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The Relationship Between Emotion Dysregulation and Deliberate Self-Harm Among Inpatients with Substance Use Disorders

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Abstract Despite the emphasis on the role of emotion dysregulation in deliberate self-harm (DSH), no studies have examined this association among patients with substance use disorders (SUD). This study examined if emotion dysregulation is heightened among SUD inpatients with (vs. without) DSH, and if the association between DSH and emotion dysregulation remains significant when controlling for their shared association with risk factors for both, including borderline personality disorder (BPD), posttraumatic stress disorder (PTSD), childhood abuse, and substance use severity. Findings indicate heightened emotion dysregulation among SUD patients with (vs. without) DSH, and provide evidence of a unique association between emotion dysregulation and DSH when controlling for BPD, PTSD, childhood abuse, and substance use severity. Findings also highlight the particular relevance of three dimensions of emotion dysregulation to DSH among SUD patients: limited access to effective emotion regulation strategies, difficulties engaging in goal-directed behaviors when distressed, and emotional nonacceptance.

Keywords Deliberate self-harm · Self-injury · Emotion regulation · Emotional responding · Substance use

Introduction

Substance use disorders (SUD) are a serious clinical concern, associated with substantial economic, societal, and personal costs (Cartwright 2008) and heightened levels of self-destructive and health-compromising behaviors, including suicide attempts (Mino et al. 1999), intravenous drug use (Dinwiddie et al. 1992), and risky sexual behavior (Langer and Tubman 1997). However, one clinically relevant behavior that has been relatively understudied among patients with SUD is deliberate self-harm (DSH), defined here as the deliberate, direct destruction of body tissue without conscious suicidal intent, but resulting in injury severe enough for tissue damage to occur (see also Klonsky et al. 2003; Pattison and Kahan 1983). The relative absence of research on DSH among SUD patients is particularly notable given the high rates of DSH among individuals with psychiatric disorders that frequently co-occur with SUD, including borderline personality disorder (BPD) and posttraumatic stress disorder (PTSD; for whom rates of DSH exceed 50%; see, e.g., Cloitre et al. 2002; Linehan 1993; Sacks et al. 2008; Soloff et al. 1994). Further, both DSH and substance use have been conceptualized as serving an emotion-regulating function (see Cooper et al. 1992; Gratz 2003; Linehan 1993), increasing the likelihood that these behaviors will co-occur (given research suggesting that behaviors that serve similar functions tend to covary; see Chapman et al. 2006; Nelson 1988).

Indeed, preliminary research indicates clinically relevant rates of DSH among SUD patients (ranging from 29 to 52%; see Evren and Evren 2005; Evren et al. 2006; Evren et al. 2008; Zlotnick et al. 1999), higher than those found among other populations considered to be at-risk for DSH, including high school and college students (14–35%; Gratz 2001; Muehlenkamp and Gutierrez 2004; Ross and Heath 2002; Whitlock et al. 2006) and patients with eating disorders (23–25%; Sansone and Levitt 2002). Yet, despite findings suggesting the relevance of DSH to SUD populations, few studies have examined this behavior among SUD patients, and even fewer have examined the factors

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that may increase the risk for this behavior within this population. Moreover, no studies to date have examined DSH among inner-city, African-American SUD patients, a particularly underserved and understudied population at risk for a variety of negative outcomes (e.g., more severe substance abuse patterns, substance abuse treatment dropout, and relapse; see Bernstein et al. 2005; Castellani et al. 1997; King and Canada 2004). Given that DSH is a serious clinical concern in its own right, associated with a wide range of negative interpersonal and intrapersonal consequences (e.g., shame and social isolation; Favazza 1998; Leibenluft et al. 1987), research focused on elucidating the factors associated with DSH among SUD patients has great clinical and public health significance.

