Dialectical behavior therapy skills for transdiagnostic emotion dysregulation: A pilot randomized controlled trial

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Abstract

Difficulties with emotions are common across mood and anxiety disorders. Dialectical behavior therapy skills training (DBT-ST) reduces emotion dysregulation in borderline personality disorder (BPD). Preliminary evidence suggests that use of DBT skills mediates changes seen in BPD treatments. Therefore, we assessed DBT-ST as a stand-alone, transdiagnostic treatment for emotion dysregulation and DBT skills use as a mediator of outcome. Forty-four anxious and/or depressed, non-BPD adults with high emotion dysregulation were randomized to 16 weeks of either DBT-ST or an activities-based support group (ASG). Participants completed measures of emotion dysregulation, DBT skills use, and psychopathology every 2 months through 2 months posttreatment. Longitudinal analyses indicated that DBT-ST was superior to ASG in decreasing emotion dysregulation (d = 1.86), increasing skills use (d = 1.02), and decreasing anxiety (d = 1.37) but not depression (d = 0.73). Skills use mediated these differential changes. Participants found DBT-ST acceptable. Thirty-two percent of DBT-ST and 59% of ASG participants dropped treatment. Fifty-nine percent of DBT-ST and 50% of ASG participants complied with the research protocol of avoiding ancillary psychotherapy and/or medication changes. In summary, DBT-ST is a promising treatment for emotion dysregulation for depressed and anxious transdiagnostic adults, although more assessment of feasibility is needed.

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use of maladaptive emotion regulation strategies, such as experimental avoidance, suppression, rumination, and problematic goal setting (Aldao et al., 2010; Campbell-Sills, Barlow, Brown, & Hofmann, 2006; Kring & Sloan, 2010). Furthermore, participants with either a mood or an anxiety disorder report limited emotional clarity, fear of experiencing emotions (Campbell-Sills et al., 2006; Mennin, Heimberg, Turk, & Fresco, 2005), inappropriate emotional intensity (Etkin & Wager, 2007), inability to modulate emotions based on contextual demands (Koele, 2009; Rottenberg, Kasch, Gross, & Gotlib, 2002), and intense reactions to nonthreatening cues (Kross, Davidson, Weber, & Ochsner, 2009; Schmidt & Keough, 2010). Researchers have also argued that underlying problems with affect are common in depression and anxiety (Barlow et al., 2004).

Transdiagnostic treatments for problems with emotions are emerging (Ellard, Fairholme, Boisseau, Farchione, & Barlow, 2010). Nevertheless, more research is needed to characterize how behavioral treatments change emotion dysregulation across disorders. Our aim was therefore to test an intervention designed to reduce transdiagnostic emotion dysregulation. Neacsiu et al. (2013) presented a transdiagnostic treatment model for emotion dysregulation. The model includes teaching skills that help the individual reduce under- and over-regulation to emotions; manage situations that cue emotions; control attention toward or away from emotional stimuli; interpret emotional cues; manage biological, experiential, and action changes; and process emotions.

This treatment model was derived from dialectical behavior therapy (DBT; Linehan, 1993a), an empirically supported treatment for suicide and for borderline personality disorder (BPD; for a review see Neacsiu & Linehan, 2014). DBT is based on a skills deficit model that views dysfunctional behavior as either a consequence of dysregulated emotions or a maladaptive approach to emotion regulation (Linehan, 1993a, 1993b). Consequently, DBT includes more than 60 concrete skills (translated from behavioral research and other evidence-based treatments) that are grouped into four modules: (a) mindfulness skills, which emphasize observing, describing, and participating in the present moment effectively and without judgment; (b) emotion regulation skills, including strategies for changing emotions and the tendency to respond emotionally; (c) interpersonal effectiveness skills, ranging from acting assertively to maintaining self-respect; and (d) distress tolerance skills, including strategies to control impulsive actions and to radically accept difficult life events (Linehan, 1993b). These skills map onto the treatment model for emotion dysregulation (Table 1), offering a comprehensive intervention for the lack of adaptive skills and use of maladaptive strategies that define emotion dysregulation (Neacsiu et al., 2013).

Emerging evidence suggests that DBT skills training (DBT-ST) reduces problems with emotions and is feasible to implement with a variety of mental disorders. DBT-ST outperformed treatment as usual in decreasing depression in treatment-resistant individuals (Harley, Sprich, Safren, Jacobo, & Fava, 2008) and in decreasing depression, anxiety, and anger in a BPD sample (Soler et al., 2009). When compared to an active control condition, DBT-ST equally reduced emotion dysregulation and problems with anger, anxiety, and depression for participants diagnosed with eating disorders (Safer, Robinson, & Jo, 2010). Evidence also suggests that increased use of DBT skills mediates the relationship between time in treatment and changes in depression, anger control, and suicidal behavior across multiple treatments in BPD samples (Neacsiu, Rizvi, & Linehan, 2010). Thus, DBT skills use may be a mechanism of change for emotion dysregulation.

In the current outcome study, we pilot tested DBT-ST as a transdiagnostic intervention for emotion dysregulation using a randomized controlled trial (RCT) designed to control for common therapy factors. We targeted non-BPD adults with high emotion dysregulation who met criteria for at least one anxiety or depressive disorder. We chose to target adults with clinical anxiety or depression because emotion dysregulation had been most strongly connected with depression and anxiety (see Aldao et al., 2010; Cisler et al., 2010; Kring & Bachorowski, 1999) and because we wanted to ensure the sample had significant clinical distress.

