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Emotion Regulation and Substance Use Frequency in Women with Substance Dependence and Borderline Personality Disorder Receiving Dialectical Behavior Therapy

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Abstract

Background—Dialectical Behavior Therapy (DBT) identifies emotion dysregulation as central to the dangerous impulsivity of borderline personality disorder (BPD) including substance use disorders, and DBT targets improved emotion regulation as a primary mechanism of change. However, improved emotion regulation with DBT and associations between such improvement and behavioral outcomes such as substance use has not been previously reported.

Objective—Thus, the goal of this study was to assess for improvement in emotion regulation and to examine the relationship between improvements in the emotion regulation and substance use problems following DBT treatment.

Method—Emotion regulation as assessed by the Difficulties in Emotion Regulation Scale, depressed mood as assessed by the Beck Depression Inventory, and their associations with substance use frequency were investigated in 27 women with substance dependence and BPD receiving 20 weeks of DBT in an academic community outpatient substance abuse treatment program.

Results—indicated improved emotion regulation, improved mood, and decreased substance use frequency. Further, emotion regulation improvement, but not improved mood, explained the variance of decreased substance use frequency.

Conclusions—This is the first study to demonstrate improved emotion regulation in BPD patients treated with DBT and to show that improved emotion regulation can account for increased behavioral control in BPD patients.

Significance and Future Research—Emotion regulation assessment is recommended for future studies to further clarify the etiology and maintenance of disorders associated with emotional dyregulation such as BPD and substance dependence, and to further explore emotion regulation as a potential mechanism of change for clinical interventions.

Keywords

Emotion Regulation; Substance Dependence; Borderline Personality Disorder; Dialectical Behavior Therapy

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Emotional regulation includes processes for amplifying, attenuating, or maintaining affective responses. The capacity to regulate emotion has been identified as central to mental health, determining one's capacity for working, relating to others, and enjoyment (1), and. chronic difficulties in emotion regulation have been specifically implicated as the central underlying pathology of the BPD (2). Specifically, interpersonal problems, impulsive behaviors, and other BPD symptoms (e.g., suicidality, self-harm, identity disturbance) have been considered to be byproducts of an inability to control emotional responses (2,3,4).

Individuals with BPD are more emotionally unstable than individuals without BPD (5), have more intense responses to emotionally negative events and slower return to baseline (6), have more trait negative affect (7). Further, individuals with BPD tend to experience and recall more emotions with negative valence as compared with neutral or positive emotions (8,9,10,11). Yet, they do not exhibit an increased sensitivity to emotional stimuli (11,12,13), indicating that even when emotional responses are in the normative range, emotional control is still compromised. The formulation that deficient affective regulation underlies BPD pathology is also supported by abnormalities observed in the neurocircuitry involved with emotion regulation in BPD patients including electrophysiology (e.g., 11,14), structural imaging (e.g., 15), and functional imaging (e.g., 16; for a review of neuroimaging studies of BPD see 17). Various neuroanatomical and neurophysiological abnormalities have been reported in individuals with BPD, including reduced hippocampal, amygdala and frontal lobe volumes, as well as diminished serotonergic function (see 3 for review).

The disordered emotional regulation in BPD may be related to disrupted attention processes and impaired executive functioning. Individuals with BPD exhibit a tendency to attend to dominant stimuli and ignore nondominant but task relevant cues, and hyperfocus on cues associated with negative affective valence (18). Thus, contextual and often nonemotional cues are largely underutilized or ignored in BPD, while most attention is diverted to more salient and often more negative emotional stimuli. Further, individuals with BPD display deficits on tasks that require controlled or effortful information processing, as well as abstraction ability and cognitive flexibility that tap executive functioning (19). Therefore, the processes of attention and executive functioning are targeted by cognitive-behavioral interventions, such as Dialectical Behavior Therapy (DBT), to increase the self-regulatory processes in these individuals.

