A Treatment Mechanism for Emotion Dysregulation Across Mood and Anxiety Disorders

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Abstract

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Dialectical Behavior Therapy (DBT; Linehan, 1993a) has been consistently shown to successfully improve indices of emotion regulation in a variety of client populations (e.g., Bohus et al., 2004; Lynch et al., 2007; Feigenbaum et al., 2011). Furthermore, evidence suggests that use of DBT skills is a mechanism of change for emotion dysregulation in Borderline Personality Disorder (BPD; Neacsiu, Rizvi, & Linehan, 2010). Thus, DBT may offer a mechanism of treatment for emotion dysregulation.

In this paper, evidence supporting emotion dysregulation as a transdiagnostic mechanism of disorder is presented. A theoretical model that accounts for the effectiveness of DBT skills training, a component of DBT, at reducing emotion dysregulation across disorders is proposed. In addition, the transdiagnostic

effectiveness of DBT skills training to change emotion dysregulation is assessed via a randomized controlled trial.

Forty-four men and women who met criteria for at least one mood or anxiety disorder and who reported high emotion dysregulation were included in the study. Participants were randomly assigned to DBT skills training or an Activities Based Support Group, designed to control for nonspecific factors. The randomization algorithm matched participants on gender, primary disorder and reported use of medication. Both treatment conditions were administered in a group format and lasted for 16 weeks, two hours per week.

Enrolled participants were assessed before treatment started, at the middle of the treatment, at the end of treatment and at a 2-month follow up. Analyses using hierarchical linear modeling supported that DBT skills training was superior to the support group in increasing skills use and in reducing emotion dysregulation, general distress, shame, anger suppression and anxiety. Both treatments performed similarly in reducing depression, disgust and anger expression. Furthermore, use of DBT skills mediated all of the changes seen between conditions. Findings are discussed in the context of the current treatment literature.

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Introduction

Common Factors Approaches to Treatment of Mental Disorders Are Needed

There is compelling evidence that successful psychosocial treatments exist for a large range of mental disorders. Psychotherapy provides benefits reflecting a moderate to large effect size for anxiety disorders (Barlow, Allen, & Choate, 2004), substance use disorders (Dutra et al., 2008), depression, marital distress, eating disorders and schizophrenia (Butler, Chapman, Forman, & Beck, 2006), or borderline personality disorder (Kliem, Kröger, & Kosfelder, 2010). These encouraging findings reflect almost 21, 000 articles and 6818 books published on the topic of psychotherapy, including 550 randomized controlled trials on treatment effectiveness. Nevertheless, despite our wealth of data on treatment effectiveness, there are still a number of problems with this body of research.

One problem is that the 21,000 articles are difficult to summarize in a cohesive whole. Most clinical trials contrast two or more treatment approaches, focusing on individuals meeting criteria for specific disorders defined by the Diagnostic and Statistical Manual of Mental Disorders (DSM; American Psychiatric Association, 2000). These findings become impossible to compile in a usable format because of inconsistencies in defining and implementing control conditions (Borkovec & Miranda, 1999), a lack of consistent guidelines for inclusion/exclusion criteria across studies even when studies are designed to replicate previous studies (e.g. Christensen, Griffiths, & Jorm, 2004; Jacobs et al., 2001), variations in how

disorders are assessed and problems are operationally defined (e.g. Giesen-Bloo et al., 2006; Linehan et al., 2006), problems with measurement (see Fava, Evins, Dorer, & Schoenfeld, 2003) and failures to include objective measures of adherence to treatments (e.g. Burgess, Andiappan, & Chalder, 2012; Clarkin, Levy, Lenzenweger, & Kernberg, 2007). Furthermore, few evidence-based treatments (EBTs) exist for individuals who present with comorbid conditions, for subclinical cases, or for high-risk clients (see Fava et al., 2003 for a discussion). Where we do have effective treatments, few specifications exist for how to adapt the treatments to the client in front of us, or for how to choose the best treatment when more than one EBT exists (Barlow et al., 2004).

Another problem is that of efficiency. Rarely are specific, simple interventions evaluated. Instead, new treatments tend to combine interventions. Most evidence-based treatments have significant overlap; and it is difficult to find in new interventions what is novel or unique. This problem stems from the fact that we know little about what the active ingredients in our EBTs are. For example, Eye Movement Desensitization and Reprocessing therapy (EMDR) for Posttraumatic Stress Disorder (PTSD) is often mentioned as a treatment where unnecessary components are added onto an effective mechanism (see Rosen & Davison, 2003 for a discussion).

Overall, the current proliferation and dissemination of new treatment methods and packages is flawed. As a result, it is becoming increasingly difficult for clinicians to stay adherent in the number of interventions needed for a successful practice (Barlow et al., 2004). Clinicians are becoming reluctant to learn the numerous

treatment protocols currently on the market (Garb, 2000), and clients with problems that do not clearly fit manualized protocols are not receiving EBTs. Furthermore, our lack of knowledge of what's new or active in our interventions could make training or provision of treatments lengthier, thus failing the expectations clients and funders for a cost-effective, efficient intervention. Barlow and colleagues (2004) called this a crisis that may lead to poor services being provided to clients.

One potential solution to this significant problem is to identify what is actually working and what isn't in mental health treatments. For example principles of exposure aimed to address maladaptive avoidance are used in multiple treatments (Prolonged Exposure, EMDR, Behavioral Activation, etc.) Nevertheless, is expertise in all of these treatments necessary to successfully treat patients who avoid? It is possible that identifying a mechanism of disorder (avoidance) and a treatment mechanism to address it (exposure) could lead to clinical change in some clients. A new direction for the psychotherapy field may come from identifying common, easy to assess mechanisms of disorder and defining easy to learn treatment mechanisms to address them. Although there has been a call for more integrative treatment programs (e.g. Barlow et al., 2004) there have been very few research studies testing treatment mechanisms targeting mechanisms of disorders. Instead, the psychosocial treatment research field keeps publishing more data for more treatments addressing disorders one at a time.

This review will illustrate a process of identifying a mechanism of disorder, which is common across multiple disorders, and a corresponding treatment mechanism.

Emotion Dysregulation Is a Common Problem in Mental Disorders

Emotions govern much of human behavior. They communicate to ourselves and to others, help us organize our behavior, get us motivated, keep us alive and provide us with meaning (Frijda, 1977; Izard, 1979; Linehan, 1993a). Therefore, it is not surprising that 85% of disorders recognized by the psychiatric DSM include descriptions of problems involving excesses or deficits of emotions, or lack of coherence among emotional components (Kring & Sloan, 2010). Theorists also propose that disordered behaviors such as over eating, self-injury, suicide attempts or impulsive shopping serve as maladaptive strategies for regulating emotions (Chapman, Gratz, & Brown, 2006; Linehan, 1993a). Furthermore, experiential avoidance, emotion suppression and problematic goal setting – all maladaptive strategies for handling emotions– have been linked to a variety of psychological disorders (Kring & Sloan, 2010). Therefore, difficulty with handling emotions is a promising candidate to be a common mechanism of disorder across mental disorders.

Linehan (1993a) was among the first to offer a definition of emotion and conceptualize emotion regulation in the field of mental health disorders. She defines emotions as brief, complex, involuntary, patterned, full-system responses to internal and external stimuli. Emotions are viewed as systemic and for theoretical purposes are separated into transacting subsystems. Five transacting subsystems are presented:

1) emotional vulnerability to cues, 2) internal and/or external events that serve as cues for emotions (including attention and appraisal), 3) emotional response tendencies (including physiological and experiential responses, cognitive processing and action urges), 4) expressive responses and actions (including verbal and non-verbal), and 5) after-effects of the initial emotional "firing" (including secondary emotions). These subcomponents are not discrete. Instead, they overlap, mingle and transact in order to form the unique pattern of an emotion (Linehan, Bohus, & Lynch, 2007).

Emotion regulation is defined as the set of processes through which emotions are themselves increased, maintained, or decreased; experienced, or expressed differentially, at a conscious or subconscious level (Gross & Thompson, 2007). Linehan (1993a) views emotion regulation as any change in any subcomponents of the emotion system. Given that these subsystems transact, such changes lead to an overall increase, decrease, or maintenance of the entire emotion system. Regulation can be effortful (when the person must consciously attempt to regulate the emotion) or automatic, outside of the person's awareness. Most regulation is initially effortful, but through learning and practice it becomes automatic. This process of learning how to regulate happens primarily during development and problems in learning at developmental stages can be related to the development of psychopathology (Linehan, 1993a).

Emotion dysregulation is therefore defined as either a failure to change an emotional response in the desired way, or as a use of regulation strategies in such a way in which the cost required has detrimental long term effects (Werner et al.,

2010). Emotion dysregulation may also include use of maladaptive strategies, or deficits or difficulties with the mechanics of applying effective strategies (Kring et al., 2004).

Emotion dysregulation has been hypothesized to play two different roles in mental illness. At one level, the development of disorders can stem from the use of poor regulation strategies that lead to chronic exposure to stress. For example, one study found that recovered depressed individuals displayed more frequent use of dysfunctional regulation strategies when compared to participants who were never depressed (Ehring, Fischer, Schnulle, Bosterling, & Tuschen-Caffier, 2008). At the second level, use of the problematic regulation strategies is responsible for maintaining the disorders. For example, ineffective use of avoidance may contribute to the development of an anxiety disorder, while alcohol used to decrease anxiety may maintain a substance use disorder (Aldao, Nolen-Hoeksema, & Schweizer, 2010).

The emerging belief in the literature is that emotion dysregulation is a common component of multiple mental health disorders. In this paper, I will focus the discussion on emotion dysregulation as a component of mood and anxiety disorders. Nevertheless, evidence exists linking emotion dysregulation to substance use disorders (Li et al., 2008; Ostafin & Brooks, 2011; Thorberg, Young, Sullivan, & Lyvers, 2009; Verdejo-Garcia, Perez-Garcia, & Bechara, 2006), eating disorders (Fox & Harrison, 2008; Harrison, Sullivan, Tchanturia, & Treasure, 2009; Sloan & Kring, 2010), impulsive/compulsive disorders (Abramowitz & Berenbaum, 2007;

Shusterman, Feld, Baer, & Keuthen, 2009; Tice & Bratslavsky, 2000) and somaticizing disorders (Waller & Scheidt, 2004; Witthoft & Hiller, 2010).

Emotion Dysregulation as a Mechanism of Disorder

Mechanisms of disorder refer to the mechanics behind what causes distress in mental illness. We can think about someone with mental illness as being locked behind a door and relief from mental illness coming from opening the door. In this metaphor, a mechanism of disorder is one of the locks that keep the door closed. Identifying such a lock could provide a direct target for treatment. A treatment mechanism would be the key that opens the lock and that leads to some relief from distress.

Research thus far has focused on symptoms of disorders as being potential mechanisms of disorders. Nevertheless, the strong link between emotion dysregulation and mental health suggests that difficulty with regulating emotions may be a mechanism of disorder regardless of the particular mental health problems an individual presents with. Following, I will present evidence that supports the claim that emotion dysregulation is a mechanism of disorder applicable to mood and anxiety disorders.

Evidence for emotion dysregulation as a mechanism of disorder in mood disorders. In the case of mood disorders, the role of emotion dysregulation is evident from the name of these disturbances. Theorists have therefore proposed that major depressive disorder (MDD) should be conceptualized as an emotion dysregulation

disorder based partly on a deficit in up-regulating and maintaining positive emotions (see Kring & Bachorowski, 1999 for a review) and that bipolar disorders can be understood as a failure to down-regulate positive emotions (Werner et al., 2010).

Evidence supporting emotion dysregulation in mood disorders is emerging. First, a meta-analysis of over 100 studies reported a strong association between depressive symptoms and maladaptive emotion regulation strategies such as rumination, avoidance and difficulties with reappraisal of situations (Aldao et al., 2010).

Second, experimental designs have found that emotion dysregulation is associated more depressive symptomatology (Garnefski, Teerds, Kraaij, Legerstee, & van den Kommer, 2004) and that depressed individuals have a reduced capacity to sustain positive emotions when compared to controls (Heller et al., 2009). In addition, depressed individuals have more difficulties than controls in finding attentional distracters in the context of a distressing emotion (Koole, 2009). Finally, recovered depressed individuals display more frequent use of dysfunctional regulation strategies when compared to participants who were never depressed (Ehring et al., 2008).

Third, physiological research provides additional support. MDD participants are unable to modulate physiological responses based on contextual demands in emotional situations when compared to nonclinical controls (Rottenberg, Kasch, Gross, & Gotlib, 2002). In addition, individuals diagnosed with MDD showed a heigher amygdala response to negative emotion stimuli when compared to controls (Taylor & Liberzon, 2007) suggesting problems with emotion regulation.

Evidence for emotion dysregulation as a mechanism of disorder in anxiety disorders. Anxiety disorders, albeit a heterogeneous group, are defined by problems with regulating the emotions of fear and anxiety. The architecture of these emotions in these disorders is intact (in other words, fear in anxiety disorders is similar to fear in non-clinical controls); nevertheless, the intensity of the response given contextual cues is dysfunctional (Kring & Werner, 2004).

In support of this hypothesis, a meta-analysis of emotional arousal in three anxiety disorders found that participants with posttraumatic stress disorder (PTSD), social anxiety disorder (SAD) and specific phobias (SPs) showed a greater activation in the amygdala and insula in the presence of negative emotional experiences, than non-anxious individuals (Etkin & Wager, 2007).

Cisler and colleagues (2010) summarize the literature on the interaction between anxiety and emotion regulation research fields. They conclude that regulation of fear and anxiety can be differentiated from the actual emotions of fear and anxiety at a conceptual, neural and behavioral level. Furthermore, they argue that emotion regulation explains additional variance in anxiety disorders above and beyond emotional reactivity. They propose a model for anxiety disorders where emotion regulation plays a central role in the development of the symptoms via moderating the consequences of fear conditioning. In addition, chronic and rigid patterns of using dysfunctional emotion regulation strategies lead to the development and maintenance of anxiety disorders (Cisler et al., 2010).

Evidence for the importance of emotion dysregulation can be found for each anxiety disorder. For panic disorder, harmless interoceptive events are perceived as threatening, situations where such events may occur are avoided and the likelihood of negative results from threatening events is overestimated (Schmidt & Keough, 2010). Thus, use of maladaptive emotion regulation strategies is common in individuals diagnosed with panic disorder (Cisler et al., 2010; Kring et al., 2004).

Social anxiety disorder (SAD) has also been linked to a having problems with regulating emotions. SAD participants, unlike normal controls, display dysregulated fear in response to social threat. Nevertheless, when taught emotion regulation strategies, SAD participants display equivalent reduction in fear as control participants. This suggests that lacking effective emotion regulation strategies is responsible for the increase in negative emotions that SAD participants report when compared to controls (Goldin, Manber, Hakimi, Canli, & Gross, 2009).

Specific phobias (SP), by definition, represent dysregulated fears (Thorpe & Salkovskis, 1995). In addition to problems with regulating fear, phobic patients have difficulties regulating disgust (see Charash & McKay, 2002; Cisler, Olatunji, & Lohr, 2009; Phillips, Fahy, David, & Senior, 1998). Cisler and colleagues (2009) define two forms of disgust as related to phobias: disgust sensitivity (difficulties with regulating disgust) and disgust propensity (reactivity to disgusting cues). The authors hypothesize that fear of responding with disgust may serve as a maintenance mechanism for contamination fears. Therefore, the difficulty to regulate disgust potentiates the development of fear of experiencing disgust, which is directly related

to anxiety disorders such as blood-injury phobia or animal phobias. Thus, differences with regulating disgust and fear are central to SPs.

The most compelling evidence for emotion dysregulation as a mechanism of disorder can be found for Generalized Anxiety Disorder (GAD). Research evaluating GAD has led to the conceptualization of this anxiety disorder as having a primary emotion dysregulation maintenance mechanism. Worry, the primary GAD symptom, is understood as an avoidance strategy used to prevent distressing and uncertain emotional states (Mennin, 2004). Indeed, individuals diagnosed with GAD report heightened sympathetic inhibition during stress induction than non-anxious controls (Hoehn-Saric, McLeod, & Zimmerli, 1989). Individuals with GAD are therefore hypothesized to lack emotion regulation strategies (Mennin, 2004). This theory has partial empirical support (Mennin, Heimberg, Turk, & Fresco, 2005).

PTSD has been linked to emotion dysregulation based on observed patterns of responses to emotional situations, such as intense negative reactions when confronted with trauma cues, or emotional numbing in situations that otherwise would elicit positive emotions. To examine these response patterns, one study compared participants diagnosed with PTSD with non-clinical controls on emotional responding before and after exposure to trauma cues. The authors found no evidence to support a restricted emotional experiencing in veterans with PTSD. Nevertheless, PTSD participants had less facial/motor response to positively valenced emotional stimuli after exposure to trauma cues (Litz, Orsillo, Kaloupek, & Weathers, 2000). This study and additional findings support that individuals with a PTSD diagnosis tend to

suppress emotional expression for both positive and negative emotions (Roemer, Litz, Orsillo, & Wagner, 2001). Therefore, the emotional numbing seen in PTSD may not represent a decrease in affect intensity, but rather a blunted expression of the emotion (Kring et al., 2004), which is a maladaptive emotion regulation strategy. PTSD symptom severity has also been associated with lack of emotional acceptance (Cisler et al., 2010) and awareness (Frewen, Dozois, Neufeld, & Lanius, 2011), which may lead to emotion dysregulation.

Finally, difficulties with emotion regulation likely are a mechanism of disorder in Obsessive Compulsive Disorder (OCD). Clients diagnosed with OCD often engage in ritualistic behavior to reduce intense emotional distress. They also use maladaptive strategies to reduce their negative emotions. Additional impairments in emotion regulation may come at the emotional awareness level as evidenced by findings that severity of OCD is correlated with alexitymia score (De Berardis et al., 2005).

These patterns of dysregulation in OCD do not solely arise in the context of regulating anxiety, but also when regulating other intense negative emotions (McKay et al., 2004). Washers evidence difficulty regulating disgust, hoarders have excessive emotional attachment to possessions and patients with sexual or harm obsessions have difficulty regulating shame and guilt responses (McKay et al., 2004). Thus, individuals diagnosed with OCD can be conceptualized as having fears of experiencing negative emotions and as lacking skills to regulate these fears: checkers can be hypothesized to fear experiencing fear; washers as fearing disgust; and patients

with distressing intrusions as fearing the shame and guilt associated with acting on such intrusions. Furthermore, hoarding behavior may also be understood as dysregulated attachment or love, which could result in fear of losing important objects, and hence, fear of sadness. Thus, individuals diagnosed with OCD may have difficulties regulating a variety of negative emotions.

Emotion dysregulation across mood and anxiety disorders. Additional evidence for emotion dysregulation as a mechanism of disorder comes from literature examining individuals with both anxiety and depression. These studies support that emotion dysregulation is similar across mood and anxiety disorders. In one study, participants with either a mood or an anxiety disorder, when compared to non-clinical controls, reported less emotional clarity and more fear of experiencing emotions when asked to view an emotionally charged movie. Moreover, regardless of the diagnosis, clinical participants rated their emotional reactions as less acceptable and relied significantly more on maladaptive emotion regulation strategies than controls (Campbell-Sills, Barlow, Brown, & Hofmann, 2006).

An underlying problem with regulation of negative emotions was therefore hypothesized. Indeed, when analyzing the factor structure behind MDD, GAD, OCD, PD and SAD using structural equation modeling (SEM) a two latent factor structure (positive and negative affectivity) was found to explain significant variance in all of the assessed diagnoses (Barlow et al., 2004).

Thus, Barlow and colleagues (2004) recommend a unified conceptualization of anxiety and depression. In their review of the literature supporting this unified

view, they present arguments for a common underlying problem with emotions. First, they highlight significant overlap: in between 70-80% of clients who meet criteria for either an anxiety disorder, or a unipolar mood disorder at some point in their lifetime, will also meet criteria for a different anxiety or mood disorder. Furthermore, they also highlight that treatment targeted to resolve one condition, often yields improvements in other conditions. For example panic treatment, improves GAD without necessarily addressing it; and MDD and OCD respond equally well to antidepressant medication.

Barlow extended the applicability of his theory of panic and suggested that an interaction between a biological vulnerability to emotions (such as trait anxiety, neuroticism, or behavioral inhibition) coupled with a learned sense of uncontrollability, is responsible for most anxiety and unipolar mood disorders. A perpetual sense of uncontrollability leads to use of dysfunctional emotion regulation strategies, such as suppression and avoidance, which only intensifies the emotional experience and reinforces the perceived lack of control over the emotions (Barlow et al., 2004).

Summary of emotion dysregulation as a mechanism of disorder in mental illness. Numerous emotion dysregulation problems seem to cut across mood and anxiety disorders. First, in most types of mental disorders the functions of emotions and general knowledge of what emotions are and how they are structured seems to be lacking, which may be partially responsible for emotional dysregulation. Furthermore, evidence suggests that patients with mood and anxiety disorders underutilize effective emotion regulation strategies while overusing ineffective

strategies. Finally, these problems span a wide array of negative emotions from fear, shame and guilt, to sadness and disgust. Thus, emotion dysregulation is likely a mechanism of disorder that spans across multiple mental health problems.

A Treatment Mechanism for Emotion Dysregulation

An intervention aimed at reducing emotion dysregulation could therefore cover an important facet of the problems anxious and depressed clients bring into therapy. Furthermore, a targeted intervention for a specific mechanism of disorder may solve some of the problems in the treatment research field. It is unclear at this point what a specific treatment mechanism targetting this mechanism of disorder is.

Dialectical Behavior Therapy (DBT; Linehan, 1993a) is a treatment approach for suicide and for Borderline Personality Disorder (BPD) that has been built on Linehan's conceptualization of these disorders as pervasive emotion dysregulation problems. Thus, it is a promising approach that could yield an effective treatment mechanism to address emotion dysregulation across disorders.

Dialectical Behavior Therapy as a treatment for emotion dysregulation in BPD. DBT is a cognitive behavioral treatment developed based on Linehan's biosocial theory of BPD (Linehan, 1993a). According to this theory, pervasive emotion dysregulation is a result of a heightened vulnerability to emotions that transacts over time with an invalidating environment. The vulnerability is hypothesized to be a biological predisposition that manifests as impulsivity in

childhood and as heightened emotional sensitivity and reactivity in adulthood (Crowell, Beauchaine, & Linehan, 2009).

DBT has significant empirical support for reducing emotion dysregulation in individuals diagnosed with BPD (Lynch, Trost, Salsman, & Linehan, 2007). DBT is highly structured to target increases in emotion regulation via increasing motivation in individual therapy and promoting skills acquisition. DBT is based on a skills deficit model that argues that dysfunctional behaviors in BPD, including suicidal behavior, are either a consequence of dysregulated emotions, or a maladaptive approach to emotion regulation (Linehan, 1993a; Linehan, 1993b).

To date, standard DBT has been evaluated in 18 randomized controlled trials conducted across several independent research teams. Consistently, DBT was shown effective in improving indices of emotion regulation across a variety of BPD presentations. One year long standard DBT improves indices of anger dysregulation (Linehan et al., 1991; Linehan, Heard, & Armstrong, 1993; Linehan et al., 1999; Linehan et al., 2006; McMain et al., 2009; Verheul et al., 2011), depression (Linehan, Armstrong, Suarez, Allmon, & Heard, 1991; Linehan et al., 2006; Linehan, McDavid, Brown, Sayrs, & Gallop, 2008; McMain et al., 2009) and remission from anxiety disorders (Harned et al., 2008). Inpatient DBT significantly improves anxiety and depression in BPD women (Bohus et al., 2000, Bohus et al., 2004; Roepke et al., 2011); and a 6-month DBT adaptation significantly reduces anger outbursts and self-reported depression (Feigenbaum et al., 2011).

Analyses of data in one recently completed RCT suggests that DBT successfully improves emotion regulation, as measured by an emotion dysregulation index, which drops significantly from pretreatment through one year of DBT (Neacsiu, Rizvi, & Linehan, 2008).

The success of DBT on changing emotion dysregulation is also highlighted by neuroscientific findings. Schnell and Herpetz (2007) examined fMRI correlates of BPD individuals undergoing an intensive inpatient DBT treatment. They found that as treatment progressed, a decrease hemodynamic response to negative stimuli could be seen in the right, areas of the brain related to emotion regulation. Furthermore, only participants who were successful in DBT displayed post treatment a reduction in left amygdala and both hippocampi activation in response to negative stimuli presentations. Therefore, a successful course of intensive DBT led to a significant improvement in amygdala activation in the presence of emotional stimuli, which may suggest better emotion regulation.