As suggested above, one factor that warrants particular attention is emotion dysregulation, defined here as 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 and Roemer 2004). Theoretical literature emphasizes the central role of emotion dysregulation in the pathogenesis of DSH (Linehan 1993), consistent with both the conceptualization of DSH as an emotion regulation strategy (Gratz 2003; Haines and Williams 1997) and findings that one of the most frequently reported reasons for DSH is to relieve unwanted feelings (Brown et al. 2002). Further, a growing body of empirical evidence provides support for an association between emotion dysregulation and DSH within various clinical and nonclinical samples (Gratz and Chapman 2007; Gratz and Roemer 2008; Heath et al. 2008; Slee et al. 2008). Given evidence that SUD are associated with heightened levels of both emotion dysregulation *per se* (Fox et al. 2007) and a variety of maladaptive behaviors thought to serve an emotion-regulating function (e.g., binge eating and worry; see Javaras et al. 2008, and Bonn-Miller et al. 2008, respectively), it is likely that emotion dysregulation may be quite relevant to DSH among this particular clinical population.

Despite the clear relevance of this line of research, however, no studies to date have examined this association among SUD patients. Rather, extant research on the factors associated with DSH among SUD patients has focused almost exclusively on experiences of childhood maltreatment and co-occurring psychiatric disorders, finding that SUD patients with DSH (vs. those without DSH) have higher rates of childhood abuse (Evren and Evren 2005; Evren et al. 2006, 2008) and co-occurring personality disorders (Evren et al. 2006), as well as greater substance use severity (Evren et al. 2008). Nonetheless, providing suggestive support for the relevance of emotion dysregulation to DSH among SUD

patients, Evren and Evren (2005) found a relation between DSH and alexithymia (a related construct that encompasses both emotional inexpressivity and deficits in emotional awareness and clarity).

Thus, the primary aim of this study was to examine if emotion dysregulation is heightened among SUD patients with DSH (vs. those without DSH). Given that SUD patients in general have been found to evidence heightened emotion dysregulation (Fox et al. 2007), it is unclear if emotion dysregulation will be higher among SUD patients with (vs. without) DSH, or conversely, if heightened levels of emotion dysregulation among the sample as a whole will create a ceiling effect for this variable. However, findings of higher levels of emotion dysregulation among SUD patients with DSH (compared to those without DSH) would provide important information regarding the potential centrality of emotion dysregulation to DSH in general.

Of course, even if results indicate heightened levels of emotion dysregulation among SUD patients with (vs. without) DSH, this between-group difference in emotion dysregulation could be due to the presence of other factors common among SUD patients that are associated with both DSH and emotion dysregulation. Specifically, SUD patients have been found to exhibit elevated rates of PTSD (Brady et al. 2004; Jacobson et al. 2001), BPD (Trull et al. 2000), and childhood abuse (Brems et al. 2004), all of which have been found to be strongly associated with both DSH (Evren et al. 2006, 2008; Zlotnick et al. 1999) and emotion dysregulation (Gratz et al. 2008; Gratz et al. 2006; Tull et al. 2007). Moreover, the severity of substance use has also been found to be associated with both DSH and emotion dysregulation (see Evren et al. 2008; Fox et al. 2008). Thus, in the absence of analyses examining the unique association between emotion dysregulation and DSH (above and beyond these other factors), findings of a relationship between these phenomena among SUD patients could be solely the result of their shared association with these other factors. Therefore, analyses also examined whether differences in emotion dysregulation between SUD patients with and without DSH remain significant when controlling for the influence of BPD, PTSD, childhood abuse, and substance use severity on both. By examining both the simple association between emotion dysregulation and DSH and the unique association between these phenomena when controlling for their shared associations with other factors relevant to both, we can gain a more complete understanding of the nature of the association between DSH and emotion dysregulation among SUD patients.