DBT, is an empirically supported treatment for BPD (2,20) and cormorbid BPD and Substance Use Disorders (21–26). DBT conceptualizes the dangerous impulsivity exhibited by BPD patients (e.g., deliberate self-harm and substance use) as maladaptive emotion regulation strategies. DBT purports to increase control of such behaviors via improved emotion regulation (2,27). However, no prior published research has directly assessed improved emotion regulation with DBT, or shown that positive outcome is mediated by increased emotion regulation capacity. To begin to address this gap, we assessed emotion regulation in an open trial of DBT with treatment-seeking women with substance dependence and BPD. Substance use serves to avoid or decrease emotional distress (28). Difficulties of emotion regulation have been documented in individuals with substance use disorders including cocaine (29) and alcohol (30), and individuals comorbid for BPD. Further, patients with substance use disorders have been shown to have greater emotion regulation difficulties than those with BPD alone (31). We investigated the following questions: 1) is DBT associated with improved emotion regulation?; and, 2) can improved emotion regulation account for decreased substance use during treatment?

Method

Subjects

Participants included 27 women who were consecutively admitted into a primary substance use clinic and that met DSM-IV criteria for BPD and substance dependence. This public-funded clinic serves only low socioeconomic status individuals who either have no insurance or are on a public insurance coverage, and does not admit patients with major mental illnesses such as those that are actively psychotic with a schizophrenia, schizoaffective, or bipolar disorder, or those that are actively suicidal (patients were not excluded for past suicidality) or those who do not speak English. There were no other specific exclusion criteria for this study. Participants were 92% Caucasian and 8% Hispanic with an average age of 38.0 (range 27–51); 62% were never married and 38% were divorced (none were currently married). All had at least high school education and 31% had some college education. They met DSM-IV current criteria for an average of 1.7 substance dependence diagnoses (88% alcohol, 44% cocaine, 25% opiates, and 6% marijuana). They had an average of 2.4 Axis I disorders, with 81% comorbidity for depressive disorders, 69% for anxiety disorders (50% for PTSD), and 6% for bipolar disorder. Eighty-eight percent were prescribed antidepressants, 31% were prescribed mood stabilizers (anticonvulsants), and 12% were not prescribed psychotropic medications. Patients diagnosed with opiate dependence were started on an opiate antagonist (naltrexone) at study entry.

Procedures

Participants were newly admitted outpatients at a specialized, publicly-funded community substance abuse facility affiliated with Yale University. Licensed and certified academic psychiatrists conducted the admission assessments including psychiatric diagnoses that were determined by reviewing DSM-IV criteria for specific Axis I and Axis II BPD disorders and documenting symptom counts to determine BPD and substance abuse diagnoses. Those diagnosed with comorbid DSM-IV substance dependence and BPD upon intake assessment were assigned to DBT treatment, and once committed to treatment, were approached for study participation. Study participation did not involve any manipulation of standard treatment of this facility; therefore, this study received expedited approval from the Yale Human Investigation Committee. All participants provided informed consent prior to study participation. Self-report measures (described below) were administered at the beginning (T1), middle (T2), and end (T3) of treatment.

DBT Program—This program was established as part of a statewide DBT training initiative for the Connecticut Department of Mental Health and Addiction Services (DMHAS) conducted by Dr. Marsha Linehan and colleagues, following the “train-the-trainer” model (32). A DMHAS DBT trainer (RS) attended the consultation meetings and supervised the one doctoral level and three masters level clinicians for treatment adherence (2,33). Treatment consisted of 20 weeks of weekly, hour-long individual therapy, weekly 90-minute skills group, as needed telephone skills coaching, and a weekly hour-long consultation group for the therapists. The relatively brief length of treatment was based on practical constraints of the substance abuse facility. Substance use was the prioritized quality-of-life-interfering-behavior (2), following the treatment targets of life-threatening and treatment-interfering behaviors. Treatment non-completion was defined as patients missing four consecutive individual or skills group sessions (2).

Measures

Beck Depression Inventory (BDI; 34) was used to measure depression. The BDI is a well-validated and frequently used 21-item self-report scale designed to measure severity of

depressive symptomatology with scores significantly associated with clinical measures of depression.