We had two primary aims. First, we assessed the unique effects of DBT-ST on emotion dysregulation. We hypothesized that (a) DBT-ST would reduce emotion dysregulation significantly more than an activities-based support group (ASG) and (b) DBT skills use would mediate the differential changes between conditions. Second, we explored (a) the unique effects of DBT-ST on depression and anxiety severity, (b) whether DBT skills use mediated differential changes, and (c) whether confounding effects explained any significant findings. As a supplementary aim, we also examined the feasibility of DBT-ST for a transdiagnostic sample based on (a) retention rates, (b) treatment credibility and satisfaction, and (c) compliance with the ancillary treatment protocol.

**Method**

**Participants and design**

Intent-to-treat (ITT) participants were 44 men and women from a metropolitan area in the Northwestern United States. Participants were included if they were older than 18 years of age, scored high in emotion dysregulation (above 96 on the Difficulties in Emotion Regulation Scale; DERS; Gratza & Roemer, 2004), and met criteria for at least one current depressive or anxiety disorder on the

<table>
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<tr>
<th>Week Module</th>
<th>Selected skills</th>
<th>Target problems with</th>
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<tr>
<td>1 Mindfulness</td>
<td>Wise Mind, Observe</td>
<td>All components</td>
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<tr>
<td>2 Emotion Regulation</td>
<td>Understand, Identify &amp; Label Emotions</td>
<td>Processing emotions</td>
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<td>3 Distress Tolerance</td>
<td>Mindfulness review</td>
<td>Cognitive Change</td>
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<td>4 Interpersonal Effectiveness</td>
<td>Mindfulness of Thoughts</td>
<td>Cognitive change</td>
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<td>5 Interpersonal Validation</td>
<td>DEAR MAN GIVE FAST</td>
<td>Managing situations that cue emotions</td>
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<tr>
<td>6 Mindfulness</td>
<td>Mindful, Effective</td>
<td>Managing vulnerability to emotions</td>
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<td>16 Mindfulness</td>
<td>Mindful, Effective</td>
<td>Managing vulnerability to emotions</td>
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Note. In which participants could join the group are boldface.

*See Neacsiu, Bohus, and Linehan (2013) for a full description of the treatment model of emotion dysregulation.

bDBT skills training module in the original skills manual (Linehan, 1993b).
Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I; First, Spitzer, Gibbon, & Williams, 1995). Participants were excluded if they scored above 2.5 on the Borderline Symptom List-23 (BSL-23; Bohus et al., 2009) or met full criteria for BPD on the Structured Clinical Interview for DSM-IV Axis II Personality Disorders (SCID-II; First, Gibbon, Spitzer, Williams, & Benjamin, 1997). Participants were also excluded if they (a) were at high risk for suicide (had attempted suicide within the past year or had current suicidal ideation with a specific plan), (b) were mandated to psychological treatment, (c) were homeless, (d) could not attend group, (e) had received more than five sessions of outpatient DBT, (f) could not communicate in English, (g) met criteria for a bipolar or psychotic disorder, (h) had a verbal IQ of less than 70 on the Peabody Picture Vocabulary Test-Revised (PPVT-R; Dunn, 1981), or (i) met criteria for a life-threatening disorder (e.g., severe anorexia). To be included, participants had to verbally agree to remain on the same dosage (if any) of psychotropic medication and to refrain from participating in ancillary psychotherapy. The University of Washington (UW) Institutional Review Board approved all research procedures.

Screening

To recruit participants, we distributed study flyers and brochures in the community and contacted clinicians to offer the study as a potential low-cost referral. We screened 406 participants by phone and further screened qualified participants in person. Fifty-seven participants met all eligibility criteria (Fig. 1). The DERS cutoff was set at one standard deviation above the pooled grand mean for control samples ($GM = 77.33, pSD = 19.52$) in experimental studies published before July 2010. These samples had 1365 total participants who (a) did not meet criteria for any disorder (Fox et al., 2007; Harrison et al., 2009), (b) did not meet criteria for the

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Fig. 1. Participant flowchart. DBT-ST = dialectical behavior therapy skills training; ASG = activities based support group; discontinued intervention = participants who discontinued the intervention but continued participating in assessments; lost to follow-up = participants who dropped out of the study completely (discontinued the intervention and did not participate in any additional assessments); DERS = Difficulties in Emotion Regulation Scale; BSL = Borderline Symptoms List
disorder of interest in the study (Salter-Pedneault et al., 2006; Whiteside et al., 2007), or (c) were from the general population (Cohn, Jakupcak, Seibert, Hildebrandt, & Zeichner, 2010; Gratz & Roemer, 2004).

Four assessors who were blind to treatment assignment and trained to reliability with the UW Behavioral Research and Therapy Clinics gold standard conducted the in-person interviews. Interrater reliability for 20% of SCID-I interviews (14/67) was moderate to outstanding (κ range: .44–1.00; Landis & Koch, 1977). The only diagnosis with low reliability was specific phobia. All other diagnoses had acceptable reliabilities (> .60). To improve reliability, a different assessor subsequently coded all remainingITT SCID-I interviews. Discrepancies were resolved through discussion with the first author, leading to 100% agreement. Interrater reliability for 20% of SCID-II-BPD interviews (19/91) was outstanding (κ = .88, SD = 0.11).

Power and randomization

We determined sample size based on power analyses aimed at detecting longitudinal emotion dysregulation differences between conditions. Data from a recently completed RCT and a published RCT suggested that we could expect an effect size ranging from 0.89 to 1.53 (Gratz & Gunderson, 2006; Linehan, 2013). We conducted power analyses in Optimal Design (Raudenbush et al., 2011), a software package designed for hierarchical linear modeling (HLM). In HLM, a slope is created for each participant completing at least one assessment time point. The differences between these slopes (nested within conditions) are subsequently analyzed. An HLM power analysis helps determine how many individual slopes are needed to detect the expected effect size. Our power analysis indicated that, to reach 80% power with an effect size of 0.89, 42 participants would need to complete the DERS at least once. We therefore recruited 48 participants, allowing for a 10% loss of data (from participants who do not complete any assessments). Using a minimization randomization algorithm (Pocock & Simon, 1975) to match participants on gender, primary diagnosis (depressive/anxiety disorder), and psychotropic medication use (present/absent), we assigned the 48 participants equally to either DBT-ST or ASG. Four participants withdrew before treatment started and did not complete any assessment, leaving 44 participants for ITT analyses (Fig. 1).