Given past findings of higher levels of overall emotion dysregulation among individuals with (vs. without) DSH (e.g., Gratz and Chapman 2007; Gratz and Roemer 2008;

Heath et al. 2008), we hypothesized that SUD patients with DSH would report higher levels of overall emotion dysregulation than those without DSH. Further, although the specific dimensions of emotion dysregulation found to be associated with DSH have varied across studies (see Gratz and Roemer 2008; Heath et al. 2008; Slee et al. 2008), the two dimensions that have consistently emerged as relevant to DSH across studies are: limited access to effective emotion regulation strategies and difficulties engaging in goal-directed behaviors when distressed. Thus, we predicted that these two dimensions of emotion dysregulation in particular would be significantly higher among SUD patients with (vs. without) DSH.

Method

Participants

Participants were inpatient residents in a drug and alcohol abuse treatment center in Northeast Washington DC. Treatment at this center involves a mix of strategies adopted from Alcoholics and Narcotics Anonymous, as well as groups focused on relapse prevention. Abstinence from drugs and alcohol is required upon entry into the center and throughout treatment, with the exception of caffeine and nicotine; regular drug testing is conducted and any substance use leads to immediate dismissal from treatment. When needed, detoxification from an outside source is required prior to entry into the center. Typical treatment lasts between 30 and 180 days and aside from scheduled activities, residents are not permitted to leave the center grounds during treatment.

Data for this study were collected as part of a larger study focused on the functional relationship between PTSD and crack/cocaine use. To be eligible for the larger study, participants were required to: (1) be 18–65 years of age; (2) meet criteria for crack/cocaine dependence; (3) have been in residential treatment for at least 72 h (in order to limit the potential impact of withdrawal symptoms on responses to the study materials); (4) exhibit no significant cognitive impairment (as demonstrated by a score of >24 on the *Mini-Mental Status Exam* [Folstein et al. 1975]); and (5) not meet criteria for a current manic episode or psychotic disorder.

Based on these criteria, 61 participants (54% male) were included in the study. Participants were primarily African-American (97%), low-income (79% reported an annual income of under $10,000), unemployed (89%), and single (75%), and ranged in age from 20 to 58 (*mean age* = 44.45, SD = 7.05). Most participants (71%) reported no higher than a high school education.

Measures

Separate from this study, the *Structured Clinical Interview for DSM-IV Axis I Disorders* (SCID-IV; First et al. 1996) was administered to all patients upon entry to the treatment facility. This interview was conducted by trained graduate- and doctoral-level researchers and was used to assess for the presence of current Axis I disorders (including SUD).

The *Deliberate Self-harm Inventory* (DSHI; Gratz 2001) is a 17-item questionnaire that assesses lifetime history of various aspects of DSH, including frequency, duration, and type of DSH behavior (e.g., cutting, burning, carving, bone-breaking, biting, and head-banging). Specifically, the DSHI asks participants whether and how often they have engaged in a variety of behaviors "intentionally (i.e., on purpose)," as well as the last time they engaged in each of the behaviors. For the one behavior that could also be used to end one's life (cutting), participants are asked whether they have cut themselves "without intending to kill yourself." In addition, participants are instructed to exclude behaviors they engaged in with the sole purpose of delivering substances, especially in regard to the item, "Have you ever intentionally (i.e., on purpose) stuck sharp objects such as needles, pins, staples, etc. into your skin." The DSHI has demonstrated high internal consistency, adequate test–retest reliability, and adequate construct, discriminant, and convergent validity among undergraduate student and patient samples (Fliege et al. 2006; Gratz 2001). Consistent with past research examining the factors associated with DSH among a variety of nonclinical and clinical populations (including SUD patients), a dichotomous DSH variable was created by assigning a score of "1" to participants who reported having engaged in DSH, and a score of "0" to participants who did not report having engaged in any of the behaviors on the DSHI (for examples of previous studies examining differences between individuals with and without a lifetime history of DSH, see Andover et al. 2005; Evren and Evren 2005; Evren et al. 2006; Heath et al. 2008; Klonsky et al. 2003; Muehlenkamp and Gutierrez 2004; Polk and Liss 2007; Ross and Heath 2002).

