in this sample was good ($\alpha = .92$).

A self-report measure modeled after the Alcohol Use Disorders Identification Test (Saunders, Aasland, Babor, de la Fuente, & Grant, 1993) was used to assess substance use severity (an established risk factor for RSB; Browne et al., 2009; Scott-Sheldon et al., 2010;

Simons et al., 2010). On this measure, participants rate the frequency with which they used a variety of different substances (alcohol, cannabis, cocaine, MDMA, stimulants, sedatives, opiates, hallucinogens [other than PCP], PCP, and inhalants) in the past year using a 6-point Likert-type scale (0 = never; 1 = one time; 2 = monthly or less; 3 = 2 to 4 times per month; 4 = 2 to 3 times per week; 5 = 4 or more times a week). A total score representing frequency of past year substance use across all substances was calculated. Internal consistency for this scale was adequate ($\alpha = .72$).

The Depression Anxiety Stress Scales (DASS; Lovibond & Lovibond, 1995a) is a self-report questionnaire designed to differentiate between the core symptoms of depression, anxiety, and stress. The DASS has demonstrated adequate test-retest reliability (Brown, Chorpita, Korotitsch, & Barlow, 1997), and there is extensive evidence for its construct and discriminant validity (Antony, Bieling, Cox, Enns, & Swinson, 1998; Lovibond & Lovibond, 1995a; Lovibond & Lovibond, 1995b). There are two versions of the DASS, a 21-item version and a 42-item version. These versions have been found to be consistent (Clara, Cox, & Enns, 2001) and comparable in their ability to distinguish between different diagnostic groups (Antony et al., 1998). The depression symptom severity subscale of the 21-item version of the DASS was used in this study as a potential covariate (given past findings of an association between depression and RSB; Mazzaferro et al., 2006). Internal consistency was good ($\alpha = .89$).

The Life Events Checklist (LEC; Gray, Litz, Hsu, & Lombardo, 2004) provides a list of 17 potentially traumatic events (PTEs) and instructs participants to indicate whether: (a) the PTE happened to them, (b) the PTE was witnessed, or (c) they learned about the PTE. The list of PTEs includes natural disaster, unexpected death of a loved one, assault with a weapon, sexual assault, and physical assault, among others. The LEC is commonly used in combination with the Clinician Administered Posttraumatic Stress Disorder (PTSD) Scale (CAPS-IV; Blake et al., 1995) to assess for PTSD. Thus, following completion of the LEC (and in order to identify the occurrence of a traumatic event consistent with Criterion A for PTSD), participants were asked to indicate (a) which event was the most stressful for them; (b) whether or not they experienced fear, helplessness, or horror in response to the event; and (c) whether or not the event they identified involved actual or threatened death or serious injury, or a threat to their own or another person's physical integrity. Participants reporting affirmative responses to the last two questions were classified as having experienced a traumatic event consistent with Criterion A for PTSD (American Psychiatric Association, 2000), previously shown to be associated with RSB (Messman-Moore et al., 2010).

Finally, all participants completed a demographics form assessing gender, age, racial/ethnic background, marital status, education, and annual income.

2.3. Procedure

All procedures were reviewed and approved by the medical center's Institutional Review Board (IRB). Data were collected as part of a larger ongoing study examining predictors of residential substance abuse treatment dropout. To be eligible for inclusion in the study, participants were required to have 1) obtained a Mini-Mental Status Exam (Folstein, Folstein, & McHugh, 1975) score of > 24 ; and 2) exhibited no current psychotic disorders as determined by the Structured Clinical Interview for DSM Axis IV Disorders (First, Spitzer, Gibbon, & Williams, 1996). Eligible participants were recruited for this study no sooner than 72 hours after entry in the facility (to limit the possible interference of withdrawal symptoms on study engagement). Those who met inclusion criteria were provided with information about study procedures and associated risks, following which written informed

consent was obtained. All patients participated in this study within their first two weeks of treatment.

3. Results

3.1. Preliminary Analyses

All three RSB variables evidenced skew and/or kurtosis; thus, a logarithmic transformation was performed on each variable, following which they approximated normal distributions. For ease of presentation and interpretation, the original means and standard deviations of these variables prior to transformation are presented in Table 1; however, all analyses utilized the transformed scores.

Prior to testing hypotheses, the demographic characteristics of education and income level were examined as potential covariates for inclusion in the primary analyses (in addition to the previously established risk factors for RSB, including age, gender, racial/ethnic background, marital status, depression symptom severity, sensation seeking, traumatic exposure, and substance use severity). Given the small number of participants in several of the income and education categories, these variables were collapsed into dichotomous variables of over (53.1%) versus under (46.9%) \$10,000 per year and high school education (61%) versus more than a high school education (39%), respectively. Next, point-biserial correlation analyses were conducted to examine the associations between these two demographic variables and the RSB variables. Neither of these variables were found to be associated with any of the RSB items ($p > .05$). Consequently, neither of these variables were included in subsequent analyses.

3.2. Primary Analyses

Descriptive data are presented in Table 1. Intercorrelations between the primary variables of interest are provided in Table 2. The full sample ($N = 177$) was included in analyses of the HRBS item assessing the number of different commercial sexual partners with whom penetrative sex had occurred in the past year (with participants who reported no such commercial sexual partners represented by a 0 on this ratio-level variable). For analyses of the other two outcomes of interest, only those participants who indicated that the item(s) applied to them were included in the analyses. Specifically, 65 participants were included in analyses of the HRBS item involving likelihood of using a condom when having penetrative sex with a commercial partner, and 48 participants were included in analyses of the HRBS item involving likelihood of using a condom when engaging in penetrative sex with a commercial partner while high on drugs. As expected, difficulties in emotion regulation were significantly positively associated with the number of commercial sexual partners in the past year, and significantly negatively associated with the likelihood of using a condom when having penetrative sex with a commercial partner while high on drugs. Emotion regulation difficulties did not demonstrate a significant association with the likelihood of using a condom in general when having penetrative sex with a commercial partner. Consequently, subsequent analyses did not focus on this variable.

