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Dialectical Behavior Therapy: An Intervention for Emotion Dysregulation

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Our aim in this chapter is to describe a set of emotion regulation skills developed within the context of dialectical behavior therapy (DBT; Linehan, 1993a, 1993b) and their potential to serve as a transdiagnostic intervention. DBT is a comprehensive cognitive-behavioral treatment originally developed for suicidal individuals and later expanded to suicidal individuals meeting criteria for borderline personality disorder (BPD). DBT has since been adapted to treat BPD with several comorbidities and other psychological disorders in which problems in emotion regulation lead to psychopathology. Data for the efficacy of DBT are extensive, including 43 clinical trials conducted across 21 independent research teams (for a review, see Neacsiu & Linehan, in press).

DBT conceptualizes difficulties with emotion regulation as a consequence of biosocial transactions: A biological sensitivity to emotions interacts with aversive or invalidating experiences during childhood and adolescence, and leads to neurobiological malfunction and to insufficient skills to manage the emotional system (Linehan, 1993a; Crowell, Beauchaine, & Linehan, 2009). Therefore, a primary focus in DBT is to teach clients how to regulate emotional responses actively.

In this chapter we present a model of

emotion regulation that we teach in DBT. We argue that BPD is a disorder of pervasive emotion dysregulation, and also provide examples of how this model is relevant to people without BPD who have difficulties managing emotions. We then present how the DBT skills map onto the model of emotion regulation, and how they can be used systematically to change dysregulation. We conclude by describing the research needed to evaluate the model proposed.

Emotion and Emotion Dysregulation

The DBT Model of Emotion Regulation

Similar to many others (e.g., Ekman & Davidson, 1994), in DBT we consider emotions to be complex, brief, involuntary, patterned, full-system responses to internal and external stimuli. DBT emphasizes the importance of the evolutionary adaptive value of emotions (Tooby & Cosmides, 1990). Although emotional responses are viewed as systemic, we present them to clients as comprising six transacting subsystems that are practical in both understanding and learning to regulate emotions: (1) emotion vulnerability factors; (2) internal and/or external events that serve as emotional cues; (3) interpretations

of cues; (4) emotional response tendencies, including physiological responses, cognitive processing, experiential responses, and action urges; (5) nonverbal–verbal expressive responses and actions; and (6) aftereffects of the initial emotion, including secondary emotions (see Linehan, 1993a).

Although the DBT emotion model was developed to serve a clinical population, it is interesting to note the similarities it has to the modal model of emotions that evolved in basic science (Gross & Thompson, 2007). Briefly, in the modal model, emotions originate from person–situation transactions that are relevant to one’s goals and values. Such a situation acts as a cue and draws the individual’s attention, gives rise to an appraisal of the event, and leads to an emotional response. This response is associated with behavioral displays and action tendencies, and is malleable, in that the course of the emotion is not fixed when it starts (Gross & Thompson, 2007).

Both the DBT and the modal model include the importance of attending to a cue within a relevant context, highlight appraisals as potentially influencing the course of the emotion and present how emotions directly affect context. Nevertheless, DBT places more emphasis on difficulties regulating the emotional response *after* it has already been initiated, especially when it is past the point at which it could be suppressed. Therefore, one difference between the models is that in DBT the emotional response is broken into experien-

tial and expressive responses. Research supporting the importance of this distinction for clinical populations suggests that processes occurring after the emotional firing are key for psychopathology (Aldao, Nolen-Hoeksema, & Schweizer, 2010).

An additional difference is the inclusion of emotion vulnerability factors. The construct of *emotion vulnerability* refers to the effects of distal and proximal prior events on the initiation, course, and intensity of emotional responses. For example, individuals diagnosed with BPD who meet diagnostic criteria for co-occurring posttraumatic stress disorder (PTSD; a distal vulnerability factor) report significantly higher emotion dysregulation (Harned, Rizvi, & Linehan, 2010). Similarly, sufficient sleep (a proximal vulnerability factor) leads to less emotional intensity when compared to lack of sleep (Gujar, Yoo, Hu, & Walker, 2011).

In this chapter, we reorganize Linehan’s original model (1993a) to be applicable to a wider range of disorders and to use terminology consistent with basic research models (Figure 29.1; Table 29.1). Briefly, in this model, emotions start within the context of a situation, where a cue grabs the individual’s attention. The cue is appraised or interpreted, which triggers an emotional response that comprises biological–experiential changes (including urges or response tendencies) and expressions–actions changes (including body language, facial expression, and actions). All components are affected by proximal and distal emotion vulnerability

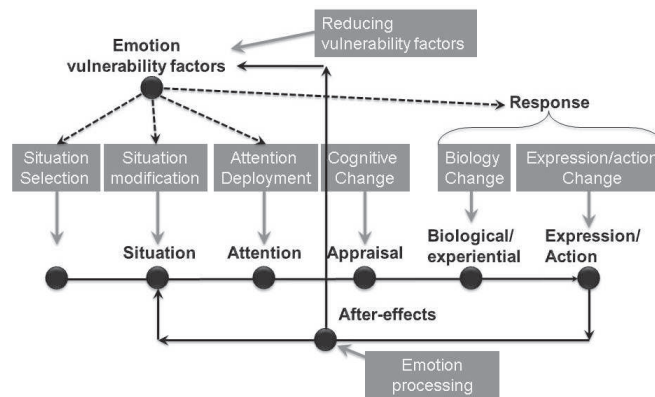


FIGURE 29.1. DBT extended model of emotion regulation. Adapted to be consistent with Gross and Thompson (2007).