The *Difficulties in Emotion Regulation Scale* (DERS; Gratz and Roemer 2004) is a 36-item measure that assesses individuals' typical levels of emotion dysregulation across six domains: nonacceptance of negative emotions, difficulties engaging in goal-directed behaviors when experiencing negative emotions, difficulties controlling impulsive behaviors when experiencing negative emotions, limited access to emotion regulation strategies perceived as effective, lack of emotional awareness, and lack of emotional clarity. The DERS demonstrates good test–retest reliability ($\rho_I = .88$, $p < .01$), adequate construct and predictive validity (Gratz and Roemer 2004), and is strongly correlated with an experimental measure of

emotion regulation among patients with BPD ($r = -.63$; Gratz et al. 2006). Internal consistency in this sample was excellent for the overall scale ($\alpha = .94$) and adequate to good for the subscales (αs $= .70–.88$).

The *Life Events Checklist* (LEC; Blake et al. 1990; Gray et al. 2004) provides a list of 14 potentially traumatic events (PTEs). Participants are asked to indicate which (if any) of the events they have experienced directly or indirectly, as well as the age at which these events occurred. Of particular interest to this study were the items pertaining to experiences of physical assault, assault with a weapon, sexual assault, and any other unwanted or uncomfortable sexual experience during childhood (prior to the age of 18). For the purposes of this study, these items were combined to create a composite variable of childhood abuse. Participants who reported experiencing one or more of these PTEs during childhood were assigned a score of "1," and participants who did not report having experienced any of these PTEs during childhood were assigned a score of "0."

The *Clinician Administered PTSD Scale, Version IV* (CAPS; Blake et al. 1990), a 30-item structured clinical interview designed to assess the 17 DSM-IV symptoms of PTSD, was used to assess for current (past month) PTSD. The robust psychometric properties of the CAPS have been supported in a variety of combat and civilian samples (see Weathers et al. 2001), including individuals in inpatient substance use treatment (e.g., Brown et al. 1996). The CAPS was administered by trained interviewers and all interviews were reviewed by a PhD level clinician (MTT). In the four cases for which a discrepancy was evident, areas of disagreement were discussed as a group and a consensus was reached.

The Diagnostic Interview for DSM-IV Personality Disorders (DIPD-IV; Zanarini et al. 1996), a semi-structured interview for assessing Axis II personality disorders, was used to assess for BPD. The DIPD-IV has previously demonstrated good interrater and test–retest reliability (Zanarini et al. 2000). The BPD module was administered by trained interviewers, and all interviews were reviewed by a PhD-level clinician (MTT). In the three cases for which a discrepancy was evident, areas of disagreement were discussed as a group and a consensus was reached.

Consistent with past studies (e.g., Lejuez et al. 2007), past year severity of alcohol and drug use was assessed through a self-report measure modeled after the *Alcohol Use Disorders Identification Test* (Saunders et al. 1993). On this measure, participants rate the frequency with which they have used a variety of substances in the past year. Responses were summed to create an overall score representing past year substance use severity. Internal consistency was adequate ($\alpha = .73$).

Finally, a brief self-report questionnaire was administered to obtain information on age, gender, racial/ethnic background, marital status, yearly income, and employment status.

Procedure

All study procedures received Institutional Review Board approval. Eligible participants were informed that involvement in the study was voluntary and refusal to participate would not affect their treatment status. Participants who provided written informed consent were interviewed with the CAPS and the BPD module of the DIPD-IV, and then completed the self-report measures described above. Participants were provided with gift cards ($30) to a local grocery store in exchange for their participation.

Results

Identification of Covariates

Preliminary analyses were conducted to explore the impact of demographic factors on emotion dysregulation and DSH status, in order to identify potential covariates for the analysis of covariance (Tabachnick and Fidell 1996). Neither emotion dysregulation nor DSH was significantly associated with racial/ethnic background, income, marital status, employment status, educational attainment, or age (all ps $> .05$), and there were no gender differences in emotion dysregulation ($p < .05$). However, women were more likely than men to report a history of DSH (46 vs. 15%, respectively; χ^2 (1) $= 7.12$, $p < .01$). Thus, gender was included in the analysis as a covariate.