To test the unique role of emotion regulation difficulties in RSB above and beyond other well-established risk factors for RSB, a series of hierarchical linear regression analyses were conducted. In the first step of each model, age, gender, racial/ethnic background (represented as a dichotomous variable of White versus non-White), marital status (single versus cohabitating/married) depression symptom severity, sensation seeking, Criterion A traumatic exposure (yes versus no), and substance use severity were entered. Overall emotion regulation difficulties (as indexed by the total DERS score) was entered in the second step. Past-year number of commercial sexual partners and likelihood of using a

condom when having penetrative sex with a commercial partner while high on drugs served as dependent variables. The first step of the model for number of past-year commercial sexual partners was significant, accounting for 10% of the variance in the dependent variable. However, only Criterion A traumatic exposure emerged as significant in this step. The inclusion of overall emotion regulation difficulties significantly improved the model, accounting for a significant amount of unique variance in this form of RSB (see Table 3). Next, exploratory analyses were conducted to examine the unique associations between specific difficulties in emotion regulation and past-year number of commercial sexual partners. To do so, all six subscales of the DERS were entered in the second step of the model (as opposed to the overall DERS score). Although the inclusion of the DERS subscales was found to significantly improve the model ($R^2 = .15$, $Adjusted R^2 = .08$, $\Delta R^2 = .05$, final model $F = 2.05$, $p < .05$), none of the specific dimensions of emotion regulation difficulties assessed in this measure emerged as a significant predictor of past-year number of commercial sexual partners above and beyond the other risk factors ($ps > .05$).

With regard to the second model examining likelihood of using a condom when having penetrative sex with a commercial partner while high on drugs, the first step of the model was significant, accounting for 35% of the variance in the dependent variable (although only sensation seeking and Criterion A traumatic exposure emerged as significant in this step). The inclusion of overall emotion regulation difficulties significantly improved the model, accounting for unique variance in the dependent variable (see Table 4). Exploratory analyses were conducted to examine unique associations between specific difficulties in emotion regulation and the likelihood of using a condom when having sex with a commercial partner while high on drugs. The inclusion of the DERS subscales in the second step of the model significantly improved the model ($R^2 = .61$, $Adjusted R^2 = .45$, $\Delta R^2 = .26$, final model $F[14, 33] = 3.69$, $p < .001$). Only lack of emotional clarity ($\beta = -.71$, $p < .01$) emerged as a significant predictor of the dependent variable above and beyond other emotion regulation difficulties and RSB risk factors.

Given that not all of the risk factors previously found to be associated with RSB were associated with our RSB variables in this sample (see Table 2), the primary analyses were rerun using only those variables that demonstrated a significant association with each dependent variable (Tabachnick & Fidell, 1996). Results of these analyses did not change. Overall emotion regulation difficulties emerged as uniquely associated with number of past-year commercial sexual partners above and beyond age, racial/ethnic background, and traumatic exposure (accounting for an additional 4% of the variance in the dependent variable within the final model; $\beta = .20$, $R^2 = .11$, $Adjusted R^2 = .09$, $\Delta R^2 = .04$, final model $F[4, 172] = 5.20$, $ps < .01$), as well as the likelihood of using a condom when having penetrative sex with a commercial partner while high on drugs above and beyond sensation seeking, traumatic exposure, and substance use severity (accounting for an additional 7% of the variance in the dependent variable in the final model; $\beta = -.27$, $R^2 = .31$, $Adjusted R^2 = .24$, $\Delta R^2 = .07$, final model $F[4, 43] = 4.72$, $ps < .05$). Likewise, although no specific dimensions of emotion regulation difficulties emerged as uniquely associated with the number of past-year commercial sexual partners above and beyond only age, racial/ethnic background, and traumatic exposure (all $\beta s < |.23|$, $ps > .05$; $R^2 = .14$, $Adjusted R^2 = .09$, $\Delta R^2 = .07$, final model $F[9, 167] = 3.03$, $p < .01$), lack of emotional clarity ($\beta = -.51$, $p < .05$) evidenced a unique association with the likelihood of using a condom when having penetrative sex with a commercial partner while high on drugs above and beyond sensation seeking, traumatic exposure, and substance use severity (as well as the other DERS subscales; $R^2 = .48$, $Adjusted R^2 = .35$, $\Delta R^2 = .24$, final model $F[9, 38] = 3.86$, $p < .01$).

4. Discussion

Results from the present study provide preliminary support for the proposed emotion regulating function of RSB (Crepaz & Marks, 2001) within a high-risk sample of SUD inpatients – a population exhibiting elevated rates of RSB (Bornoalova et al., 2010; Reynolds et al., 2010; Subramaniam et al., 2009) and subsequently at high risk for HIV infection, as well as other sexually transmitted diseases (Klinkenberg & Sacks, 2004). Extending past research on the role of emotion regulation difficulties in RSB (Messman-Moore et al., 2010), results from the present study demonstrate that difficulties in emotion regulation contribute to RSB above and beyond other well-established risk factors for this behavior, such as demographics (i.e., age, gender, and racial/ethnic background), depression symptom severity, sensation seeking, traumatic exposure, and substance use severity.

Individuals who exhibit greater difficulties in emotion regulation may be more likely to engage in RSB in an attempt to alleviate or distract themselves from emotional states perceived as aversive, such as anger, shame, or sadness (Crepaz & Marks, 2001). Alternatively, it is possible that heightened emotion regulation difficulties may interfere with the ability to control other behaviors, consistent with an ego-depletion model of self-regulation (Baumeister, Bratslavsky, Muraven, & Tice, 1998). According to this model, the capacity for self-regulation is a limited resource (similar to energy or strength). Thus, exposure to any situation or activity that requires self-regulation or self-control will deplete this resource, temporarily limiting one's capacity for self-regulation (Baumeister et al., 1998; Muraven, Tice, & Baumeisters, 1998). High levels of emotion regulation difficulties, and the maladaptive behaviors that often arise out of such a state (Gratz, Bornoalova, Delany-Brumsey, Nick, & Lejuez, 2007), may rapidly deplete an individual's self-regulatory resources (Baumeister et al., 1998; Muraven et al., 1998), limiting the available self-regulatory resources for other situations that may be encountered. Consequently, such individuals may be more likely to make rash or risky decisions or exhibit difficulties controlling maladaptive behaviors.