TABLE 29.1. Emotion Regulation Tasks and Corresponding DBT Skills

Emotion components	Regulation strategies	DBT skills
A. Emotion Vulnerability Factors	Managing Vulnerability Factors (Biological and Contextual)	Change Biological Sensitivity (PLEASE skills) Accumulate Positives Build Mastery Cope Ahead by Covert Rehearsal [Mindfulness Skills]
B. Situation (emotional cue)	Situation Selection Situation Modification	Problem Solving Interpersonal Effectiveness Skills [Mindfulness Skills]
C. Attention	Attention Deployment	Distract Crisis Survival Skills [Mindfulness Skills]
D. Appraisal	Cognitive Change	Check the Facts Reality Acceptance [Mindfulness Skills]
E. Biological/ Experiential Response	Biological Change	Change Physiology (TIP skills) Self-Soothe Half-Smile/Willing Hands [Mindfulness Skills]
F. Expression/ Action Response	Expression and Action Change	Opposite Action [Mindfulness Skills]
G. Emotional After-Effects (including emotional awareness)	Emotional Processing	Identify and Label Emotions [Mindfulness Skills]

Note. See text for explanation of acronyms.

factors. The emotional response is followed by aftereffects, including secondary emotions.

To give an example: A depressed woman has a fight with her partner over house chores, followed by a night of poor sleep. Within the context of these *emotion vulnerability* factors, she walks into the kitchen and a pile of dirty dishes [situation] in the sink captures her *attention*. She *appraises* the situation by thinking “The dishes are dirty”; “I should have washed them”; and “I didn’t so I’m a terrible wife.” The emotion continues, with her heart beating faster, her body slumping lower; she has the urge to go to bed and hide under the covers [biological response–action urge] and she starts crying [expression–action response]. Her attention narrows [aftereffect] and, as she walks around the house, she sees the clothes [situation] she did not iron [appraisal], which refires her emotion of shame. She goes to bed and covers her head with the blanket

[action response] and subsequently becomes angry with herself [secondary emotion].

Figure 29.1 and Table 29.1 present types of strategies that can be used to change each emotion component. Like Davidson (1998) we contend that emotion regulation can be both automatic and effortful, and that regulatory processes are an integral part of emotional responding.

Pervasive Emotion Dysregulation

Emotion dysregulation is the inability, even when one’s best efforts are applied, to change *in a desired way* emotional cues, experiences, actions, verbal responses, and/or nonverbal expressions under normative conditions. Characteristics of emotion dysregulation include an excess of aversive emotional experiences, an inability to regulate intense physiological arousal, problems turning attention away from stimuli, cognitive distortions and failures in information

processing, insufficient control of impulsive behaviors related to strong emotions, difficulties organizing and coordinating activities to achieve non-mood-dependent goals when emotionally aroused, and a tendency to “freeze” or dissociate under very high stress (Ray et al., 2006). *Pervasive emotion dysregulation* refers to an inability to regulate emotions that occurs across a wide range of emotions and situational contexts.

BPD: A Disorder of Pervasive Emotion Dysregulation

The Disorder

BPD is a severe mental disorder with a serious dysregulation of the emotion system at its core. Clients show a characteristic pattern of instability in emotion regulation, impulse control, interpersonal relationship, and self-image. The often severe functional impairment leads to substantial treatment utilization and a mortality rate by suicide of almost 10%, which is 50% higher than the rate in the general population (American Psychiatric Association, 2001). BPD affects approximately 3% of the general population, up to 10% of outpatients treated for mental disorders, and up to 20% of inpatients (Trull, Jahng, Tomko, Wood, & Sher, 2010). Because of the severity of the disturbance and the intensive treatment use, clients with BPD constitute a disproportionately large subset of psychiatric patients, consuming considerably more mental health resources than most other psychiatric groups (Soeteman, Hakkaart-van Roijen, Verheul, & Busschbach, 2008).