Preliminary Analyses

Consistent with past research, 30% ($n = 18$) of participants reported a history of DSH, with all self-harming participants reporting more than one episode, 50% reporting more than five lifetime episodes, and 22% reporting more than 10 lifetime episodes. Among self-harming participants, the average number of DSH episodes was 7.89 (SD = 9.32), and the most frequently reported form of DSH was cutting (28%; see Table 1 for rates of each of the behaviors assessed in the DSHI). Further, 50% of the self-harming participants reported recent DSH (defined as an episode of DSH within the past 12 months; see Brown et al. 2007; Nock and Banaji 2007).

According to the clinical interviews, 49% ($n = 30$) of participants met criteria for current PTSD, and 39% ($n = 24$) met criteria for BPD. Further, 23% ($n = 14$) of participants reported a history of childhood abuse. Information on the current Axis I disorders (including SUD) of participants is provided in Table 2.

Table 1 Rates of deliberate self-harm behaviors among inpatients with substance use disorders ($N = 61$)

Deliberate self-harm behaviors	%	N
1. Cutting (without intending to kill oneself)	27.8	5
2. Burned self with cigarette	11.1	2
3. Burned self with lighter or match	11.1	2
4. Carved word into skin	11.1	2
5. Carved pictures, designs, or other marks onto skin	16.7	3
6. Severely scratched oneself to the extent that scarring or bleeding occurred	22.2	4
7. Bit oneself to the extent that skin broke	5.6	1
8. Rubbed sandpaper onto one's body	0.0	0
9. Dripped acid onto your skin	0.0	0
10. Used bleach, comet, or oven cleaner to scrub skin	22.2	4
11. Stuck sharp objects (e.g., needles, pins) into one's skin	16.7	3
12. Rubbed glass into one's skin	0.0	0
13. Broken one's own bones	0.0	0
14. Banged one's head against something to the extent that a bruise appeared	16.7	3
15. Punched oneself to the extent that a bruise appeared	22.2	4
16. Prevented wounds from healing	11.1	2
17. Done anything else to harm oneself (e.g., punched a wall)	16.7	3

Table 2 Rates of current axis I disorders among participants ($N = 61$)

Diagnosis	Percentage meeting criteria (%)
Major depressive disorder	40.0
Specific phobia	13.6
Panic disorder	4.5
Social anxiety disorder	13.6
Generalized anxiety disorder	2.3
Obsessive compulsive disorder	0.0
Posttraumatic stress disorder	49
Alcohol dependence	50.0
Sedative dependence	3.6
Cannabis dependence	14.3
Stimulant dependence	3.6
Opioid dependence	19.6
Cocaine dependence	100.0
Hallucinogen/PCP dependence	5.4

Current PTSD status was determined through the CAPS, administered as part of the present study

participants with and without recent DSH, $t (16) = -.06$, $p > .10$, with both groups reporting almost identical levels of emotion dysregulation (*mean DERS* $= 101.67 \pm 22.95$ and 101.00 ± 22.77 for self-harming participants with recent DSH and those without recent DSH, respectively).

Next, in order to examine the unique association between emotion dysregulation and DSH (above and beyond their shared association with other factors relevant to both), a one-way analysis of covariance (ANCOVA) was conducted with overall emotion dysregulation serving as the dependent variable, DSH status (no vs. yes) serving as the independent variable, and gender, BPD status, PTSD status, childhood abuse status, and substance use severity entered as covariates. As predicted, even when controlling for the influence of the other relevant risk factors and gender on both DSH and emotion dysregulation, levels of emotion dysregulation remained significantly higher among SUD patients with (vs. without) DSH, $F (1, 53) = 4.12$, $p < .05$, $\eta_p^2 = .07$.[2]