An ego-depletion model of RSB may be particularly relevant for understanding the current study's findings, as emotion regulation difficulties demonstrated the strongest association with RSB in the context of substance use. The use of substances may result in a depletion of self-regulation resources. Consequently, individuals may experience a high level of difficulty controlling risky behavior, especially in the context of other emotion regulation difficulties that further deplete resources. This might explain why we were unable to find a significant association between emotion regulation difficulties and the likelihood of wearing a condom when having penetrative sex with a commercial partner regardless of context.

Of the specific dimensions of emotion regulation difficulties examined in this study, only lack of emotion clarity was found to be uniquely associated with any of the RSB outcomes (specifically, likelihood of using a condom when having penetrative sex with a commercial partner while high on drugs). Individuals high in emotional clarity (particularly negative emotional clarity) have been found to be better able to regulate their emotions (Feldman Barrett, Gross, Christensen, & Benvenuto, 2001), as effective emotion regulation requires a moment-to-moment understanding of one's current emotional state (Feldman, Barrett, & Gross, 2001). Conversely, difficulties in identifying and labeling specific emotional experiences may increase the extent with which emotions feel confusing, overwhelming, and aversive. As a result, individuals may experience difficulties accessing and utilizing the functional information that is provided by emotions, resulting in the use of maladaptive emotion regulation strategies (Mennin, Heimberg, Turk, & Fresco, 2005). Consistent with this idea and similar to findings from this study, lack of emotional clarity has been found to be associated with a variety of maladaptive behaviors thought to serve an emotion regulatory

function, such as deliberate self-harm (Gratz & Roemer, 2008) and substance use (Bornovalova, Ouimette, Crawford, & Levy, 2009).

Although the results of this study are compelling, they must be considered in light of the limitations present. First and foremost, the outcome being examined in this study, past year RSB, was assessed through self-report. Although few alternatives are available when it comes to assessing RSB, there are limitations associated with this approach that warrant mention. First, the veracity of self-reported RSB may be limited by the perceived negative consequences of reporting this behavior. In addition, given that we are utilizing a substance dependent sample, some participants may have been engaging in RSB in the context of substance use, thus limiting their ability to provide an accurate report of frequency of RSB in the past year. Despite such limitations, there is evidence that self-report measures may result in more valid reports of HIV-risk behaviors in general (e.g., drug use; Weatherby et al., 1994) and RSB in particular (Johnson et al., 2000; for a review, see Fenton, Johnson, McManus, & Erens, 2001), compared to other assessment methods (e.g., interviews). Nonetheless, future studies would benefit from the inclusion of other assessment methods of RSB that may result in more valid data, such as timeline follow-back procedures (Weinhardt, Carey, & Carey, 2000). In addition, we assessed RSB retrospectively. Prospective or longitudinal studies that examine the effect of emotion regulation difficulties on future engagement in RSB would help address this limitation. Our measure of RSB also did not ask participants to identify their role in commercial sex. Likewise, we did not have a large enough sample of women to enable the examination of the relationship between difficulties in emotion regulation and RSB within men and women separately. Given that the precise role of participants in a commercial sex relationship may vary across gender, the function of RSB within the context of commercial sex may likewise differ between women and men. Future studies are needed that explore the extent to which the role an individual plays in commercial sex affects the relationship between emotion regulation difficulties and RSB, as well as the moderating role of gender in this relationship.

Likewise, we utilized a self-report measure of emotion regulation difficulties. The reliance on self-report measures of emotional responding may introduce bias, as individuals with elevated difficulties in emotion regulation, such as individuals with SUDs (Fox, Hong, & Sinha, 2008; McDermott et al., 2009), may have difficulties accurately reporting on their internal states (Tull, Bornovalova, Patterson, Hopko, & Lejuez, 2008). Therefore, future studies may benefit from the use of non-self-report (e.g., behavioral, physiological) measures of emotion regulation (Gratz, Rosenthal, Tull, Lejuez, & Gunderson, 2006).

Furthermore, although difficulties in emotion regulation accounted for unique variance in RSB above and beyond other well-established risk factors for RSB, the additional variance in RSB explained by these emotion regulation difficulties was modest (particularly with regard to the number of different past-year commercial sexual partners). Consequently, whereas our findings suggest that difficulties in emotion regulation may be an important factor to consider in understanding motivations for RSB, they also indicate that emotion regulation difficulties are not sufficient to explain RSB on their own. Thus, it will be important for future studies to explore additional risk factors for RSB, as well as the contribution of difficulties in emotion regulation to RSB relative to these other risk factors. Specifically, future research would benefit from the examination of other relevant risk factors for RSB, such as knowledge about HIV, awareness of one's own or a partner's HIV status, beliefs about safe sex, perceived barriers to condom use, and lack of confidence in the ability to enact safe sex practices (Crepaz & Marks, 2002). In addition, given that emotion dysregulation accounted for a more substantial amount of variance in the likelihood of using a condom when having penetrative sex with a commercial partner while high on drugs (versus the other RSB outcomes), it may be important for future studies to focus on

risky behaviors that occur in the context of commercial sex (e.g., not using a condom) as opposed to engagement in commercial sex in general.