Assessment schedule

Treatments and data collection occurred between November 2010 and January 2012. Assessments were conducted (a) at pretreatment, (b) after 2 months, (c) at the end of treatment, and (d) at a 2-month follow-up. Participants completed brief interviews and self-reports measuring skills use, emotion dysregulation, psychopathology, feasibility, and confounding factors at each assessment period, except where noted below. Participants received up to $100 in compensation for completing all the study assessments.

Outcome measures

**DBT Ways of Coping Checklist (DBT-WCC)** *(Neacsiu, Rizvi, Vitaliano, Lynch, & Linehan, 2010)*

The DBT-WCC is a 59-item self-report of the frequency of adaptive and maladaptive skills used to manage difficult situations over the past month. We used only the DBT Skills Subscale (DSS), which includes general descriptions of skillful behavior without using DBT-specific language. In several BPD samples, the DSS had excellent internal consistency (Cronbach’s α = .92 – .96), good test–retest reliability (r = .71), and evidence for criterion validity (Neacsiu, Rizvi, & Linehan, 2010; Neacsiu, Rizvi, Vitaliano, et al., 2010). In the present study, internal consistency at pretreatment was high (Cronbach’s α = .86).

**Patient Health Questionnaire-9 (PHQ-9; Kroenke, Spitzer, & Williams, 2001)**

Given that some established measures of depression (e.g., Beck Depression Inventory; BDI; Beck, Steer, & Brown, 1996; Hamilton Depression Rating Scale; HAM-D; Hamilton, 1960) are not free for clinicians and that recent findings have led to questions about their accuracy (e.g., Bagby, Ryder, Schuller, & Marshall, 2004), we used the PHQ-9, a newer measure that is easy to administer, psychometrically strong, and clinician friendly. The PHQ-9 is a 9-item self-report that is sensitive to clinical change and that closely resembles DSM criteria. The PHQ-9 has shown good test–retest reliability (r = .84) over 2 days, and a cutoff of 9 had high sensitivity and specificity in identifying major depressive disorder (MDD; McMilan, Gilbody, & Richards, 2010).

A growing body of evidence supports that the PHQ-9 has validity and reliability comparable to those of the BDI or the HAM-D. The PHQ-9 is strongly correlated with both measures (e.g., r_{BDI-II} = .84; Dum, Pickren, Sobell, & Sobell, 2008; r_{HAM-D} = .79; Cameron et al., 2011), as responsive as the BDI to change (Titov et al., 2011), and recommended over the BDI-II (Titov et al., 2011). Both the PHQ-9 and the BDI-II tend to overestimate depression severity when compared with the HAM-D (Cameron et al., 2011). Internal consistency at pretreatment was good (Cronbach’s α = .74).

**Overall Anxiety Severity and Impairment Scale (OASIS; Norman, Hami-Cissell, Means-Christensen, & Stein, 2006)**

Using a similar rationale as for depression, we identified a free, easy-to-interpret, psychometrically strong self-report for anxiety severity. The OASIS is a 5-item measure of general anxiety over the past week with strong test–retest reliability (r = .82), strong convergent and discriminant validity, good internal consistency (Cronbach’s α = .80), and adequate sensitivity and specificity. In one study, a cutoff of 7 on the OASIS correctly classified 87% of patients with an anxiety disorder, and scores did not significantly vary with the anxiety disorder identified as most distressing (Campbell-Sills et al., 2009). Other research also supports this cutoff (e.g., Norman et al., 2011). Internal consistency in the present study at pretreatment was acceptable (Cronbach’s α = .79).

**Confound and feasibility measures**

**Brief Treatment History Interview (B-THI)**

The B-THI is a short version of the Treatment History Interview (Linehan & Heard, 1987) that contains face-valid questions about treatments received in the past 2 months. Use of psychotropic medication and receipt of ancillary psychotherapy (each yes/no) were tested as confounds.

**Addiction Severity Index Self-Report Form (ASI-SR)**

The ASI-SR is a self-report version of the ASI (McLellan et al., 1992). A subsection of the ASI-SR was used to assess illicit drug use over the previous month, which was tested as a confound.
Credibility and Expectancy of Improvement Scales (CEIS)

Treatment credibility and satisfaction were assessed with an adaptation of Borkovec and Naus’s (1972) scale. Participants reported on a 9-point scale how logical the treatment seemed (one item), how successfully it would reduce their anxiety and/or depression (two items), and how confidently they would recommend it to a friend (two items). Expectancy of improvement (Borkovec & Mathews, 1988) in anxiety and/or depression was assessed with two items on a 0–100% scale. Credibility and expectancy after the first group session (Cronbach’s αs = .91 and .94, respectively) and at 2 months were tested as confounds. Four-month ratings of confidence in recommending the therapy and attribution of improvement to the treatment were analyzed as feasibility outcomes.

Treatments

Each participant attended a weekly 2-h group therapy session for 16 weeks and paid for each session on a sliding scale of $0–65. The groups were open and ongoing, and participants could join at weeks 1, 2, and 9 of the curriculum (see Table 1). Each participant had access to 16 sessions of group therapy and met individually with their group therapists once for a 30-min private orientation session in which a crisis plan was established. Outside of this session, participants did not have any contact with an individual therapist. Participants who missed 4 consecutive weeks were considered treatment dropouts but could still participate in assessments. If they declined assessment participation, they were considered study withdrawals (and were marked as “lost to follow-up” in Fig. 1). Each group had a leader (a trained master’s-level therapist) and a coleader (an untrained bachelor’s-level assistant).