Primary Analyses

Independent *t*-tests were first conducted to examine differences in overall emotion dysregulation (as well as different aspects of emotion dysregulation) between participants with and without a history of DSH.[1] As expected, substance users with a history of DSH (vs. those without DSH) reported significantly higher levels of overall emotion dysregulation, as well as the specific dimensions of emotional nonacceptance, difficulties engaging in goal-directed behaviors when distressed, and limited access to effective emotion regulation strategies (see Table 3). Further, given that half of our sample reported non-recent DSH, we examined differences in overall emotion dysregulation between participants with recent (i.e., past-year) DSH and those without recent DSH. Results indicate no significant differences in emotion dysregulation between

Discussion

The present study adds to the literature on the role of emotion dysregulation in DSH, examining the relation between emotion dysregulation and DSH among inpatients

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[1] Given both our relatively small sample size and the small number of planned, hypothesis-driven comparisons examined in this study, an alpha correction was not applied to our analyses (for further discussion of the rationale for not applying an alpha adjustment when conducting planned comparisons or hypothesis-driven analyses, see Keppel and Zedeck 1989; Perneger 1998; for further discussion of the problems associated with utilizing an alpha adjustment when conducting comparisons within a small sample, see Tutzauer 2003). In support of this decision, the number of outcomes that emerged as significant (57%) far exceeded what would be expected by chance given the number of analyses conducted (30%; Sankoh et al. 1997).

[2] Results of these analyses did not change when examining only SUD patients with recent DSH. Specifically, findings indicate that SUD patients with recent DSH reported higher levels of emotion dysregulation than SUD patients without DSH (controlling for other relevant variables), $F (1, 45) = 4.02$, $p = .05$, $\eta_p^2 = .08$.

Table 3 Means, standard deviations, and independent sample *t*-tests assessing differences in emotion dysregulation between SUD inpatients with and without a history of DSH

	DSH ($n = 18$)		No DSH ($n = 43$)		*t*-test ($df = 59$)	Effect size (d)
	Mean	SD	Mean	SD		
1. Overall emotion dysregulation	101.33	22.17	84.09	24.93	2.54*	.66
2. Emotional nonacceptance	17.11	6.53	13.21	5.99	2.26*	.59
3. Goal-directed behavior difficulties	16.72	4.00	13.88	4.75	2.22*	.58
4. Difficulties controlling impulsive behaviors	17.56	5.62	14.33	6.40	1.86[†]	.49
5. Limited access to ER strategies	22.50	7.36	17.07	6.32	2.92**	.76
6. Lack of emotional awareness	14.44	4.71	14.54	4.72	0.07	.02
7. Lack of emotional clarity	13.00	3.41	11.07	4.54	1.62	.42

Cohen (1988) has defined effect sizes as small ($d = .20$), medium ($d = .50$), and large ($d = .80$)

SUD substance use disorders; *DSH* deliberate self-harm; *ER* emotion regulation

[†] $p < .10$, * $p < .05$, ** $p < .01$

with SUD (a relatively understudied population with regard to DSH). Consistent with previous studies among nonclinical samples (Gratz and Chapman 2007; Gratz and Roemer 2008; Heath et al. 2008), results indicate heightened levels of emotion dysregulation among SUD patients with (vs. without) DSH. This finding is particularly notable given evidence of heightened emotion dysregulation even among the SUD patients without DSH. Indeed, levels of emotion dysregulation among the nonself-harming SUD patients in this sample were consistent with those found previously among self-harming samples, including both male and female undergraduates with frequent DSH (*mean* DERS = 85.84 and 87.44, respectively; see Gratz and Chapman 2007; Gratz and Roemer 2008). Thus, findings that the presence of DSH is associated with higher levels of emotion dysregulation among a sample of SUD patients with already heightened levels of emotion dysregulation provide further support for the relevance of emotion dysregulation to DSH. Moreover, findings of a unique association between emotion dysregulation and DSH when controlling for the influence of BPD, PTSD, childhood abuse, and substance use severity (all of which are considered risk factors for both DSH and emotion dysregulation; see Evren et al. 2006, 2008; Fox et al. 2008; Gratz et al. 2006, 2008; Harned et al. 2006; Tull et al. 2007; Zlotnick et al. 1999) suggest that emotion dysregulation may uniquely contribute to our understanding of DSH among SUD patients.