In addition, the cross-sectional nature of our study limits our ability to establish causal relationships between variables. It is possible that engagement in RSB and its associated consequences (e.g., HIV infection, guilt, interference with committed relationships) may contribute to heightened difficulties in emotion regulation. It is also possible that emotion regulation difficulties operate as a proxy risk factor for the effect of particular diagnoses on RSB, such as borderline personality disorder and PTSD – both of which have been found to be associated with emotion regulation difficulties (Gratz et al., 2006; Tull, Barrett, McMillan, & Roemer, 2007) and RSB (Munroe, Kibler, Ma, Dollar, & Coleman, 2010; Tull, Gratz, & Weiss, 2011). Future studies should utilize prospective designs, as well as examine the moderating role of various diagnoses on the relationship between difficulties in emotion regulation and RSB. Finally, given that our findings were obtained in a low-income sample of substance dependent inpatients, findings from this study may not generalize to other clinical populations. Results of this study failed to replicate past findings of significant associations between RSB and previously established risk factors for this behavior within our sample, and found little support for an association between emotion regulation difficulties and likelihood of using a condom with commercial sexual partners in general. It is possible that the absence of significant associations between these factors and RSB may be an artifact of the sample in which they were examined. Consequently, although the focus on an underserved and understudied population may be considered an asset of this study, relationships examined in this study should be explored within other clinical and nonclinical samples.

Despite limitations, results add to the growing body of literature on the deleterious effects of emotion regulation difficulties and highlight a potential avenue for reducing RSB within a high-risk population. Indeed, given the high rates of sexually transmitted diseases found among SUD patients (Klinkenberg & Sacks, 2004), research focused on identifying the factors associated with RSB within this population has great clinical and public health significance, highlighting potential targets for intervention. Findings from this study suggest that difficulties in emotion regulation may be one such treatment target among SUD patients, suggesting the potential utility of dialectical behavior therapy (DBT; Linehan, 1993) in the treatment of RSB among SUD patients (given evidence that DBT has been found to improve emotion regulation within SUD populations; Axelrod, Perepletchikova, Holtzman, & Sinha, 2011). Likewise, Gratz and Tull (in press) have found that a brief, adjunctive emotion regulation group therapy (ERGT) can significantly reduce various forms of self-destructive impulsive behaviors (e.g., deliberate self-harm, disordered eating behaviors) by focusing specifically on improving emotion regulation (Gratz, Levy, & Tull, in press).

Acknowledgments

The authors would like to thank Michael McDermott, Melissa Soenke, Rachel Brooks, Jessica Fulton, and Sarah Anne Moore for their assistance with data collection. The authors would also like to thank the Mississippi State Region 15 Chemical Dependency Treatment Center for providing us with access to their site for data collection.

Role of Funding Sources

Support for this study was provided in part by R21 DA022383 from the National Institute on Drug Abuse of the National Institutes of Health, awarded to the first author. The NIDA has no role in the study design, collection, analysis, or interpretation of data, writing the manuscript, or the decision to submit the paper for publication.

References

- American Psychiatric Association. Diagnostic and statistical manual of mental disorders, 4th ed – text revision. Washington, DC: Author; 2000.
- Anestis MD, Bage CL, Tull MT, Joiner TE. Clarifying the role of emotion dysregulation in the interpersonal-psychological theory of suicidal behavior in an undergraduate sample. *Journal of Psychiatric Research*. 2011; 45:603–611. [PubMed: 21092986]
- Antony MM, Bieling PJ, Cox BJ, Enns MW, Swinson RP. Psychometric properties of the 42-item and 21-item versions of the Depression Anxiety Stress Scales in clinical groups and a community sample. *Psychological Assessment*. 1998; 10:176–181.
- Axelrod SR, Perepletchikova F, Holtzman K, Sinha R. Emotion regulation and substance use frequency in women with substance dependence and borderline personality disorder receiving dialectical behavior therapy. *American Journal of Drug and Alcohol Abuse*. 2011; 37:37–42. [PubMed: 21091162]
- Baumeister RF, Bratslavsky E, Muraven M, Tice DM. Ego depletion: Is the active self a limited resource? *Journal of Personality and Social Psychology*. 1998; 74:1252–1265. [PubMed: 9599441]
- Bellis DJ. Fear of AIDS and risk reduction among heroin-addicted female street prostitutes: Personal interviews with 72 Southern California subjects. *Journal of Alcohol and Drug Education*. 1990; 35:26–37.
- Blake DD, Weathers FW, Nagy LM, Kaloupek DG, Gusman FD, Charney DS, et al. The development of a Clinician-Administered PTSD Scale. *Journal of Traumatic Stress*. 1995; 8:75–90. [PubMed: 7712061]
- Bonn-Miller MO, Vujanovic AA, Zvolensky MJ. Emotional dysregulation: Association with coping-oriented marijuana use motives among current marijuana users. *Substance Use and Misuse*. 2008; 43:1653–1665. [PubMed: 18752166]
- Bornoalova MA, Daughters SB, Lejuez CW. Motivations for sexual risk behavior across commercial and casual partners among male urban drug users: Contextual features and clinical correlates. *Behavior Modification*. 2010; 34:219–246. [PubMed: 20348275]
- Bornoalova MA, Ouimette P, Crawford AV, Levy R. Testing gender effects on the mechanisms explaining the association between post-traumatic stress symptoms and substance use frequency. *Addictive Behaviors*. 2009; 34:685–692. [PubMed: 19423233]
- Brown TA, Chorpita BF, Korotitsch W, Barlow DH. Psychometric properties of the Depression Anxiety Stress Scales (DASS) in clinical samples. *Behaviour Research and Therapy*. 1997; 35:79–89. [PubMed: 9009048]
- Browne DC, Clubb PA, Wang Y, Wagner F. Drug use and high-risk sexual behaviors among African American men who have sex with men and men who have sex with women. *American Journal of Public Health*. 2009; 99:1062–1066. [PubMed: 19372526]
- Centers for Disease Control and Prevention [CDC]. [Accessed May 28, 2011] HIV surveillance report: Diagnoses of HIV infection and AIDS in the United States and dependent areas, 2009. Centers for Disease Control and Prevention Web site. 2011. <http://www.cdc.gov/hiv/topics/surveillance/basic.htm>
- Clara IP, Cox BJ, Enns MW. Confirmatory factor analysis of the depression-Anxiety-Stress Scales in depressed and anxious patients. *Journal of Psychopathology and Behavioral Assessment*. 2001; 23:61–67.
- Crepaz N, Marks G. Are negative affective states associated with HIV sexual risk behaviors? A meta-analytic review. *Journal of Health Psychology*. 2001; 20:291–299.
- Crepaz N, Marks G. Towards an understanding of sexual risk behavior in people living with HIV: A review of social, psychological, and medical findings. *AIDS*. 2002; 16:135–149. [PubMed: 11807297]
- Cyders MA, Smith GT. Mood-based rash action and its components: Positive and negative urgency. *Personality and Individual Differences*. 2007; 43:839–850.
- Darke S, Hall W, Heather N, Ward J, Wodak A. The reliability and validity of a scale to measure HIV risk-taking behaviour among intravenous drug users. *AIDS*. 1991; 5:181–185. [PubMed: 2031690]