BPD as a Disorder of Emotion Regulation

Based on clinical experience, Linehan (1993a) proposed that pervasive emotion dysregulation in BPD is caused by an interplay between biological (e.g., genetic, intrauterine factors; trauma to the biological system) vulnerability and aversive sociobiographical experiences. According to this biosocial theory, a child born with heightened biological sensitivity to emotional cues encounters emotionally aversive experiences (e.g., interpersonal violence, social rejection, emotional neglect, invalidation)

and consequently develops biological and psychological alterations of the emotion regulation system (Linehan, 1993a; Distel et al., 2011). The neurobiological alterations in the emotion circuitry manifest in adulthood as heightened emotional sensitivity (low threshold for recognition of/response to emotional stimuli), heightened reactivity (high amplitude of emotional responses), and a slow return to baseline after emotion induction (Linehan, 1993a; Crowell et al., 2009). The psychological alterations involve maladaptive or insufficient learning in how to understand, label, regulate, or tolerate emotional responses effectively. A BPD diagnosis is hypothesized to emerge from such biological alterations, coupled with insufficient knowledge about emotion regulation.

Existing evidence provides emerging support for this theory. First, 60% of clients with BPD report sexual abuse and severe interpersonal violence during childhood (Hernandez, Arntz, Gaviria, Labad, & Gutiérrez-Zotes, 2012; Bornoalova et al., 2013), which leads to significantly higher suicidality and emotion dysregulation (Harned et al., 2010). Second, animal research shows that traumatization during early life stages leads to morphological alterations of the central frontolimbic system and to behavioral and epigenetic modifications (Pryce & Feldon, 2003; Cirulli et al., 2009). Third, preliminary data connect genetic factors with the development of borderline features (Distel et al., 2009).

Neurobiological Dysfunction in BPD

Numerous studies have tested biological alterations in the emotion circuitry in BPD, with the majority of studies assessing reactivity and return to baseline. Findings are extensive and somewhat mixed; next, we present some highlights of this body of literature.

Functional and structural data support enhanced reactivity and slow return to baseline in BPD. In this population, volume reduction of the amygdala (Nunes et al., 2009) was correlated with amygdala hyperactivity to emotional stimuli (e.g., Herpertz et al., 2001; Niedtfeld et al., 2012). This heightened amygdala activation was more prominent in BPD and took longer to return to baseline when compared to clini-

cal and nonclinical controls (Hazlett et al., 2012). In addition to amygdala dysfunction, volume reductions in brain areas hypothesized to serve emotion regulation functions were also found (Tebartz van Elst et al., 2003; Minzenberg, Fan, New, Tang, & Siever, 2008). Recent studies also report reduced neural connectivity between such brain areas and the amygdala at baseline (New et al., 2007) or during emotional distress (Niedtfeld et al., 2012). Furthermore, research indicates a reduced activation of prefrontal areas after emotional induction (Minzenberg, Fan, New, Tang, & Siever, 2007; Schulze et al., 2011). These findings suggest that in BPD amygdala hyperactivity in the presence of emotional stimuli takes longer to return to baseline, partly because of insufficient modulation from brain centers responsible for emotion regulation.

Self-report and psychophysiological findings are less clear with regard to heightened reactivity in individuals diagnosed with BPD (for a detailed review, see Rosenthal et al., 2008). Across several samples, people diagnosed with BPD self-report being more reactive, having more negative emotions, and experiencing more emotional instability than non-BPD controls (Rosenthal et al., 2008; Lobbstaël & Arntz, 2010). Additional studies using heart rate as a psychophysiological measure of distress (Gratz, Rosenthal, Tull, Lejuez, & Gunderson, 2010; Reitz et al., 2012), or electrophysiological recordings (Marissen, Meuleman, & Franken, 2010) also found greater emotional reactivity for participants with BPD. Nevertheless, studies using different psychophysiological indices of distress (i.e., skin conductance response) failed to show enhanced reactivity (e.g., Kuo & Linehan, 2009; Rosenthal et al., 2008). Thus, additional research is needed to better understand the mixed findings on reactivity.

Self-report and psychophysiological data support a prolonged return to baseline. Applying ambulatory assessments under daily life conditions, Stiglmayr, Shapiro, Stieglitz, Limberger, and Bohus (2001) reported significantly longer intervals of activated aversive emotions but no nonspecific arousal for people with BPD compared to healthy controls. In addition, in a laboratory study participants diagnosed with BPD evidenced prolonged return to baseline after induced anger (Jacob et al., 2008) and stress (Reitz et al., 2012).

Emotion Dysregulation in BPD

It is important to highlight that the construct of emotion dysregulation is independent from neurobiological alterations in the emotion circuitry that are thought to underlie BPD. Having increased sensitivity, reactivity and a slow return to baseline may make it more difficult for individuals to regulate emotions. At the same time, persistent use of dysfunctional regulation strategies may lead to continued biological alteration. Whether neurobiological alterations precede dysregulation, or vice versa, remains an empirical question. Nevertheless, both constructs are crucial for understanding difficulties with emotions as presented in DBT.