Beyond emotion dysregulation in general, results suggest the particular relevance of three specific dimensions of emotion dysregulation to DSH among SUD patients: limited access to effective emotion regulation strategies, emotional nonacceptance, and difficulties engaging in goal-directed behaviors when distressed (all of which have previously been found to be associated with DSH among nonclinical and clinical samples; Gratz and Roemer 2004,

2008; Slee et al. 2008). Findings highlighting the relevance of the first two dimensions of emotion dysregulation to DSH are consistent with the common conceptualization of DSH as an emotion regulation strategy (Haines and Williams 1997; Linehan 1993), as well as theories that DSH stems from a tendency to evaluate emotional experiences negatively (and consequent efforts to avoid or escape those emotions; Chapman et al. 2006; Gratz 2007). Moreover, findings of an association between DSH and difficulties engaging in goal-directed behaviors when distressed are consistent with theories that DSH is associated with deficits in attentional control (particularly under conditions of emotional distress; Linehan 1993). In addition to providing further support for the relevance of these specific dimensions of emotion dysregulation to DSH, these findings suggest that extant models of the pathogenesis of DSH in general may be useful for understanding DSH among SUD patients as well.

Several limitations warrant consideration. First, because this study used correlational data and a cross-sectional design, the direction or temporal order of the relationships we examined may differ from our predictions. For instance, although theoretical literature suggests that emotion dysregulation may increase the risk for DSH (Linehan 1993), DSH could also increase the risk for emotion dysregulation (given the negative interpersonal and intrapersonal consequences of DSH, as well as the potentially paradoxical effects of attempts to avoid emotions; see Chapman et al. 2006; Favazza 1998; Hayes et al. 1996). Prospective, longitudinal studies are needed to address this limitation and more fully examine the precise nature of the relationship between emotion dysregulation and DSH (which is likely bidirectional).

Furthermore, consistent with past research examining the factors associated with DSH among a variety of nonclinical and clinical populations (Heath et al. 2008;

Klonsky et al. 2003; Muehlenkamp and Gutierrez 2004; Polk and Liss 2007; Ross and Heath 2002), including SUD patients (Evren and Evren 2005; Evren et al. 2006), this study examined differences in emotion dysregulation as a function of lifetime DSH status. Findings that levels of emotion dysregulation did not differ between SUD patients with and without recent DSH suggest that a focus on DSH in general (rather than current DSH in particular) does not preclude the identification of clinically relevant correlates of DSH. Further, findings that results did not change when examining differences between participants without DSH and those with only recent DSH suggest that the results of this study are applicable to SUD patients with recent DSH in particular. Nonetheless, it is possible that SUD patients with non-recent DSH may differ from those with recent DSH on another (unmeasured) factor that could have had an indeterminable influence on the observed association between emotion dysregulation and DSH in this study. Likewise, the precise nature and meaning of the association between emotion dysregulation and DSH may differ in unknown ways between individuals with and without recent DSH. Future research should examine specifically the similarities and differences between self-harming individuals with and without recent DSH on a variety of factors thought to be associated with the development and maintenance of this behavior. In addition to providing further information on the factors most robustly associated with DSH, such research may help elucidate the factors involved in DSH recovery.

Moreover, the reliance on self-report measures of childhood abuse and DSH provides no way to substantiate the actual occurrence of these phenomena and introduces the possibility of retrospective bias. A related limitation is the exclusive reliance on a self-report measure of emotion dysregulation, responses to which may be influenced by an individual's willingness and/or ability to report accurately on emotional responses. However, it is important to note that the measure of emotion dysregulation utilized in this study is strongly correlated with an experimental measure of emotion regulation ($r = -.63$; Gratz et al. 2006). Furthermore, with the exception of BPD, data were not collected on participants' co-occurring personality disorders, the presence of which could arguably influence emotion dysregulation and/or DSH. Although BPD is by far the most relevant personality disorder to DSH (Gunderson 2001; Mack 1975), future studies should assess and control for the presence of other personality disorders that may be particularly relevant to SUD populations, such as antisocial personality disorder (see Verheul et al. 2009).