DBT may be a successful intervention for emotion dysregulation outside of BPD. It is important to highlight that the theoretical premise behind DBT may be applicable to other regulation disorders. Indeed the transaction between vulnerability and an environment that does not promote sufficient emotion regulation learning is similar to the etiological theories presented in panic disorder (Barlow et al., 2004), GAD (Mennin, 2004) and some specific phobias (Cisler et al., 2010). Therefore, it can be hypothesized that in most cases where emotion dysregulation is involved,

sensitivity to emotional cues coupled with insufficient training in emotion regulation may result in psychopathology.

This hypothesis is indirectly supported by evidence suggesting that DBT is an effective treatment for other populations with emotional difficulties. Depressed elderly individuals with or without comorbid personality disorders remitted much faster when treated with DBT and medication than when treated with medication alone (Lynch et al., 2007). An adaptation of DBT was also found to be effective in reducing stalking behavior for stalking offenders (Rosenfeld et al., 2007). Finally, suicidal college students improve in their reported depression in 7 to 12 months of DBT (Pistorello, Fruzzetti, & MacLane, 2012).

DBT skills training reduces emotion dysregulation. Based on her theory of emotion dysregulation stemming from a skills deficit, Linehan (1993b) included in DBT a set of concrete skills translated from behavioral research and other evidence-based treatments. DBT skills training includes more than 60 skills grouped into four modules, each designed to target a different area of skills deficits: a) mindfulness skills: emphasizing observing, describing, and participating in the present moment effectively and without judgment; (b) emotion regulation skills: including an array of strategies for changing emotions quickly, as well as strategies for changing the tendency to respond emotionally in everyday life situations; (c) interpersonal effectiveness skills: ranging from basic social skills training, to assertiveness and goal-oriented interpersonal problem solving; and (d) distress tolerance skills:

including short-term strategies to control impulsive actions and long-term strategies to radically accept difficult life events (Linehan, 1993b).

Evidence suggests that the skills training component of DBT alone is effective in reducing emotion dysregulation in a variety of mental health disorders. A DBT skills-only intervention outperformed standard group therapy in improving drop-out, depression, anger and affect instability in a BPD sample (Soler et al., 2009). In other studies, DBT-skills only improved pre- to post-treatment ratings of depression, hopelessness and general distress in victims of domestic abuse (Iverson, Shenk, & Fruzzetti, 2009); depression, hopelessness and anger in vocational rehabilitation clients (Koons et al., 2006); perceived burden, psychic health and well being in family members of suicidal individuals (Rajalin, Wickholm-Pethrus, Hursti, & Jokinen, 2009); and aggression, impulsivity and psychopathology in difficult to manage correctional populations (Shelton, Sampl, Kesten, Zhang, & Trestman, 2009). When compared to Treatment as Usual (TAU) or a waitlist condition, DBT-skills training is better at decreasing depression in treatment resistant depressed individuals (Harley, Sprich, Safren, Jacobo, & Fava, 2008). In a forensic adaptation DBT-skills training reduced severity of violent incidents and hostility and anger self-reports significantly more than TAU (Evershed et al., 2003). Finally, an adaptation of DBT-skills training was also found to be an effective treatment for oppositional children (Nelson-Gray et al., 2006).

The importance of skills use for DBT outcomes was also assessed in standard DBT trials. Two studies used DBT diary cards, a daily self-monitoring record on

which clients were asked to circle the skills that they practiced on any given day, as the measure of frequency of skills used. Use of skills was assessed every week throughout one year of treatment. Both studies reported that participants in DBT practiced increasingly more skills over time (Lindenboim, Comtois, & Linehan, 2007; Stepp, Epler, Jahng, & Trull, 2008). In addition, Stepp and colleagues (2008) reported that this increase was related to a more rapid decrease in BPD features.

A treatment mechanism for changing emotion dysregulation is DBT skills training. Owning to the consistency of results indicating the therapeutic benefits of DBT skills, one potential treatment mechanism in DBT is skills training. It can be hypothesized that increases in skills use lead to improvements in emotion regulation, which in turn lead to positive outcomes in treated populations.

To assess the relationship between emotion dysregulation and skills, an existing coping scale (the Revised Ways of Coping Checklist; Vitaliano, Russo, Carr, Maiuro, & Becker, 1985) was adapted to measure DBT skills use in BPD clients (DBT-WCCL; Neacsiu, Rizvi, Vitaliano, Lynch, & Linehan, 2010). Using the DBT-WCCL across three randomized control trials for BPD patients, the authors found that use of skills mediated the relationship between time in treatment and the reduction in depression, the increase in anger regulation and the decrease in likelihood of suicidal behavior to occur. In other words, these findings strongly suggested that using DBT skills is a treatment mechanism for indices of emotional dysregulation, such as depression, suicidal behavior and anger control (Neacsiu, Rizvi, & Linehan, 2010).

Lastly, the most compelling evidence supporting skills use as a mediator of emotion regulation improvements in DBT comes from analyses of data from a recently completed clinical trial using BPD participants. Preliminary analyses suggest that increased use of DBT skills fully mediates the relationship between time in treatment and decreases in emotion dysregulation (Neacsiu, Rizvi, Korslud & Linehan, 2010). Therefore, use of behavioral skills is likely an effective treatment mechanism for emotion dysregulation.

Conclusion

In this review, I have highlighted that research needs to identify treatment mechanisms that target common problems in mental disorders to improve dissemination and decrease the problems with treatment proliferation. I have also summarized evidence suggesting that mood and anxiety disorders have in common difficulties with emotion regulation, which could be addressed with a treatment mechanism for emotion dysregulation. A treatment for emotion dysregulation (DBT) has already been developed for BPD and for suicidal behavior, where problems in emotion regulation are considered to be the key dysfunction. Evidence supports this treatment's effectiveness at reducing emotion dysregulation in BPD, as well as in other DSM disorders. Furthermore, a subcomponent of this treatment (DBT skills training) is likely to be the active treatment mechanism at play in changing emotion dysregulation. Since this mechanism contains strategies to address many of the emotion regulation deficiencies found in Axis I disorders, it is likely that a treatment mechanism for this group of psychological problems could be DBT skills training.

Current Study

The current study was designed to evaluate the effectiveness of Dialectical Behavior Therapy (DBT) skills training (Linehan, 1993b) in reducing emotion dysregulation in individuals with significant mental health disorders. A randomized controlled trial was employed comparing DBT skills training with an activities based support group, designed to control for nonspecific factors.

DBT Skills Training

DBT is defined by its philosophical base (dialectics), treatment strategies, and treatment targets. The term *dialectical* is meant to convey both the multiple tensions that co-occur in therapy and DBT's emphasis on enhancing dialectical thinking patterns to replace rigid, dichotomous cognition. The overriding dialectic for therapists is the necessity of accepting clients as they are from within the context of trying to help clients change. DBT requires that therapists balance their use of strategies, from rapidly juxtaposing change and acceptance foci to using both irreverent and warmly responsive communication styles. DBT maintains that strategy changes are required to sustain therapeutic progress in the face of patients who struggle with dysregulated emotions.

The DBT Skills Training group (DBT-ST) was designed to retain the essence of DBT. It was didactically focused; emphasized modeling; and utilized instructions, structured behavioral rehearsal exercises, feedback, and homework assignments to practice new skills.

Modifications to standard DBT skills training. DBT-ST included two important modifications to the standard DBT skills training protocol. First, the duration of the treatment protocol was shortened from 24 to 16 weeks. In standard DBT, clients spend 24 weeks in DBT skills training. During this time, clients repeat the 2-week mindfulness module three times and spend 6 weeks on emotion regulation, 6 weeks on distress tolerance, and 6 weeks on interpersonal effectiveness. In DBT-ST, 3 weeks of interpersonal effectiveness skill instruction were eliminated. Additionally, each of the two mindfulness reviews were completed in 1 week, and distress tolerance skills were taught in 3 weeks. The rationale for these changes was that, with a less severe population—one that would not constantly be in crisis—teaching distress tolerance could be done at a quicker pace.

Second, skills from the interpersonal effectiveness module were shortened and moved to the end of the problem-solving skill set. This decision was based on evidence that completers of DBT programs practice interpersonal skills the least (Lindenboim et al., 2007). Furthermore, Gratz and Gunderson (2006) reduced emotion dysregulation with a 14-week group intervention that did not include interpersonal effectiveness. In the context of emotion dysregulation, some interpersonal skills are relevant to resolving difficult situations; therefore, these skills were covered as an addition to problem-solving skills.

The 16-week curriculum was similar in length to the treatment developed by Gratz and Gunderson (2006), whose model was successfully applied to nonsuicidal, self-injurious women with BPD. Furthermore, preliminary analyses of data from past

RCTs show that emotion dysregulation improves dramatically in the first 4 months of DBT treatment (Neacsiu, Rizvi, Korslund, & Linehan, 2010). Lastly, the duration of treatment in the present study was in the range of 4-to-6-month DBT-based interventions that had been successful in reducing emotional dysregulation in non-suicidal individuals (Harley et al., 2008; Iverson et al., 2009; Koons et al., 2006; Linehan, McDavid, Brown, Sayrs, & Gallop, 2008; Soler et al., 2009).

Activities-Based Support Group

The activities support group (ASG) was designed as an intervention based on principles of client-centered supportive therapy that are common to various treatments and that have therapeutic value. ASG aimed to serve several therapeutic functions, such as fostering a sense of belongingness among participants by providing an opportunity for participants to meet others with similar difficulties; and providing a therapist who maintains unconditional positive regard for participants, helps them feel supported, offers empathy, provides psychoeducation, and provides a treatment ritual and structure.

Evidence suggests that such factors are therapeutic (Barker, Funk, & Huston, 1988). In treating depression, for example, nonspecific factors such as structure, rationale, therapeutic empathy, and alliance seem to play a large role in mediating clinical improvement (Illardi & Craigheard, 1994). Additionally, evidence suggests that psychological treatments may not need active components (e.g., skill instruction) in addition to nonspecific factors to yield positive results (Ahn & Wampold, 2001). Moreover, the activities integrated into the ASG group may be beneficial to anxious

and depressed participants, as the behavioral activation inherent in participating in activities is known to improve anxiety and depression (Hopko, Lejuez, Ruggiero, & Eifert, 2003; Hopko, Robertson, & Lejuez, 2006). Furthermore, psychoeducation is an effective treatment for a variety of disorders (e.g., Duman, Yildirim, Ucok, Er, & Kanik, 2010).

An activities-based therapy group was chosen as a control condition because it had been successfully used in a DBT dismantling study and because it was unlikely to duplicate DBT skills training. Giving advice, utilizing exposure homework, teaching DBT skills, or following any CBT procedures were prohibited.

Targeted Population

The primary focus of the study was on individuals with high emotion dysregulation. To increase applicability and to allow for meaningful comparisons across disorders, only individuals diagnosed with a mood or anxiety disorder were targeted. To avoid the confounding factor of DBT-ST being a successful intervention for BPD, individuals who met criteria for BPD were excluded. To preserve consistency with prior studies assessing the effectiveness of DBT, similar inclusion/ exclusion criteria as described in the DBT literature were used.

High emotion dysregulation was defined as scoring above a predetermined cutoff on the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004), a popular measure of emotion dysregulation. This measure was chosen because it assesses pervasive emotion dysregulation (across emotions) and because it

has been successfully used as an index of change for emotion dysregulation in the past (e.g. Gratz & Gunderson, 2006).

Specific Aims

Aim1. Aim 1 was to conduct a randomized controlled trial (RCT) with individuals meeting criteria for at least one mood or anxiety disorder (except bipolar disorder or depression with psychotic features), and having significant difficulties with emotion regulation. The RCT compared DBT-ST and ASG. I hypothesized that DBT-ST was going to be superior to ASG in improving skills use and emotion dysregulation and that the superior outcomes were going to be maintained at a 2-month follow-up assessment.

It is important to note that the first aim of this research was not to demonstrate that DBT-ST works better than other manualized psychosocial treatments for reducing mental illness, but rather to demonstrate that DBT-ST is itself efficacious at producing change in emotion regulation independent of diagnosis and above and beyond nonspecific factors. That is, significant effects were interpreted as evidence that gains in the target areas of the treatment are in fact due to DBT-ST and not to non-specific factors associated with any treatment (e.g. time, contact, structure, etc.).

Findings in the literature at the time when this study was conducted suggested that DBT skills training was a promising intervention for treatment resistant depression, with success in reducing indices of depression but unknown effects on emotion regulation (Harley et al., 2008; Lynch, Morse, Mendelson, & Robins, 2003). At the time of this study, no findings could be identified in the literature about the

effects of DBT skills training on individuals diagnosed primarily with an anxiety disorder. Nevertheless, difficulties with emotion dysregulation are common and perhaps instrumental in both mood and anxiety disorders (e.g. Liverant, Brown, Barlow, & Roemer, 2008; Mennin, McLaughlin, & Flanagan, 2009). Therefore, understanding the effect of an intervention on emotion dysregulation was warranted.

To measure changes in emotion dysregulation, three instruments assessing different facets of problems with emotion regulation were selected. First, the DERS was used to define high emotion dysregulation in the sample and therefore it was also utilized to assess changes over time. In addition to this measure, assessments of alexithymia and of fear of emotions were also included.

Alexithymia has been linked with a variety of psychiatric disorders including depression and anxiety (for a review see Bankier, Aigner, & Bach, 2001). The construct includes difficulties with identifying and describing emotions as well as a preference to focus on external rather than on internal events (Ogrodniczuk, Piper, & Joyce, 2011). Initially alexithymia was considered to be a stable personality trait (Taylor & Bagby, 2004) but findings are mixed with regards to its stability (see Rufer et al., 2004). Nevertheless, this construct in essence quantifies the difficulties with emotional awareness and cognitive change (Taylor, 2000) that are part of emotion dysregulation. Thus, although in the literature alexithymia is assessed as a moderator of treatment effects with mixed findings on whether it impedes outcome (Ogrodniczuk, Piper, & Joyce, 2011), successful change in emotion dysregulation should also include a change in alexithymia.

An additional facet of emotion dysregulation is captured through the affective control scale. Williams, Chambless and Ahrens (1997) developed this measure as a way to assess "fear of emotions", which they defied as apprehension about losing control over one's emotions or over one's response to these emotions. This construct included fear of physical sensations associated with emotions and implicit avoidance of emotional experiences. This measure therefore maps onto emotion dysregulation through assessing problematic cognitions surrounding emotions (i.e., the perceived lack of skills to regulate emotions once they are experienced; Yen, Zlotnick, & Costello, 2002). Fear of emotions has been hypothesized to be a mechanism that leads to emotion dysregulation (i.e., use of suppression or worry) and to the subsequent development and maintenance of disorders (e.g. Berg, Shapiro, Chambless, & Ahrens, 1998; Stapinski, Abbott, & Rapee, 2010) and therefore the success of DBT-ST to reduce problematic affect control would further support that skills training is a treatment mechanism for emotion dysregulation across disorders.

Aim 2. The second aim of the study was to examine skills use as a mediator of emotion dysregulation outcomes. I hypothesized that reported use of skills would mediate the difference between conditions in each of the three facets of emotion dysregulation examined.

Exploratory aims. Given the theoretical relationship between emotion dysregulation and psychopathology, three exploratory aims were also added to the study. I hypothesized that DBT-ST would lead to a significantly higher decrease in general and emotional distress when compared to ASG. To define emotional distress,

literature on DBT skills training as well as literature on dysfunctional emotions related to mood and anxiety disorders was examined.

DBT skills training has accumulated some empirical support suggesting that it is superior to a supportive therapy group at reducing anger (Soler et al., 2009) in a BPD sample. Standard DBT, which includes skills training, was also found to be superior to an expert intervention in reducing anger expression, but performed the same on reducing anger suppression and shame (Neacsiu, Lungu, Harned, Rizvi, & Linehan, 2012). Little research has evaluated the impact of DBT skills training on dysregulated anger in individuals who are not diagnosed with BPD.

Nevertheless, there is evidence from previous studies that anger difficulties are common in depression (Koh, Kim, & Park, 2002; Pasquini, Picardi, Biondi, Gaetano, & Morosini, 2004). Significant problems with anger have also been associated with PTSD (Kulkarni, Porter, & Rauch, 2012), SAD (Erwin, Heimberg, Schneier, & Liebowitz, 2003), and other anxiety disorders (Hawkins & Cougle, 2011). Some evidence also suggests that difficulties with anger may impede progress in therapy (e.g. Newman, 2011). Thus, one facet of emotional distress assessed in this study was difficulty with regulating anger.

Little research has evaluated the impact of DBT skills training on additional indices of dysfunctional emotions. Nevertheless, the skills taught target a wide variety of emotions, including disgust and shame. Problems with regulating the emotion of shame have been associated with depressive symptoms (Kim, Thibodeau, & Jorgensen, 2011; Orth, Berking, & Burkhardt, 2006), posttraumatic stress, anxiety

and self-harm (Blum, 2008). Problems with regulating the emotion of disgust (disgust sensitivity) and increased vulnerability at experiencing disgust (disgust propensity) have been associated with the development and maintenance of anxiety disorders (Olatunji, Cisler, McKay, & Phillips, 2010). Self-disgust has also been associated with maintenance of depression symptoms (Simpson, Hillman, Crawford, & Overton, 2010). Therefore, the effect of skills training on dysregulated shame and disgust in individuals diagnosed with anxiety or depression was also assessed.

The lack of a standard in measurement has made it difficult to assess the importance of shame in psychopathology. Thus, in this study a measure found to specifically assess a disposition to experience shame above and beyond negative affectivity was used (Andrews, Quian, & Valentine, 2002).

A second exploratory aim was added to examine whether skills training leads to improvements in anxiety and depression. Although specific symptoms of depression and anxiety were not directly targeted, I hypothesized that teaching DBT skills would result in significantly more improvement in anxiety and depression than the control condition. It was also hypothesized that the difference would be maintained at follow-up.

Given the theoretical premise of the study, a third exploratory aim was added to examine whether reported use of skills mediated the differences between conditions in general and emotional distress, anxiety and depression.

Method

Participants

Participants were 44 men and women with high emotion dysregulation as defined by a score on the DERS higher than 97, who met criteria for at least one mood or anxiety disorder (except for bipolar disorder or for depression with psychotic features). To establish this sample, 463 participants were initially screened for the study by phone. All participants provided informed consent using protocols approved by the University of Washington Human Subjects Division. (See Figure 1 for participant flow and Table 1 for exclusion criteria.) Participants were first screened for high emotion dysregulation and for a willingness to participate in group therapy without also having an individual therapist. The latter criterion required that some participants terminate pre-existing psychotherapy; thus, to meet phone screen criteria, the participant had to agree to terminate any current psychosocial treatment.

Participants were excluded if they were at high risk for suicide defined as having had (a) a suicide attempt that occurred more than 1 year prior and current suicidal ideation of any severity, (b) a suicide attempt that occurred within the past year, or (c) current suicidal ideation that included a preferred method and a specific plan. This exclusion criterion was included because a group-only treatment, without 24-hour access to a therapist, could not provide a sufficient level of care for highly suicidal individuals. Such participants were given referrals to other treatment options, including the number for the King County crisis line.

In addition, participants were excluded at the phone screening if they (a) were

mandated to mental health treatment, (b) had a chronic and current absence of shelter or an impending jail/prison sentence of more than 3 weeks, (c) lived outside of commuting distance, or (d) had received more than five sessions of outpatient DBT (individual or group). They were also excluded if they (e) could not communicate or understand English at sufficient levels to benefit from treatment or (f) were 17 or younger.

In the first 2 months of the study, it became apparent that 30.19% participants meeting phone-screening criteria were being rejected at the in-person screening because they met criteria for BPD. To provide appropriate resources to these individuals sooner in the screening process, the Borderline Symptom List-23 (BSL-23; Bohus et al., 2009) was added to the phone screen. Individuals scoring above a predetermined cutoff on this measure were also excluded from the study. This addition reduced the percentage of participants excluded for meeting BPD diagnostic criteria to 17.14% for the remainder of the study.

Participants who passed the phone screen were invited to an in-person screening in which they participated in a structured diagnostic interview with study assessors. At this phase, participants were excluded from the study if they (a) met diagnostic criteria for BPD, bipolar disorder or a psychotic disorder, (b) had an IQ of less than 70, (c) met criteria for current chemical dependence or life-threatening anorexia that required immediate treatment, or (d) did not meet criteria for a mood or anxiety disorder.

Fifty-seven men and women met all inclusion criteria and were invited to

participate in the study. Each of these participants met criteria for at least one of the following diagnoses: major depressive disorder (MDD), dysthymic disorder, depression NOS, generalized anxiety disorder, post-traumatic stress disorder, social phobia, specific phobia, panic disorder with or without agoraphobia, obsessive-compulsive disorder, and anxiety disorder NOS. To join the study, participants had to verbally agree to stay on the same dosage of psychotropic medication (if any) throughout the study's duration. They were also asked to pay for treatment on a sliding scale of $0 to $65 per session. Forty-eight participants signed consent for the study and were randomized to treatment conditions. Four participants dropped the study after they were communicated the results of the randomization, but before treatment started, leaving 44 participants who ultimately started treatment and became considered intent-to-treat (ITT).

All demographic and diagnostic characteristics were analyzed to check for any statistically significant differences between those who were randomly assigned to either the DBT-ST or the ASG condition. Independent samples *t*-tests were used to assess differences between groups for continuous variables, Mann-Whitney *U* tests were used to assess differences between groups for ranked variables (e.g., highest level of education), and Chi-Squares were computed for binomial variables.

Procedure

Recruitment. Several recruitment strategies were used. One method involved contacting local mental health treatment communities, private practitioners, primary care physicians, counseling centers, and hospitals to provide information about the

study and facilitate referrals. These providers were mailed informational materials and inclusion/exclusion criteria and were called regularly with updates about the study. In addition, flyers, brochures, cards, and posters were distributed in supermarkets, coffee shops, community centers, and universities to publicly advertise the study. A website with study details and referral information was maintained, and study advertisements were listed in online and print newspapers, blogs, and advertising websites (e.g., Craigslist and Backpage). Finally, details about the study were announced in a press release published by the University of Washington.

Screening.

Operational definition for high emotion dysregulation. The Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004), a popular measure of emotion dysregulation, was chosen to delineate high dysregulation from low dysregulation in the present study. This measure has been validated on clinical and nonclinical populations and has demonstrated strong psychometric properties, including test-retest reliability for a period ranging from 4 to 8 weeks ($\rho = .88$, $p < .01$), internal consistency (Cronbach's $\alpha = .93$), and convergent validity ($r = -.69$, $p < .01$). Since norms for this measure did not exist at the start of the study, a cutoff score was computed using data compiled from all experimental studies published before July 2010 that utilized the DERS and that compared a nonclinical sample to a sample of individuals diagnosed with a DSM Axis I disorder. Based on the means and standard deviations of all participants (see Table 2), grand means (*GMs*) and pooled standard deviations (*pSDs*) were computed for control ($GM = 77.33$, $pSD = 19.52$)

and Axis I (*GM* = 94.39, *pSD* = 23.94) samples. A score of 97 (DERS range = 36-180) was chosen as the cutoff for high emotion dysregulation because this score is one standard deviation above the control grand mean and it is comparable to the Axis I grand mean. Hence, participants who scored higher than 97 on the DERS at phone screen met threshold for high emotion dysregulation.

Assessing likelihood of BPD at phone screening. As mentioned before, many participants who had passed the phone screening were later rejected at the in-person screening because they met criteria for BPD. A screening tool was needed to capture this subsample faster in order to reduce participant burden and provide more appropriate resources. The Borderline Symptoms List-23 (BSL-23) is a short version of a validated screening measure for BPD. This version has demonstrated good psychometric properties across five samples, including high internal consistency (Cronbach's α = .94-.97; Bohus et al., 2009). The BSL-23 has been found to range from 0.04 to 3.83 in a BPD sample—higher average scores indicate greater likelihood of meeting criteria for BPD. The original paper for this measure does not include a cutoff; rather, it reports means and standard deviations for participants with a variety of diagnostic presentations (scale range = 0-4): Individuals diagnosed with MDD, anxiety, schizophrenia, and ADHD had average scores of 1.38 (*SD* = 0.83), 1.09 (*SD* = 0.62), 0.92 (*SD* = 0.53) and 1.02 (*SD* = 0.78), respectively. Based on this data, individuals with Axis I disorders are likely to score between 0.24 and 2.21. By contrast, individuals diagnosed with BPD are likely to score an average of 2.05 (*SD* = 0.90; Bohus et al., 2009). To reduce the risk of false negatives, the present study

utilized a cutoff score of 2.5 on the BSL-23.