We propose that individuals with BPD have pervasive emotion dysregulation. In support, below we summarize evidence suggesting that individuals diagnosed with BPD have problems with each set of emotion regulation strategies described in the DBT model. Difficulties with reducing emotion vulnerability are highlighted by findings suggesting dysregulated sleep patterns in BPD individuals (Schredl et al., 2012), high prevalence of abuse history and substance use disorders (Trull et al., 2010; Distel et al., 2012), as well as chronic health problems and poor lifestyle choices (Frankenburg & Zanarini, 2004).

Self-inflicted injuries (including suicide attempts) and most other dysfunctional behaviors (i.e., suicide threats, impulsive behaviors, dissociation) are hypothesized to be maladaptive problem-solving strategies (Reitz et al., 2012), an escape mechanism (Chapman, Gratz, & Brown, 2006), or a way to communicate distress (Koerner & Linehan, 1997). These behaviors may suggest problems with regulating the biological and expressive components of the emotion, or with selecting effective situation modification strategies. Problems with emotion-induced dissociation have also consistently been shown and suggest impairments in the attention regulation component (Ebner-Priemer et al., 2009). In addition, research has documented problems with cognitive flexibility (Ruocco, 2005), cognitive change (Selby & Joiner, 2009), emotional awareness (Levine, Marzilli, & Hood, 1997), and aftereffects (Korfine & Hooley, 2000),

suggesting difficulties with regulation of all the remaining emotion components.

The DBT Model and Other Disorders

Emotional dysregulation has been reported to underlie etiological and maintenance mechanisms for a large number of mental health problems (Kring & Sloan, 2010). Literature reviews have demonstrated that mood disorders, anxiety disorders, substance use disorders (SUDs), eating disorders, schizophrenia, and even psychotic disorders are directly linked to emotion dysregulation (Cisler, Olatunji, Feldner, & Forsyth, 2010; Harrison, Sullivan, Tchanturia, & Treasure, 2009; Kring & Werner, 2004; Thorberg, Young, Sullivan, & Lyvers, 2009).

Individuals diagnosed with a variety of Axis I disorders also appear to reveal emotion dysregulation patterns. Increased reactivity when compared to controls has been connected to generalized anxiety disorder (GAD; Mennin, Heimberg, Turk, & Fresco, 2005), substance dependence (Thorberg et al., 2009), social anxiety disorder (SAD), and specific phobias (Etkin & Wager, 2007). Furthermore, the transaction between neurobiological dysfunction (e.g., anxiety sensitivity) and lack of skills to manage it is similar to the etiological theories presented in panic disorder (Barlow, Allen, & Choate, 2004), GAD (Mennin et al., 2005), and some specific phobias (Cisler et al., 2010). It can therefore be hypothesized that in cases where emotion dysregulation is involved, reactivity to emotional cues coupled with insufficient regulation strategies may result in psychopathology. Thus, emotion dysregulation may be a transdiagnostic phenomenon.

People diagnosed with BPD have difficulties with regulating all of the emotion subsystems described in the DBT model. Similar difficulties can be found in many additional Axis I disorders, as described in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5). Difficulties managing emotion vulnerability factors are common in mood and anxiety disorders and in SUDs (e.g., Monti & Monti, 2000; Wong, Brower, Fitzgerald, & Zucker, 2004). Individuals diagnosed with anxiety and mood disorders also make negative inter-

pretations (e.g., catastrophizing) that lead to dysregulated emotions, and use maladaptive situation selection and situation modification strategies (e.g., avoidance, use of safety cues; Kring & Werner, 2004; Aldao et al., 2010). Experimental evidence also makes a strong link between depression and anxiety, and difficulties regulating attention in emotional contexts. For example, depressed individuals have a reduced capacity to sustain positive emotions (Heller et al., 2009) and more difficulties finding attentional distracters in the context of a distressing emotion (Koole, 2009) when compared with controls. Similarly, when presented with social threat stimuli, participants with SAD report more negative emotions than do controls, suggesting attention deployment and/or cognitive change dysregulation (Goldin, Manber, Hakimi, Canli, & Gross, 2009).

Finally, difficulties with emotion processing have been linked to PTSD (Frewen, Dozois, Neufeld, & Lanius, 2012).

DBT Emotion Regulation Skills

Rationale

Linehan (1993a) included in DBT a set of concrete skills translated from behavioral research and other evidence-based treatments, aimed to address emotion dysregulation in BPD. It was therefore hypothesized that increases in skills use led to improvements in emotion regulation, which in turn led to positive outcomes in treated populations. Empirical findings indeed suggest that use of DBT skills explains changes in depression, anger regulation, and suicidal behavior across BPD treatments (Neacsiu, Rizvi, & Linehan, 2010). Therefore, behavioral skills are likely a potent mechanism of change for emotion dysregulation.