DBT-ST

DBT-ST was designed to retain the essence of standard DBT, adopting the same philosophical base, treatment strategies, and treatment targets. The DBT-ST therapist focused on teaching participants DBT skills and utilized modeling, step-by-step instructions, structured behavioral rehearsal exercises, feedback, and homework assignments for this purpose.

DBT-ST included two modifications to standard DBT that the treatment developer approved. First, the protocol was shortened from 24 weeks to 16 (Table 1) to correspond in length with other evidence-based treatments for this population (e.g., Dimidjian et al., 2006). To this end, skills from the interpersonal effectiveness module were taught together with distress tolerance in a shorter amount of time than recommended by the original manual (Linehan, 1993b). This decision was based on evidence that interpersonal skills may not be needed to reduce emotion dysregulation (Gratz & Gunderson, 2006). Second, because of financial constraints, the group coleader was not a trained DBT therapist.

Each session started with a mindfulness practice and review of homework (~40 min) and ended with skills instruction and homework (~30 min). Participants chose each week (~50 min). The most commonly discussed topics were anger, anxiety, communication, coping, goals, sleep, stress, and depression. For homework, participants were asked to think about issues discussed and to track daily social support on diary cards.

Therapists and supervision

DBT groups were led by the first author, a master’s-level clinician who had participated in several DBT trainings (including a weeklong intensive training) and had 3 years of experience providing DBT under the supervision of the treatment developer. An expert DBT supervisor watched sessions and provided supervision weekly. In accordance with the DBT model, the therapist and coleaders also attended weekly DBT team meetings.

Two clinicians who held Master of Social Work degrees and who had 3 years of experience conducting group psychotherapy led the ASG groups. Before the study started, both therapists studied the ASG manual and were trained in the study protocols by an expert community clinician who had prior experience conducting and supervising ASG groups. The therapists also received training in suicide assessment and management from the first author. ASG therapists and coleaders received weekly supervision from the community expert.

Adherence

An independent coder trained to reliability with the clinic gold standard in the DBT Global Rating Scale (Linehan & Korslund, 2009) rated 10% of the DBT group sessions for adherence. Because no adherence scale for supportive therapy could be found, we developed a coding system (available upon request) to assess adherence to ASG. A coder naive to DBT was trained in the ASG adherence scale and rated 20% of the ASG sessions. We decided to code more sessions for ASG adherence because the measure used had not been validated.

Ancillary treatment changes

Participants were classified as compliant or noncompliant with the ancillary treatment protocol at each assessment period. Participants were deemed noncompliant if they reported (a) adding, dropping, or changing the dosage of a psychotropic medication or (b) seeing a psychotherapist outside the study. Participants were allowed to continue regardless of their compliance. Noncompliance was tested as confound.

Statistical analysis

Longitudinal outcomes

HLM (Bryk & Raudenbush, 1992) was used to assess differences between conditions over time. Appropriate covariance structures were analytically determined (Verbeke, 1997), and the analyses included a restricted estimated maximum likelihood model to account for missing data (Schafer & Graham, 2002). Assuming that the main effects could be different during the active phase of treatment vs. the follow-up phase of the study, we separated the time variable into two legs. The first leg (time1) was coded as continuous throughout treatment and constant at follow-up, whereas the second leg (time2) was coded as constant throughout treatment and continuous at follow-up. Time1 and time2 were both used as fixed effects and together yielded two time-by-condition interactions (one for treatment and one for follow-up). Each analysis included four a priori contrasts—two for each study phase—to assess the significance of each condition.

Confounds

To assess whether another variable better explained treatment effects, we tested confounds as covariates. Each analysis added to the model described above the potential confound and two time-by-confound interactions (one for time1 and one for time2) as fixed effects. If the confariate main effect was significant, it was kept in the outcome's HLM model as a moderator; if it was not significant, it was removed. We tested six confounds: (a) use of psychotropic medication, (b) receipt of ancillary psychotherapy, (c) illegal drug use (each yes/no), (d) treatment credibility, (e) expectancy of improvement, and (f) age. In addition, we assessed whether ancillary treatment changes (i.e., changing medication dose, starting/stopping a medication, or participating in ancillary psychotherapy) explained treatment effects, by conducting independent analyses on only participants who complied with the study requirement to maintain ancillary treatments unchanged.

Clinically significant change

Following Jacobson and Truax's (1991) method, we used change scores, instrument reliability, and clinical and nonclinical distributions to classify each participant as deteriorated/unchanged, improved, or recovered.

Mediation

We tested mediation hypotheses using Krull and MacKinnon's (2001) statistical procedures and the specifications described by Kramer, Wilson, Fairburn, and Agras (2002). Tofighi and MacKinnon's (2011) distribution-of-the-product method was employed to compute the mediation effect ($p$ path) and the confidence interval (CI) that determined its significance. Mediation equations used a single-level HLM model in which the overall condition effect throughout the study was the independent variable. We computed the percentage of the total effect explained by the mediator to better understand these results.

Results

Sample characteristics and baseline differences

ITT participants were primarily single, heterosexual, Caucasian women who met criteria for multiple Axis I disorders ($M_{diagnoses} = 2.68$, SD = 1.21 in DBT-ST; $M_{diagnoses} = 2.59$, SD = 1.44 in ASG). Current GAD, MDD, and dysthymia were the most frequent diagnoses. Randomization successfully matched participants on gender, psychotropic medication use, and primary diagnosis. No significant demographic differences emerged (Table 2). At pretreatment, 18 participants (40.9% in each condition) reported taking a mean of 1.39 (SD = 0.61) medications for anxiety, depression, or mood (Supplementary Table S1). Participants joined their assigned therapy groups, on average, 13.66 days after pretreatment (SD = 12.72), and no significant difference arose between conditions, $t(42) = -0.18$, $p = .86$.