Telephone screening. Interested individuals contacted the University of Washington's Behavioral Research and Therapy Clinics (BRTC) and were screened on the phone by one of the study's research assistants. Participants also had the option to complete an optional online survey before the phone screening to reduce time on the phone. The phone screening served as a preliminary screening tool in determining participant eligibility. Individuals were provided with a general overview of the screening process, including information about the type of questions they would be asked and about their rights as participants. Individuals were asked about their commuting distance to the BRTC, whether they were receiving outpatient treatment, whether they were taking psychiatric medication, whether they could freely discontinue treatment (e.g., whether they were court-ordered to treatment), about any current and/or past suicidality, and about their interest in the 6-month trial. If participants had not completed the DERS and/or the BSL-23 via the online survey, they were given these measures by phone. The phone screening took an average of 30-45 minutes to complete. Individuals who met inclusion criteria at the end of the phone screening were invited to an in-person screening at the BRTC. By contrast, those ineligible for continued screening, either due to rejection based on inclusion/exclusion criteria or to self-withdrawal, were offered a treatment referral list.

In-person screening. The in-person screening was the principle method for determining participant eligibility. After receiving a description of the screening's

purpose and procedures, participants had an opportunity to ask questions and gave informed consent. Individuals who did not consent to the screening were given a treatment referral list. All interviews were video-recorded. The screening assessment included the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I; First, Spitzer, Gibbon, & Williams, 1995), the BPD module of the Structured Clinical Interview for DSM-IV Axis II Disorders (SCID-II-BPD; First, Spitzer, Gibbon, & Williams, 1997), and a verbal IQ test (PPVT-R; Dunn, 1981) to rule out mental retardation. If, at any point in the interview, it was discovered that a participant met one of the exclusion criteria or did not meet all inclusion criteria, the interview was promptly ended to reduce participant burden. In such cases, a referral list was immediately provided.

Participants who met all inclusion criteria at the end of the in-person screening were invited to participate in the study. Those who were interested in enrolling then underwent an additional informed consent process for the treatment and assessment components of the study with their assessor. At the end of the screening, assessors gave all participants the option to receive a diagnostic summary report. For participants accepted into the study, assessors also composed an intake report, which was then forwarded to the appropriate treatment therapist.

Randomization and group assignment. Matching data for all participants who signed consent was entered into a computerized system that utilized a minimization randomization algorithm to obtain equal numbers of participants at the various levels of each matching variable. This strategy for random assignment to condition was

developed specifically for studies in which the number of matching criteria is large in proportion to the number of participants. Essential for the present study, this procedure allows sequential assignment of participants and has been successfully used in previous trials. Participants were randomly assigned to one of two treatment conditions (DBT-ST or ASG) based on the following matching variables: (a) gender, (b) primary diagnosis (mood disorder or anxiety disorder), and (c) use of psychotropic medication (yes or no). Participants were randomized using a 1:1 ratio, with as many participants assigned to the experimental condition (DBT-ST; $n = 24$) as to the control condition (ASG; $n = 24$).

Once a participant was assigned to a group, the participant's assignment and intake summary were sent to the group's therapist. The therapist then contacted the participant, introduced herself, welcomed the participant to the group, and scheduled a treatment induction session, where participants were oriented to the group logistics, format and confidentiality. Therapists were responsible for informing each participant of the results of the randomization procedure. Participants did not have the information on treatment randomization results until the contact with the study therapist was established.

Treatment.

DBT-ST therapists. The first author, a master's-level clinician (the group leader) trained in DBT conducted all DBT-ST groups with the aid of two bachelor's-level volunteer assistants (the group coleaders). The DBT-ST therapist had participated in a weeklong intensive training and provided DBT services to BPD

clients under the supervision of Dr. Linehan, the DBT treatment developer. In DBT-ST, the group leader was responsible for teaching, reviewing homework, and managing each group session, while each coleader was responsible for keeping time, ensuring participants had proper materials, calling absent participants, and attending to the group process to maintain a class-oriented focus. The group therapists also participated in weekly consultation meetings, as required by the DBT model, and were supervised weekly by an expert DBT clinician (Dr. Heidi Heard). Group therapists were blind to the assessment results for each assessment period.

ASG therapists. Two MSW clinicians (the group leaders) with experience in providing psychosocial treatments conducted the ASG groups with the aid of two bachelor's-level volunteer assistants (the group coleaders). The group leaders were asked to study the treatment manual for the ASG condition and received training in the protocol and weekly supervision from a community therapist who had experience in conducting activities groups. They also received one training session in suicide assessment and management and in the study's procedures from the first author. ASG group leaders were responsible for facilitating each group session, providing a strong rationale for the treatment; using empathic listening, reformulation, clarification, and recapitulation; and displaying positive consideration. However, giving advice, giving exposure-based homework, teaching DBT skills, and problem solving were prohibited. Each coleader was responsible for keeping time, ensuring that participants had proper materials, calling absent participants, and attending to the group process to maintain a supportive listening focus. Group therapists were blind to the assessment

results for each assessment period. To obviate potential allegiance effects, the group therapists for ASG were different from the group therapists for DBT-ST.

DBT-ST design and protocol. DBT-ST was extracted from a comprehensive treatment that is well-articulated in Linehan's (1993) Skills Training Manual for Treating Borderline Personality Disorder. All of the skills included in DBT-ST were extracted from an updated version of this manual. (The newer version is currently in the final stage of editing for publication.) Two main components of DBT were extracted: principles and strategies for teaching, and skills content.

Group session agendas were determined by the skills to be taught that week. Four sets of skills were included in the DBT-ST curriculum (see Table 3): (a) mindfulness skills, (b) emotional regulation skills, (c) distress tolerance skills, and (d) interpersonal effectiveness skills. The mindfulness skills were taught twice over the course of the intervention.

Each session followed the DBT model. Sessions started with a mindfulness practice and homework review followed by skills instruction and new homework assignment. Each skill was taught using the corresponding DBT handout(s), which were modified to remove references to skills that were not included in DBT-ST.

Participants were given diary cards and were instructed to track their use of skills over the week. The top section of each diary card asked participants to rate daily their anxiety, depression, and stress; their self-efficacy at handling their problems; and their drug and medication use. In DBT-ST, the bottom section of the diary card contained a list of skills where participants could indicate, by day, what

skill(s) they used. On the backside of the diary card, participants could indicate important events that occurred in the last week. In DBT-ST, during each session, diary cards from the previous session were reviewed, and participants' understanding of the skills taught in the previous session was assessed and refined before teaching additional skills.

Participants joined the group at weeks 1, 2 and 9. These time points were chosen because it was during these weeks that the group started learning a new set of skills. Before joining the group, each participant met privately with the group leader for a 30-min treatment induction session to discuss the group's rules, format, and confidentiality policies; to establish a crisis plan; and to address any concerns. If participants missed a group session, they had the option to watch the video recording of the missed session and to ask the group therapist questions via e-mail.

The DBT-ST group met for 16 weekly sessions. Each session was 2 hr and consisted of approximately 40 min of homework review, a 5-min break, and 1 hr 15 min of teaching. Sessions in weeks one and nine had 2 hr of teaching with a 10-min break in the middle. During homework review, participants took turns talking about how they had used skills in the previous week using assigned worksheets and their completed diary cards as guides. The group therapists provided feedback and clarified material.

ASG design and protocol. The ASG group met for 16 weekly sessions. Each session was 2 hr. Originally group session agendas were determined by an established treatment structure described in the ASG manual, which included suggestions for

support-building activities and psychoeducation topics. After the first few sessions, however, ASG participants voiced that they did not like the structured psychoeducation portion of the sessions. Therefore, for the remainder of the study, pre-planned psychoeducation was replaced with group discussion.

ASG sessions started with a check-in of approximately 30 min. During this time, participants took turns talking about the highs and lows of their previous week. Check-in was followed by about 30 min of one of the support-building activities described in the treatment manual and then a 10-min break. Each week, participants chose the topic they wanted to discuss the following week. In the last hour of each session, participants discussed the previously chosen topic. The group therapists encouraged discussion, provided support, and offered a small portion of psychoeducation if prompted by participants. ASG groups discussed topics such as anxiety, anger, goals, and support. (Table 4 contains a listing of topics and the frequency with which they were discussed throughout the study.) At each session's end, homework was assigned: participants were asked to think about the issues discussed during the session. Participants were also given diary cards and instructed to track the level of social support they received each day.

The top section of each diary card was the same as in the DBT-ST condition; all participants were asked to rate their anxiety, depression, and stress for the day; their self-efficacy at handling their problems; their drug and medication use. In ASG, the bottom section of the diary card contained lines for listing people whom

participants felt supported by and a way to indicate when in the last week they felt such support. In ASG, diary cards were collected each week but were not discussed.

As in DBT-ST, Participants joined the group at weeks 1, 2 and 9. Before joining the group, each participant met privately with the group leader for a 30-min treatment induction session to discuss the group's rules, format, and confidentiality policies; to establish a crisis plan; and to address any concerns. If participants missed a group session, they had the option to watch the video recording of the missed session and to ask the group therapist questions via e-mail.

To prevent contamination, group sessions for ASG and DBT-ST were held on different days of the week.

Adherence to the treatment protocols. The DBT Global Rating Scale (Linehan, unpublished work, 2003) was used to assess the therapists' adherence in the DBT-ST condition. This scale codes DBT adherence on a 5-point scale (to one decimal point), with a score of 4.0 or higher denoting adherence. One coder, who had been previously trained to reliability with the treatment developer, coded a random selection of group sessions to establish whether the DBT-ST therapists were adherent to the protocol.

An adherence measure assessing therapists' fidelity to a supportive intervention could not be found. Thus a coding system was developed (see Appendix) to assess for fidelity to the main elements of the intervention relevant to the study (e.g. supportive environment, lack of problem solving, etc.). The ASG adherence measure consists of two parts: part I includes a set 20 questions scored as "yes" or

"no" evaluating basic components of each session. A session could only be deemed adherent if the sum of part I was above 17 (i.e., did not miss more than 3 basic components). Part II includes five questions related to perceived support and 12 questions related to facilitating group participation. All questions in part II were rated on a scale of 1 to 7 (low to high), with adherence being indicated by an average score of 4 or higher. One bachelors' level coder, naïve to DBT, was trained in the use of this measure and rated a random selection of group sessions to establish whether the ASG therapists were adherent to the protocol.

Protocols.

Risk assessment and management. Group therapists used the University of Washington Risk Assessment and Management Protocol (UWRAMP; Linehan, Comtois, & Ward-Ciesielski, 2011) to address suicide risk. The UWRAMP contains a treatment form for group therapists to complete if the they suspect that particular participants become higher in risk for suicide or self-harm. The form documents the clinician's risk assessment and the interventions provided, those not provided, and the reasons certain interventions were not provided. The protocol's design was informed by over 35 years of experience in assessing and managing suicide risk, and items selected for the UWRAMP are based on an extensive literature on risk factors for suicide.

Participants were informed during pretreatment that suicide and self-harm are sometimes associated with the disorders they were diagnosed with at the in-person screening. Participants' crisis plans included a reference list with crisis service

numbers, and participants were coached in calling these numbers if they felt suicidal. Participants were also encouraged to tell the group therapist if they ever felt more suicidal or had stronger urges to self-harm. During the one-on-one meeting and whenever a participant indicated suicidality, the participant and his or her group therapist met in private to assess risk with the UWRAMP and to create a crisis plan.

Risk/distress during in-person assessments. Given the nature of the present study's sample, a protocol for managing suicidality and distress was included in each in-person assessment. This protocol served to assess and reduce distress during assessments and to monitor any negative effects of participating in assessments. All study assessors were trained in this protocol prior to conducting assessments.

Each assessment began with an evaluation of the participant's current level of stress and urges to self-harm, attempt suicide, binge, purge, or use alcohol or drugs. Before moving on, the assessor and participant also discussed strategies they could use to manage distress that might arise during or after the assessment. Assessors used information from this exchange to structure and pace the assessment according to the participant's tolerance. At the end of each session, the assessor administered a debriefing form, which reassessed the participant's stress and urges. If the participant's mood or urges worsened during the assessment, the assessor and participant actively attempted to reduce distress and made a crisis plan for the participant to follow after leaving the assessment.

Therapy fee. All participants were asked to pay for each group session on a sliding scale between $0 and $65. Each participant's per session fee was determined

during the pretreatment assessment. If a participant indicated that he or she could not pay the full fee for therapy ($65/session), the assessor and the participant completed a form together on the participant's income and expenses. Based on the difference, the participant and assessor negotiated a reasonable fee. Payments were collected at the end of each group session. The fee remained negotiable throughout treatment and could be waived by the group therapist if it seemed to interfere with the participant's group attendance. A fee was included in the treatment protocol to help offset study costs and to increase external validity (participants must pay for therapeutic services in the community).

Dropout. After randomization, any participant who had missed 4 consecutive scheduled weeks of their group (regardless of condition) became considered a treatment dropout. (This rule was explained to participants during their treatment induction session.) However, participants who discontinued therapy could remain in the study. During the informed consent process, participants were told that, if they discontinued treatment, they would still be contacted to participate in assessments unless they explicitly requested to be dropped from the study. Participants who could not be reached for any follow up assessment period were also considered study dropouts.

Medication and ancillary treatment. Participants were accepted into the study regardless of whether they were taking psychotropic medication. However, intent-to-treat participants taking psychotropic medication were asked to maintain a stable dosage and to stay in regular contact (even by phone) with their medication provider

(e.g., PCP, psychiatrist, ARNP) throughout the study. Participants not taking psychotropic medication were asked to remain off of psychotropic medication for the duration of the study.

Medication compliance was assessed at each period using questions from the brief adaptation of the Treatment History Interview (THI; Linehan & Heard, 1987). Psychotropic medications reported at pretreatment became each participant's baseline regimen. In each subsequent assessment, participants were asked what medications they had taken since their last assessment. Participants were deemed noncompliant with the medication protocol during a period if, for that period, they reported (a) dropping a psychotropic medication within their baseline regimen or (b) adding a psychotropic medication outside of their baseline regimen.

In addition, participants were asked not to be in any additional psychotherapy in order to be accepted into the study. For some participants, this involved terminating ongoing psychotherapy sessions. The pros and cons of this decision were discussed with participants during the in-person screening, and acceptance in the study was contingent on participants' verbal confirmation that they would terminate ancillary psychotherapy. Participants were also asked to refrain from seeking additional psychosocial treatment for the duration of the study.

Compliance with this requirement was assessed at each assessment period using questions from the adapted THI (Linehan et al., 1987). Participants were deemed noncompliant for treatment during a period if, for that period, they reported (a) receiving help from an additional therapist or counselor, (b) gaining admittance to

a psychiatric floor, or (c) spending time in a residential recovery center for drug and/or alcohol treatment.

All participants verbally agreed to abide by these requirements during the informed consent process at the in-person screening. However, participants could still continue in therapy and in the study even if they did not adhere to these protocols.

Assessments.

Assessment schedule and protocol. Assessors, who were blind to randomization and who had been trained to reliability on all interviews, conducted all assessments. All randomized participants were asked to complete assessments before treatment started (pretreatment assessment), halfway through treatment (2-month assessment), at the end of treatment (4-month assessment), and at a 2-month follow-up (6-month assessment). Each assessment consisted of a 90-min interview portion and a 90-min set of computerized self report measures. Assessments were scheduled independent from therapy sessions at the targeted time points.

Each assessment covered four main domains of interest: emotion dysregulation, skills use, general and emotional distress, and Axis I psychopathology and remission. Additional measures were also included to assess feasibility (client satisfaction) and potential confounds such as expectancies and medication usage.

One modification to the assessment protocol was made during the study. In an effort to reduce participant burden, at the beginning of the study the DERS was not administered at pretreatment under the assumption that DERS scores obtained at phone screening could also serve as pretreatment scores. However, after 14

participants had entered the study, the DERS was added to the pretreatment assessments in addition to the phone screening. As a result of this change, 30 participants have both phone screening and pretreatment DERS scores, while 14 participants have only phone screening DERS scores.

Participants were offered incentives to complete some assessments. Participants were paid $25 for completing the 2-month assessment, $25 for the 4-month, and $50 for the 6-month. No compensation was offered for completing the screening and pretreatment assessments.

Assessment measures: emotion dysregulation domain.

Difficulties in Emotion Regulation Scale (DERS; Gratz et al., 2004). The DERS is a 39-item self-report measure of individuals' typical levels of emotion dysregulation across six domains: nonacceptance of negative emotions, inability to engage in goal-directed behaviors when experiencing negative emotions, difficulties in controlling impulsive behaviors when experiencing negative emotions, limited access to emotion regulation strategies perceived as effective, lack of emotional awareness, and lack of emotional clarity. Participants respond on a 5-point Likert-type scale ranging from 1 (*almost never*) to 5 (*almost always*). The DERS has high internal consistency (Cronbach's $\alpha = .93$), good test-retest reliability ($\rho_I = .88$, $p < .01$), and adequate construct and predictive validity.

Affective Control Scale (ACS; Williams, Chambless, & Ahrens, 1997). The ACS is a 42-item self-report measure that assesses fear of emotions and attempts to control emotional experience. Items are scored on a 7-point scale ranging from 1

(*very strongly disagree*) to 7 (*very strongly agree*). The ACS has excellent internal consistency (Cronbach's α =.92) and good test-retest reliability (ρ_I =.77) as well as evidence of validity.

Toronto Alexithymia Scale-20 (TAS-20; Bagby, Parker, & Taylor, 1994; Bagby, Taylor, & Parker, 1994). The TAS-20 is a 20-item self-report measure that assesses difficulties with understanding emotions across three domains: (a) difficulty identifying feelings, (b) difficulty describing feelings, and (c) externally oriented thinking. Items are scored on a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The scale has acceptable internal consistency (Cronbach's α = .81), and fair test-retest reliability (ρ_I =.77). Validity is supported by evidence suggesting that the TAS correlates negatively with instruments that measure one's access and openness to feelings.

Assessment measures: skills use domain.

DBT Ways of Coping Checklist (DBT-WCCL; Neacsiu et al., 2010*)*. The DBT-WCCL is an adaptation of the Revised Ways of Coping Checklist (RWCCL; Vitaliano et al., 1985) that includes additional items intended to represent DBT skills. The DBT-WCCL is a self-report questionnaire consisting of 38 items that measure frequency of DBT skills use over the previous month and 21 items that measure dysfunctional, non-DBT coping strategies. To avoid potential response bias, the questionnaire is composed of general descriptions of skillful behavior rather than specific terms and phrases used in DBT skills training. Items are rated on a 4-point scale ranging from 0 (*never use*) to 3 (*always use*). A prior examination of the DBT-

WCCL's psychometric properties in a BPD sample revealed that the DBT Skills Subscale (DSS) has excellent internal consistency (Cronbach's α =.92-.96; n = 316). In addition, test-retest reliability for 119 BPD individuals treated without access to skills training was also acceptable at 4 months, (ρ_I = .71, p < .001). Individuals who received skills training had significantly higher scores after 4 months of treatment than those who did not receive skills training, which supports the criterion validity of this measure (Neacsiu et al., 2010).

Assessment measures: general distress domain.

Outcome Questionnaire (OQ-45; Lambert et al., 1996). The OQ is a 45-item self-report measure of functioning that includes subscales for three domains: subjective discomfort, interpersonal relationships, and social role performance. Items are rated on a 5-point scale ranging from 0 (*never*) to 4 (*almost always*). This measure has been reported to have adequate reliability and validity in both clinical and normative populations. Psychometric evaluation of the OQ-45 has revealed adequate test-retest reliability over a 3-week interval (ρ_I = .84), excellent internal consistency (Cronbach's α = .93), and validity (Lambert et al., 1996). Research also shows that the measure is sensitive to changes in clients over short time periods and that it remains stable for untreated individuals (Vermeersch, Lambert, & Burlingame, 2000).

Based on cutoffs suggested by the OQ-45 development study, a total score of 64 or higher indicates significant clinical distress, and a drop by 14 points in the total score signals reliable change.

Assessment measures: emotional distress domain.

State-Trait Anger Expression Inventory (STAXI; Spielberger, 1988*)*. The STAXI is a widely used self-report measure of anger with four subscales: disposition to experience anger (Anger Trait), frequency of anger suppression (Anger In), frequency of anger expression (Anger Out), and attempted control of anger (Anger Control). Each item is scored on a 4-point scale ranging from 1 (*never*) to 4 (*almost always*). Internal consistencies of the subscales range from .73 to .93, and construct validity has been demonstrated by associations between each scale and responses to anger scenarios. Because only anger expression and suppression are in line with the emotional distress domain, only these subscales were used in this study.

Disgust Propensity and Sensitivity Scale-Revised (DPSS-R; Olatunji, Cisler, Deacon, Connolly, & Lohr, 2007). The DPSS-R is a 16-item measure of the frequency of feeling disgust (propensity) and the emotional impact of disgust symptoms (sensitivity). Statements are rated for disgust on a 5-point scale ranging from 1 (*never*) to 5 (*always*). The DPSS-R has excellent internal consistency (Cronbach's α =.90), adequate test-retest reliability for both subscales (ρ_I =.69-.77), and convergent validity.

Experience of Shame Scale (ESS; Andrews et al., 2002). The ESS is a 25-item self-report measure used to predict depressive symptoms based upon their potential link to shame. The questionnaire assesses four areas of characterological shame (personal habits, social manners, personal character, personal ability), three areas of behavioral shame (doing something wrong, saying something stupid, failing in competitive situations), and bodily shame. Each item is rated on a 4-point scale

ranging from 1 (*not at all*) to 4 (*very much*). The ESS has high internal consistency (Cronbach's α =.92) and good test-retest reliability (ρ_I =.83).

Assessment measures: psychopathology domain.

Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I; First et al., 1995). The SCID-I is a semi-structured interview used to make DSM-IV Axis I diagnoses. The interview is divided into six self-contained modules, which were administered in the suggested sequence: mood episodes; psychotic symptoms; psychotic disorders; mood disorders; substance use disorders; and anxiety, adjustment, and other disorders. The language of SCID-I criterion items closely resembles that of DSM-IV criteria. Assessors rate each item as 1 (*absent*), 2 (*subthreshold*), or 3 (*threshold*), and logic patterns embedded in the interview help assessors make accurate diagnoses. The SCID-I was administered as part of the in-person screening.

An inter-rater reliability analysis using the Kappa statistic (κ) was performed to determine consistency among assessors. As a rule of thumb, ranges in κ of .40-.59, .60-.79, and .80-1.00 reflect moderate, substantial, and outstanding reliability, respectively. Most statisticians prefer that κ values meet or exceed .60 for a sufficient level of agreement to be claimed (Landis & Koch, 1977).

Structured Clinical Interview for DSM-IV Axis II Personality Disorders-BPD Module (SCID-II-BPD; First et al., 1997). The SCID-II-BPD is a semi-structured interview used to make DSM-IV Axis II diagnoses of BPD. The language of SCID-II criterion items closely follows that of DSM-IV criteria, and assessors rate each item

as 1 (*absent*), 2 (*subthreshold*), or 3 (*threshold*). The present study included only the BPD module, which was administered as part of the in-person screening, to assess for borderline personality disorder, one of the exclusion criteria.

Overall Anxiety Severity and Impairment Scale (OASIS; Norman, Hami-Cissell, Means-Christensen, & Stein, 2006). The OASIS is a 5-item self-report measure that assesses the severity of general anxiety experienced in the previous week. Each item is rated on a 5-point scale ranging from 0 (*little or none*) to 4 (*extreme*), making it one of the shortest anxiety scales available. The OASIS has strong test-retest reliability ($\rho_I = .82$, $p < .05$), strong convergent and discriminant validity in relation to other anxiety measures, and good internal consistency (Cronbach's $\alpha = .80$).

The OASIS has adequate sensitivity and specificity in distinguishing between individuals with and without anxiety disorders. Campbell-Sills and colleagues (2009) showed that a cutoff score of 8 on the OASIS correctly classified 87% of a client sample as having an anxiety disorder. In their study, 925 anxious patients scored an average of 11.37 ($SD = 3.61$) on the OASIS, and scores did not significantly vary depending on the specific anxiety disorder each participant identified as most distressing, $F(3) = 2.26$ ($p > .05$). In a different study using the SCID-I to assess for anxiety disorders, the mean OASIS score for individuals without anxiety diagnoses was 5.69 ($SD = 3.27$), and the mean for those with anxiety diagnoses was 9.15 ($SD = 3.28$). A cutoff score of 8 classified 78% of the sample as pathological with 69% sensitivity and 74% specificity (Norman et al., 2011).