In addition to the five sets of regulatory processes proposed by Gross and Thompson (2007), DBT targets five additional processes: managing emotion vulnerability factors, biological change, expression and action change, and emotional processing (at the point of emotional aftereffects). We next present the skills that directly map onto the DBT model of emotions, organizing them according to regulation process to which they primarily relate, although the functions

of each set of skills can be applied across many of the regulation processes (see Table 29.1). This is particularly the case for mindfulness skills, which can be viewed as critical at every juncture in the emotion regulation process.

Strategies for Managing Emotion Vulnerability Factors

DBT teaches clients to decrease emotion vulnerability factors by increasing happiness and resilience (“building a life worth living”) through a set of skills that target biological homeostasis and influence emotional reactivity. The *PLEASE* skills target treating Physical iLlness (Anderson, Hackett, & House, 2004), balancing nutrition and Eating (Smith, Williamson, Bray, & Ryan, 1999), staying off nonprescribed mood-Altering drugs, getting sufficient but not excessive Sleep (Gujar et al., 2011), and getting adequate Exercise (Cox, Thomas, Hinton, & Donahue, 2004).

In addition, DBT promotes resilience by teaching skills for *accumulating positive life events* and for *building* a sense of generalized *mastery*. Increasing the number of pleasurable events in one’s life is one approach to increasing positive emotions. In the short term, this involves increasing daily positive experiences. In the long term, it means working on goals related to important life values, so that pleasant events will occur more often. Building mastery is achieved by engaging in activities that increase a sense of competence and self-efficacy. The focus is very similar to activity and mastery scheduling in psychotherapy for depression (Martell, Addis, & Jacobson, 2001). Both skills have been shown to predict decreased vulnerability to negative emotional states (Joiner, Lewinsohn, & Seeley, 2002; de Beurs et al., 2005).

Coping ahead (Linehan, in press) is an additional skill that promotes contextual resiliency. Individuals learn to use imaginal exposure and rehearsal to cope successfully with a difficult situation ahead of time. For people who are prone to dysregulation, coping ahead via covert rehearsal can be helpful in building the coping skills necessary for problem solving (see Fourkas, Avenanti, Urgesi, & Aglioti, 2006). Thus, this skill is

likely to increase peoples’ appraisal of their own ability to cope with an emotional event, effectively increasing a sense of mastery and self-efficacy.

Situation Selection–Modification Strategies

Situation selection and modification are two classes of emotion regulation strategies through which emotions are modulated via stimulus control (i.e., avoiding or modifying situations that generate unwanted emotions). To promote effective situation selection skills, DBT teaches how to generate a list of pros and cons to guide a course of action. To improve situation modification, DBT teaches a simple set of *problem-solving* skills (Linehan, in press) aimed at changing or developing strategies for eliminating, reducing, or avoiding emotionally problematic situations. The focus here is on defining those situations that cue unwanted emotions, then applying standard problem-solving steps, such as those outline by D’Zurilla and Nezu (1999) and others.

Because many problems are interpersonal (and even if they are not may require interpersonal interactions to solve), DBT also includes a set of *interpersonal effectiveness skills*. These skills focus on how to obtain a wanted objective without hurting the interpersonal relationship or one’s own self-respect. Coping ahead as a way to practice these skills and to manage intense emotional arousal before it happens is often a helpful addition to problem solving.

DBT also includes a set of mindfulness skills that emphasize observing, describing, and participating in the present moment effectively and without judgment. These skills may also promote adaptive situation selection by nonjudgmentally expanding awareness regarding situations that in the past have evoked emotional experience. This awareness is hypothesized to increase sensitivity to the current contingencies in the environment, allowing the opportunity for new learning. Thus, by seeing reality “as it is” (i.e., being in the present moment without historical filters), mindfulness may enhance the ability of an individual to decide what situations to avoid, when to attempt to problem-solve, or when to cope ahead.

Attentional Deployment Strategies

Mindfulness skills are often used in DBT to promote attentional control, which can reduce problems with attentional deployment. Mindfulness involves learning to *control the focus of attention*, not the object to which one attends (e.g., observing a thought as a thought or emotion as emotion, without attempting to change the thought or emotion). Being able to disengage from emotional stimuli may reduce the tendency to experience negative affect (Ellenbogen, Schwartzman, Stewart, & Walker, 2002), and redeploying attention has been postulated to lead to a “flexibility of attention” (Teasdale, Segal, & Williams, 1995) needed for successful attention modulation in emotional contexts. Thus, mindfulness may help modulate emotional experience by enhancing the practitioner’s ability to turn his or her attention away from that which is not useful (or effective) and attend to what is (Lynch, Rosenthal, et al., 2006).

Cognitive Change Strategies

DBT focuses on analyzing and correcting situation appraisals by *checking the facts* (Linehan, in press). These skills focus on discriminating assumptions, interpretations, ruminative thoughts, and worries from the actual observed facts of situations. Support for this set of skills comes from a number of studies comparing different reappraisal strategies, including nonappraisal control conditions, following presentation of emotional cues (e.g., Lazarus & Abramovitz, 1962).