Difficulties in Emotion Regulation Scale (DERS; 35) includes 36 self-report items endorsed on a five-point scale ranging from "almost never; 0–10%" to "almost always 91–100%" and assess six dimensions of emotion dysregulation including 1) nonacceptance of one's negative emotions (NONACCEPTANCE; e.g., "When I'm upset, I feel ashamed at myself for feeling that way"); 2) difficulties accomplishing goals when experiencing negative emotions (GOALS; e.g., "When I'm upset, I have difficulty focusing on other things"); 3) difficulties remaining in control of one's behavior when experiencing negative emotions (IMPULSE; e.g., "I experience my emotions as overwhelming and out of control"); 4) lack of emotional awareness (AWARENESS; e.g., "I pay attention to how I feel" reverse-scored); 5) low self-efficacy for regulating negative emotions (STRATEGIES, e.g., "When I'm upset, I believe that wallowing in it is all I can do"); and 6) difficulty identifying and understanding emotions (CLARITY; e.g., "I have difficulty making sense out of my feelings"). In a large college sample the DERS and its subscales demonstrated high internal consistency with Total DERS $\alpha = .93$ and all subscales $\alpha > .80$, significant correlations with other measures of emotion regulation, and significant correlations with self-reported history of self-harm and intimate partner abuse (35). In addition, the scales showed adequate to high four-to-eight week test-retest reliability in a small subsample, with intraclass coefficients of $\rho I = .88$ for Total DERS and $\rho I = .57$ to .80 for the six subscales (35).

Substance Use Frequency for the 30 days preceding treatment and for the last 30 days of treatment was compiled from clinician completed documentation on substance use forms that were part of the standard practice of the clinical setting, and included data on weekly patient self-report, ongoing clinician assessment, collateral information when available, and weekly urine toxicology screenings and alcohol breathalyzer tests. The data was collected by the clinician and we recorded/transcribed it. Participants self-reported positive drug use in one fifth of the assessments on average, and had positive urine toxicology reports in one quarter of the assessments on average. It is noted that the substances monitored by the urine toxicology screenings (i.e., 4-panel or 8-panel) were selected based on clinical assessment of need and were therefore not consistent across all participants. Also, any missed urine toxicology screenings due to patient absences or administrative error were excluded. On the basis of these data, clinicians rated substance use frequency according to the following four categories: 0 = none, 1 = 1 to 3 times per month, 2 = 1 to 3 times per week, and 3 = more than three times per week. The contribution of urine toxicology and self-report assessments to coded frequency was approximately equal, with a slightly greater contribution of urine toxicology at baseline and slightly greater contribution of self-report at discharge; discrepancies between these sources were always rated in the positive direction. All use of alcohol and substances of abuse were incorporated whether or not a given substance was the primary substance of abuse for that patient.

Results

Participants attended an average of 14.9 therapy sessions and 14.0 skills sessions, with 55.6% completing treatment. Participants who did and did not complete treatment did not differ on primary drug of choice [$\chi^2(df\ 2) = .96$; $p = .62$] or baseline frequency of drug use [$t(df\ 21) = 1.17$; $p = .26$], BDI [$t(df\ 25) = 1.33$; $p = .20$], or DERS [$t(df\ 22) = 0.11$; $p = .91$]. The BDI and DERS for the three time points approximated normal distributions (Kolmogorav Smirnov $Z = .49$ to .68; $p = .75$ to .97). One-way repeated measures ANOVAs using the SAS Proc Mixed procedure to account for missing data were conducted to assess change in BDI scores and DERS scores over treatment time (T1, T2, T3).