The average adherence score for a random sample of 6 out of 64 DBT-ST sessions was 4.0 (SD = 0.18), indicating that the treatment was adherent to the DBT model. In addition, only 1 out of 9 randomly selected ASG sessions (43 total) was nonadherent.

Preliminary analyses

A preliminary examination of outcomes showed that, for the entire ITT sample at pretreatment, depression severity moderately correlated with skills use ($r = -3.32$, $p < .05$) and anxiety severity ($r = .31$, $p < .05$). We found no other significant correlations between outcomes ($ps > .05$). HLM main effects, slope estimates, and standard errors for ITT and completer analyses are included in Table 3. (Supplementary Fig. 1 shows raw score averages for the ITT sample.) Confound analyses showed that use of psychotropic medications significantly predicted change in emotion dysregulation on the DERS, $\hat{f}(1, 152.91) = 5.87, p < .05$; therefore, this confound was included as a covariate in DERS analyses. No other confound was significant (Supplementary Table S2).

For clinical significance analyses, we computed cutoffs based on Jacobson and Truax's (1991) specifications using DERS data from nonclinical (Fox et al., 2007; Harrison et al., 2009) and clinical (Harrison et al., 2009; Salters-Pedneault et al., 2006; Whiteside et al., 2007) samples and PHQ-9 and OASIS data from nonclinical (Kroenke et al., 2001), depressed (McMillan, Gilbody, & Richards, 2010), and anxious (Norman et al., 2011) samples. For reliable change indices (RCIs), we used the test—retest reliabilities reported in the original validation studies for all measures except the DERS, for which we computed reliability using data from 30 ITT participants who completed the measure both on the phone and at pretreatment ($r = .47, p < .01$). See Fig. 2 for results.

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**Table 2**

| Participant demographic and clinical characteristics by condition ($n = 22$ in each). |
|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Demographic | DBT-ST | ASG | Test | p | Current disorder | DBT-ST | ASG | Test | p |
| Age (years)$^a$ | 32.27 (10.50) | 38.82 (13.55) | $t(42) = -1.79$ | .08 | Depressive disorder | 68.2% | 68.2% | $\chi^2(1) = 0.00$ | 1.00 |
| Female$^b$ | 68.2% | 63.6% | $\chi^2(1) = 0.10$ | .75 | Major depression | 50.1% | 40.9% | |
| Racial background | | | | | Dysthyemic disorder | 4.5% | 45.5% | |
| Caucasian | 95.4% | 90.9% | | | NOS | 4.5% | 0.0% | |
| Hispanic ethnicity | 4.5% | 9.1% | FE | 1.00 | Anxiety disorder | 90.9% | 86.4% | FE | 1.00 |
| LGBTQ | 18.2% | 13.6% | FE | 1.00 | Panic | 9.1% | 18.2% | |
| Single/divorced$^c$ | 81.8% | 61.2% | $\chi^2(1) = 0.30$ | .30 | Agoraphobia | 4.5% | 9.1% | |
| Education | | | $U = 221.00$ | .55 | Generalized anxiety | 77.3% | 54.5% | |
| ≥ College graduate | 63.6% | 72.7% | | | Social phobia | 36.4% | 36.4% | |
| No. BPD symptoms$^d$ | 3.20 (2.50) | 2.41 (1.30) | $U = 199.00$ | .30 | Specific phobia | 13.6% | 22.7% | |
| Lifetime disorder | | | | | Obsessive-compulsive | 18.2% | 4.5% | |
| Depressive disorder | 95.5% | 81.8% | FE | .35 | Posttraumatic stress | 13.6% | 4.5% | |
| Anxiety disorder | 72.7% | 72.7% | $\chi^2(1) = 0.00$ | 1.00 | NOS | 4.5% | 13.6% | |
| SUD | 40.9% | 59.1% | $\chi^2(1) = 0.23$ | .23 | SUD | 13.6% | 0.00% | FE | .23 |

Note: DBT-ST = dialectical behavior therapy skills training; ASG = activities-based support group; LGBTQ = Lesbian, Gay, Bisexual, Transgender, Questioning; NOS = not otherwise specified; SUD = substance use disorder; FE = Fisher's Exact test.

$^a$ $M$ (SD) reported.

$^b$ Between-condition analysis compares males vs. females.

$^c$ Between-condition analysis compares married vs. not married.
Change in emotion dysregulation as a function of skills use

ITT analyses revealed that during treatment participants in both conditions reported significantly less emotion dysregulation over time but that those in DBT-ST improved significantly more and faster ($d = 1.86$). We found no significant difference in slopes for participants who were vs. were not taking psychotropic medications; therefore, we present slope results per condition combining participants regardless of medication use (Table 3). At follow-up a significant time-by-condition interaction favored ASG. Although neither the DBT-ST nor the ASG slope was significant, participants in DBT-ST trended toward losing some of their gains, while participants in ASG trended toward continuing to improve.

Completer analyses ($n = 24$) yielded similar findings, except only medications; therefore, we present slope results per condition combining participants regardless of medication use (Table 3). At follow-up a significant time-by-condition interaction favored ASG. Although neither the DBT-ST nor the ASG slope was significant, participants in DBT-ST trended toward losing some of their gains, while participants in ASG trended toward continuing to improve. Completer analyses ($n = 24$) yielded similar findings, except only medications; therefore, we present slope results per condition combining participants regardless of medication use (Table 3). At follow-up a significant time-by-condition interaction favored ASG. Although neither the DBT-ST nor the ASG slope was significant, participants in DBT-ST trended toward losing some of their gains, while participants in ASG trended toward continuing to improve.