- Feldman Barrett, L.; Gross, JJ. Emotional intelligence: A process model of emotion representation and regulation. In: Mayne, TJ.; Bonanno, GA., editors. *Emotions: Current issues and future directions*. New York, NY: Guilford Press; 2001. p. 286-310.
- Feldman Barrett L, Gross JJ, Christensen TC, Benvenuto M. Knowing what you're feeling and knowing what to do about it: Mapping the relation between emotion differentiation and emotion regulation. *Cognition and Emotion*. 2001; 15:713–724.
- Fenton KA, Johnson AM, McManus S, Erens B. Measuring sexual behavior: Methodological challenges in survey research. *Sexually Transmitted Infections*. 2001; 77:84–92. [PubMed: 11287683]
- First, MB.; Spitzer, RL.; Gibbon, M.; Williams, JBW. Structured clinical interview for DSM-IV Axis I Disorders – Patient edition (SCIP-I/P, Version 2.0). New York, NY: New York State Psychiatric Institute; 1996.
- Folstein MF, Folstein S, McHugh PR. Mini-mental state: A practical method for grading the cognitive state of patients for the clinician. *Journal of Psychiatric Research*. 1975; 12:189–198. [PubMed: 1202204]
- Fox HC, Hong KA, Sinha R. Difficulties in emotion regulation and impulse control in recently abstinent alcoholics compared with social drinkers. *Addictive Behaviors*. 2008; 33:388–394. [PubMed: 18023295]
- Fulton JJ, Marcus DK, Payne KT. Psychopathic personality traits and risky sexual behavior in college students. *Personality and Individual Differences*. 2010; 49:29–33.
- Gratz KL, Bornova MA, Delany-Brumsey A, Nick B, Lejuez CW. A laboratory-based study of the relationship between childhood abuse and experiential avoidance among inner-city substance users: The role of emotional nonacceptance. *Behavior Therapy*. 2007; 38:256–268. [PubMed: 17697851]
- Gratz KL, Levy R, Tull MT. Emotion regulation as a mechanism of change in an acceptance-based emotion regulation group therapy for deliberate self-harm among women with borderline pathology. *Journal of Cognitive Psychotherapy*. (in press).
- Gratz KL, Roemer L. 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*. 2004; 26:41–54.
- Gratz KL, Roemer L. The relationship between emotion dysregulation and deliberate self-harm among female undergraduate students at an urban commuter university. *Cognitive Behaviour and Therapy*. 2008; 37:14–25.
- Gratz KL, Rosenthal MZ, Tull MT, Lejuez CW, Gunderson JG. An experimental investigation of emotion dysregulation in borderline personality disorder. *Journal of Abnormal Psychology*. 2006; 115:850–855. [PubMed: 17100543]
- Gratz KL, Tull MT. Extending research on the utility of an adjunctive emotion regulation group therapy for deliberate self-harm among women with borderline personality pathology. *Personality Disorders: Theory, Research, and Treatment*. (in press).
- Gratz KL, Tull MT. The relationship between emotion dysregulation and deliberate self-harm among inpatient substance users. *Cognitive Therapy and Research*. 2010a; 34:544–553. [PubMed: 21132101]
- Gratz, KL.; Tull, MT. Emotion regulation as a mechanism of change in acceptance-and mindfulness-based treatments. In: Baer, RA., editor. *Assessing mindfulness and acceptance: Illuminating the processes of change*. Oakland, CA: New Harbinger Publications; 2010b.
- Gray MJ, Litz BT, Hsu JL, Lombardo TW. Psychometric properties of the Life Events Checklist. *Assessment*. 2004; 11:330–341. [PubMed: 15486169]
- Harned MS, Pantalone DW, Ward-Ciesielski EF, Lynch TR, Linehan MM. The prevalence and correlates of sexual risk behaviors and sexually transmitted infections in outpatients with borderline personality disorder. *Journal of Nervous and Mental Disease*. 2011; 199:832–838. [PubMed: 22048134]
- Hellinger FJ. Cost and financing of care for persons with HIV disease: An overview. *Health Care Financing Review*. 1998; 19:1–14.