Limitations with regard to the generalizability of our sample also warrant mention. Specifically, this study used a unique sample of inner-city, primarily low SES, African-American SUD patients in residential treatment. Although

our focus on the association between emotion dysregulation and DSH among inner-city SUD patients is arguably an asset of this study (given that inner-city substance-dependent individuals are an underserved population vulnerable to a variety of negative outcomes; e.g., Castellani et al. 1997), our findings cannot be assumed to generalize to other substance-using populations and require replication across a more diverse group of SUD patients. Likewise, our relatively small sample size may also limit the generalizability of the results. However, it warrants mention that the rates of BPD, PTSD, and childhood abuse found within our sample (as well as the demographic characteristics of our sample) are comparable to those reported in previous studies of SUD patients (see Bernstein et al. 2005; Brady et al. 2004; Brems et al. 2004; Evren and Evren 2005; Jacobson et al. 2001; King and Canada 2004; Trull et al. 2000), suggesting that our results may be generalizable to other SUD populations. The relatively small sample size may also have limited our statistical power and ability to detect between-group differences. However, it is important to note that our pattern of findings is comparable to those obtained in other studies utilizing substantially larger samples (e.g., Gratz and Roemer 2008; Heath et al. 2008), and our nonsignificant findings were associated with effect sizes that do not meet the accepted threshold for a medium effect ($d = 0.5$; Cohen 1988). Nonetheless, the findings of this preliminary study need to be replicated in larger samples.

Future research would benefit from the use of behavioral and experimental measures of emotion dysregulation, as well as a prospective longitudinal design. Moreover, future research should examine other mechanisms that may underlie DSH among SUD patients, including experiential avoidance, emotional inexpressivity, and dissociation (for preliminary research on the latter two factors, see Evren and Evren 2005; Evren et al. 2008). Future studies should also examine additional psychological and biological risk factors for DSH among SUD patients.

Despite limitations, the results of this study extend extant research on the factors associated with DSH among SUD patients, providing preliminary evidence that emotion dysregulation is associated with DSH among this high-risk clinical population. In addition to highlighting a possible risk factor for DSH among SUD patients, these findings have potential clinical implications, suggesting the utility of teaching self-harming SUD patients more adaptive ways of responding to their emotions. In particular, findings highlighting the relevance of emotional nonacceptance to DSH suggest the importance of decreasing judgmental, non-accepting responses to emotions among self-harming SUD patients, and highlight the potential utility of mindfulness- and acceptance-based interventions [e.g., dialectical behavior therapy (DBT; Linehan 1993) and

acceptance and commitment therapy (ACT; Hayes et al. 1999)] for DSH within this population. Such interventions are considered to be particularly useful for facilitating emotional acceptance, as they actively seek to facilitate a non-judgmental and non-evaluative stance toward internal experiences—a stance that may enable clients to remain present with their emotions and view these as a natural part of the human experience (Gratz et al. 2005). Further, findings highlighting the relationship between DSH and the specific dimension of limited access to effective emotion regulation strategies suggest the need to teach self-harming SUD patients more adaptive ways of modulating emotional arousal. In particular, interventions such as DBT aimed at teaching healthy, non-avoidant strategies that may be used to modulate the intensity and/or duration of emotions will likely increase emotional self-efficacy and decrease the need to rely on a maladaptive strategy such as DSH. In addition to treating DSH, treatments focused on decreasing emotion dysregulation and increasing emotional acceptance among SUD patients may have the added benefit of decreasing substance use as well (given literature suggesting that substance use may serve an emotion regulating function; Cooper et al. 1992; Fox et al. 2007).

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