Patient Health Questionnaire-9 (PHQ-9; Kroenke, Spitzer, & Williams, 2001). The PHQ-9 is a 9-item self-report measure of depression whose questions closely resemble DSM-IV-TR criteria for this disorder. Each item is rated on a 4-point scale ranging from 0 (*never*) to 3 (*nearly every day*). In addition, at the end of the questionnaire, participants rate how much the previous nine criteria have interfered with their daily functioning. A total score is computed by summing the answers to the first nine questions.

The PHQ-9 can be administered quickly and is sensitive to clinical change in individuals diagnosed with depression. In addition, the PHQ-9 has good test-retest reliability (ρ_I =.84) over a 2-day interval. In the PHQ-9 development study, most patients without depressive disorder (93%) had total scores of less than 10 (M = 3.3, SD = 3.8), while most patients with MDD (88%) had scores of 10 or more. This suggests that a cutoff score of 10 has adequate sensitivity and specificity in differentiating depressed individuals from individuals without MDD (Kroenke et al., 2001). Follow-up studies have validated this cutoff as an indicator of depression. For example, in a carefully designed depression study, 114 participants diagnosed with MDD had an average score of 17.3 on the PHQ-9 (SD = 5.0; McMillan, Gilbody, & Richards, 2010).

Additional assessment measures.

Brief Demographic Data Survey (B-DDS). The B-DDS is a face-valid questionnaire that was administered as part of the phone screening. It contains demographic questions about gender, sexual orientation, racial and ethnic

background, marital status, income, and disability.

Brief Treatment History Interview (B-THI). The B-THI is an adaptation of the Treatment History Interview (THI; Linehan et al., 1987). It is a face-valid questionnaire that assesses for ancillary mental health treatment and for psychotropic medication(s) participants were prescribed since the last assessment. It contains questions about the type of medication; the reason for each one; and details about participants' dosage, frequency of use, and compliance. In addition to using the medication and ancillary treatment information to assess ongoing compliance with study protocols, general use of psychotropic medication since the last assessment was coded into a binary variable (yes/no) and was tested as a potential confounding factor.

Client Satisfaction Questionnaire (CSQ; Attkisson & Zwick, 1982). The CSQ is an 8-item self-report measure of individuals' satisfaction with treatment. All items (e.g., "Have the services you received helped you deal more effectively with your problems?") have high face validity. Each item is rated on a 4-point scale ranging from 1 (e.g., *no, definitely not*) to 4 (e.g., *yes, definitely*). The CSQ has excellent internal consistency (Cronbach's $\alpha = .93$) and significantly correlates with clients' self-ratings of global improvement ($r = .53$, $p < .001$) and with therapists' estimates of client satisfaction ($r = .56$, $p < .01$). The CSQ was not given at pretreatment, but was administered at every subsequent assessment point.

Peabody Picture Vocabulary Test-Revised (PPVT-R; Dunn, 1981). The PPVT-R is a brief measure of verbal intelligence. Unlike many other brief instruments of its kind, the PPVT-R has the advantage of exhibiting low sensitivity to

learning disabilities while providing IQ scores that are comparable to those arrived at by other intelligence tests. Participants with suspected cognitive impairment (i.e., with IQ scores less than 70) were excluded from the study.

Expectancy of Improvement Scale (EIS; Devilly & Borkovec, 2000). The EIS is a 6-item measure of participants' expectations about treatment. Each item is rated on a 4-point scale with a set of anchors specifically worded for that item. For each item, the lower anchor represents the most negative expectation, and the highest anchor represents the most positive expectation. A total score is computed by summing the ratings for all six items.

The present study utilized an adapted version of the EIS. The last two items ("How much do you really *feel* that therapy will help you to reduce your symptoms?" and "How much improvement in your symptoms do you really *feel* will occur?") were removed, and all other questions (except for the first, "At this point, how logical does the therapy offered to you seem?") were duplicated to address outcomes for both anxiety and depression. For example, the question "How successful do you think this treatment will be in reducing your symptoms?" became two: (a) "How successful do you think this treatment will be in reducing your anxiety?" and (b) "How successful do you think this treatment will be in reducing your depression?" To improve sensitivity, each item's rating scale was expanded to range from 1 (most negative expectation) to 9 (most positive expectation). As a result of this revision, total scores can range from 0 to 63, with greater values indicating more positive expectations. The

EIS was given after the first treatment session and at each subsequent assessment period and was tested in the analyses as a potential confounding factor.

Data Management and Analysis

Power analyses. Sample size for the present study was determined using G-Power by conducting power analyses and focusing on existing emotion dysregulation data. Based on Cohen's (1988) work, treatment effect sizes from prior studies were calculated as a difference in means divided by the standard deviation of that difference, as in *Equation 1* below.

$$d = \frac{\bar{x}_1 - \bar{x}_2}{s}, s = \sqrt{\frac{(n_1-1)s_1^2+(n_2-1)s_2^2}{n_1+n_2}}. \quad (1)$$

This method produces an effect size, *d*, for which 0.2 is considered a small effect, 0.5 is considered a moderate effect, and 0.8 is considered a large effect.

First, data from a recently completed RCT was used to determine expected effect sizes. In this study, 99 participants were randomly assigned to three groups: standard DBT (S-DBT), which included DBT skills training and individual DBT therapy; DBT skills training + case management (DBT-S); and individual DBT + activities group (DBT-I). All participants were diagnosed with BPD and scored high in emotion dysregulation as measured with the DERS (M = 127.03, SD = 21.15). Assessors, who were blind to treatment assignment, assessed participants at pretreatment and every 4 months throughout the one-year treatment.

The power analysis involved examining 4-month assessment data from this ongoing RCT because this time point corresponds to the duration of treatment in the

present study. Data from the DBT-S and DBT-I conditions were selected because these conditions most closely resemble DBT-ST and ASG. The DERS 4-month total score was subtracted from the pretreatment score for each participant, and the resulting change scores yielded a 4-month effect size of 0.89 when comparing DBT-S with DBT-I.

Second, a different RCT, performed by Gratz and Gunderson (2006), was also examined for expected effect sizes. This study compared treatments for nonsuicidal, self-injurious BPD women with high emotion dysregulation (pretreatment DERS total score: M = 119.9-127.92, SD = 20.86-19.99). Twenty-two participants were randomly assigned either to treatment-as-usual (TAU) or to TAU and a 14-week group targeting nonsuicidal self-injury and emotion dysregulation using skills derived from DBT and Acceptance and Commitment Therapy (ACT). The effect size based on the difference between conditions in the DERS total score at the end of treatment is 1.8. The effect size based on the F-test comparing the difference between conditions from pre- to post-treatment is 1.53.

Third, since both DERS effect sizes (0.89 and 1.8) are large, a third study was considered to ensure that large effect sizes could indeed be expected in the present study. Harley and colleagues (2008) compared the effectiveness of DBT skills to TAU for 19 treatment-resistant participants with MDD. Using a similar 4-month group format, they found significant differences between groups at post-treatment and large effect sizes on two depression measures: the Hamilton Depression Interview

(Harley et al., 2008; $d = 1.45$) and the Beck Depression Inventory (Harley et al., 2008; $d = 1.31$).

Considering each effect size calculated from prior studies, the most conservative effect size to include in the power analysis is 0.89. Forty-four participants (17 study completers per condition, allowing for 10 potential study dropouts) were therefore accepted into the current clinical trial. This sample size is based on an estimated effect size of at least 0.89 (one-tailed, when comparing DBT-I to DBT-S at 4 months) with power set to .80.

Data management. Assessors and participants entered all data directly through an online interface into an SQL database. Missing values due to participant absenteeism were coded to reflect the reason data was missing (e.g., "subject is unable to be located"). During each assessment, participants were also asked to provide reasons for leaving items blank (e.g., "subject refuses to answer"). All data were cleaned for logical inconsistencies and other types of errors using SPSS version 13. In addition, frequency counts and cross-tabulations were generated to check for outliers and consistent relationships among the variables.

Outcome domains. Two primary outcome domains are of principal theoretical interest in this study: emotion dysregulation and skills use. Three exploratory outcomes are also of interest: general distress, emotional distress, and reduction in psychopathology.

Regarding primary outcomes, three outcomes measures were used to target emotion dysregulation: the DERS total score (for difficulties with emotion

regulation), the TAS-20 total score (for alexithymia), and the ACS total score (for affect control). A Bonferroni correction was employed to control for multiple comparisons in emotion dysregulation. In addition, the main outcome measure for skills use was the DBT Skills Subscale score from the DBT-WCCL.

With respect to the exploratory outcomes, the chief outcome for general distress was the OQ-45 total score. Second, emotional distress was assessed using specialized measures for multiple dysfunctional emotions: the DPSS-R for disgust, the ESS for shame, and the STAXI for anger (Anger In subscale for suppression, Anger Out subscale for expression). The Anger Control subscale of the STAXI was not included because it more closely measures emotion regulation than emotional distress. As before, a Bonferroni correction was employed to correct for multiple comparisons.

Third, two measures were used to assess reductions in psychopathology: the PHQ-9 for depression and the OASIS for anxiety. Only participants who scored within the clinical range for these measures were included in analyses to assess change over time in psychopathology.

On each of these outcome variables, greater improvements were hypothesized for DBT-ST than for ASG. Primary analyses were conducted on both intent-to-treat participants (i.e., those who completed the pretreatment assessment and attended the first group session) and treatment completers; results from each sample are reported. Results for participants who were compliant with the study protocol (i.e., maintained

the same course of psychotropic medication and refrained from ancillary psychotherapy) are also reported.

Finally, results from analyses on potential confounding factors of treatment effects are reported. Potential confounds include expectancies and psychotropic medication use.

Treatment attendance and satisfaction. Data on treatment attendance, dropout, and satisfaction (CSQ) were analyzed to assess for differences between conditions. In addition, adherence to treatment protocols was assessed by coding a random selection of sessions on pre-established adherence measures. Ten percent of the sessions in each condition were selected for coding.

Statistical analysis strategy.

Normality assumption. Exploratory data analyses were initially conducted to assess whether the present data satisfy the assumptions required for later analyses. Different statistical analyses were used for different distributions among variables. One key assumption of the longitudinal model framework is normality of the outcome measure. When the response variable of interest has a normal distribution, special cases of the General Linear Model are sufficient for modeling needs. These versions include Linear Regression, Analysis of Variance, Analysis of Covariance, Multivariate Analysis of Variance, and extensions to Longitudinal and Mixed Effect model. However, in many practical situations, the response variable may not have a

near normal distribution. To account for non-normality, various transformations are often applied.

Shapiro and Wilk (1965) provide a test statistic for normality. The Shapiro-Wilk *W* test statistic ranges from 0 to 1, in which larger values indicate greater resemblance to the normal distribution. The W statistic and its significance are used to establish whether the normality assumption is false for a measure. However, the significance of this statistic is very sensitive to sample size and may not be a reliable indicator of normality for small sample sizes (Royston, 1991). For this reason, a *W* statistic greater than .9 was taken to indicate normality regardless of its significance. Because this statistic is univariate, it was assumed that if an outcome variable is normally distributed at each time point, then the variable can be considered normally distributed for the longitudinal analysis.

Longitudinal outcome analyses. The primary method used for longitudinal outcome analyses was hierarchical linear modeling (HLM; Bryk & Raudenbush, 1992). Repeated outcome measures over time were used as level one variables, and treatment condition was used as the level two variable. This analysis tests whether the level two variable (condition) explains differences in the dependent variable (the slope of that outcome measure over time).

HLM was the best analysis for testing the proposed hypotheses because it allowed for variation at multiple levels and because it provided the best approach to handling missing data. First, individual variability was expected among participants. Variability was also expected between conditions. In HLM, a regression line is

constructed for each participant, allowing both types of variability and their interaction to be tested. In addition, regression lines were constructed from available data points. If a data point was missing for a participant, a regression line could still be constructed under the assumption that the data point, had it not been missing, would have followed the trajectory of the participant's data from other assessments.

Appropriate covariance structures were analytically determined based on a comparison of model fit criteria (Verbeke, 1997). Three models were compared: random intercept (RI), random intercept and random slope (RI&RS), and unstructured (UN). The RI model assumes there is no subject-to-subject variability in slope. In other words, all participants are assumed to have the same trajectory without individual variability over time. By contrast, the RI&RS model assumes participant variability in slope but sets the covariance between the random slope and the random intercept to zero. That is, the RI&RS model does not assume a relationship between where participants started on the outcome measure and how they progressed in treatment—participants may vary in their trajectories throughout the study. Alternatively, the UN model allows the random intercept and random slope to be correlated. If this model is used, how high (or low) participants score at pretreatment affects how much (or little) they change in the analysis. To improve the likelihood that each of the models would converge, SPSS-13 was set to perform the maximum number of iterations it allowed. If the models converged, chi-square tests comparing indices of fit were used to determine the best model. If one of the models did not converge, the fit comparison was started with the next model.

Missing data imputations were not specified. Instead, a restricted estimated maximum likelihood (REML) model was used to account for missing data in HLM analyses. In this approach, time is treated as a continuous variable, and a regression line is modeled for each participant based on the number of available time points. The model does not assume that each outcome contains data from the same number of time points; therefore, the regression line is created with any available time points. In this way, participants with missing data are still modeled using any data points they did provide (Schafer & Graham, 2002).

Data were collected throughout treatment and at a 2-month follow-up. To assess whether being in treatment versus being in the follow-up period significantly predicted outcomes, a binary covariate was added to each HLM model. If the covariate was significant, a different slope-by-condition interaction was assumed during treatment and at follow-up. To better characterize differences in this situation, a new analysis was conducted in which the time variable was conceptualized with two legs. The first leg (time1) was coded as continuous throughout treatment and constant at follow-up, whereas the second (time2) was coded as constant throughout treatment and continuous at follow-up. Using both time variables in the HLM models yielded two slope-by-condition interactions: one for effect of being in treatment and one for the effect of being in the follow-up period.

Because some longitudinal analyses had significant treatment and follow-up effects while others did not, the intercept for the time variable for all analyses was set

at the pretreatment assessment. In this way, the intercept time point did not vary among analyses.

HLM output from SPSS provides an estimated coefficient and an *F*-test assessing the significance for each fixed effect and interaction effect. In these analyses, the fixed effects are time in study, study phase (treatment or follow-up), and condition, and the interaction effect is time-by-condition. For two-leg analyses, the fixed effects were time1, time2, and condition, and the interaction effects were time1-by-condition and time2-by-condition. A significant effect of time suggests that participants significantly changed over time regardless of condition. A significant effect of condition suggests that participants in one condition significantly differed from participants in the other condition regardless of time. A significant interaction suggests that participants in one condition changed differently over time (i.e., faster or slower) than participants in the other condition.

However, the *F*-test of significance does not explain the source of any differences. Therefore, an a priori set of contrasts was created for each analysis to better understand the main effects and interactions. Two tests assessing whether the slope for each condition is significantly different from zero were included in the HLM model. These tests provide a slope estimate for each condition and a *t*-test assessing the significance of the slope. For cases in which one slope is significantly different from zero for one condition, but not for another, the outcome for the condition with the significant slope was considered superior even if a significant time-by-condition interaction was not obtained. For the two-leg analyses, four a priori

tests were included in the HLM analysis, one assessing the significance of the slope of change in each condition, for each study phase.

Intent-to-treat (ITT), completer, and compliance analyses. Three types of analyses for each outcome measure were performed: intent-to-treat (ITT) analyses, including all data available; completer analyses, including only data from participants who completed the entire course of treatment; and compliance analyses, including only data points were participants were compliant. As stated before, participants were deemed compliant at each assessment period if they did not participate in additional psychosocial treatment and if they stayed on the same course of psychotropic medication (if any). In the compliance analyses, any time point for which a participant was noncompliant was excluded. Differences between compliance analyses and ITT analyses are also described.

Effect size. Based on a literature review, Feingold (2009) concluded that treatment effect sizes for longitudinal analyses are best obtained by employing pretreatment raw scores rather than change scores. This approach for calculating effect size minimizes bias in estimating the treatment effect from longitudinal results.

$$\text{Effect size} = \beta * \text{time}/SD_{\text{raw}}. \quad (2)$$

In *Equation 2* above, β is the estimated coefficient of the difference in slope for each condition (DBT slope, ASG slope), SD_{raw} is the pooled standard deviation between conditions at pretreatment, and time is the number of time points included in the analysis (in the present study, time = 3). The resulting effect size is interpreted using Cohen (1988)'s specifications.

Confound analyses. For each of the main analyses, a series of confounding factors were tested to assess whether treatment effects are better explained by another variable. These potential confounds included psychotropic medication use and expectancy of improvement. Each variable was tested by adding it as a covariate to the primary analyses. If an analysis indicated a significant main effect for the covariate, the variable was kept in the analysis and reported with the main results for that outcome. If the covariate was not significant, it was removed from the analysis.

Two potential confounding factors were tested: use of psychotropic medication in the past 2 months (from B-THI) and expectancy for improvement (EIS).

Clinically significant change. Significant clinical change as described by Jacobson and Truax (1991) was also examined. This construct refers to functional changes that are meaningful to participants in a psychosocial intervention. A comparison of multiple methods for assessing reliable change concluded that the initial method developed by Jacobson and Truax (1991) is the simplest and that it yields results similar to those found via more complicated, yet more accurate means (Bauer, Lambert, & Nielsen, 2004).

According to Jacobson and Truax (1991), deciding whether reliable change has occurred is a two-step process. First, a cutoff score is established to differentiate between clinical and nonclinical populations for a measure of interest. Depending on available data, three types of cutoffs can be computed: one based on the clinical sample included in the study (cutoff *a*), one based on known functional norms (cutoff

b), and one based on a weighted midpoint between the means of functional and dysfunctional populations (cutoff *c*).

The second step is to determine whether a participant's change from pre- to post-treatment is an artifact of measurement error or indicative of actual change. For this determination, a reliable change index (RCI) is computed based on the test-retest reliability of the measure and its standard deviation at pretreatment. If the post-test score exceeds the chosen cutoff and the RCI is greater than 1.96, the participant is classified as *recovered.* If the RCI is greater than 1.96 but the post-test score falls below the cutoff, the participant is classified as "improved." If neither criterion is met, or if the RCI is exceeded but the participant worsens, the participant is classified as "unchanged" or "deteriorated" (Jacobson et al., 1991; Bauer et al., 2004).

Clinical significance analyses were performed on outcome variables that could offer a better understanding of the treatment effects, including the DERS, DBT-WCCL, OQ-45, PHQ-9, and OASIS. Cutoffs and RCIs for each measure were determined a priori. Because the three categories into which participants can fall are ranked, Man-Whitney *U* analyses were performed between conditions at each time point to assess for differences in the amounts of participants who remained unchanged, who improved, and who recovered between conditions.

Mediation analyses. Mediation hypotheses were assessed using the statistical mediation procedures developed by Krull and MacKinnon (2001). Kramer, Wilson, Fairburn and Agras, (2002) listed additional considerations for Krull and MacKinnon's steps; these specifications were also utilized in mediation analyses.

According to Krull and MacKinnon's procedure, three criteria must be met to support a mediation model. First, the independent variable must be significantly related to the mediator (e.g., condition predicts skills use—α path). Second, the independent variable must significantly predict the outcome variable (e.g., condition predicts emotion dysregulation). (According to Kramer and colleagues (2002), there may be situations in which there is no treatment effect even when the mediator interacts differently with each condition. For these cases, the outcome is used as the independent variable, and condition is added to the equation as a time-invariant predictor.) Third, the mediator must be a significant predictor of the outcome even in the presence of the condition variable (β path).

The effect of condition on outcome with the mediator present is called the direct effect. In assessing the direct effect, the analysis evaluates whether treatment condition continues to predict longitudinal outcome when the mediator is included in the model. According to Kramer and colleagues, if no effects of condition or mediator are significant, then an interaction effect between treatment condition and the mediator should be assessed. This additional analysis investigates the differential effects of the mediator at each level of treatment.

Procedures described by Tofighi and MacKinnon (2011) were employed to compute the mediation effect and its significance. These authors provide access to a web application that computes a confidence interval (CI) for the mediated effect using the distribution-of-the-product method. In this analysis, the mediation effect is based on the product of the α and β path coefficients, and the correlation between the two

paths is set to zero. To better understand the mediated effect, the percentage of the total effect explained by the mediator was computed. The total effect represents the sum of the direct effect and the mediated—or indirect—effect.

Results

Matching Results

Participants were randomized using a matching procedure. This procedure led to equal distribution of important characteristics between the two groups (see Table 5). Fourteen participants in DBT-ST and 11 in ASG presented with an anxiety disorder as being their most distressing problem. The rest were classified as primarily depressed. With regards to medication, 11 participants in DBT-ST and 10 in ASG started the study while concurrently taking psychotropic medication. The sample randomized in both conditions was primarily formed of women (68.2% in DBT-ST versus 63.6% in ASG).

Participant Demographics

The 44 subjects accepted into the study were primarily single, heterosexual, Caucasian women who had either completed some college or were college graduates and were employed outside the home. Fifty four percent of participants earned less than $30,000 per year (see Table 5a). Few participants reported having a physical or learning disability, and the majority reported that they were not in therapy at the time of the screening and did not report past suicide attempts or current suicidal ideation (see Table 5b).

The most common current axis I disorders in both groups were generalized anxiety disorder and major depressive disorder. Participants in both groups had an average of three diagnosed disorders over their lifetimes. Participants had an average

global assessment of functioning (GAF score) of 49.77 (*SD*=9.80) in DBT-ST and 54.91 (*SD*=9.82) in ASG (see Table 5c). There were no statistically significant differences between conditions on any demographic variable, supporting proper randomization.

Compliance with Study Protocols

Half of the participants in each condition reported receiving at least one prescription for depression or anxiety at some point during the study (see Table 6a). At pretreatment, participants on medication reported taking a mean of 1.41 (*SD* = 0.62) medications—1.22 (*SD* = 0.44) in DBT-ST and 1.63 (*SD* = 0.74) in ASG. Specifically, 12 participants (27% of the entire sample)—five in DBT-ST and seven in ASG—reported taking medication for depression. Moreover, 14 participants (31.8%), an equal number in each condition, reported taking medication for anxiety during the study. The most frequently prescribed medications were citalopram and lamotrigine for depression; and alprazolam, buspirone, and clonazepam for anxiety (see Table 6b).

Overall, 14 participants (32% of the entire sample)—six in DBT-ST and eight in ASG—were noncompliant in that they added or dropped at least one medication during one or more period(s) of the study. These participants either added or dropped at least one medication during one or more period(s) of the study. Specifically, less than 10% of participants were noncompliant in the first half of the treatment, 30% were noncompliant in the second half of the treatment. This percentage was maintained at follow up (Table 6c).

Regarding pre-existing treatment, nine participants (20.5% of the entire sample) reported being in psychotherapy when accepted in the study. Of these, eight participants discontinued their pre-existing treatments, and one participant did not comply (i.e., reported receiving ancillary treatment in the first 2 months of the study).

In total, 11 participants (25% of the entire sample)—seven in DBT-ST and four in ASG—reported receiving ancillary treatment during at least one period of the study (Table 6c). The time periods where ancillary treatment was reported were considered noncompliant.

Missing Data

Participants could drop the treatment but still continue the assessments. In these cases, data was not marked as missing but was used as collected. Data was missing nevertheless from three to six participants at each time point. Table 7 contains a break down as well as the reasons for the missing data.

Study Implementation

Assessment reliability. Inter-rater reliability for the SCID-I was moderate to outstanding in the present study, with κ ranging from .44 to 1.00 for each diagnosis in a sample of 14 randomly selected interviews (21% of all interviews). The only diagnosis with low reliability was specific phobia (lifetime and current). All other diagnoses had reliabilities greater than .60, which is considered acceptable. To improve agreement, all intent-to-treat interviews were watched and recoded by a second assessor. If discrepancies between original and retrospective ratings were

found, the original assessor, the principal investigator, and the reliability assessor discussed the assessment in more detail and reached diagnostic agreement.

Inter-rater reliability for a sample of 22 randomly selected SCID-II BPD interviews (24% of all interviews) was outstanding for diagnosis (κ =.90, *SD* =.10) and substantial for the number of BPD symptoms rated at threshold (κ =.67, *SD* =.11).

Treatment fidelity and feasibility. Dialectical behavior therapy adherence was rated for six sessions randomly selected from 64 total group sessions. Adherence scores ranged from 3.8 to 4.2, with a mean of 4.0 (*SD*=0.18), which suggests that the implementation of the DBT skills training was adherent to the model. Nine ASG sessions (out of 43) were rated for adherence to the support group protocol (see Appendix I). One session was rated below adherence on part I (inclusion of basic components) and on part II (facilitation). All other sessions were adherent with the protocol. Average ratings for perceived support and for facilitating participation were 5.09 (*SD*=0.53), 5.28 (*SD*=0.91) respectively.