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Note. HLM = hierarchical linear model; TX = treatment phase; DBT-ST = dialectical behavior therapy skills training; ASG = activities-based support group; FU = follow-up phase; DERS = difficulties in emotion regulation scale; DBT-WCCL = dialectical behavior therapy ways of coping checklist; PHQ-9 = patient health questionnaire – depression module; OASIS = overall anxiety severity and impairment scale. When necessary completer analyses used transformations using exponential or square-root functions. Only participants who at pretreatment scored over the PHQ-9 cutoff ($n_{ITT} = 36$; $n_{completer} = 19$) or OASIS cutoff ($n_{ITT} = 20$; $n_{completer} = 35$) were included in the PHQ-9 and OASIS analyses.

*p < .05.

**p < .01.

***p < .001.

### Change in emotion dysregulation as a function of skills use

ITT analyses revealed that during treatment participants in both conditions reported significantly less emotion dysregulation over time but that those in DBT-ST improved significantly more and faster ($d = 1.86$). We found no significant difference in slopes for participants who were vs. were not taking psychotropic medications; therefore, we present slope results per condition combining participants regardless of medication use (Table 3). At follow-up a significant time-by-condition interaction favored ASG. Although neither the DBT-ST nor the ASG slope was significant, participants in DBT-ST trended toward losing some of their gains, while participants in ASG trended toward continuing to improve.
ASG completers taking medication significantly improved in emotion regulation during treatment: slope estimate_{ASG-meds} = -6.56; SE = 4.49; t(75.53) = -1.46, p = .15; slope estimate_{ASG-no meds} = -10.57; SE = 4.87; t(78.11) = -2.17, p = .03. Clinical significance analyses (Fig. 2) showed a significant difference in recovery from emotion dysregulation favoring DBT-ST at each time point (U₂ months = 135.00, U₄ months = 99.50, U₆ follow-up = 117.00, ps < .05).

Longitudinal ITT analyses using the DBT-WCCL indicated that during treatment only DBT-ST participants significantly increased their skills use over time (d = 1.02). During follow-up, participants did not change significantly, suggesting that DBT-ST participants maintained their gains. By the end of treatment, the skills use reported by ITT participants increased by 16.0% in DBT-ST and 3.5% in ASG. Completer analyses showed similar results, although the interaction effect during treatment was only a trend (Table 3). Significant differences in classification (ps < .05) based on clinical significance analyses favored DBT-ST at 4 months (U = 92.00) and at follow-up (U = 108.00; Fig. 2). Skills use significantly mediated the relationship between condition and improvement in emotion regulation (Table 4).

We conducted secondary analyses for the ITT sample to explore differential changes between conditions in the different facets of emotion dysregulation (Supplementary Figure S2). During treatment DBT-ST participants increased their goal-directed behavior and use of regulation strategies in emotional situations significantly more than ASG participants: F_{interaction}(1, 130.14) = 6.03, p < .05; F_{interaction}(1, 138.16) = 10.90, p < .01; respectively. Gains were maintained at follow-up for both DERS subscales: F_{interaction}(1, 137.72) = 3.87, p = .05; F_{interaction}(1, 132.34) = 3.09, p = .08; respectively. For all other subscales, between-condition differences were not significant (ps > .05).

Changes in psychopathology

Depression severity

Thirty-six ITT participants who were clinically depressed at pretreatment based on a score above the clinical cutoff (9) on the PHQ-9 were analyzed for differential changes over time in depression severity. During treatment, participants in both conditions improved significantly and similarly (d = 0.73). During follow-up, no main effect of time was present, but a trend for an interaction favored ASG. After treatment, DBT-ST participants slightly worsened, reporting a significant increase in depression severity from the end of treatment to follow-up, while ASG participants did not report a significant change. Even with losses in depression gains, DBT-ST participants still reported significant decreases during the study in their depression severity. The effect size for change from pretreatment to follow-up it was 1.59 in DBT and 1.47 in ASG. Completer analyses indicated that only DBT-ST led to significant improvement in depression severity during treatment, although the time-by-condition interaction was not significant. At follow-up no significant change for treatment completers was present, suggesting DBT-ST completers maintained their gains (Table 3). Clinical significance analyses revealed no significant difference in classification between conditions (Fig. 2). Use of skills significantly mediated the relationship between condition and change in depression severity (Table 4).

Anxiety severity

Thirty-five ITT participants who were clinically anxious at pretreatment based on a score above the clinical cutoff (7) on the OASIS were analyzed for differential changes in anxiety severity. During treatment, participants in both conditions reported a significant decrease in their anxiety severity, but DBT-ST participants improved significantly faster (d = 1.37). Follow-up analyses showed no significant effect of time but revealed a significant interaction favoring ASG. DBT-ST participants lost some of their gains from the end of treatment to follow-up. Even with the loss in some gains, DBT-ST participants still reported a significant decrease in their anxiety severity from pretreatment to the end of the study. The effect size for changes from pre- to post-treatment was 1.34 in DBT-ST and 0.67 in ASG; from pretreatment to follow-up it was 1.98 in DBT-ST and 1.08 in ASG. Completer analyses revealed similar results, with the interaction effect approaching (although not reaching) significance during treatment (Table 3). Clinical significance analyses revealed no significant difference in classification between conditions for anxiety (Fig. 2). Because the overall main effect of condition was not significant for anxiety severity, we followed Kramer et al.’s (2002) guidelines and added the interaction between skills use and condition to the mediation model. We found significant condition and interaction effects, F(1, 147.65) = 5.03, F(1, 153.39) = 4.43, respectively, ps < .05. Thus, skills use mediated anxiety severity differentially by condition.