- Hittner JB, Kryzanowski JJ. Residential status moderates the association between gender and risky sexual behavior. *Journal of Health Psychology*. 2010; 15:634–640. [PubMed: 20460420]
- Holtgrave DR, Pinkerton SD. Updates of illness and quality of life estimates for use in economic evaluations of HIV prevention programs. *Journal of Acquired Immune Deficiency Syndromes and Human Retrovirology*. 1997; 16:54–62. [PubMed: 9377126]
- Hutchinson AB, Farnham PG, Dean HD, Ekwueme DU, del Rio C, Kamimoto L, et al. The economic burden of HIV in the United States in the era of highly active antiretroviral therapy: Evidence of continuing racial and ethnic differences. *Journal of Acquired Immune Deficiency Syndromes*. 2006; 43:451–457. [PubMed: 16980906]
- Johnson ME, Fisher DG, Montoya I, Booth R, Rhodes F, Andersen M, Zhuo Z, Williams M. Reliability and validity of not-in-treatment drug users' follow-up self-reports. *AIDS and Behavior*. 2000; 4:373–380.
- Klinkenberg WD, Sacks S. Mental disorders and drug abuse in persons living with HIV/AIDS. *AIDS Care*. 2004; 16(Suppl. 1):S22–S42. [PubMed: 15736820]
- Leith KP, Baumeister RF. Why do bad moods increase self-defeating behavior? Emotion, risk taking, and self-regulation. *Journal of Personality and Social Psychology*. 1996; 71:1250–1267. [PubMed: 8979390]
- Lejuez CW, Bornovalova MA, Daughters SB, Curtin JJ. Differences in impulsivity and sexual risk behavior among inner-city crack/cocaine users and heroin users. *Drug and Alcohol Dependence*. 2005; 77:169–175. [PubMed: 15664718]
- Linehan, MM. *Cognitive Behavioral Treatment of Borderline Personality Disorder*. New York, NY: Guilford Press; 1993.
- Lopez WD, Krueger PM, Walters ST. High-risk drug use and sexual behaviors among out-of-treatment drug users: An aging and life course perspective. *Addictive Behaviors*. 2010; 35:432–437. [PubMed: 20071098]
- Lovibond PF, Lovibond SH. The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour Research & Therapy*. 1995b; 33:335–343. [PubMed: 7726811]
- Lovibond, SH.; Lovibond, PF. *Manual for the Depression Anxiety Stress Scales*, 2nd ed.. Sydney: Psychology Foundation; 1995a.
- Lucenko BA, Malow RM, Sanchez-Martinez M, Jennings T, Dévieux JG. Negative affect and HIV risk in alcohol and other drug (AOD) abusing adolescent offenders. *Journal of Child and Adolescent Substance Abuse*. 2003; 13:1–17. [PubMed: 19112523]
- Mazzaferro KE, Murray PJ, Ness RB, Bass DC, Tyus N, Cook RL. Depression, stress, and social support as predictors of high-risk sexual behaviors and STIs in young women. *Journal of Adolescent Health*. 2006; 39:601–603. [PubMed: 16982400]
- McDermott MD, Tull MT, Gratz KL, Daughters SB, Lejuez CW. The role of anxiety sensitivity and difficulties in emotion regulation in posttraumatic stress disorder among crack/cocaine dependent patients in residential substance abuse treatment. *Journal of Anxiety Disorders*. 2009; 23:591–599. [PubMed: 19233609]
- McGowan JP, Shah SS, Ganea CE, Blum S, Ernst JA, Irwin KL, et al. Risk behavior for transmission of human immunodeficiency virus (HIV) among HIV-seropositive individuals in an urban setting. *Clinical Infectious Diseases*. 2004; 38:122–127. [PubMed: 14679457]
- McKeganey NP. Prostitution and HIV: What do we know and where might research be targeted in the future? *AIDS*. 1994; 8:1215–1226. [PubMed: 7802974]
- Mennin DS, Heimberg RG, Turk CL, Fresco DM. Preliminary evidence for an emotion dysregulation model of generalized anxiety disorder. *Behaviour Research and Therapy*. 2005; 43:1281–1310. [PubMed: 16086981]
- Messman-Moore TL, Walsh KL, DiLillo D. Emotion dysregulation and risky sexual behavior in revictimization. *Child Abuse and Neglect*. 2010; 34:967–976. [PubMed: 21030084]
- Munroe CD, Kibler JL, Ma M, Dollar KM, Coleman M. The relationship between posttraumatic stress symptoms and sexual risk: Examining potential mechanisms. *Psychological Trauma: Theory, Research, Practice, and Policy*. 2010; 2:49–53.

- Muraven M, Tice DM, Baumeister RF. Self-control as a limited resource: Regulatory depletion patterns. *Journal of Personality and Social Psychology*. 1998; 74:774–789. [PubMed: 9523419]
- Patterson TL, Goldenberg S, Gallardo M, Lozado R, Orozovich P, Abramovitz D, Strathdee SA. Correlates of HIV, sexually transmitted infections, and associated high-risk behaviors among male clients of female sex workers in Tijuana, Mexico. *AIDS*. 2009; 24:1765–1771. [PubMed: 19584699]
- Reynolds EK, Magidson JF, Bornoalova MA, Gwadz M, Ewart CK, Daughters SB, et al. Application of the social action theory to understand factors associated with risky sexual behavior among individuals in residential substance abuse treatment. *Psychology of Addictive Behaviors*. 2010; 24:311–321. [PubMed: 20565157]
- Rosenheck R, Ngilangwa D, Manongi R, Kapiga S. Treatment-seeking behavior for sexually transmitted infections in a high-risk population. *AIDS Care*. 2010; 22:1350–1358. [PubMed: 20635239]
- Saunders JB, Aasland OG, Babor TF, de la Fuente JR, Grant M. Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption: II. *Addiction*. 1993; 88:791–804. [PubMed: 8329970]
- Scott-Sheldon LA, Carey MP, Carey KB. Alcohol and risky sexual behavior among heavy drinking college students. *AIDS and Behavior*. 2010; 14:845–853. [PubMed: 18648928]
- Selby EA, Ward AC, Joiner TE. Dysregulated eating behaviors in borderline personality disorder: Are rejection sensitivity and emotion dysregulation linking mechanisms? *International Journal of Eating Disorders*. 2010; 43:667–670. [PubMed: 19806606]
- Simons JS, Maisto SA, Wray TB. Sexual risk taking among young adult dual alcohol and marijuana users. *Addictive Behaviors*. 2010; 35:533–536. [PubMed: 20071102]
- Smith GT, Fischer S, Cyders MA, Annus AM, Spillane NS, McCarthy DM. On the validity and utility of discriminating among impulsivity-like traits. *Assessment*. 2007; 14:155–170. [PubMed: 17504888]
- Subramaniam GA, Stitzer ML, Woody G, Fishman MJ, Kolodner K. Clinical characteristics of treatment-seeking adolescents with opioid versus cannabis/alcohol use disorders. *Drug and Alcohol Dependence*. 2009; 99:141–149. [PubMed: 18818027]
- Tabachnick, BG.; Fidell, LS. *Using multivariate statistics* (3rd edition). New York, NY: Harper Collins; 1996.
- Tager DT, Good GE, Brammer S. “Walking over ‘em”: An exploration of relations between emotion dysregulation, masculine norms, and intimate partner abuse in a clinical sample of men. *Psychology of Men and Masculinity*. 2010; 11:233–239.
- Tull MT, Barrett HM, McMillan ES, Roemer L. A preliminary investigation of the relationship between emotion regulation difficulties and posttraumatic stress symptoms. *Behavior Therapy*. 2007; 38:303–313. [PubMed: 17697854]
- Tull, MT.; Bornoalova, MA.; Patterson, R.; Hopko, DR.; Lejuez, CW. Analogue research. In: McKay, D., editor. *Handbook of research methods in abnormal and clinical psychology*. Thousand Oaks, CA: Sage Publications; 2008.
- Tull MT, Gratz KL, Weiss NH. Exploring associations between borderline personality disorder, crack/cocaine dependence, gender, and risky sexual behavior among substance-dependent inpatients. *Personality Disorders: Theory, Research, and Treatment*. 2011; 2:209–219.
- Weatherby NL, Needle R, Cesari H, Booth RE, McCoy CB, Watters JK, Williams M, Chitwood DD. Validity of self-reported drug use among injection drug users and crack cocaine users recruited through street outreach. *Evaluation and Program Planning*. 1994; 17:347–355.
- Weinhardt LS, Carey KB, Carey MP. HIV risk sensitization following a detailed sexual behavior interview: A preliminary investigation. *Journal of Behavioral Medicine*. 2000; 23:393–398. [PubMed: 10984867]
- Whiteside SP, Lynam DR, Miller JD, Reynolds SK. Validation of the UPPS impulsive behaviour scale: A four-factor model of impulsivity. *European Journal of Personality*. 2005; 19:559–574.
- Wood E, Schachar J, Li K, Stoltz J, Shannon K, Miller C, et al. Sex trade involvement is associated with elevated HIV incidence among injection drug users in Vancouver. *Addiction Research and Theory*. 2007; 15:321–325.