There was a trend for more ASG group participants (*n*=13) to drop out of treatment when compared to DBT group participants (*n*=7; χ^2=3.3, *p*=.07; Tables 11 and 12). Participants in the study attended between one and sixteen total sessions, on average 10.27 sessions (*SD*=4.72) in DBT-ST and 7.73 (*SD*=5.21) sessions in ASG. The number of sessions attended was not normally distributed. As a result, the variable was recoded into an ordinal variable (attended less than two sessions, attended between two and eight sessions, attended more than 2 months but less than

13 sessions, attended 14 to 16 sessions). There were no significant differences in total numbers of sessions attended between groups (U=181.50, p=.14).

There was a significant difference between conditions in total satisfaction (F(1,38.94)= 23.12, p<.001) but no significant time by condition interaction (p>.05). Participants in DBT-ST (M=24.78, $S.E.$=1.13) reported greater overall satisfaction than participants in ASG (M=17.93, $S.E.$=1.21). The difference in satisfaction was consistent at 2 months, at the end of treatment and at follow up.

Longitudinal Outcome Analyses

Outcome analyses were conducted within each of the five domains of interest: skills use, emotion dysregulation, general distress, emotional distress and psychopathology. Table 10 includes means and standard deviations for each outcome broken by treatment condition at each time point.

Confounding factors analyses. Before conducting the main analyses, I used an iterative process to assess whether any confounding factor explained significant variance within each outcome model. If a main effect of confound was significant, the confounding factor was added as a covariate in the main outcome model. If there was no significant main effect for the confounding factor, then this variable was dropped. For the DBT-WCCL, OQ, PHQ-9 and OASIS, significance was set to a p value lower than .05. For DERS, ACS and TAS, significance was considered to be a p value lower than .016 (using a Bonferroni correction for three multiple comparisons). For STAXI, EES and DPSS-R, significance was assessed with a p value of .01 (using a Bonferroni correction for five multiple comparisons).

None of the potential confounding factors explained significant variance for any outcome measure and therefore no covariate was added to outcome analyses. There was a trend for use of medication to be a significant predictor for skills use (p=.06), affect control and alexithymia (p=.02, p=.08 respectively), general distress (p=.06), shame and anger suppression (p=.02). There was a trend for expectancies to be a significant covariate for general distress (p=.07) and for anger expression (p=.04).

DBT skills use as an outcome of treatment (Table 11; Figure 2). HLM analyses revealed a significant interaction between time and treatment condition in predicting DBT skills use (F (1, 95.25) = 11.35, p<.001). A significant difference between treatment and follow up was also found (F (1, 75.60) = 14.85, p<.001). Therefore, results were examined separately during the treatment and follow up phases. During the treatment phase, there was a significant time by condition interaction (F (1, 115.04) = 5.87, p<.05). The DBT slope was significant while the control treatment slope was not. At follow up, the interaction between time and condition was not significant (p>.05) and neither slope was significant (Table 11a). This suggests that only DBT-ST participants started using more skills over time while in treatment and they maintained their end of treatment skills use at follow up. Participants in ASG did not improve significantly in their skills use. The effect size of these differences was large (d=1.01). Compliance analyses yielded the same findings (Table 11b).

For treatment completers, there was no significant difference between time in treatment and follow up ($p>.05$). There was a significant time by condition interaction (F (1, 51.47) = 9.50, $p<.01$) resulting from the DBT completers improving significantly over time including follow up, while ASG completers did not improve significantly in skills use (Table 11c).

At pretreatment, the mean score for all participants on the DBT-WCCL was 1.78 (*SD*=0.34; *range*=0.82 to 2.42). Two months into treatment, participants in the DBT condition increased in their mean DBT skills use by 13.9%, while participants in the control conditions increased by 3.06%. At the end of the treatment phase, participants in the DBT condition increased in their mean DBT skills use by 16.00% from pretreatment, while participants in the control conditions increased by 3.48% from pretreatment. Two months after treatment ended, participants in both conditions remained at the same level skills as at the end of their treatment year (Table 8a).

Emotion dysregulation as an outcome of treatment. Three measures for emotion dysregulation were employed: the DERS, ACS, and TAS. Bonferroni adjustments were made for multiple comparisons and significant values were set at .05/3=.016.

Difficulties in emotion regulation (Table 11; Figure 3). Thirty participants received the DERS both at phone screen and at pretreatment. Fourteen participants received the DERS only at phone screen. There was a significant correlation between the phone screen scores (*M*=112.63, *SD*=9.42) and the pretreatment scores (*M*=104.73, *SD*=16.84), $r=.47$, $p<.01$. There were no differences in conducting HLM

outcome analyses utilizing the pretreatment scores or the phone screen scores as the initial data point. Therefore, because phone screen scores were available for all participants, phone screen DERS scores were included in the analyses as baseline.

HLM analyses revealed a significant interaction between time and treatment condition in predicting emotion dysregulation (F (1, 129.67) = 10.34, p<.01). A significant difference between treatment and follow up was also found (F (1, 93.44) = 15.72, p<.001). Therefore, results were examined separately during the treatment and follow up phases. During the treatment phase, there was a significant time by condition interaction (F (1, 123.35) = 10.10, p<.01). Both the DBT-ST slope and the control treatment slope were significant. At follow up, the interaction between time and condition was not significant (p>.02) and neither slope was significant (Table 11a). This suggests that participants in both conditions endorsed reductions in emotion dysregulation. Nevertheless, DBT-ST participants improved their emotion dysregulation more and faster and this effect was maintained at follow up. The effect size of these differences was large (d=1.87).

Compliance analyses yielded similar findings with the exception that DBT-ST participants significantly improved at follow up, while ASG participants did not (Table 11b). Therefore, compliant DBT-ST participants are likely to continue improving in their emotion dysregulation at follow up, while compliant ASG participants do not.

For treatment completers, there was no significant time by condition interaction during the treatment phase of the study (p>.02). DBT-ST completers alone

improved significantly over time during treatment in their reported emotion dysregulation, while ASG completers did not (Table 11c). At follow up, no significant differences were found. Thus, a complete course of DBT-ST alone led to emotion dysregulation improvements, while a complete course of ASG did not have evidence supporting this improvement.

Affect control (Table 11; Figure 4). HLM analyses revealed a trend for a significant interaction between time and treatment condition in predicting emotional control (F (1, 86.04) = 5.63, p=.02). A significant difference between treatment and follow up was found (F (1, 76.33) = 16.37, p<.001). Therefore, results were examined separately during the treatment and follow up phases. During the treatment phase, there was a significant time effect (F (1, 95.59) = 25.34, p<.001) but no significant interaction (p=.10). Only the DBT-ST slope was significant, while the ASG slope was not significant. At follow up, the interaction between time and condition was not significant (p>.02) and neither slope was significant (Table 11a). This suggests that only participants in the DBT-ST condition decreased significantly over time in their maladaptive emotional control while ASG participants remained the same. No additional differences emerged at follow up. The effect size for the differences that emerged during the treatment year was medium (d=0.77).

Compliance analyses yielded similar findings with the exception that the time by condition interaction considering the entire time in the study was significant, F (1,59.15) =7.81, p<.01 (for slope coefficient estimates Table 11b). Therefore,

compliant DBT-ST participants are likely to improve more and faster overall during the study when compared to compliant ASG participants.

For treatment completers, the findings were identical to the general results (Table 11c for estimates of slope coefficients).

Alexithymia (Table 11; Figure 5). HLM analyses revealed a significant main effect of time predicting alexithymia (F (1, 73.78) = 7.67, p<.01), but no significant time by condition interaction (p=.37) and no significant effect of phase (p=.04). Therefore, results were examined combining the treatment and follow up time points. During the study, only the DBT-ST slope was significant, while the ASG slope was not significant (Table 11a). This suggests that only participants in the DBT-ST condition decreased significantly over time in their alexithymia while ASG participants remained the same. The effect size of the differences between conditions was medium (d=0.54).

Compliance analyses indicated a significant main effect of study phase (F(1, 39.89) =11.83, p<.001) and time (F(1,69.14)=7.57, p<.01) but no significant time by condition interaction (p=.52). During the treatment phase of the study, the DBT-ST slope was significant, while the ASG slope was not. Neither slope was significant at follow up (Table 11b). Therefore, compliant DBT-ST participants improved during treatment when compared to compliant ASG participants, who did not improve. There were no changes in either condition at follow up.

For treatment completers, there is no significant effect of time (p=.18), phase (p=.17), or time by condition interaction (p=.80). There was a trend for the DBT-ST

to be significant, while the ASG slope was not significant over time in the study (Table 11c).

General distress as an outcome of treatment (Table 11; Figure 6). HLM analyses revealed a significant interaction between time and treatment condition in predicting general distress (F (1, 105.13) = 8.54, p<.005). A significant difference between treatment and follow up was also found (F (1,76.76) =7.82, p<.01). Therefore, results were examined separately during the treatment and follow up phases. During the treatment phase, there was a significant time by condition interaction (F (1, 127.99) = 5.64, p<.02). The DBT slope was significant while the control treatment slope was not. At follow up, there was a trend for the interaction between time and condition to be significant (p=.09), but neither slope was significant (Table 11a). This suggests that only DBT-ST participants reported a significant decrease in general distress over time in treatment and they maintained their changes in general distress at follow up. Participants in ASG did not improve in their general distress. The effect size of the differences seen during treatment was medium (d=0.74).

Compliance analyses yielded identical findings, with no trend for a time by condition interaction at follow up (p>.05; Table 11b for slope coefficient estimates). For treatment completers, there was no significant difference between study phases (p>.05). There was a significant time by condition interaction (F (1, 62.21) = 4.41, p<.05) resulting from the DBT completers improving significantly over time

including follow up, while ASG completers did not improve significantly over time in general distress (Table 11c).

Emotional distress as an outcome of treatment. Three measures for emotional distress were employed: the DPSS (disgust sensitivity and disgust propensity), ESS (total experience of shame), and STAXI (anger suppression and anger expression). Bonferroni adjustments were made for multiple comparisons and significant values were set at .05/5= .01.

Disgust propensity (Table 11; Figure 7). HLM analyses revealed a significant main effect of time (F (1, 108.18) = 13.64, p<.001) but no significant main effect of phase (p=.14) and no significant interaction between time and treatment condition (p=.80) in predicting propensity to experience disgust. Only the ASG slope was significant, while there was a trend for the DBT-ST slope to be significant (Table 11a). This suggests that only participants in ASG experienced a significant reduction in disgust propensity over time in the study. DBT-ST participants did not change over time in their propensity to experience disgust. The effect size for this difference was very small (d=0.10).

Compliance analyses found no significant main effects or interactions, except for a trend for a main effect of time (p=.05). Neither slope was significant (Table 11b). Thus, a compliant course of either therapy did not lead to significant changes in disgust propensity.

Completer analyses yielded a significant main effect of time F(1, 65.76)=7.75, p<.01, but no significant main effect of phase (p=.41) and no significant time by

condition interaction (p=.26). Neither slope was significant, although there was a trend for the ASG slope to be significant (Table 11c).

Disgust sensitivity (Table 11; Figure 8). HLM analyses revealed a significant main effect of time (F (1, 111.81) = 17.91, p<.001) but no significant main effect of phase (p=.04) and no significant interaction between time and treatment condition (p=.78) in predicting sensitivity to disgust. Both the DBT-ST slope and the control treatment slope were significant over time in study (Table 11a). This suggests that participants in both conditions endorsed similar reductions in disgust sensitivity.

Compliance and completer analyses found no significant main effects or interactions, except for a trend for a main effect of time (p=.02, p=.08). Neither slope was significant (tables 14b and 14c). Thus, a complete or compliant course of either therapy did not lead to significant changes in disgust sensitivity.

Experience of shame (Table 11; Figure 9). HLM analyses revealed a significant main effect of time (F (1, 96.40) = 21.41, p<.001) but no significant main effect of phase (p=.49) and no significant interaction between time and treatment condition (p=.26) in predicting experience of shame. Only the DBT-ST slope was significant, while there was a trend for the ASG slope to be significant (Table 11a). This suggests that only participants in DBT-ST experienced a significant reduction in their experience of shame over time in the study. ASG participants did not change over time in their experience of shame. The effect size for this difference was small to moderate (d=0.39).

Compliance analyses yielded identical findings, with a drop in significance for the ASG slope over time (Table 11b). Thus, a compliant course of DBT-ST only led to significant reductions in shame.

Results from completer analyses were similar to the intent-to-treat findings with a significant DBT-ST slope and a trend for a significant ASG slope (Table 11c). Thus, a complete course of DBT-ST significantly reduces shame, while a trend emerges for a complete course of ASG to reduce shame.

Anger suppression (Table 11; Figure 10). HLM analyses revealed a trend for a significant main effect of time (p=.02), and a trend for a significant time by condition interaction (p=.02), but no significant main effect of phase (p=.20) in predicting anger suppression. Only the DBT-ST slope was significant, while the ASG slope was not significant over time in the study (Table 11a). This suggests that only participants in DBT-ST experienced a significant reduction in their anger suppression over time in the study. ASG participants did not change over time in their anger suppression. The effect size for this difference was large (d=1.42).

Compliance analyses yielded a significant main effect of time (F(1,93.17)=7.10, p<.01), but no significant main effect of phase (p=.15) and no significant time by condition interaction (p=.05) in predicting anger suppression. Only the DBT-ST slope was significant, while the ASG slope was not significant over time in the study (Table 11b). Thus, only a compliant course of DBT-ST led to significant reductions in anger suppression. Results from completer analyses were similar to the ITT findings (Table 11c).

Anger expression (Table 11; Figure 11). HLM analyses revealed a trend for a significant main effect of time (F (1, 106.26) = 4.11, p=.045) but no significant main effect of phase (p=.11) and no significant interaction between time and treatment condition (p=.99) in predicting anger expression. Neither slope was significant (Table 11a). This suggests that there was a trend for participants to improve in anger expression over time similarly across conditions.

Compliance analyses yielded identical findings, with no significant main effects for time (p=.22) or phase (p=.38), no significant time by condition interaction (p=.84) and no significant slopes (Table 11b). Completer analyses showed identical findings (Table 11c). Thus, a compliant or a complete course of either treatment did not lead to any changes in anger expression.

Psychopathology as an outcome of treatment. For these analyses, only participants who could be qualified as depressed at pretreatment were included in depression analyses, and only participants who could be qualified as anxious at pretreatment were included in anxiety analyses. To identify such participants a cutoff score of 10 or above on the PHQ-9 at pretreatment was used for depression (Mcmillan et al., 2010) and a cutoff score of 8 or above on the OASIS at pretreatment was used for anxiety (Campbell-Sills et al., 2009; Norman et al., 2011). Participants who scored below the cutoff at pretreatment (n=5 for depression; n=3 for anxiety) were excluded from these analyses. No Bonferroni corrections were applied to these analyses. Seventeen participants were included in the depression analyses; 19 participants were included in the anxiety analyses.

Depression (Table 11; Figure 12). HLM analyses revealed a significant difference between treatment and follow up (F (1, 93.91) = 13.00, p<.001). Therefore, results were examined separately during the treatment and follow up phases. During the treatment phase, there was a significant main effect of time (F(1, 95.89)=45.25, p<.001), but no significant time by condition interaction (p=.21) in predicting reductions in depression severity. Both the DBT-ST slope and the control treatment slope were significant. At follow up, the main effect for time was not significant (p=.16), but there was a trend for a significant interaction between time and condition (p=.07). The DBT-ST slope was significant at follow up and it indicated an increase in depression severity, while the ASG slope was not significant (Table 11a). This suggests that participants in both conditions endorsed similar reductions in depression severity over time in treatment. Participants in ASG maintained their gains, while participants in DBT-ST worsened at follow up.

Compliance analyses yielded similar findings with the exception that DBT-ST participants no longer evidenced significant increases in depression severity at follow up (Table 11b). Therefore, compliant participants in both conditions significantly improved in depression severity during treatment and maintained their gains at follow up.

When including only participants who completed treatment in the analyses, a significant main effect of time was found (F(1,53.00)=10.79, p<.005). There was no significant main effect of phase (p=.09) and no significant time by condition interaction (p=.11). DBT-ST participants alone improved significantly over time in

study in their reported depression severity, while ASG participants did not (Table 11c). Thus, a complete course of DBT-ST alone leads to significant depression reduction, while a complete course of ASG did not significantly improve depression.

Anxiety (Table 11; Figure 13). HLM analyses revealed a significant difference between treatment and follow up (F (1, 89.75) = 9.54, p<.005). Therefore, results were examined separately during the treatment and follow up phases. During the treatment phase, there was a significant main effect of time (F(1, 92.41)=39.19, p<.001) and a significant time by condition interaction (F(1, 92.41)=7.83, p<.01) in predicting reductions in overall anxiety. Both the DBT-ST slope and the control treatment slope were significant. At follow up, the main effect for time was not significant (p=.34), but there was a significant interaction between time and condition (F(1, 89.16)=5.08, p<.05). The DBT-ST slope was significant at follow-up and it indicated an increase in overall anxiety, while the ASG slope was not significant at follow up (see Table 11a). The overall effect size was large (d=2.07). This suggests that participants in both conditions endorsed improvements in anxiety over time in treatment, but DBT-ST participants improved more and faster than ASG participants. Participants in ASG maintained their gains, while participants in DBT-ST worsened at follow up.

Compliance analyses also yielded a significant effect of phase, F(1, 68.86)=9.19, p<.05. During the treatment phase of the study, a significant time by condition interaction was found, F(1,72.14)=9.19, p<.005. Only the DBT-ST slope was significant; there was a trend for the ASG slope to be significant. At follow up,

there was a significant time by condition interaction, $F(1,68.80)=5.20$, $p<.05$, but neither slope was significant (Table 11b). Therefore, if participants complied with the study protocols, only DBT-ST yielded a significant improvement in anxiety over time, and these gains were maintained at follow up.

When including only participants who completed treatment in the analyses, a significant main effect of time was found ($F(1,56.00)=13.07$, $p<.001$). There was no significant main effect of phase ($p=.08$) and no significant time by condition interaction ($p=.06$). DBT-ST completers alone improved significantly over time in study in their reported anxiety, while ASG completers did not (Table 11c). Thus, a complete course of DBT-ST alone leads to significant anxiety reduction, while a complete course of ASG did not significantly improve anxiety.

Clinical Significance Analyses

Clinical significance analyses were conducted on outcomes where moving from a "clinical" to a "nonclinical" distribution was meaningful. Thus, analyses were conducted for the DBT-WCCL, DERS, OQ, PHQ-9 and OASIS. For each of these outcomes reliable changes were assessed at 2 months, at the end of treatment and at follow up. A Mann-Whitney *U* nonparametric test was used to assess significant differences in classification between conditions at each time point. Table 12 shows the classification results for each outcome by condition at each assessment period.

In order to classify individuals as unchanged/deteriorated, improved or recovered, a cutoff and an RCI computation procedure was established before analyses were conducted. Established cutoffs and reliable change indices were found

in the literature for the OQ. For the DERS, DBT-WCCL, PHQ-9 and OASIS, the indices were manually computed and are described below.

Reliable change in skills use (Table 12). In the case of the DBT-WCCL skills sub-scale no cutoff or RCI norms exist. In addition, there is not enough data published on the measure to empirically determine means and standard deviations for clinical and non-clinical samples. Therefore, cutoff *a*, as described by Jacobson and Truax (1991) was computed. The pretreatment mean for the study sample (M=1.78; SD=0.34) was chosen to be the mean representing a clinical distribution. The cutoff was established to be two standard deviations above the mean, assuming that clinical samples use less skills than non-clinical samples. Thus, cutoff *a* for the DBT-WCCL was computed to be 2.46. For RCI computations the test-retest reliability coefficient presented in the original validation study (ρ =.71, p<.05; Neacsiu et al., 2010) and the pretreatment standard deviation (SD=0.34) were used.

At 2 months, 27.3% of DBT-ST participants and 5.3% ASG participants showed some improvement in skills use. The numbers of improved and recovered almost doubled by 4 months when 42.1% in DBT-ST versus 9.1% in ASG showed some improvement in skills use. Furthermore, 15.8% of DBT-ST participants and no ASG participant were classified as recovered (i.e., improved by two standard deviations from pretreatment). These differences were maintained at follow up (Table 12). At the end of the study 52.4% in DBT-ST and 94.4% in ASG did not change or worsened in their skills use. Nonparametric tests indicated a trend for significance or a significant difference in classification between conditions at 2, 4 and 6 months

U=162.00 (*p*=.06), *U*=92.00 (*p*<.01), *U*=108.00 (*p*<.01) respectively.

Reliable change in emotion dysregulation (Table 12). The DERS is a well-established measure of emotion dysregulation; nevertheless at the time of the study, no norms existed for the measure. Because the normal and clinical distributions for this measure are likely to overlap, and because data for computing a non-clinical norm can be found, the third method to establish a cutoff was employed (Jacobson et al., 1991).

For a cutoff *c*, the mean and standard deviation for a non-clinical and clinical sample were needed. Two studies used the DERS with non-clinical participants, who were assessed for psychopathology and who did not meet criteria for any DSM disorder. Fox, Axelrod, Paliwal, Sleeper and Sinha (2007) found a group of 50 non-clinical individuals to score on average 60.90 on the DERS (*SD*=15.00). Harrison and colleagues (2009) found a group of 20 non-clinical controls to score on average 67.95 (*SD*=14.46). Thus, a true non-clinical mean was computed to be 62.91, with a pooled standard deviation of 15.12. In clinical samples, a number of studies (Whiteside et al., 2007; Salters-Pedneault, Roemer, Tull, Rucker, & Mennin, 2006; Fox et al., 2007; Cohn et al., 2010) found participants with Axis I disorders to score on average 94.39, with a pooled standard deviation of 23.94. Thus, cutoff *c* for the DERS was established to be 75.10.

To compute the RCI, I used data from the study sample to establish test-retest reliability. Thirty participants were administered the DERS at both phone screen and pretreatment, with time lags between the two assessments ranging from 0 to 106 days

(*M*=20.33, *SD*=22.42; the interval was more than a month in only four cases). No intervention was provided between these assessments. The test-retest reliability was ρ =.49 ($p<.01$). This reliability index, as well as the standard deviation for the DERS at pretreatment (*SD*=11.94) was used to compute an RCI for each individual. If the person scored below 75.10 and had an RCI greater than 1.96, they were classified as recovered. If the RCI was above 1.96, but the person scored above 75.09, the subject was classified as improved. If neither criterion was met, the subject was classified as unchanged or deteriorated.

More participants in DBT-ST than in ASG showed improvements at 2 months. Table 12 shows that 57.9 % of DBT-ST participants and 21.1% ASG participants reported difficulties with emotion regulation that fit within a non-clinical distribution at the end of treatment. Furthermore, 15.8% in DBT-ST versus 10.5% in ASG showed some improvement in emotion dysregulation. These differences were maintained at follow up, and DBT-ST participants continued to improve. An average of 20% of DBT-ST participants and 60% ASG participants did not improve or worsened in their emotion dysregulation. Nonparametric tests indicated a significant difference in classification between conditions at 2, 4 and 6 months *U*=125.50 ($p<.05$), *U*=99.50 ($p<.05$), *U*=117.00 ($p<.05$) respectively.

Reliable change in general distress (Table 12). For OQ reliable change analyses, only participants who scored above the clinical cutoff (64) at pretreatment were included (*n*=36). Table 12 indicates that 41.2 % of DBT-ST participants and 13.3% ASG participants reported general distress that fit within a non-clinical

distribution at the end of treatment. Furthermore, 35.3% in DBT-ST versus 33.3% in ASG showed some improvement in general distress. These differences were attained by 2 months (80% improved or recovered in DBT-ST vs. 31.3% in ASG) and were maintained at follow up.

In DBT-ST 31.6% of participants did not improve or worsened in their general distress by the end of the study when compared to 42.9% of ASG participants who remained unchanged or worsened in their general distress at the end of the study. Nonparametric tests indicated a significant difference in classification between conditions at 2 and 4 months and no difference at 6 months, U=73.00 (p<.01), U=78.00 (p<.05), U=113.50 (p=.45) respectively.

Reliable change in depression (Table 12). For the PHQ-9, the test-retest reliability reported in the original validation study (ρ =.84, p<.05; Kroenke et al., 2001) and the pretreatment standard deviation from this sample (SD=4.85) were used for the RCI index. Based on the literature, a cutoff score *c,* between a non-clinical sample (Kroenke et al., 2001) and a depressed sample (McMillan et al., 2010) was computed to be 9.34. This number is similar to other empirically determined cutoffs aimed to differentiate between depressed and non-depressed individuals (i.e., a cutoff of 10 is used by Mcmillan et al., 2010).