An additional set of strategies (*reality acceptance*) targets changing one’s appraisal of emotions as experiences that cannot be tolerated or experienced willingly. Emotion acceptance, when compared to emotion suppression, or a control, has been shown to result in less subjective anxiety or avoidance in clients diagnosed with panic disorder undergoing a carbon dioxide challenge (Levitt, Brown, Orsillo, & Barlow, 2004). In addition, coaching in an acceptance mindset, compared to coaching in a control-your-emotions mindset or a placebo condition, significantly increased the amount of time a subject was willing to spend in a cold pressor task (Hayes et al., 1999). With respect

to emotions, DBT reality acceptance skills (“turning the mind” toward acceptance, radical acceptance, and willingness over willfulness) focus on *radical* (meaning full and complete) acceptance of the current emotion and willingness to experience even aversive emotions.

Mindfulness skills may also alter situation appraisal by reducing literal belief in emotional appraisals. Mindfulness teaches individuals to observe appraisals as only thoughts that are not necessarily literally true. This is hypothesized to increase sensitivity to the current contingencies in the environment, allowing the opportunity for new learning. In this context, mindfulness in DBT would *not* be predicted to reduce the frequency of distressing thoughts but instead to decrease the influence these thoughts have on subsequent behavior and emotions.

Biological–Experiential Change Strategies

In DBT, an important part of the biological component of an emotion is the *action tendency*, or urge, to act in a specific manner. DBT provides a range of *distress tolerance skills* whose aim is to inhibit acting on maladaptive urges that interfere with long-term emotion regulation. These skills are also designed to down-regulate the extreme physiological arousal that often accompanies intense emotions. The function of these skills is to impact high arousal quickly, without requiring a high level of cognitive processing to complete. Grouped under the term TIP skills (Linehan, in press) these skills target activation of the parasympathetic nervous system.

The first skill (*Temperature change with ice water*) has to do with using cold, icy water on the face to trigger the human dive reflex (which is typically elicited to aid survival when falling into a frozen lake). This reflex can be triggered by a combination of breath holding and face immersion in cold water. The physiological response that follows involves both branches of the autonomic nervous system and reduces emotional arousal for a short period of time (Hurwitz & Furedy, 1986).

Intense exercise is also recommended if arousal is very high. Most important here is the intensity of the exercise. Cox and col-

leagues (2004) compared intensity of bouts of exercise and found that while intensity of exercise conditions did not differ in state anxiety immediately after exercise, a significant difference favoring *the most intense exercise* condition over the control condition emerged at 30 minutes postexercise.

Additional distress tolerance strategies are Paced breathing and Progressive relaxation, soothing one of the five senses, adopting an opened posture with palms facing the ceiling (willing hands), or adopting a serene facial expression (half smile).

Expression and Action Change Strategies

Changing expression and action components of emotions implies preventing emotional actions, or acting in a way that opposes or is inconsistent with the emotion. The DBT skill of *opposite action* is based on the idea that not only is changing action tendencies essential for reducing emotional disorders, but also that deliberate actions opposite to those associated with unwanted emotions can effectively change emotions as well as action tendencies. Others have made this same point (e.g., Barlow, 1988, p. 313). Izard (1977) stated that treatment for anxiety disorders involves “the individual learn[ing] to act his way into a new feeling” (cited in Barlow, 1988, p. 410).

Opposite action in DBT applies principles of exposure-based treatments for anxiety disorders across the entire domain of emotions. All exposure-based interventions include this one common element: Individuals have to approach the object/situation that is fearful, thus acting counter to (and inhibiting) their prominent urges to avoid. Effective treatments for anger also require individuals to act counter to the urges associated with anger (attack physically or verbally) by leaving the situation. Anger interventions also focus on taking the opposite perspective, and shifting from aggression and blame to gentleness and forgiveness (e.g., Tafrate, Kassonove, & Dundin, 2002). A number of researchers have observed that effective therapies for depression also share a common thread: They activate behavior. For example cognitive therapy (Beck, Rush, Shaw, & Emery, 1979) and behavioral activation (BA; Martell et al., 2001) require that

the individual galvanize him- or herself to engage in activities that result in a sense of mastery or pleasure. This engagement runs counter to the depression urge to withdraw and shut down.

Opposite action “all the way” (Linehan, in press) targets changing the entire range of physical responses that accompany action, including visceral responses, body postures, facial expressions, and movements. A large literature has demonstrated that the activation of specific physical states activates the other facets of the corresponding emotion responses, whether via the face (e.g., Duclos & Laird, 2001), posture (Stepper & Strack, 1993) or respiration. To the contrary, there is ample empirical evidence that modulating one’s physical state alters one’s emotional state (Philippot, Baeyens, Douilliez, & Francart, 2004). Also implied by “all the way” are emotion-linked thought patterns and verbal responses. The idea here is to act contrary to an emotion, not to mask or hide emotions.