Xia Q, Osmond DH, Tholandi M, Pollack LM, Zhou W, Ruiz JD, et al. HIV prevalence and sexual risk behaviors among men who have sex with men: Results from a statewide population-based survey in California. *Journal of Acquired Immune Deficiency Syndromes*. 2006; 41:238–245. [PubMed: 16394858]

Highlights

- Emotion dysregulation is positively associated with risky sexual behavior.
- Emotion dysregulation predicts risky sexual behavior above and beyond other risk factors for risky sex.
- Results suggest that emotion dysregulation may be a potential target for reducing risky sexual behavior among substance dependent patients.

Table 1
Descriptive Data for Primary Variables of Interest Overall and as a Function of RSB Outcome and Gender

Variable	N = 117		n = 65		n = 48	
	Past Year Number of Different Commercial Sexual Partners		Condom Use with Commercial Sexual Partner ^a		Condom Use with Commercial Sexual Partner While High on Drugs ^b	
	Male (n = 107)	Female (n = 70)	Male (n = 39)	Female (n = 26)	Male (n = 25)	Female (n = 23)
Age	36.48 (10.64)	34.64 (9.46)	34.62 (10.29)	35.08 (9.08)	36.20 (9.38)	35.22 (9.47)
Racial/ethnic background ^c	49.5%	80.0%	48.7%	65.4%	32.0%	60.9%
Marital status ^d	72.9%	60%	76.9%	73.1%	84.0%	73.9%
Depression	13.19 (11.36)	15.45 (12.09)	13.45 (11.39)	18.59 (12.99)	15.55 (11.90)	18.67 (13.01)
Sensation seeking	27.43 (10.07)	24.80 (9.65)	27.62 (10.50)	21.83 (8.28)	26.27 (10.57)	22.07 (8.78)
Traumatic exposure ^e	56.1%	91.4%	51.3%	96.2%	60.0%	100.0%
Substance use severity	13.30 (8.42)	14.42 (8.57)	14.75 (9.27)	16.04 (7.16)	13.05 (8.12)	15.66 (7.09)
Emotion regulation difficulties	83.84 (25.40)	90.22 (26.47)	85.36 (24.04)	97.01 (20.82)	91.03 (26.51)	97.32 (21.55)
Non-acceptance ^f	12.81 (5.98)	13.14 (6.22)	12.00 (5.44)	13.65 (5.27)	12.52 (6.43)	13.78 (5.57)
Goal-directed ^g	13.26 (4.75)	14.68 (5.29)	13.15 (4.49)	14.91 (4.42)	14.00 (5.26)	15.16 (4.44)
Control impulsive behaviors ^h	13.50 (6.47)	14.40 (5.83)	15.13 (6.44)	16.42 (5.01)	16.76 (6.73)	16.39 (5.26)
Lack of strategies ⁱ	16.38 (7.18)	18.87 (7.70)	15.88 (6.12)	20.77 (7.26)	16.84 (6.95)	20.78 (7.56)
Lack of awareness ^j	16.85 (5.99)	17.30 (4.79)	17.18 (5.33)	18.72 (5.30)	18.12 (5.62)	18.86 (5.49)
Lack of clarity ^k	11.08 (4.51)	11.86 (4.39)	12.03 (3.98)	12.62 (4.47)	12.80 (4.18)	12.44 (4.35)
Mean (SD)	1.16 (5.15)	0.96 (2.95)	2.74 (1.85)	2.92 (1.77)	2.68 (1.52)	2.83 (1.61)

Note. Standard deviations for means are presented in parentheses.

^aLikelihood of using a condom in general when having penetrative commercial sex in the past year (1 = Never; 2 = Rarely; 3 = Sometimes; 4 = Often; 5 = Every time).

^bLikelihood of using a condom when having penetrative commercial sex while high on drugs in the past year (1 = I was much less likely to use a condom than when I was sober; 2 = I was a little less likely to use a condom than when I was sober; 3 = I was just as likely to use a condom than when I was sober; 4 = I was a little more likely to use a condom than when I was sober; 5 = I was much more likely to use a condom than when I was sober).

^cPresented percentage is for participants who self-identified as White;

^dPresented percentage is for participants who reported being single.

^ePresented percentage is for participants who reported the occurrence of a Criterion A traumatic event;

^fNon-acceptance = Lack of emotional acceptance.

^gGoal-directed = Difficulties engaging in goal-directed behaviors when distressed.