For the PHQ-9 reliable change analyses, only participants who scored above the clinical cutoff (>=10) at pretreatment were included (n=34). Table 12 indicates that 64.7% of the DBT-ST participants versus 17.3% of ASG participants remitted from depression by 2 months. These rates slightly worsened in DBT-ST and

improved in ASG by the end of treatment (50% vs. 31.3%) and were maintained at follow up. An average of 50% of participants in DBT-ST and 53% participants in ASG remained unchanged or worsened at the end of study.

Nonparametric tests indicated a significant difference in classification between conditions at 2 months and no difference at 4 and 6 months, U=88.50 (p<.05), U=94.50 (p=.40), U=111.50 (p=.71) respectively.

Reliable change in anxiety (Table 12). In the case of the OASIS, a cutoff score of 8 was used based on empirical support (e.g. Campbell-Sills et al., 2009; Norman et al., 2011). For the RCI index, the one-month test-retest reliability coefficient presented in the original psychometric analyses (ρ =.82, p<.05; Norman et al., 2011) and the standard deviation in the study sample at pretreatment (SD=3.71) were used.

For these analyses, only participants who scored above the clinical cutoff (>=8) at pretreatment were included (n=33). Table 12 indicates that by 2 months, 36.8% of the DBT-ST participants versus 21.4% of ASG participants' scores on the OASIS fit within a non-clinical distribution. These rates improve in DBT-ST but stay the same in ASG by the end of treatment (62.5% vs. 25.0% are classified as recovered). Anxiety rates worsen in DBT-ST but not in ASG at follow up (38.9% vs. 33.3% classified as recovered). Fifty percent of participants in DBT-ST and 66.7% participants in ASG remained unchanged or worsened in their overall anxiety at the end of study.

Nonparametric tests indicated no significant differences in classification between conditions at 2, 4 and 6 months, U=101.50 (p=.18), U=66.00 (p=.12), U=94.00 (p=.50) respectively.

DBT Skills Use as Mediator of Outcome

Mediation analyses were conducted for all primary outcomes: difficulties with emotion regulation, affect control, alexithymia, general distress, disgust propensity, disgust sensitivity, shame, anger suppression, anger expression, depression and anxiety. All outcome indices were normally distributed and therefore a single-level HLM model was used for each of the three mediation equations. The effect size of the mediated effect was assessed through computing the percent of the total effect that the mediated effect explained (Table 13).

DBT skills use as a mediator of improvements in emotion dysregulation (Table 13). The relationship between treatment condition and the improvement in emotion dysregulation and alexithymia were mediated by DBT skills use. In the case of affect control, there was no significant main effect of condition. Therefore, according to Kramer's recommendations, the interaction between the mediator and the independent variable (condition) was also added to the equation. With the interaction included, there was a significant main effect of condition and a significant interaction effect, $F(1,153.89) = 7.95$ $p<.01$, $F(1,155.49) = 7.67$ $p<.01$ respectively. Thus, skills use mediates affect control differentially between conditions.

DBT skills use as a mediator of improvement in general distress and psychopathology (Table 13). The relationship between condition and decrease in

depression (as measured by the PHQ-9) was mediated by DBT skills use. In the case of anxiety (OASIS) there was no significant main effect of condition. Thus, a mediator-condition interaction was added to the model yielding a significant main effect of condition and a significant interaction, $F(1, 147.65)=5.03$ $p<.05$, $F(1, 153.39)=4.43$ $p<.05$ respectively.

The picture is less clear with regards to general distress (OQ). There was a significant mediation effect; nevertheless condition was not a significant predictor of general distress, even when the mediator-condition interaction was added to the model, $p>.05$.

DBT skills use as a mediator of improvements in emotional distress (Table 13). Skills use did not mediate the relationship between condition and disgust propensity, disgust sensitivity and anger out. Condition was not a significant predictor for shame and anger in, and therefore the interactions with the mediator were added to the model. This yielded a significant main effect of condition and a significant interaction for anger in, $F(1, 153.47)=8.64$ $p<.01$, $F(1, 153.48)=8.04$ $p<.01$ respectively. Thus, skills use mediated changes in anger suppression differentially by condition. In the case of shame, both the main effect for condition and the condition by mediator interaction effect were not significant. Nevertheless, the mediation effect was significant.

Discussion

Main Findings

The present study examined whether use of DBT skills is a treatment mechanism for emotion dysregulation in individuals diagnosed with at least one mood or anxiety DSM disorder, who endorsed high emotion dysregulation. This randomized controlled trial comparing DBT skills training to an activities-based support group had four main results. First, only DBT-ST participants started using more skills over time in treatment and they maintained their gains in skills use at follow up. Participants in ASG did not improve in their skills use; the difference between conditions corresponded with a large effect size. This result was not dependent on completing the course of treatment, staying on the same course of psychotropic medications, or on withholding involvement in additional psychotherapy. DBT-ST helped improve skills use reliably for 47.6% of participants by the end of the study, a significantly higher number than the 5.6% who improved in ASG.

Second, DBT-ST was superior to ASG in improving indices of emotion regulation across three measures: difficulties with emotion regulation, alexithymia, and affect control. DBT-ST participants showed a faster reduction during treatment while ASG participants reported fewer gains, although both treatments were effective in reducing difficulties with emotion dysregulation. Only DBT-ST participants endorsed significant improvements in maladaptive affect control and in alexithymia. When excluding data points from non-compliant subjects (i.e., who changed their

medication regimen or participated in ancillary psychotherapy), DBT-ST participants demonstrated faster and larger gains than ASG participants across all domains of emotion regulation. The differences between conditions were consistent with medium to large effect sizes. DBT-ST helped 60% of participants to score in a non-clinical range on the difficulties in emotion regulation scale, compared to 21% of ASG participants, a significant difference.

Factors nonspecific to the treatment offered may have led to the reduction in difficulties with emotion regulation for ASG participants, because a complete course of ASG did not yield significant findings. Nevertheless, DBT-ST completers reported a significant decrease in difficulties with emotion regulation and maladaptive affect control and a trend for a significant decrease in alexithymia by the end of the study. Participants in both conditions maintained their gains at follow up, with compliant DBT-ST participants showing significant continued reduction in their difficulties with emotion regulation.

Third, the main effect of condition for emotion dysregulation indices was mediated by DBT skills use. Thus, increase in use of skills explained a significant amount (30-60%) of the different changes and is likely a treatment mechanism for emotion dysregulation across mood and anxiety disorders.

Fourth, DBT-ST as an intervention for emotion dysregulation, applied to a group of individuals with different DSM disorders, was feasible. Satisfaction with DBT-ST was comparable to treatment-as-usual satisfaction in community mental health settings (e.g. Lunnen, Ogles, & Pappas, 2008). The treatment retention rate in

DBT-ST was 68%, which is slightly lower than retention rates reported by other treatments for depression, 76-77% (Harley et al., 2008; Kwan, Dimidjian, & Rizvi, 2010) or for anxiety disorders, 73.2% (van Ingen, Freiheit, & Vye, 2009). Participants who dropped the DBT-ST treatment did so primarily because they wanted individual therapy, or because they did not find the group to be a good fit. Thus, giving clients the option to participate in DBT-ST as an adjunct to individual therapy and assigning treatment based on client preferences will likely lead to lower drop out rates.

It is important to note that these results were not better explained by use of psychotropic medication or expectancies of improvement in treatment. Given the success of medication for anxiety and depression in reducing psychopathology (Welberg, 2012), the lack of a medication effect suggests that a behavioral intervention is needed in order to improve indices of emotion regulation and skills use.

These results support and extend the findings reported in the literature. Standard DBT clients, who receive both individual and group therapy, increase in their skills use over time in treatment (e.g. Lindenboim et al., 2007) and report using 15% more skills by the end of a treatment year (Neacsiu et al., 2010). This study extends prior findings by showing that 4 months of DBT skills training alone led to a 16% increase in skills use. Therefore, DBT skills training alone, in the absence of an individual therapist, is effective at increasing use of DBT skills.

It is important to note that the participants in this study reported on average higher use of skills at pretreatment than what individuals diagnosed with BPD report

(Neacsiu et al., 2010). Nevertheless, the comparable increase in skills use by the end of treatment suggests that a 15% increase in skills use can be expected irrespective of the baseline level of skills use and of the primary mental health disorder. Furthermore, such changes in skills do not seem to happen simply from participation in a supportive therapy group, where discussion about difficulties occurs. Rather direct teaching, practicing and shaping of skills is essential for individuals with a variety of mental health disorders to increase their skills use.

The emotion dysregulation results also extend prior findings. In studies assessing DBT skills training as a stand-alone intervention, difficulties with emotion regulation improved only when compared to waitlist (Hill, Craighead, & Safer, 2011; Telch, Agras, & Linehan, 2001), but not to an active intervention (Safer & Joyce, 2011; Safer, Robinson, & Jo, 2010) in women with a primary eating disorder. This study targeted a different group of axis I disorders; nevertheless, given the strong link between eating disorders and difficulties with emotion regulation (e.g. Whiteside et al., 2007), the same mechanism should be at play regardless of the population targeted. In the present RCT, individuals with higher emotion dysregulation were included (pretreatment DERS *M*=105.27) than in the study presented by Safer and colleagues (pretreatment DERS *M*=94.08-98.04). Thus, it is possible that an intervention for emotion dysregulation is suitable for individuals who are more severe on this dimension and may be less useful for individuals with lower dysregulation. It is also possible that skills training is not a treatment mechanism for emotion dysregulation in eating disorders.

No study to date assessed the effects of DBT skills training on alexithymia or on maladaptive affect control. Nevertheless, DBT-ST includes skills such as mindfulness of emotions, observing and describing emotions and changing myths about emotions, which should reduce both alexithymia and fear of emotions. As hypothesized, DBT-ST was successful at improving these two facets of emotion dysregulation.

These findings highlight that alexithymia and fear of emotions are not stable personality traits and can be successfully changed in treatment. Since typical interventions for anxiety and depression do not change alexithymia (e.g. Rufer et al., 2004; Wise, Mann, & Randell, 1995), the current result has important implications for clinicians concerned about alexithymia impeding treatment success (e.g. Ogrodniczuk, Piper, & Joyce, 2011). If alexithymia, or affect control are suspected to interfere with treatment, adding DBT skills training as an adjunct treatment may be a viable solution.

An additional interesting finding is that high scores on the DERS did not translate in comparable higher scores on the alexithymia and affect control scales. Rather the pretreatment alexithymia and affect control scores found in this sample were comparable to reports from a variety of psychiatric patients (Bankier, Aigner, & Bach, 2001; Rufer et al., 2004) and BPD samples (Yen et al., 2002). Therefore, these results can be generalized to any typical sample of individuals diagnosed with a DSM disorder where alexithymia or affect control may be considered targets of therapy.

In addition to contributing to the treatment literature, these findings have

important implications for assessment. The problem of assessment burden on therapists, clients and clinics is well known in "real world" mental health settings (Ebesutani, Bernstein, Chorpita, & Weisz, 2012). Structured interviews are used in efficacy trials to identify the most appropriate interventions; however only a small fraction of clinicians report using structured assessments in clinical practice (Garland, Kruse, & Aarons, 2003).

In this study, structured interviews were conducted to establish the diagnostic profile for each client who had scored above the cutoff on the difficulties in emotion regulation scale. From 91 participants who scored over 97 on the DERS, only one individual did not meet criteria for a current DSM disorder on the structured clinical interview. The DERS took seven minutes to complete, did not require reliability training and it yielded a group of participants that respond well to treatment. Thus, using the DERS with a cutoff of 97 could significantly reduce assessment burden on mental health clinicians while ensuring the administration of an evidence-based treatment for the clients selected.

Exploratory Findings

The effect of DBT skills training on general distress, emotional distress and psychopathology was also assessed. Four main findings emerged.

Psychopathology. For depressed participants both interventions successfully reduced depression severity and for anxious participants both interventions reduced anxiety impairment over the course of treatment. Both treatments performed equally well in reducing depression severity, while DBT-ST led to a faster and more

pronounced improvement in anxiety (corresponding to a large effect size). At follow up, participants in ASG maintained their gains, while DBT-ST participants worsened in their ratings for both anxiety and depression. Noncompliance with the treatment protocols may explain this finding. When only compliant data was used, DBT-ST participants no longer reported a significant worsening of symptoms at follow-up. Furthermore, only a complete course of DBT-ST yielded significant reductions in anxiety and depression, while a complete course of ASG resulted in non-significant changes over time.

Reliable change analyses painted a clearer picture about the effects each intervention had on psychopathology. Three times more participants in DBT-ST (67.7%) than in ASG (17.3%) recovered from depression during the first 2 months of the study. By the end of treatment, 50% in DBT-ST and 31.1% in ASG recovered from depression, and these percentages were maintained at follow up. Anxiety scores fit a non-clinical distribution for 36.8% of DBT-ST participants and for 21.4% of ASG participants at the 2-month assessment. DBT-ST continued to increase the number of recovered participants while the percentage in ASG stayed the same by the end of treatment (62.5% vs. 25.0%). On average 50-60% of participants in both conditions were unchanged or deteriorated by the end of the study with regards to their psychopathology.

The depression and anxiety results for DBT-ST are comparable to the literature. First, this study adds to the literature supporting skills use as an effective intervention for depression (Harley et al., 2008; Lynch et al., 2003). Findings for

DBT-ST as an intervention for anxiety could not be found, nevertheless standard DBT was found to reduce anxiety in BPD samples (Harned et al., 2008; Turner, 2000).

Second, it was interesting to note that the activities support group led to a significant reduction in depression and anxiety. The effect size for depression in ASG from pretreatment to post treatment was 1.32; from pretreatment to follow up, the effect size was 1.47. Both are comparable to effect sizes found in effectiveness trials for MDD (*ES*=1.34; Westbrook & Kirk, 2005), but are lower than effect sizes found in efficacy trials for depression (*ES*=2.54-2.92; Dimidjian et al., 2006). Pre-post effect sizes obtained for anxiety in ASG (0.67 for pre to post treatment; 1.08 for pretreatment to follow-up) are comparable to those reported in effectiveness trials for treatments on anxiety disorders (ES=0.94; McEvoy & Nathan, 2007) but lower than those reported in efficacy trials (ES=1.03-2.06; Norton & Price, 2007). Thus, ASG mirrors typical community psychotherapy and highlights the success of supportive therapy in the treatment of anxiety and depression. Nevertheless, the lack of an effect on anxiety and depression in treatment completers may suggest that other factors, nonspecific to the current study (additional therapy, life changes, etc.) led to these improvements.

The results for depression and anxiety improvement in DBT-ST are comparable to those found in efficacy and effectiveness trials for individuals diagnosed with MDD or with an anxiety disorder. Westbrook and Kirk (2005) assessed reliable change during an effectiveness trial for depression. In their study

52.2% improved, 35.5% recovered and 1.4% deteriorated. Compared to Westbrook and Kirk (2005), DBT-ST obtained better rates of recovery, and similar rates for lack of response. The effect size for depression in DBT-ST from pretreatment to post treatment was 2.34; from pretreatment to follow up, the effect size was 1.59. These effect sizes are higher to those found by Westbrook and Kirk (2005; *ES*=1.34) in their effectiveness trial for depression, but lower than the effect sizes reported by Dimidjian and colleagues (2006) in their efficacy trial (*ES*= 2.54-2.92).

Pre-post effect sizes obtained for anxiety in DBT-ST (1.34 for pre to post treatment; 1.98 for pretreatment to follow-up) are comparable to those reported in meta-analyses by Norton and Price (2007; *ES*=1.03-2.06 for various anxiety disorders) and Stewart and Chambless (2009; *ES*=0.92 for GAD, 1.02 for PD). Effect sizes were higher than those reported in McEvoy and Nathan's (2007) review of effectiveness trials (*ES*=0.94 across anxiety disorders). Rates of recovery in this study were also higher than those of Westbrook and Kirk (62.5% at the end of treatment and 38.9% at follow up versus 31.5%).

Thus, DBT-ST yields comparable results to efficacy trials on more traditional interventions for depression and for anxiety disorders. Furthermore, DBT-ST performs better than interventions assessed in effectiveness trials. Given that DBT-ST is one intervention that can change both anxiety and depression, effective dissemination to the community may be easier to achieve, but this hypothesis needs to be further tested. A complete course of DBT-ST had the best evidence for decreasing psychopathology and maintaining gains.

General distress. Only DBT-ST participants reported a significant reduction in general distress over time in treatment (and maintained their gains at follow-up). Participants in ASG did not improve in their reported general distress and the difference between conditions corresponded with a medium effect size. This result was not dependent on completing the course of treatment, or on being compliant with the protocols; although DBT-ST completers continued to improve at follow up unlike ASG completers. The most significant clinical improvement in general distress happened within the first 2 months of treatment, with 80% in DBT-ST versus 31.3% in ASG showing at least some improvement. By the end of the treatment, 41.2 % of DBT-ST participants and 13.3% ASG participants reported general distress that fit within a non-clinical distribution.

The findings from these exploratory analyses extend the current body of literature. No study thus far has explored the reductions in general distress that result from DBT skills training. The average OQ-45 score in the sample was comparable to the typical distress reported by community mental health clients (e.g. Lunnen et al., 2008). DBT-ST successfully decreased general distress in 80% of participants. Although individual distress was not directly targeted, as part of their homework clients were encouraged to use skills on current distressing problems. This finding therefore supports the importance of learning and using new skills as a means to reduce distress.

Emotional distress. DBT-ST showed some superiority in reducing indices of emotional distress. DBT-ST yielded moderate to large effect sizes in reducing

dysfunctional shame and anger suppression during the study when compared with ASG. ASG participants did not significantly improve in shame or anger suppression, but reported a marginally higher reduction in their likelihood of experiencing disgust. DBT-ST participants did not change on this measure. Lastly, participants in both conditions improved equally in disgust sensitivity and in anger expression. These results were generally not dependent on completing the course of treatment or on being compliant with the protocols, although a complete course of ASG had a trend for a significant reduction in shame.

Unlike general distress, the study sample reported at baseline higher emotional distress than a typical DSM sample. Ratings on disgust propensity and sensitivity were higher than what was reported in the literature for individuals with anxiety disorders (Olatunji, Tart, Ciesielski, McGrath, & Smits, 2011). This sample reported higher experience of shame than a non-clinical sample (Andrews et al., 2002) suggesting difficulties with regulating this emotion. Finally, intent-to-treat participants reported anger suppression and expression problems that were similar to problems reported in a BPD sample (Neacsiu et al., 2012).

In DBT-ST dysfunctional emotions are targeted via teaching skills that help observe and describe the emotions, skills that promote exposure to the emotion as a means to reduce the emotional intensity, and skills that teach cognitive restructuring and problems solving. Participants are free to choose the emotional experiences on which they try these skills for homework. Although generalization to other situations is promoted, differences in reducing specific maladaptive emotions may be an artifact

of the homework choices clients in the group made.

DBT-ST was not superior in improving disgust. Furthermore, disgust ratings at the end of the study were higher than ratings reported in the literature for non-clinical controls (Olatunji et al., 2011), suggesting that more intervention was needed to bring the experience of disgust to a non-clinical range. It is likely that participants in the study rarely practiced skills on the emotion of disgust, which may explain the lack of improvement. The marginal superiority of the control group in reducing disgust propensity may be due to increased exposure to the emotion through group discussion, although future research to better understand this finding is needed.

The success of DBT-ST to reduce the experience of shame over time in treatment above and beyond nonspecific factors extends prior findings and supports skills training as a successful intervention for specific problems with this emotion. It can be hypothesized that experiences of dysregulated shame were more often chosen for homework practice than experiences of disgust. It can also be hypothesized that skills use is a treatment mechanism for shame only and not for disgust. Future research testing these hypotheses is warranted to better understand these findings.

Similar to the BPD literature, DBT-ST was successful at changing anger suppression and anger expression. DBT-ST was superior to ASG in reducing anger suppression, but not anger expression. Prior findings suggest that standard DBT, including skills and individual therapy, is superior to an expert control treatment in reducing anger expression, but similar in reducing anger suppression (Neacsiu et al., 2012). Taken together these results suggest that additional components of DBT,

outside of skills training, are responsible for improving anger expression above and beyond an expert treatment. These findings also suggest that increase in skills use may be the active ingredient for changing anger suppression across expert treatments.

Exploratory mediation. Use of skills mediated the condition effect on depression, anxiety and anger suppression measures. The mediation effect was also significant for general distress and shame, although the condition effect was not significant. Skills use did not mediate the condition effect in disgust propensity, disgust sensitivity or anger expression.

Exploratory mediation results add important new information to the current body of literature. In a prior study conducted on a sample of BPD women undergoing treatment, skills use mediated the change over time in depression, but not in anger suppression or expression (Neacsiu et al., 2010). Depression was therefore mediated in both the BPD study and the current studies, anger expression was not mediated in either study, and anger suppression was mediated in this, but not in the BPD study. Furthermore, anger suppression was mediated differentially between conditions. The difference in anger suppression findings may stem from the different approaches of understanding mechanisms: Neacsiu and colleagues (2010) assessed skills use as a universal treatment mechanism, while this study examines skills use as a condition specific treatment mechanism. The current findings suggest that anger suppression is changed in DBT-ST via increased skills use, which is likely not a mechanism that is applicable to other treatments changing anger suppression. Nevertheless, increases in skills use may be a treatment mechanism for depression specific to DBT-ST and to

other treatments. The lack of findings in both studies for anger expression suggests a different mechanism through which this change occurs.

This study extended prior findings supporting the mediating effects of skills use, through including meditational models on anxiety, general distress, shame and disgust. The lack of significant findings for changes in disgust suggests that a different mechanism may be at play in improving this index of dysregulation, or that this emotion was insufficiently addressed in DBT-ST. Anxiety successfully decreases through skills use supporting this as a treatment mechanism in anxiety treatments. Lastly, for general distress and shame the findings are more difficult to interpret.

There was no main effect of condition for general distress and shame when assessed as an overall study effect (as opposed to when change over time in the outcomes was assessed). A significant main effect of condition is one of the steps Krull and MacKinnon (2001) require for a significant mediation effect. Nevertheless, it is possible to imagine that the lack of such a relationship could come from two mediators with opposite effects (MacKinnon, Fairchild, & Fritz, 2007). If skills use for example is a significant mediator of improvement, and poor alliance is a significant mediator of worsening in symptoms, the effects of both mediators could annul each other and yield a non-significant condition main effect. In this case, the mediation relationship would be significant but may be confounded by the additional mediator. In the case of shame and general distress, the mediation effect was significant and explained a large proportion of the total effect (69-94%). Future studies should nevertheless continue to assess the relationship between skills use and

shame and general distress as well as additional mediators that might be at play, to support or refute this hypothesis.

Study Limitations and Strengths

This study has several limitations. It remains unclear how our results would generalize to less dysregulated individuals. In addition a third of participants were non-compliant with study protocols, making the interpretation of results more difficult. Furthermore, the differences between therapists in the two treatment conditions does not allow us to rule out effects of therapists or therapist characteristics (e.g. gender or personal experience with emotion dysregulation or with mood and anxiety disorders) as important factors in treatment effectiveness (Wampold & Serlin, 2000).

An additional limitation comes from the measure used to define the sample. The DERS has good evidence for stability (Gratz et al., 2004); nevertheless in the current study the test-retest reliability from phone-screen to pretreatment for the DERS was low (r=0.47). This discrepancy from the literature may be due to the difference in administration, as the DERS was initially assessed over the phone as a means to enter the study. Nevertheless, this finding may suggest potential problems with the stability of the measure, which warrants future investigation.

There were relatively few subjects in each treatment condition, which may have compromised statistical power to find other differences in outcomes that might exist. In some instances (e.g. ACS; EES) the longitudinal outcome analyses did not yield a significant condition by time interaction, even though DBT-ST participants

improved significantly over time, while the ASG participants did not. In these instances the effect size was small to medium, which suggests that the study was not sufficiently powered to pick up these differences. Thus, low power to detect some of the proposed differences may be a limitation of this study.

Finally, the mediation analyses conducted were not designed to account for the temporal relationship between mediator and outcome. Mediation analyses assume that the mediator changes before the outcome changes (MacKinnon et al., 2007). In this study the mediator was skills use, which was assessed at the same time as the outcome. This is a limitation of the analyses presented and future research should assess this relationship through a design that preserves the temporal relationship required by mediation analyses.

Despite these limitations, this study has a number of strengths. First, this randomized controlled trial used a component analyses design. This allowed me to examine the contribution to outcome of learning and utilizing DBT skills above and beyond nonspecific factors associated with being in a supportive group therapy environment. Second, I made use of a fairly broad set of inclusion criteria to expand generalizability of the findings. Third, the addition of confound-analyses provided further support for the theoretical explanation of the findings. Fourth, adherence to each treatment protocol was assessed. Fifth, I used an intent-to-treat approach incorporating all available data and highlighted differences in outcomes from those reported by compliant participants and from participants who completed treatment. Given the low percentage of missing data, the findings in this study are an accurate

reflection of the changes that occurred with the sample included.