We utilized Holm-Bonferroni corrections to adjust the alpha level downward to prevent chance capitalization in multiple comparisons. Holm-Bonferroni sequential approach allows for increasing power while controlling Type I error (36). BDI scores decreased significantly across time period, including a significant reduction in scores from the beginning to the middle of treatment, $F(2,35) = 31.55$, $p < .001$; T1: 25.07(9.77) > T2: 15.29(9.34) = T3: 14.50, (8.45). DERS data was available for 24 participants (three participants did not complete DERS at baseline due to an administration error), and DERS Total scores also decreased significantly across time, including a reduction at mid-treatment and again at treatment end, $F(2,32) = 16.44$, $p < .001$; at each assessment period [T1: 118.00 (18.47) > T2: 108.00 (22.23) > T3: 94.80(17.89)]. For exploratory purposes we examined changes in DERS subscales as well (see Table 1).

Of the twenty-four participants who completed the DERS, 39.1% had weekly substance use in 30 days prior to the start of treatment, while only 8.6% were found to have weekly substance use in the 30 days prior to the end of treatment, indicating a significant reduction in use $\chi^2(1) = 8.944$, $p = .003$ (one subject was not included due to missing substance use data).

To examine the contribution of improved emotion regulation on the reduction in substance use, one-way repeated measures ANOVAs were calculated first for change in substance use over time from the beginning to end of treatment, and then with change in DERS emotion regulation from beginning to end of treatment entered as a covariate. Results indicated significant change in substance use form pre- to post-intervention, $F(1, 21) = 6,731$, $p = .017$. Significant interactions were observed with frequency of substance use and emotion regulation, $F(1, 21) = 8.202$, $p = .009$, with changes in substance use losing significance when controlling for improvement in emotion regulation $F(1, 21) = .112$, *ns*. No significant interaction was observed for reduced frequency of substance use and improvement in BDI, $F(1, 21) = 2.664$, *ns*.

Discussion

This study demonstrated measurable improvement in emotion regulation in women with substance dependence and BPD that received DBT treatment. Improved emotion regulation appeared to be distinct from, and to continue beyond, improved mood. When entered as a covariate, improved emotion regulation accounted for decreased frequency of substance use, suggesting that developing effective emotion regulation skills may have allowed study participants to cease other less effective emotion regulation behaviors. This interpretation is consistent with the DBT model that understands emotion dysregulation to mediate the maladaptive behaviors of BPD in the face of life stressors (2;27). These results extend the findings of previous research showing both improved emotion regulation and decreased dangerous impulsivity (i.e., self-harm) with participation in DBT-informed interventions (37,38), by specifically showing an association between the improved emotion regulation and decreased dangerous impulsivity (i.e., substance use).

Given that the present results linking improved emotion regulation and decreased substance use are correlational, it is not possible to make conclusive interpretations of causality. For example, the results could alternatively be interpreted as indicating that those who were able to reduce their substance use were then more proficient at developing emotion regulation skills—perhaps comparable to the hindering role of PRN benzodiazepines observed in cognitive behavioral treatments for panic disorder with agoraphobia (39). Or, it is possible that the observed associations were caused by some interaction of the variables, or by some third unspecified process. However, it is noteworthy that decreased substance use was

specifically associated with improved emotion regulation, and not with improved mood (depression), supporting the specificity of this result.

With respect to the dimensions of emotion regulation that were observed to improve in the exploratory analyses, during the first half of treatment patients reported increased confidence in their ability to regulate negative emotions. By the end of treatment, this confidence improved further, and patients also reported increased ability to attend to, identify, and understand their emotions, and to remain in control when experiencing negative emotions.

Only 55.6% of participants completed treatment as defined by DBT protocol attendance requirements (2), and this finding speaks to the challenges involved with engaging patients with comorbid BPD and substance use disorders into treatment (40,41). When treatment attrition occurred, it generally included the patients “falling out” of contact, and therefore the reasons for leaving treatment were generally not available. While there is some indication that DBT is more successful than standard treatments at engaging patients with substance use disorders (21), the present study’s retention rate is consistent with past studies reporting retention between 52% and 64% (21,22,26). Linehan and colleagues have addressed the challenges of treatment retention with patients that are comorbid for BPD and substance use disorders by developing a variety of “attachment strategies” such as procedures for finding “lost” patients (26). Although some of these attachment strategies were utilized in the present investigation, such as using telephone contact break cycles of avoidance following patient absences; many of the more intense attachment strategies described by Linehan and colleagues were not utilized, such as conducting therapy in patients’ natural environments or responding to patient absences with token gifts symbolizing the therapists’ pining. It is also noted that whereas Linehan and colleagues included the prescription of drug agonist medication as part of the DBT-SUD treatment for opiate users, the present study prescribed an opiate blocker, and this less reinforcing medication may have also contributed to treatment attrition observed.