In part, opposite action is hypothesized to work by influencing classically conditioned emotional responses (Lynch, Chapman, Rosenthal, Kuo, & Linehan, 2006). Opposite action may also create sensory feedback from facial muscles and skin that can be transformed directly into emotional experience without cognitive mediation (Izard, 1977). Finally, self-perception of expressive behavior, action, and appraisals regarding proprioceptive sensations has been proposed to influence subjective emotional experience (Laird, 1974). Opposite action may influence emotion by changing the perception of the emotional event. Thus, behavior that is the opposite of the automatic response or action urge of an emotion is intended to alter the meaning of the emotional event automatically and without conscious effort (Lynch, Rosenthal, et al., 2006). In essence, people conclude that they feel safe because they are “acting as if” all is safe.

Strategies for Changing Emotional Aftereffects

Aftereffects of emotions, which include changes in attention, memory, and reasoning, are fairly well established (see Dolan, 2002, for a review). These aftereffects can increase the probability that the emotion

will reoccur. Interrupting the cycle can be enhanced if the individual notices and identifies a current, ongoing emotion, which can then guide application of relevant change strategies.

Therefore, DBT included a skill (*Observe and Describe Emotions*) through which increased awareness of the emotional experience is promoted. This skill is supported by research showing that processing emotional experience with greater specificity has advantages for improved emotion regulation over emotional processing that is overgeneral or nonspecific (e.g., Williams, Stiles, & Shapiro, 1999). Indeed, recent research has demonstrated that priming individuals with overgeneral emotional memories results in more intense emotional experience compared to priming specific emotional memories or a control condition (Schaefer et al., 2003). In addition, experimentally manipulated social anxiety has been shown to be reduced by observing and describing specifically the fear producing cues, in contrast to general impressions regarding cues that resulted in higher fear (Philippot, Burgos, Verhasselt, & Baeyens, 2002).

Drawing from the work of many, including both Shaver (e.g., Shaver, Schwartz, Kirson, & O'Connor, 1987) and Hupka (e.g., Hupka, Lenton, & Hutchinson, 1999), Linehan (in press) expanded the original list of six emotions to a taxonomy of 10 basic emotions: anger, disgust, envy, fear, jealousy, joy, love, sadness, shame, and guilt. For each emotion the following characteristics are listed: (1) family of emotion names associated with the basic emotion, (2) typical prompting events (cues), (3) interpretations or appraisals, (4) biological changes and experiences, (5) expressions and actions, (6) aftereffects, and (7) secondary emotions associated with each family of emotions. Using the taxonomy, clients are coached in learning to observe and describe their emotions relative to various events.

Evidence for DBT Skills as a Treatment for Emotion Dysregulation

Problems with regulating each component of the emotion system can be connected with BPD and with other disorders. As we argued in the previous section, there are DBT skills

to target each of the types of emotion dysregulation our model presented. Therefore, DBT skills training is a promising candidate for treating emotion dysregulation in BPD and other Axis I disorders.

Treatment trials, albeit fraught with methodological flaws, offer some support that DBT skills training is effective in reducing emotion dysregulation in various clinical presentations. A DBT skills training intervention improved pre- to posttreatment ratings of depression in abuse victims (Iverson, Shenk, & Fruzzetti, 2009), and depression and anger in vocational rehabilitation clients (Koons et al., 2006). When compared to treatment as usual (TAU) or a wait-list condition, DBT skills training decreased depression in treatment-resistant depressed individuals (Harley, Sprich, Safren, Jacobo, & Fava, 2008) and self-reported anger in a forensic sample (Evershed et al., 2003). DBT skills training was also superior to standard group therapy in improving depression, anger and affect instability in a BPD sample (Soler et al., 2009).

Therefore, although originally developed to be part of a comprehensive intervention, skills training by itself may be the mechanism through which change occurs in a variety of populations with emotion regulation difficulties. Indeed, skills training has been linked to the reduction of emotion dysregulation indices (Neacsiu et al., 2010) and emotion dysregulation has, in turn, been related to a variety of mental health problems (Kring & Sloan, 2010). Although this research area is in its infancy and more findings are needed, the evidence suggests that DBT skills are a promising intervention for emotion dysregulation across psychopathology.

Directions for Future Research

Psychopathology Research

Construct Validity of Emotion Regulation

We have refined the construct of emotion regulation as applicable to psychopathology and presented a testable model. Although we have defined *dysregulation* as dysfunction at either level in the emotion generation-regulation process, we do not know whether one or more “tipping” points differentiate

normative difficulties regulating extreme emotional arousal versus non-normative difficulties that predict serious emotional disturbance. In addition, how difficulties as emphasized by this model vary with each mental disorder is also not yet clear.