An additional strength of the study was the inclusion of clinical significance analyses. Clinical significance is a meaningful way of assessing change in therapy in a way that more closely mirrors what is expected from psychological interventions (i.e., to reach behavioral indices that are closer to those reported by a nonclinical group). This method also takes into account test reliability and standard errors and therefore presents meaningful clinical change rather than measurement error (Ankuta & Abeles, 1993).

Future Directions

Future analyses should investigate whether skills use is a treatment mechanism for emotion dysregulation in other DSM disorders. Second, an assumption that is commonly made for standard mediation analysis methods, such as the one used here, is that there is no extraneous variable which influences both the mediator and the outcome (MacKinnon et al., 2007). In the case of our analysis, it is still possible to have had unmeasured confounds influencing the results (although viable hypotheses were tested). An interesting avenue for future research would also be to validate the DBT model using a causal inferences approach, which would account for this limitation (MacKinnon et al., 2007). Although there have been some examples of these models used in longitudinal data (e.g., Lin, Ten Have, & Elliott, 2008), proper models to accommodate unmeasured confounds coupled with repeated measures are an active area under current research.

An additionally important avenue for future research is therefore to replicate

these findings with different samples and statistical techniques. Furthermore, future research should also assess how use of particular skills mediates outcomes that are directly targeted in skills training. Some questions that could be answered from such research include: Does use of emotion regulation skills alone improve emotion regulation? Are distress tolerance skills and/or other skills responsible for the improvement in emotional distress? Answers to these questions could lead to the refinement of DBT and other treatments to maximize their effectiveness.

It is interesting to notice that most changes that occurred in the study happened in the first 2 months of treatment. Thus, a future area of research could be to better understand what exactly leads to the changes seen in this study. A shorter intervention, if it yields comparable results, could be easier to disseminate and implement in community mental health settings. Thus, dose-effect studies are warranted, as well as studies that aim to strengthen skills use above and beyond the 15-16% increases seen in traditional DBT skills training (e.g. Wolf et al., 2011).

While participants in the study generally improved, 30-50% were treatment resistant in one or all domains of assessment. Future studies should be designed to better understand who the treatment responders are. Furthermore, research evaluating potential moderators of treatment effects is also warranted.

Lastly, despite many efforts to increase the diversity of the subjects included, the majority of the study sample was comprised of white Caucasian women who reported higher education. This limits the applicability of the current findings to minority populations or to individuals with limited education. Future research should

therefore explore the generalizability and/or the adaptation needed for minority or less educated samples.

In summary, DBT skills training is a treatment mechanism for emotion dysregulation in individuals with mood and anxiety disorders. Furthermore, DBT-ST is a successful stand-alone intervention that reduces general distress and indices of psychopathology with equal success to more established interventions. Adding to the emerging support for transdiagnostic treatments (McEvoy, Nathan, & Norton, 2009), this approach offers the advantage of reduced assessment burden, while providing an evidence-based treatment. Given the high prevalence of DSM disorders among individuals who report high emotion dysregulation, assessment and treatment of emotion dysregulation can provide a viable solution for some of the problems encountered in the psychotherapy literature.

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Tables and Figures

Table 1. *Participant Exclusion Criteria*

Screening phase	Criteria
Phone	Is not willing to discontinue current psychosocial treatment
	Age < 18 years
	Is mandated to treatment by
	Court order
	Agency (e.g., CPS)
	Family
	DERS < 98
	Lives outside of commuting distance
	Cannot accommodate group times
	Has received > 5 sessions of outpatient DBT approach to therapy
	BSL > 2.5
	Is at high risk for suicide:
	Has attempted suicide within the last year
	Has attempted suicide > 1 year ago and reports current ideation
	Has never attempted suicide but reports current ideation, including a preferred method and plan
In-person	Meets criteria for Borderline Personality Disorder
	Does not meet criteria for a current mood/anxiety disorder, including:
	Major Depressive Disorder
	Dysthymia
	Depressive Disorder NOS
	Social Phobia
	Specific Phobia
	Post Traumatic Stress Disorder
	Obsessive Compulsive Disorder
	Panic Disorder (with or without agoraphobia)
	Agoraphobia without Panic Disorder
	Generalized Anxiety Disorder
	Anxiety Disorder NOS
	Meets diagnostic criteria for
	Bipolar Disorder
	Schizophrenia
	Schizophreniform Disorder
	Schizoaffective Disorders
	Psychosis NOS
	Substance Dependence (current, needing immediate intervention)
	Anorexia Nervosa (current, life-threatening)
	IQ < 70
	Is not willing to be video taped throughout study
	Is not willing to stay on same dose of medication throughout study

Table 2. *Studies Using the DERS with Clinical and Nonclinical Samples*

Study	Group	*N*	*M*[a]	*SD*[a]
Whiteside et al.,	BED	106	96.19	24.96
2007	Non-BED[b]	589	78.88	18.20
Salters-Pedneault et	GAD	87	94.81	22.96
al., 2006	Non-GAD[c]	238	78.22	22.00
Fox et al., 2007	SUD (cocaine)	60	85.80	22.50
	Nonclinical	50	60.90	15.00
Gratz & Roemer,	Women[d]	260	77.99	20.72
2004	Men[d]	97	80.66	18.79
Cohn et al., 2010	Men[d]	111	72.05	15.73
Harrison et al., 2009	AN (women)	20	108.8	16.16
	Nonclinical (women)	20	67.95	14.46

Note: DERS = Difficulties in Emotion Regulation Scale; BED = binge eating disorder; GAD = generalized anxiety disorder; SUD = substance dependence; AN = anorexia nervosa.
[a] Computed from DERS total score. [b] Participants were only assessed for eating disorders. [c] Participants were only assessed for GAD. [d] Participants were not assessed for psychopathology, though some reported self-harm.

Table 3. *DBT-ST Curriculum*

Week	Module[a]	Selected skills
1	Mindfulness	Wise Mind
		Observe
2	Mindfulness	Describe
		Participate
		HOW skills
3	Emotion Regulation	Functions of emotions
		Model of emotions
		Understanding emotions
4	Emotion Regulation	Check the Facts
5	Emotion Regulation	Opposite Action
6	Emotion Regulation	Problem Solving
		Putting Opposite Action and Problem Solving together
7	Emotion Regulation	Reducing Vulnerability (A B)
8	Emotion Regulation	Reducing Vulnerability (C PLEASE)
9	Mindfulness	Mindfulness review
		Advanced mindfulness practice
10	Emotion Regulation	Managing Extreme Emotions
	Distress Tolerance	TIP
11	Distress Tolerance	Crisis Survival Skills
		Self-Soothe
		ACCEPTS
		IMPROVE
12	Distress Tolerance	Radical Acceptance
		Turning the Mind
13	Distress Tolerance	Willingness
		Half Smile
		Allowing the mind
14	Interpersonal Effectiveness	DEAR MAN
		GIVE
		FAST
15	Interpersonal Effectiveness	Validation
16	Interpersonal Effectiveness	Using behavioral principles in interpersonal situations

Note: Weeks in which participants could join the group are in boldface.
[a]Indicates the DBT skills training module (Linehan, 1993a) from which each skill was derived.

Table 4. *Frequencies of Topics Discussed in the Activities Support Group*

Topic	**Frequency**[a]
Anger	4
Anxiety	5
Avoidance	1
Communication	4
Coping	3
Depression	2
Friendship	1
Goals	4
Happiness	1
Health	2
Isolation	1
Relationships	1
Self destructive behaviors	1
Sleep	3
Social support	2
Stigma in mental health	2
Stress	4
The past	1
Trauma	2

Note: [a] Number of times topic was discussed during treatment.

Table 5a. *Demographics: Sample Characteristics*

	All Screened *n=463*	Intent to Treat *n=44*	DBT-ST *n=22*	ASG *n=22*
Gender: # (%)				
Female	341 (73.7)	29 (65.9)	15 (68.2)	14 (63.6)
Male	122 (23.3)	15 (34.1)	7 (31.8)	8 (36.4)
Age in years: *M (SD)*				
	34.33 (12.08)	35.55 (12.43)	32.27(10.5)	38.82(13.55)
# valid answers	363	44	22	22
Racial Background: # (%)				
Caucasian	287 (79.3)	40 (90.9)	20 (90.9)	20 (90.9)
Native Am./Alaskan/Hawaiian	9 (2.5)	0 (0.0)	0 (0.0)	0 (0.0)
African American	15 (4.1)	0 (0.0)	0 (0.0)	0 (0.0)
Asian American	*43 (11.9)*	3 (6.8)	1 (4.5)	2 (9.1)
Other	8 (2.2)	1 (2.3)	1 (4.5)	0(0.0)
# valid answers	362	44	22	22
Hispanic/Latino: # (%)				
Yes	27 (7.4)	3 (6.8)	1 (4.5)	2 (9.1)
No	337 (92.6)	41 (93.2)	21 (95.5)	20 (90.9)
# valid answers	364	44	22	22
Sexual Orientation: # (%)				
Subject is uncertain	15 (4.2)	1 (2.3)	1 (4.5)	0 (0.0)
Heterosexual	278 (78.1)	37 (84.1)	18 (81.8)	19 (86.4)
LGBT	63 (17.7)	6 (13.6)	3 (13.6)	3 (13.6)
# valid answers	356	44	22	22
Marital Status: # (%)				
Single, never married	230 (63.2)	27 (61.4)	16 (72.7)	11 (50)
Widowed/Separated/Divorced	75 (20.6)	6 (13.6)	2 (9.1)	4 (18.2)
Married	59 (16.2)	11 (25)	4 (18.2)	7 (31.8)
# valid answers	364	44	22	22
Educational Background: # (%)				
< high school	6 (1.7)	1 (2.3)	1 (4.5)	0 (0.0)
High school graduate/GED	36 (9.9)	1 (2.3)	0 (0.0)	1 (4.5)
> high school	135 (37.2)	12 (27.3)	7 (31.8)	5 (22.7)
College graduate	186 (51.2)	30 (68.2)	14 (63.6)	16 (72.7)
# valid answers	363	44	22	22
Employment Status: # (%)				
Unemployed	69 (19)	4 (9.1)	2 (9.1)	2 (9.1)
Employed outside the home	182 (50.1)	29 (65.9)	15 (68.2)	14 (63.6)
Homemaker, retired	13 (3.6)	2 (4.5)	0 (0.0)	2 (9.1)
Student	99 (27.3)	9 (20.5)	5 (22.7)	4 (18.2)
# valid answers	363	44	22	22
Gross Annual Income: # (%)				
Less than $10,00	140 (39.1)	9 (20.9)	4 (18.2)	5 (23.8)
$10,000-$30,000	108 (30.2)	14 (32.6)	8 (36.4)	6 (28.6)
Over $30,000	110 (30.7)	20 (46.5)	10 (45.5)	10 (47.6)
# valid answers	358	43	22	21

Table 5b. *Demographics: Clinical Characteristics*

	All Screened	Intent to Treat	DBT-ST	ASG
	n=463	*n=44*	*n=22*	*n=22*
Has learning disability: # (%)	53 (14.6)	6 (13.6)	1 (4.5)	5 (22.7)
# valid answers	364	44	22	22
Has physical disability: # (%)	28 (7.7)	2 (4.5)	1 (4.5)	1 (4.5)
# valid answers	364	44	22	22
Currently[1] in therapy: # (%)	119 (32)	9 (20.5)	4 (18.2)	5 (22.7)
# valid answers	372	44	22	22
Current[1] suicidal ideation: # (%)	99 (29.8)	14 (31.8)	5 (22.7)	9 (40.9)
# valid answers	332	44	22	22
Ever attempted suicide: # (%)	106 (22.9)	4 (9.1)	2 (9.1)	2 (9.1)
# valid answers	347	44	22	22
DERS total score: M (SD)	115.92 (23.37)	115.30 (11.94)	116.77 (12.7)	113.82(11.22)
# valid answers	355	44	22	22
BSL-23 average: M (SD)	1.95 (0.89)	1.53 (0.42)	1.44 (0.41)	1.62(0.43)
# valid answers	249	27	14	13

Note: [1]at time of screening; DERS=Difficulties in Emotion Regulation Scale; BSL-23=Borderline Symptoms List-23

Table 5c. *Demographics: Verbal IQ and Diagnostic Criteria Met*

	DBT-ST n=22	ASG n=22
Average # of BPD criteria met (*SD*)	2.00 (1.20)	2.41 (1.30)
Average verbal IQ score (*SD*)	113.18 (12.85)	109.77 (15.35)
Average SCID I GAF score (*SD*)	49.77 (9.83)	54.91 (9.82)
Current diagnoses: number (%)		
MDD	13 (59.1)	9 (40.9)
Dysthymia	1 (4.5)	10 (45.4)
Depression NOS	1 (4.5)	0 (0.0)
Panic disorder		
Without agoraphobia	1 (4.5)	2 (9.1)
With agoraphobia	2 (9.1)	2 (9.1)
Agoraphobia without panic disorder	1 (4.5)	2 (9.1)
GAD	17 (77.3)	12 (54.5)
Anxiety NOS	1 (4.5)	3 (13.6)
SAD	8 (36.4)	8 (36.4)
Specific phobia	3 (13.6)	5 (22.7)
OCD	4 (18.2)	1 (4.5)
PTSD	3 (13.6)	1 (4.5)
Somatoform disorder	2 (9.1)	0 (0.0)
Eating disorder	0 (0.0)	2 (9.1)
Substance abuse/dependence	3 (13.6)	0 (0.0)
Lifetime diagnoses: number (%)		
Anxiety disorder (any)	16 (72.7)	16 (72.7)
Substance abuse (any)	3 (13.6)	5 (22.7)
Substance dependence (any)	6 (27.3)	8 (36.6)
Eating disorder (any)	2 (9.1)	4 (18.2)
Primarily depressed	8 (36.4)	11 (50.0)
Primarily anxious	14 (63.6)	11 (50.0)

Note: BPD= Borderline Personality Disorder, GAF=General Assessment of Functioning, MDD = Major Depressive Disorder, NOS= Not otherwise specified, GAD= Generalized Anxiety Disorder, SAD=Social Anxiety Disorder OCD=Obsessive Compulsive Disorder, PTSD=Post Traumatic Stress Disorder

Table 6a. *Frequency of Participants Reporting Medication Use*

			Reason for medication			
Condition	Period	Valid *n**	Depression	Mood Stabilizer	Anxiety	Total[a]
DBT-ST	Pretreatment	22	5	3	3	9
	2-month	22	2	3	4	8
	4-month	18	3	2	4	7
	6-month	21	3	2	6	9
ASG	Pretreatment	22	7	0	4	8
	2-month	19	5	0	5	9
	4-month	18	5	0	3	7
	6-month	17	4	0	2	5

Note: * valid *n* refers to the number of participants at each assessment period for whom data was not missing; [a] Represents total number of participants who used of medication for depression or anxiety at each assessment period.

Table 6b. *Frequency of Medication Use Reported at the Pretreatment Assessment*

Reason	Generic name	Classification	Condition	
			DBT-ST	ASG
Depression	Bupropion	Atypical antidepressant		1
	Citalopram	SSRI	2	3
	Duloxetine	SNRI	1	
	Lamotrigine	Anticonvulsant	2	
	Mirtazapine	Tetracyclic antidepressant		1
	Paroxetine	SSRI		1
	Sertraline	SSRI		1
	Venlafaxine	SNRI		1
Mood Stabilizer	Lamotrigine	Anticonvulsant	1	
	Quetiapine	Atypical antipsychotic	1	
	Risperidone	Atypical antipsychotic	1	
Anxiety	Alprazolam	BZD		2
	Bupropion	Atypical antidepressant	1	
	Buspirone	Azapirone	1	1
	Clonazepam	BZD	1	1
	Escitalopram	SSRI		1

Note: BZD = benzodiazepine; SSRI = selective serotonin reuptake inhibitor; SNRI = serotonin-norepinephrine reuptake inhibitor.

Table 6c. *Noncompliance with Protocols by Condition*

Noncompliance with Medication Protocol[a]				
	DBT-ST (*n*=22)		ASG (*n*=22)	
Period	*n*	%	*n*	%
2-month	1	4.5	3	13.6
4-month	3	13.6	5	22.7
6-month	6	27.3	7	31.8

Noncompliance with Ancillary Treatment Protocol				
	DBT-ST (*n*=22)		ASG (*n*=22)	
Period	*n*	%	*n*	%
2-month	4	18.2	2	11.1
4-month	0	0.0	3	16.7
6-month	4	18.2	2	11.1

Note: [a]Based on noncompliance status determined at each assessment period for all enrolled participants ($N = 44$). Missing data values for noncompliance were imputed using the Last Observation Carried Forward (LOCF) method.

Table 7. *Reasons for Missing Data at Each Assessment Period*

	DBT-ST	**ASG**	Reasons
2-Months	0	3	*Subject was unreachable (1)* *Subject is a drop out (2)*
4-Months	3	3	*Subject was unreachable (3)* *Subject is a drop out (3)*
Follow up	1	4	*Subject was unreachable (2)* *Subject is a drop out (3)*

Table 8. *Number of Participants Who Did **Not** Drop Out of Therapy in Each Condition*

Assessment Period	DBT-ST	ASG
Pretreatment	22	22
2-Months	20	13
4-Months	15	9
Follow up	15	9

Table 9. *Reasons for Dropping Treatment per Condition*

Reason for drop	Dropped from ASG	Dropped from DBT-ST
Wanted individual therapy	1	2
Wanted a different treatment	5	0
No time for group	1	2
Found group uncomfortable	1	1
No longer interested	1	1
Found group not to be a good fit	6	3

Table 10a. *Means and Standard deviations for Skills Use, Emotion Dysregulation, General Distress and Psychopathology (by Condition, by Assessment Time)*

	Condition					
	DBT-ST			ASG		
Scale	*n*	*M*	*SD*	*n*	*M*	*SD*
DBT-WCCL						
Pre-Tx	22	1.76	0.40	22	1.80	0.28
2-month	22	2.18	0.35	19	1.89	0.39
4-month	19	2.24	0.25	19	1.91	0.38
6-month	21	2.14	0.41	18	1.88	0.46
DERS						
P/S	22	116.77	12.70	22	113.82	11.22
Pre-Tx	15	105.27	14.68	15	104.20	19.27
2-month	22	87.18	21.47	19	100.21	14.63
4-month	19	80.63	22.60	19	97.74	24.30
6-month	21	80.38	21.03	18	90.44	23.66
TAS						
Pre-Tx	22	52.77	12.71	22	56.95	11.87
2-month	22	46.41	11.93	19	53.84	11.10
4-month	19	44.26	11.89	18	52.50	12.00
6-month	21	45.19	11.90	17	51.00	13.73
ACS						
Pre-Tx	22	4.28	0.62	22	4.01	0.67
2-month	22	3.53	0.88	19	3.76	0.63
4-month	19	3.39	0.90	18	3.54	0.55
6-month	21	3.44	0.86	17	3.47	0.81
OQ						
Pre-Tx	22	87.14	17.77	22	84.86	20.51
2-month	22	62.55	21.46	19	74.42	18.70
4-month	19	61.16	20.55	18	77.72	20.73
6-month	21	64.90	20.67	17	72.12	26.63
PHQ-9*						
Pre-Tx	17	14.65	3.24	19	16.21	3.47
2-month	17	6.88	4.41	17	11.41	4.20
4-month	14	6.79	3.70	16	10.81	4.97
6-month	16	8.63	4.56	15	9.73	5.65
OASIS**						
Pre-Tx	19	11.89	2.85	16	10.88	2.39
2-month	19	7.37	2.91	14	8.71	4.45
4-month	16	5.75	3.55	12	8.83	4.00
6-month	18	7.50	3.85	12	7.58	4.01

Note: DBT-WCCL = DBT Ways of Coping Checklist; DERS = Difficulties in Emotion Regulation Scale; TAS = Toronto Alexithymia Scale; ACS = Affect Control Scale; OQ = Outcome Questionnaire; PHQ-9 = Patient Health Questionnaire-9; OASIS = Overall Anxiety Severity and Impairment Scale; *includes only subjects with PHQ-9 >= 10; ** includes only subjects with OASIS >= 8.

Table 10b. *Means and Standard Deviations for Emotional Distress Outcomes (by Condition, by Time Point)*

	Condition					
	DBT-ST			ASG		
Scale	*n*	*M*	*SD*	*n*	*M*	*SD*
DPSS-P						
Pre-Tx	22	20.59	5.97	22	16.82	4.00
2-month	22	19.82	4.81	19	17.37	2.79
4-month	19	18.37	4.32	17	14.24	4.29
6-month	21	18.33	4.99	17	14.88	3.84
DPSS-S						
Pre-Tx	22	16.73	5.61	22	13.68	3.83
2-month	22	15.23	5.50	19	14.58	3.29
4-month	19	14.63	5.39	17	10.88	2.91
6-month	21	14.38	5.12	17	12.41	4.78
STAXI In						
Pre-Tx	22	21.82	4.17	22	19.77	3.89
2-month	22	19.05	4.88	19	20.53	2.65
4-month	19	18.05	5.53	17	19.53	3.86
6-month	21	18.62	4.98	17	18.88	3.79
STAXI Out						
Pre-Tx	22	15.91	4.53	22	14.59	5.37
2-month	22	15.23	4.16	19	14.58	5.18
4-month	19	15.21	3.88	17	13.47	3.92
6-month	21	15.62	4.17	17	14.24	4.10
ESS						
Pre-Tx	22	68.64	17.12	22	69.77	15.84
2-month	22	61.95	14.96	19	69.42	14.50
4-month	19	58.68	17.01	17	64.12	13.52
6-month	21	58.52	16.23	17	57.59	13.72

Note: DPSS-P = Disgust Propensity and Sensitivity Scale-Propensity to experiencing disgust; DPSS-S = Disgust Propensity and Sensitivity Scale-Sensitivity to disgust; STAXI In = State-Trait Anger Expression Inventory Anger-in; STAXI Out = State-Trait Anger Expression Inventory Anger-out; ESS = Experience of Shame Scale.

Table 11a. *Estimated Slopes for Each Condition During Treatment and Follow up for All Intent to Treat Participants (n=44)*

		DBT-ST			ASG		
Outcome	Phase	Slope Estimate	S.E.	*p**	Slope Estimate	S.E.	*p**
DBT-WCCL	TX	0.23	0.05	<0.001	0.06	0.05	0.26
	FU	-0.12	0.07	0.11	-0.03	0.08	0.75
DERS^	TX	-19.77	2.46	<0.001	-8.59	2.52	<0.001
	FU	4.60	3.56	0.198	-6.15	3.75	0.10
ACS^	TX	-0.50	0.10	<0.001	-0.25	0.11	0.02
	FU	0.14	0.13	0.306	-0.06	0.14	0.68
TAS^	TX&FU	-4.52	1.69	<0.01	-2.30	1.80	0.20
OQ	TX	-13.96	2.89	<0.001	-4.06	3.00	0.18
	FU	7.86	4.53	0.086	-3.60	4.90	0.46
PHQ-9+	TX	-3.99	0.73	<0.001	-2.74	0.69	<0.001
	FU	3.18	1.40	<0.05	-0.39	1.38	0.78
OASIS++	TX	-2.96	0.43	<0.001	-1.13	0.49	<0.05
	FU	2.04	0.82	<0.05	-0.83	0.97	0.40
DPSS-DP^^	TX&FU	-1.21	0.48	<0.02	-1.38	0.51	<0.01
DPSS-DS^^	TX&FU	-1.23	0.43	<0.01	-1.41	0.45	<0.01
ESS^^	TX&FU	-5.45	1.30	<0.001	-3.31	1.38	0.018
STAXI-IN^^	TX&FU	-1.97	0.57	<0.001	-0.06	0.61	0.92
STAXI-OUT^^	TX&FU	-0.52	0.36	0.145	-0.52	0.37	0.16

Note: ***p*** value for each slope is computed based on a *t*-test that assesses whether the slope estimate is significantly different than 0; TX=slope coefficient estimate during the treatment phase of the study (based on time1); FU= slope coefficient estimate during the follow up phase of the study (based on time2); TX&FU= slope coefficient estimate during the entire study (based on time0); DBT-WCCL= Skills use subscale from the DBT Ways of Coping Checklist; DERS=Difficulties in Emotion Regulation Scale; ACS= Affect Control Scale; TAS= Toronto Alexithymia Scale; PHQ-9= Patient Health Questionnaire-Depression Module; OASIS=Overall Anxiety Severity and Impairment Scale; DPSS-DP= Disgust Propensity and Sensitivity Scale-Propensity Subscale; DPSS-DS= Disgust Propensity and Sensitivity Scale-Sensitivity Subscale; ESS=Experience of Shame Scale; STAXI-IN= State-Trait Anger Inventory-Anger In; STAXI-OUT= State-Trait Anger Inventory-Anger Out; + only participants who scored above the cutoff (>=10) on the PHQ-9 at baseline were included in these analyses; ++ only participants who scored above the cutoff (>=8) on the OASIS at baseline were included in these analyses; ^ significance for these analyses is assessed as p<0.016 (Bonferroni correction for three comparisons); ^^significance for these analyses is assessed as p<0.01 (Bonferroni correction for five comparisons).