Feasibility of treatment and research protocol

More participants dropped treatment in ASG (n = 13) than DBT-ST (n = 7), a nonsignificant difference. χ²(1, 44) = 3.3, p = .07. Clients attended, on average, two thirds of the sessions in DBT-ST (M = 10.27, SD = 4.72) and half in ASG (M = 7.73, SD = 5.21; U = 177.50, p = .13). At the end of treatment, participants in DBT-ST attributed significantly greater improvement in depression and/or anxiety (M = 53.33%, SD = 21.14) to their treatment than participants in ASG (M = 26.88%, SD = 25.81), t(32) = 3.28, p < .01. In addition, DBT-ST participants reported significantly higher confidence in recommending their therapy to a friend (M = 6.58,
SD = 2.35) than participants in ASG (M = 4.06, SD = 2.86),
t(32) = 2.82, p < .01.

During treatment and follow-up, 13 clients (5 in DBT-ST, 8 in
ASG) changed their medication, and 12 clients (7 in DBT-ST, 5 in
ASG) participated in ancillary psychotherapy. In total, 20 clients (9
in DBT-ST, 11 in ASG) did not comply with the research requirement
of not engaging in ancillary psychotherapy or making changes to
psychotropic medication regimens throughout the study. Of these,
6 in DBT-ST and 5 in ASG were treatment completers. We con-
ducted independent HLM analyses including only compliant ITT
participants (13 in DBT-ST, 11 in ASG) and found similar results with
two exceptions: (a) compliant ASG participants did not report
significant reductions over time in difficulties with emotion regu-
lation, depression severity, or anxiety severity (ps > .05) and (b) no
significant interaction effect at follow-up for emotion dysregulation
emerged (Supplementary Table S3).

Discussion

The present study is a preliminary examination of DBT skills
training (DBT-ST) as a stand-alone treatment for emotion disre-
gulation in a transdiagnostic sample. Compared with a supportive
therapy control condition (ASG), DBT-ST was superior in reducing
emotion dysregulation, increasing skills use, and reducing anxiety
severity in adults who met criteria for depressive and/or anxiety
disorders. Although DBT-ST was comparable to ASG in reducing
depression severity, recovery from depression was twice as high in
DBT-ST (71.4%) as in ASG (31.3%) based on clinical significance
analyses. Differential improvements between conditions were not
better explained by use of psychotropic medication or illicit drugs,
participation in ancillary psychotherapy, expectancy of improve-
ment, treatment credibility, or age. Moreover, use of DBT skills
mediated differential changes between conditions in emotion
dysregulation and psychopathology. Participants also found the
interventions acceptable, although dropout from treatment was
high (32% in DBT-ST, 59% in ASG) and 45% of participants did not
comply with the research protocol to keep ancillary treatments
constant. Although neither noncompliance nor dropout impacted
our results, the feasibility of DBT-ST as a stand-alone treatment
needs further investigation. Taken together, these findings suggest
that (a) DBT-ST may be a promising transdiagnostic intervention
that contains an active mechanism of change for reducing emotion
dysregulation, (b) targeting emotion dysregulation trans-
diagnostically has a positive effect on anxiety and depression
severity, and (c) future studies should more thoroughly examine
and improve the feasibility of DBT-ST as a stand-alone intervention.

As hypothesized for our primary aim, DBT-ST participants
showed a faster reduction in difficulties with emotion regulation
than those in ASG, although both treatments were efficacious. DBT-
ST was more successful than ASG in increasing access to regulation
strategies and engagement in goal-directed behaviors during
emotional events, outcomes that directly map onto the emotion
regulation and distress tolerance skills modules taught in DBT. The
lack of a significant finding for differential changes in emotional
awareness, clarity, or acceptance suggests that additional emphasis
on mindfulness and psychoeducation about emotions may be
needed. Nevertheless, DBT-ST helped 3 times as many participants
(57.5%) score in a nonclinical range on emotion dysregulation by
the end of treatment. Moreover, only DBT-ST participants reported
using significantly more skills over time in treatment and main-
tained their gains at follow-up. By the end of the study, 47.6% of
DBT-ST participants reliably improved their skills use—only 5.6% of
ASG participants did the same. In addition to supporting the in-
ternal validity of the study, this finding highlights that the direct
teaching and practice of skills is more effective than general
discussion and support at increasing skills use. Furthermore, skills
use explained 62% of the variance in mediating the differential
improvement in emotion dysregulation between conditions, con-
firming our second hypothesis and suggesting that increased skills
use may in turn reduce emotion dysregulation.

For our second primary aim, we explored the effects of targeting
emotion dysregulation on the severity of psychopathology and
found promising results. The DBT-ST pre—post effect sizes for im-
provements in anxiety and depression severity are comparable to
those reported in trials for depression (d = 1.34 – 2.92; Dimidjian
et al., 2006; Westbrook & Kirk, 2005) and various anxiety disor-
ders (d = 0.92 – 2.06; McEvoy & Nathan, 2007; Norton & Price,
2007; Stewart & Chambless, 2009). Teaching skills had a greater
effect than offering supportive therapy in reducing anxiety severity
but had a comparable effect in reducing depression severity. These
findings suggest that not directly addressing a primary disorder,
but instead targeting a transdiagnostic problem, does not nega-
tively impact psychopathology and may lead to significant im-
provements. In addition, skills use may be a mechanism of change
for depression and anxiety severity. Future studies should more
thoroughly investigate these hypotheses.