^hControl impulsive behaviors = Difficulties controlling impulsive behaviors when distressed.

ⁱLack of strategies = Lack of emotion regulation strategies perceived as effective.

^jLack of awareness = Lack of awareness of emotions.

^kLack of clarity = Lack of emotional clarity.

Table 2
Pearson Product Moment and Point Biserial Correlations between Primary Variables of Interest.

	1	2 ^c	3 ^e	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Commercial sex ^a	---	.12	-.11	.15*	-.01	.16*	-.07	.14	-.12	.17*	.02	.21**	.14	.11	.19**	.13	.15*	.20**
2. Condom use general ^{b,c}	---	---	.53**	-.07	.07	.11	-.15	.08	-.06	-.02	.05	-.01	-.06	-.09	.10	.02	.10	-.17
3. Condom use on drugs ^{d,e}	---	---	---	-.18	-.03	.07	.17	-.07	-.35*	-.33*	-.31*	-.32*	-.17	-.39*	-.33*	-.21	.03	-.35*
4. Age	---	---	---	---	.09	.22**	.04	-.02	-.16*	.11	-.18*	-.06	.10	-.11	-.12	-.04	-.12	.02
5. Gender ^f	---	---	---	---	---	.31**	-.14	-.10	.13	-.38**	-.07	-.12	-.03	-.14	-.07	-.16*	-.04	-.09
6. Racial/ethnic background ^g	---	---	---	---	---	---	-.10	-.10	-.40**	-.12	-.36**	-.07	.00	-.05	.06	-.05	-.15*	-.13
7. Marital status ^h	---	---	---	---	---	---	---	-.07	-.05	-.03	-.08	-.02	-.02	-.03	-.08	-.03	.04	.03
8. Depression	---	---	---	---	---	---	---	---	.03	-.09	.26**	.64**	.43**	.48**	.51**	.58**	.32**	.55**
9. Sensation seeking	---	---	---	---	---	---	---	---	---	-.04	.29**	-.03	-.08	.05	-.03	-.05	.03	-.05
10. Traumatic exposure ^j	---	---	---	---	---	---	---	---	---	---	.03	.14	.19*	.15*	.02	.15	.05	.03
11. Substance use severity	---	---	---	---	---	---	---	---	---	---	---	.16*	.09	.17*	.15	.16*	.04	.09
12. Emotion regulation difficulties	---	---	---	---	---	---	---	---	---	---	---	---	.70**	.80**	.82**	.89**	.49**	.73**
13. Non-acceptance ^j	---	---	---	---	---	---	---	---	---	---	---	---	---	.47**	.44**	.63**	.08	.40**
14. Goal-directed ^k	---	---	---	---	---	---	---	---	---	---	---	---	---	---	.70**	.72**	.21**	.46**
15. Control impulsive behaviors ^l	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	.71**	.24**	.49**
16. Lack of strategies ^m	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	.27**	.54**
17. Lack of awareness ⁿ	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	.49**
18. Lack of clarity ^o	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Note.

^aNumber of different penetrative commercial sex partners with which penetrative sex occurred in the past year (transformed).

^bLikelihood of using a condom in general when having penetrative commercial sex in the past year (transformed).

^cFor analyses associated with this variable, $n = 65$;

^dLikelihood of using a condom when having penetrative commercial sex while high on drugs in the past year (transformed).

^eFor analyses associated with this variable, $n = 48$;

- f Scored such that 0 = female and 1 = male.
- g Scored such that 0 = White and 1 = non-White.
- h Scored such that 0 = single and 1 = in a committed relationship/married.
- i Scored such that 0 = no Criterion A traumatic exposure and 1 = Criterion A traumatic exposure.
- j Non-acceptance = Lack of emotional acceptance.
- k Goal-directed = Difficulties engaging in goal-directed behaviors when distressed.
- l Control impulsive behaviors = Difficulties controlling impulsive behaviors when distressed.
- m Lack of strategies = Lack of emotion regulation strategies perceived as effective.
- n Lack of awareness = Lack of awareness of emotions.
- o Lack of clarity = Lack of emotional clarity.
- * p .05.
- ** p .01.

Table 3

Hierarchical Regression Analysis Examining the Incremental Validity of Emotion Regulation Difficulties to Number of Different Commercial Sex Partners With Which Penetrative Sex Occurred ($N = 177$).

	β	R^2 (Adj. R^2)	ΔR^2	Model F
<i>Step 1</i>		.10 (.05)	.10 *	2.24 *
Age	.11			
Gender	.01			
Racial/ethnic background	.16			
Marital status	-.04			
Depression	.12			
Sensation seeking	-.07			
Traumatic exposure	.16 *			
Substance use severity	.08			
<i>Step 2</i>		.12 (.07)	.02 *	2.45 *
Age	.12			
Gender	.01			
Racial/ethnic background	.16			
Marital status	-.05			
Depression	.00			
Sensation seeking	-.06			
Traumatic exposure	.14			
Substance use severity	.08			
Emotion regulation difficulties	.19 *			

* $p < .05$.

Table 4

Hierarchical Regression Analysis Examining the Incremental Validity of Emotion Regulation Difficulties to Likelihood of Using a Condom When Having Penetrative Sex with a Commercial Partner While High on Drugs in the Past Year ($n = 48$).

	β	R^2 (Adj. R^2)	ΔR^2	Model F
<i>Step 1</i>		.35 (.21)	.35 *	2.60 *
Age	-.01			
Gender	-.10			
Racial/ethnic background	-.27			
Marital status	.18			
Depression	-.02			
Sensation seeking	-.38 *			
Traumatic exposure	-.45 **			
Substance use severity	-.17			
<i>Step 2</i>		.47 (.35)	.13 **	3.79 **
Age	-.05			
Gender	-.09			
Racial/ethnic background	-.25			
Marital status	.22			
Depression	.28			
Sensation seeking	-.39 *			
Traumatic exposure	-.39 *			
Substance use severity	-.16			
Emotion regulation difficulties	-.47 **			

* $p < .05$.

** $p < .01$.