A primary limitation of the study is that there was not a control treatment condition. This limits our ability to attribute emotion regulation improvement specifically to DBT treatment. For example, preliminary results from a recent randomized controlled treatment of DBT applied to substance dependence did not find improved emotion regulation to be specific to the DBT treatment condition (26). Significantly, patients received concurrent psychopharmacological treatment, which could have contributed to the observed improvements in emotional distress and reduced substance use; however, it is noted that with the exception of Nalrexone, the medications prescribed do not typically have large effects on substance use outcome, and psychotropic medications would not be expected to increase efficacy for attending to, accepting, and modulating emotions, as assessed in the DERS. An additional limitation is that the treatment provided was of shorter duration than most previous DBT studies, and based on the pattern of findings observed it is unclear if the full treatment effect was realized. It is noted, however, that there have been several studies of comprehensive DBT of shorter duration than one year, such as a 12- to 16-week adaptation for adolescents by Miller, Rathus, Linehan at collagues (42,43) and two 26-week randomized controlled trials (44,45).

Other limitations include the exclusion of men, the under representation of minorities, and the use of clinical interviews for BPD and substance use diagnoses. The study also did not include no systematic assessment of DBT adherence, and therefore problems of adherence cannot be ruled out for contributing to treatment attrition. Further, assessments of substance use included participants' self-report and clinician assessments, all subject to potential bias. Although the substance use frequency variable was a composite that included biological

data, this data was collected as part of standard clinical care as opposed to standardized research outcome measures. On the other hand, the present study has the benefit of exemplifying the application of DBT in a standard community substance use clinic setting.

Nonetheless, this is the first study to show improved emotion regulation in BPD patients receiving DBT and to show that such improvement mediates improvement in an impulsive, maladaptive behavior (substance abuse). On the basis of these findings emotion regulation assessment is recommended for future studies of the etiology and maintenance of psychiatric disorders associated with emotion dyregulation, such as BPD and substance dependence, as well as to further explore the potential role of emotion regulation as a mechanism of change for clinical intervention.

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Table 1

DERS at Baseline, Mid-treatment, and End of Treatment

Scale	Baseline Mean (SD)	Midtreatment Mean (SD)	Treatment end Mean(SD)	F(2,32)	Comparisons
NONACCEPTANCE	17.50 (6.35)	16.58 (6.26)	14.87 (3.76)	3.10	
GOALS	17.75 (4.10)	17.47 (4.41)	16.00 (3.91)	2.28	
IMPULSE	19.21 (5.10)	17.53 (5.00)	16.00 (4.19)	5.36**	T1 > T3
AWARENESS	19.92 (3.73)	18.42 (4.60)	14.93 (3.33)	10.68***	T1 = T2 > T3
STRATEGIES	27.58 (6.79)	25.53 (7.11)	21.20 (6.18)	16.91***	T1 > T2 > T3
CLARITY	15.75 (2.11)	14.95 (3.06)	12.00 (3.02)	11.48***	T1 = T2 > T3
DERS TOTAL	118.00 (18.47)	108.00 (22.23)	94.80 (17.89)	16.44***	T1 > T2 > T3

Notes: n = 24 at baseline; n = 19 at midtreatment; n = 15 at treatment end.

* $p < .05$;

** $p < .01$;

*** $p < .001$.

Differences are calculated as one-way repeated measures ANOVAs using the SAS Proc Mixed procedure to account for missing data. T1 = Baseline; T2 = Midtreatment; T3 = End of Treatment.