Construct Validity of Pervasive Emotion Dysregulation

We have proposed the construct of pervasive emotion dysregulation and conceptualized it as a combination of a tendency to high emotionality across a wide array of both positive and negative emotions, together with an inability to regulate intense emotion-linked responses. The validity of this construct has not been evaluated, nor are there measures of the construct. The high incidence of comorbidity across emotional disorders suggests that the construct may be a useful one. Research is needed both to validate and identify the parameters of the construct. We further have proposed BPD as a model of pervasive emotion dysregulation. Research designed specifically to evaluate this contention, particularly research comparing BPD to other emotional disorders, is needed. Research on BPD and emotions outside of anxiety, depression, and anger is also needed to support or refute the pervasiveness of emotion dysregulation in this disorder.

Neurobiological Dysfunction of the Emotion Circuitry in BPD

We have defined neurobiological dysfunction of the emotion system in BPD as sensitivity to emotional stimuli; intense reactions to such stimuli; and a slow, delayed return to an emotional baseline. First, more research is needed to assess whether individuals with BPD do have a heightened sensitivity to emotional stimuli. Second, although it appears evident that the intensity of all emotions is enhanced in BPD, the empirical evidence that clients with BPD are reactive to emotion-eliciting cues is mixed. Additional research clarifying the inconsistent findings on emotional reactivity in BPD is sorely needed. Furthermore, it is unclear whether mode of stimulation (visual, auditory, somatic, etc.) makes a difference.

We have highlighted clear evidence for both structural and functional alterations in

the frontolimbic circuits of clients with BPD. However, it remains unclear whether these findings are specific to clients with BPD or characteristic of individuals with emotion regulation difficulties in general. It is also unclear how neurobiological alterations interact with pervasive emotion dysregulation, especially in the case of social emotions such as shame or guilt. There is only beginning research on restitution of these neurobiological alterations after successful treatment.

Emotion Dysregulation as a Transdiagnostic Phenomenon

As we have highlighted, emotion dysregulation and alterations of the biological architecture of the emotion system are issues not entirely unique to BPD. Therefore, future research should further examine the relationship between problems with emotions and other disorders. Furthermore, much of the research assessing emotion dysregulation in BPD has compared people with BPD to healthy controls (for a review, see Rosenthal et al., 2008). There is a great need for research examining the specificity of emotion dysregulation in BPD, by comparing people with BPD to those with other mental disorders. This could help refine nuances of how emotion dysregulation manifests in psychopathology and how it can be more effectively targeted.

Intervention Research

As noted previously, emerging data indicate that the skills training component of DBT is a successful stand-alone intervention for emotion dysregulation in a variety of clinical samples. What we do not know yet is whether we can use DBT skills training as a transdiagnostic treatment for emotion dysregulation.

In addition, we do not know whether some DBT skills are more useful than others, nor are there data regarding the role of competence of skills application (i.e., whether application of the “right skill at the right time” is important). It is also not clear which skills are the right skills for various situations. Given the propensity for emotional avoidance in many emotionally disturbed individuals, it is extremely important to find out

when to teach clients to distract themselves from unwanted emotions and cues and when to expose themselves to emotions and emotional stimuli. In DBT we make a distinction between moderate and extreme emotional responses. *Extreme emotional responses* are defined as those accompanied by cognitive processing that is so compromised that skills requiring high use of cognitive resources (e.g., problem solving, checking the facts) are unlikely to be successful. With extreme responses, skills that more directly impact somatic arousal (e.g., deep breathing, using ice water) or attention (e.g., distraction) are recommended. Data verifying the wisdom of these recommendations are sorely lacking. This is particularly important in light of the increasing use of mindfulness-based treatment interventions, which teach individuals to notice and accept ongoing emotional responses. The question might be reframed as follows: When is mindfulness of current emotions (a DBT skill) more or less important?

Although there is a fair amount of basic research supporting the specific skills taught in DBT, there is little evidence on their individual effectiveness as treatment interventions in clinical populations. The systematic examination of the DBT skills, both individually and in combination, is an essential first step in improving treatment for deregulated individuals. This is particularly important for the skill of opposite action. Linehan (1993a) has suggested that opposite action will be effective across a wide range of both dysfunctional positive (e.g., loving the wrong person) and negative emotions. One study found promising results for opposite action with shame (Rizvi & Linehan, 2006), but other emotions have not been studied explicitly. Thus, although DBT has been thoroughly evaluated in efficacy studies, there has been substantially less emphasis on the treatment mechanisms of change, and future research must work to narrow this gap.

Conclusion

To sum up, we propose a framework for emotion dysregulation that is applicable to BPD and in theory can be extended to other psychological disorders. We argue that emo-

tion dysregulation is prevalent beyond BPD and invite research to support our model in other disorders in which problems with emotions have been identified. Furthermore, we offer a set of skills aimed at addressing directly common components of dysregulation and illustrate how such skills have been used with individuals diagnosed with BPD. We propose additional ways in which intervention research, as directly relevant to emotion dysregulation, can advance our knowledge and help make treatments for this problem more effective.

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