An unexpected finding was that at follow-up DBT-ST partici-
pants showed some of the greatest improvements in emotion dysregulation,
anxiety, and depression. By contrast, ASG participants continued to
improve. We hypothesize that the motivational support or skills
guidance received during DBT-ST may explain this finding. In DBT-
ST (unlike in ASG), participants were strongly encouraged to use
skillful behavior through homework assignments, discussion, re-
wards for homework completion, and punishment (behavioral
analyses) for homework noncompliance. In addition, use of specific
skills was shaped and optimized via weekly feedback. Therefore,
during the treatment participants in DBT-ST may have been moti-
vated and coached in how to effectively use skills resulting in
greater relief from psychopathology and emotion dysregulation.
Once treatment ended and the motivational support and skills
guidance was no longer available, participants may have reduced
their efforts or may have become less effective in their use of skills,
resulting in a loss in some of the relief they had gained. Future
studies should test this hypothesis and provide solutions to
improve generalizability. Nevertheless, it is important to highlight
that participants did not lose all their gains at follow-up. Over the
course of the entire study, DBT-ST participants improved signifi-
cantly on all outcomes.

Our supplementary aim was to assess the feasibility of offering
a group treatment to a transdiagnostic sample with high emotion
dysregulation. We assessed feasibility by exploring treatment
retention rates, compliance with the research protocol, and satis-
faction with the treatment. We considered our sample difficult to
treat in light of evidence suggesting that difficulties with emotion
regulation are connected with less willingness to engage in mental
health treatment (e.g., Carrochi & Deane, 2001; Vogel et al., 2008).
In DBT-ST, 14% of participants dropped out because they wanted
individual therapy, 9% lost interest, and 9% could no longer attend
group because of scheduling issues. The treatment retention rate in
DBT-ST (68%) is lower than those of other treatments for depression
(e.g., 77%; Kwan, Dimidjian, & Rizvi, 2010; Harley et al., 2008) or
anxiety (e.g., 73%; van Ingen, Freiheit, & Vye, 2009), but consistent
with those of other treatments for transdiagnostic or difficult-to-
treat samples, including a BPD group (66%; Soler et al., 2009), an
oppositional defiant sample (60%; Nelson-Gray et al., 2006), a do-
metal violence group (67%; Iverson, Shenk, & Fruzzetti et al.,
2005), and a group of anxious and depressed participants (59%;
McEvoy & Nathan, 2007). Therefore, skills-only interventions for
clients who are difficult to treat or transdiagnostic may have higher
dropout rates than group therapies designed for specific diagnoses.
Although this finding suggests that DBT-ST is as feasible for a transdiagnostic sample as it is for other difficult-to-treat samples, it also highlights the need to reduce dropout from DBT-ST. Retention may improve by (a) allowing adjunctive individual therapy, (b) offering more groups to accommodate clients’ schedules, or (c) permitting a flexible number of sessions to allow for faster/slower improvement.

Regarding compliance, 32% of all participants obtained additional psychotherapy. The majority were noncompliant by either not ending previous psychotherapy relationships until after baseline or by seeking additional treatment during the follow-up period of the study. Analyses using only compliant participants indicated that noncompliance with the protocol did not affect our findings. Nevertheless, the rate of noncompliance is concerning for the feasibility of the intervention as a stand-alone treatment. Future research may improve compliance by allowing more time for previous therapy to end before baseline or by providing more sessions for participants who still need psychotherapy after 16 weeks.

Our results suggest that participants found DBT-ST acceptable. DBT-ST participants attributed their improvement in depression and/or anxiety to the treatment and reported above-average confidence in recommending the treatment to a friend. Although the feasibility of DBT-ST needs further evaluation, our treatment dropout, compliance, and satisfaction findings suggest that DBT-ST has promise as a stand-alone, transdiagnostic treatment for emotion dysregulation.

Our findings also have important implications for assessment. Assessment burden is a well-known problem for clients and clinicians in “real-world” mental health settings, and the structured interviews used in efficacy trials are rarely utilized in clinical practice (Garland, Kruse, & Aarons, 2003). We conducted structured interviews to establish the diagnostic profile for participants who scored over 96 on the DERS and completed an in-person screening assessment. Out of 90 participants, only one did not meet criteria for a current DSM-IV disorder on the SCID-I (but did meet criteria for MDD in partial remission). The DERS took 7 min to complete, did not require reliability training, and yielded a group of participants who responded to treatment. Thus, using the DERS with a cutoff of 97 identifies a clinical sample for which an intervention with preliminary support exists.

It is important to highlight that our main goal was to assess DBT-ST as a treatment for transdiagnostic emotion dysregulation in a clinical sample and not to develop a new treatment for anxiety or depression. Therefore, our study does not answer the important question of whether DBT-ST improves upon existing evidence-based treatments for these disorders or whether such treatments sufficiently change emotion dysregulation. Future studies should address such questions.

The present study has several limitations. First, therapist characteristics may have affected treatment effectiveness because different therapists conducted the interventions (Wampold & Serlin, 2000). Second, we had insufficient power to detect differences in several analyses (e.g., depression, completor, mediation). Third, the mediation analyses were not designed to account for the mediator-outcome temporal relationship (e.g., Mackinnon, Fairchild, & Fritz, 2007). Fourth, we had high dropout in ASC (59%) and a low number of sessions attended in both DBT-ST and ASC. Fifth, although both conditions contained equal numbers of participants with primary depressive disorders, ASC contained significantly more dysthymic participants than DBT-ST.

In summary, DBT-ST is a promising treatment for transdiagnostic emotion dysregulation, with a potentially active ingredient (skills use) and a positive effect on anxiety and depression in adults; nevertheless, DBT-ST can benefit from further assessment and development to enhance retention and protocol compliance and to maintain durable gains.

Author statement

Marsha M. Linehan receives royalties from Guilford Press for books she has written on dialectical behavior therapy (DBT). Marsha M. Linehan and Andrada D. Neacsiu receive fees for DBT trainings. Data was also presented as part of the first author’s doctoral dissertation and in conference talks.

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Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.brat.2014.05.005.

References


Dialectical behaviour therapy skills training compared to standard group therapy in 