Table 11b. *Estimated Slopes for Each Condition During Treatment and Follow up for All Participants, Including Only Time Points where Protocols Were Followed (n=44)*

		DBT-ST			ASG		
Outcome	Phase	Slope Estimate	S.E.	*p**	Slope Estimate	S.E.	*p**
DBT-WCCL	TX	0.23	0.06	<0.001	0.05	0.06	0.44
	FU	-0.14	0.10	0.18	-0.01	0.12	0.92
DERS^	TX	-19.80	2.58	<0.001	-8.03	2.82	<0.01
	FU	3.89	4.32	0.37	-7.28	5.04	0.15
ACS^	TX	-0.48	0.11	<0.001	-0.22	0.12	0.075
	FU	0.25	0.16	0.13	-0.13	0.20	0.53
TAS^	TX	-4.70	1.87	<0.02	-3.02	2.08	0.15
	FU	1.26	2.65	0.64	2.60	3.26	0.43
OQ	TX	-13.98	3.07	<0.001	-4.34	3.47	0.21
	FU	7.31	5.52	0.19	-5.42	6.76	0.42
PHQ-9+	TX	-4.03	0.70	<0.001	-2.90	0.74	<0.001
	FU	2.52	1.55	0.11	-1.73	1.72	0.32
OASIS++	TX	-2.95	0.41	<0.001	-0.98	0.50	0.06
	FU	1.61	0.88	0.07	-1.59	1.09	0.15
DPSS-DP^^	TX&FU	-1.09	0.70	0.12	-1.06	0.80	0.19
DPSS-DS^^	TX&FU	-1.41	0.71	0.05	-1.12	0.83	0.18
ESS^^	TX&FU	-6.23	1.38	<0.001	-3.16	1.61	0.05
STAXI-IN^^	TX&FU	-2.18	0.62	<0.001	-0.32	0.71	0.66
STAXI-OUT^^	TX&FU	-0.54	0.68	0.43	-0.76	0.79	0.34

*Note: *p* value for each slope is computed based on a *t*-test that assesses whether the slope estimate is significantly different than 0; TX=slope coefficient estimate during the treatment phase of the study (based on time1); FU= slope coefficient estimate during the follow up phase of the study (based on time2); TX&FU= slope coefficient estimate during the entire study (based on time0);DBT-WCCL= Skills use subscale from the DBT Ways of Coping Checklist; DERS=Difficulties in Emotion Regulation Scale; ACS= Affect Control Scale; TAS= Toronto Alexithymia Scale; PHQ-9= Patient Health Questionnaire-Depression Module; OASIS=Overall Anxiety Severity and Impairment Scale; DPSS-DP= Disgust Propensity and Sensitivity Scale-Propensity Subscale; DPSS-DS= Disgust Propensity and Sensitivity Scale-Sensitivity Subscale; ESS=Experience of Shame Scale; STAXI-IN= State-Trait Anger Inventory-Anger In; STAXI-OUT= State-Trait Anger Inventory-Anger Out; + only participants who scored above the cutoff (>=10) on the PHQ-9 at baseline were included in these analyses; ++ only participants who scored above the cutoff (>=8) on the OASIS at baseline were included in these analyses; ^ significance for these analyses is assessed as p<0.016 (Bonferroni correction for three comparisons); ^^significance for these analyses is assessed as p<0.01 (Bonferroni correction for five comparisons).

Table 11c. *Estimated Slopes for Each Condition During Treatment and Follow up for All Participants Who Completed Treatment (n=34)*

		DBT-ST			ASG		
Outcome	Phase	Slope Estimate	S.E.	*p**	Slope Estimate	S.E.	*p**
DBT-WCCL	TX& FU	0.24	0.04	<0.001	0.02	0.06	0.71
DERS^	TX	-20.20	3.17	<0.001	-9.00	4.09	0.03
	FU	6.80	4.61	0.144	-11.30	5.96	0.06
ACS^	TX	-0.25	0.11	0.023	-0.25	0.15	0.10
	FU	0.13	0.13	0.306	-0.06	0.14	0.68
TAS^	TX& FU	-4.93	2.21	0.031	-0.93	3.61	0.80
OQ	TX& FU	-13.53	2.94	<0.001	-3.44	3.80	0.37
PHQ-9+	TX& FU	-3.54	0.88	<0.001	-1.21	1.15	0.30
OASIS++	TX& FU	-2.29	0.52	<0.001	-0.69	0.64	0.29
DPSS-DS^^	TX& FU	-0.67	0.80	0.408	-1.67	1.03	0.11
DPSS-DP^^	TX& FU	-0.70	0.52	0.184	-1.67	0.67	<0.02
EES^^	TX& FU	-5.97	1.66	<0.001	-5.61	2.14	<0.02
STAXI-IN^^	TX& FU	-2.10	0.69	<0.01	-0.78	0.89	0.38
STAXI-OUT^^	TX& FU	-0.30	0.44	0.499	-0.83	0.57	0.15

Note: **p* value for each slope is computed based on a *t*-test that assesses whether the slope estimate is significantly different than 0; TX=slope coefficient estimate during the treatment phase of the study (based on time1); FU= slope coefficient estimate during the follow up phase of the study (based on time2); TX&FU= slope coefficient estimate during the entire study (based on time0); DBT-WCCL= Skills use subscale from the DBT Ways of Coping Checklist; DERS=Difficulties in Emotion Regulation Scale; ACS= Affect Control Scale; TAS= Toronto Alexithymia Scale; PHQ-9= Patient Health Questionnaire-Depression Module; OASIS=Overall Anxiety Severity and Impairment Scale; DPSS-DP= Disgust Propensity and Sensitivity Scale-Propensity Subscale; DPSS-DS= Disgust Propensity and Sensitivity Scale-Sensitivity Subscale; ESS=Experience of Shame Scale; STAXI-IN= State-Trait Anger Inventory-Anger In; STAXI-OUT= State-Trait Anger Inventory-Anger Out; + only participants who scored above the cutoff (>=10) on the PHQ-9 at baseline were included in these analyses; ++ only participants who scored above the cutoff (>=8) on the OASIS at baseline were included in these analyses; ^ significance for these analyses is assessed as p<0.016 (Bonferroni correction for three comparisons); ^^significance for these analyses is assessed as p<0.01 (Bonferroni correction for FIVE comparisons).

Table 12. Reliable change results at each time point by condition

		DBT-St				ASG				
		Valid n	Unchanged/ Deteriorated	Improved but not recovered	Recovered	Valid n	Unchanged/ Deteriorated	Improved but not recovered	Recovered	Significance * (*p*)
DBT-WCCL	2 months	22	16 (72.7%)	4 (18.2%)	2 (9.1%)	19	18 (94.7%)	1 (5.3%)	0 (0.0%)	**0.060**
	4 months	19	8(42.1%)	8 (42.1%)	3 (15.8%)	19	17 (94.4%)	2 (9.1%)	0 (0.0%)	**0.002**
	Follow up	21	11 (52.4%)	7 (33.3%)	3 (14.3%)	18	17 (94.4%)	1 (4.5%)	0 (0.0%)	**0.004**
DERS	2 months	22	9 (40.9%)	7 (31.8%)	6 (27.3%)	19	14 (73.7)	5 (26.3%)	0 (0.0%)	**0.014**
	4 months	19	5 (26.3%)	3 (15.8%)	11 (57.9%)	19	13 (68.4%)	2 (10.5%)	4 (21.1%)	**0.009**
	Follow up	21	4 (19.0%)	7 (33.3%)	10 (47.6%)	18	11 (61.1%)	2 (11.1%)	5 (27.8%)	**0.030**
OQ+	2 months	20	4 (20.0%)	6 (30.0%)	10 (50%)	16	11 (68.8%)	3 (18.8%)	2 (12.5%)	**0.003**
	4 months	17	4 (23.5%)	6 (35.3%)	7 (41.2%)	15	8 (53.3%)	5 (33.3%)	2 (13.3%)	**0.047**
	Follow up	19	6 (31.6%)	7 (36.8%)	6 (31.6%)	14	6 (42.9%)	5 (35.7%)	3 (21.4%)	0.450
PHQ-9 ++	2 months	17	6 (35.3%)	0 (0.0%)	11 (64.7%)	17	10 (58.2%)	4 (23.5%)	3 (17.6%)	**0.034**
	4 months	14	7(50.0%)	0 (0.0%)	7 (50.0%)	16	10 (62.5%)	1 (6.3%)	5 (31.3%)	0.402
	Follow up	16	8 (50.0%)	1 (6.3%)	7 (43.8%)	15	8 (53.3%)	2 (13.3%)	5 (33.3%)	0.708
OASIS+++	2 months	19	10 (52.6%)	2 (10.5%)	7 (36.8%)	14	11 (78.6%)	0 (0.0%)	3 (21.4%)	0.175
	4 months	16	6 (37.5%)	0 (0.0%)	10 (62.5%)	12	7 (58.3%)	2 (16.7%)	3 (25.0%)	0.120
	Follow up	18	9 (50.0%)	2 (11.1%)	7 (38.9%)	12	8 (66.7%)	0 (0.0%)	4 (33.3%)	0.499

Note: * significance tests performed used the Mann Whitney *U* statistic; DBT-WCCL – DBT ways of coping checklist (skills use subscale); DERS – Difficulties in emotion regulation scale; OQ – Outcome questionnaire; PHQ-9 – Patient health questionnaire- depression module; OASIS – overall anxiety severity and impairment scale; + only participants who scored above the cutoff (64) on the OQ were included in this analysis; ++ only participants who scored above the cutoff (9.34) on the PHQ-9 were included in this analysis; +++ only participants who scored at or above the cutoff (8) on the OASIS were included in this analyses; DBT-SK – DBT skills training treatment condition; ASG – Activities support group treatment condition.

Table 13. Mediation analyses results

Outcome	c (SE)	*p*	α (SE)	*p*	β (SE)	*p*	c' (SE)	*p*	ME (SE)	PRODCLIN 95% CI	Proportion of ME
DERS	-9.70 (4.80)	<.05	0.20 (0.10)	<.05	-30.70 (4.67)	<.001	-3.69 (5.33)	.49	-6.10 (3.16)	(-12.68;-0.23)	62.31%
ACS	-0.05 (0.20)	.80	0.20 (0.10)	<.05	-0.92 (0.14)	<.001	0.12 (0.20)	.62	-0.18 (0.10)	(-0.38;-0.01)	59.43%
TAS	-6.69 (3.31)	<.05	0.20 (0.10)	<.05	-9.81 (1.87)	<.001	-4.82(3.10)	.13	-1.95 (1.04)	(-4.17;-0.07)	28.77%
OQ	-8.41 (5.24)	.12	0.20 (0.10)	<.05	-29.59 (4.18)	<.001	-2.68(5.04)	.60	-5.88 (3.03)	(-12.13;-0.22)	68.68%
PHQ-9	-3.12 (1.10)	<.01	0.20 (0.10)	<.05	-6.69 (1.07)	<.001	-1.80(1.01)	.08	-1.33 (0.69)	(-2.78;-0.05)	42.50%
OASIS	0.06 (0.99)	.94	0.20 (0.10)	<.05	-3.67 (0.83)	<.001	0.80 (1.03)	.44	-0.73 (0.40)	(-1.60;-0.03)	47.63%
DPSS-P*	3.43 (1.11)	<.01	0.20 (0.10)	<.05	-0.54 (0.97)	.58	3.54(1.14)	<.01	-	-	-
DPSS-S*	2.20 (1.23)	.08	0.20 (0.10)	<.05	-0.23 (0.91)	.80	2.25(1.26)	.08	-	-	-
EES	-3.27 (4.24)	.44	0.20 (0.10)	<.05	-15.35 (2.75)	<.001	-0.18(4.43)	.97	-3.05 (1.61)	(-6.46;-0.11)	94.41%
STAXI-IN	-0.04 (1.15)	.97	0.20 (0.10)	<.05	-4.69 (0.80)	<.001	0.91(1.12)	.42	-0.93 (0.49)	(-1.96;-0.04)	50.52%
STAXI-OUT*	0.98 (1.25)	.44	0.20 (0.10)	<.05	-0.86 (0.73)	.24	1.15(1.27)	.37	-	-	-

Note: All results used the skills use subscale of the DBT-WCCL as mediator and condition as independent variable; c is the coefficient estimate for the direct effect (the coefficient of condition as a main effect for predicting the outcome); α is the coefficient estimate for the main effect of condition predicting skills use; β is the coefficient estimate for the main effect of skills use predicting the outcome (when condition is added to the model); c' is the coefficient estimate for the main effect of condition on outcome, when skills use is added to the model (also called the direct effect); ME (the mediated effect) is the estimate indirect effect; the 95% CI is the confidence interval for the mediated effect; % explained refers to how much percentage of the total effect (direct + indirect) the mediated effect explains; * condition by mediator interaction was not significant (p>.05).

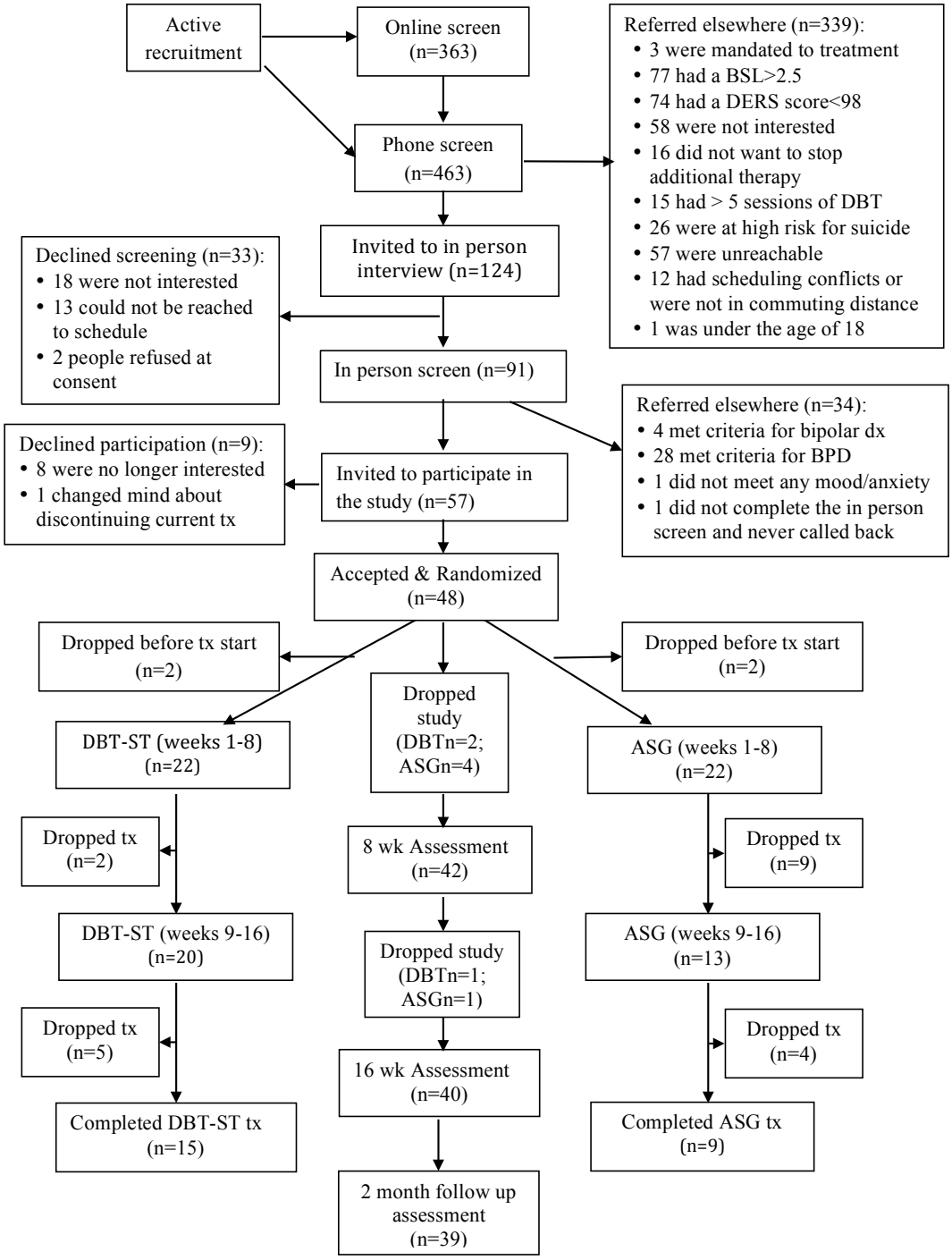

Figure 1. Subject flow

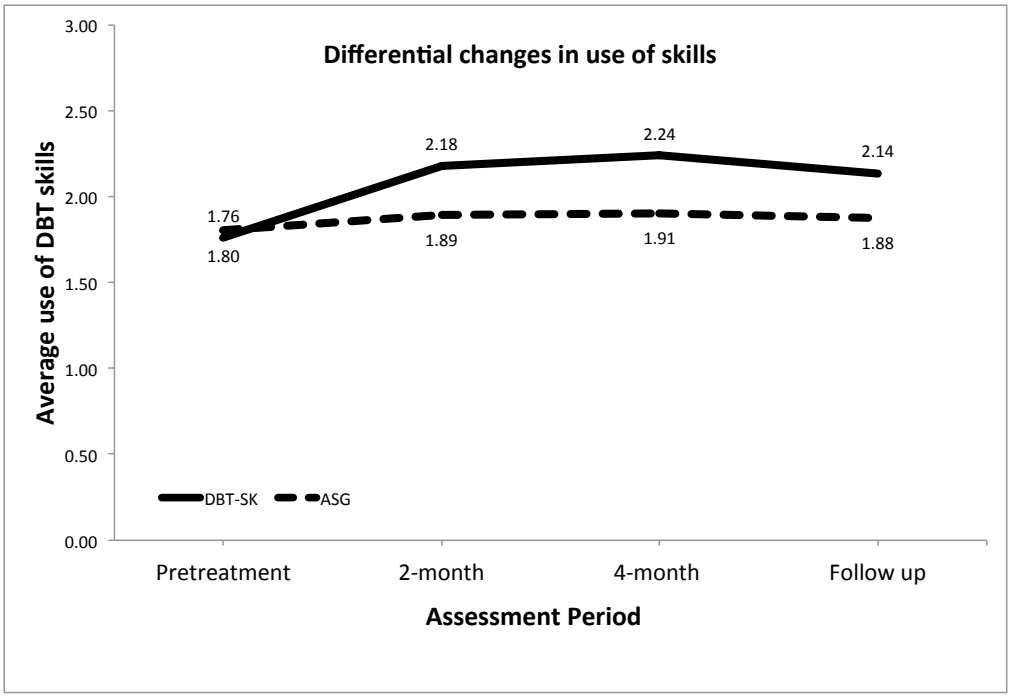

Figure 2. DBT Skills Use Graph

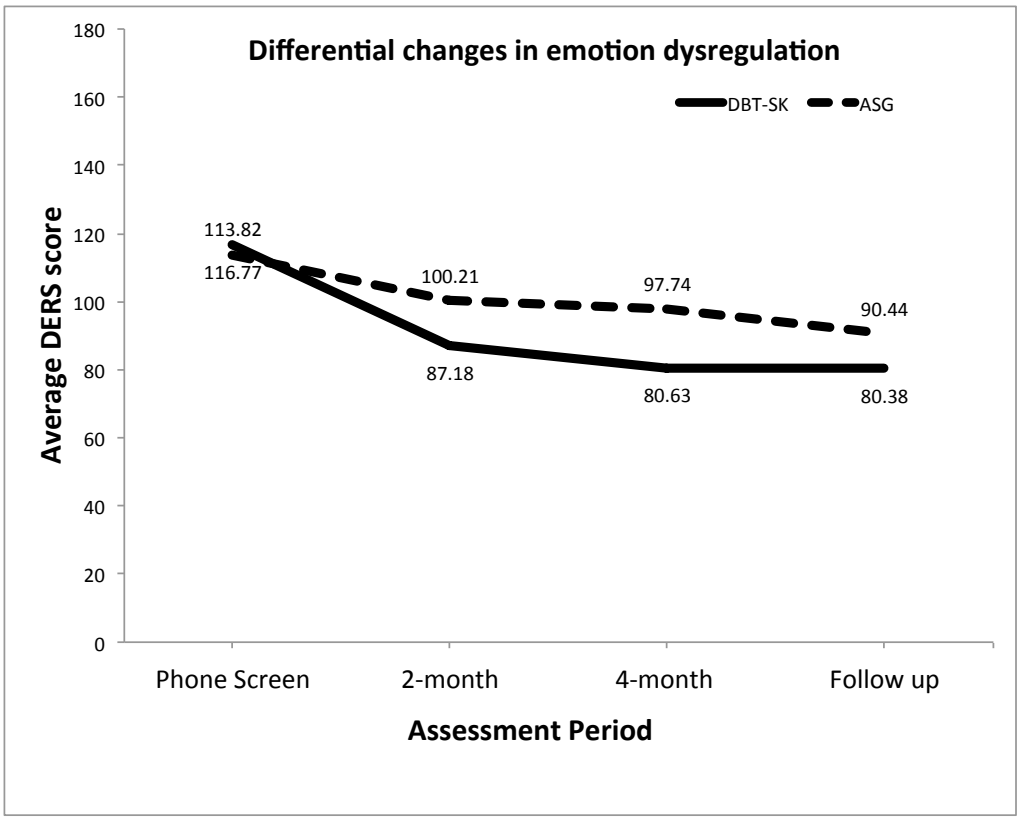

Figure 3. Difficulties with Emotion Regulation Graph

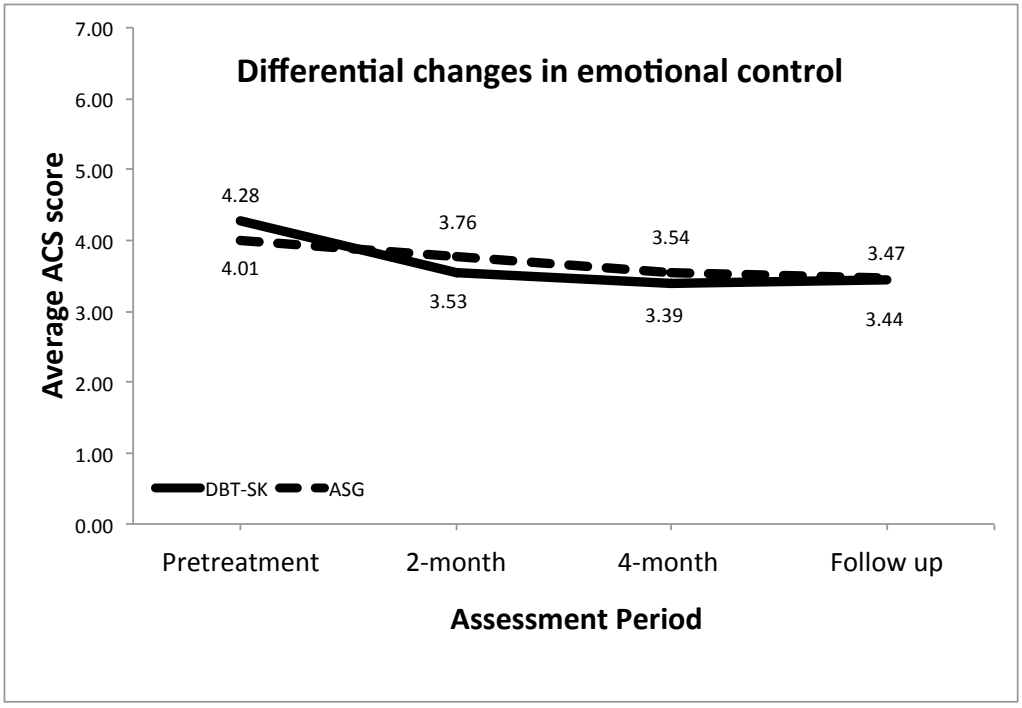

Figure 4. Difficulties with Affect Control Graph

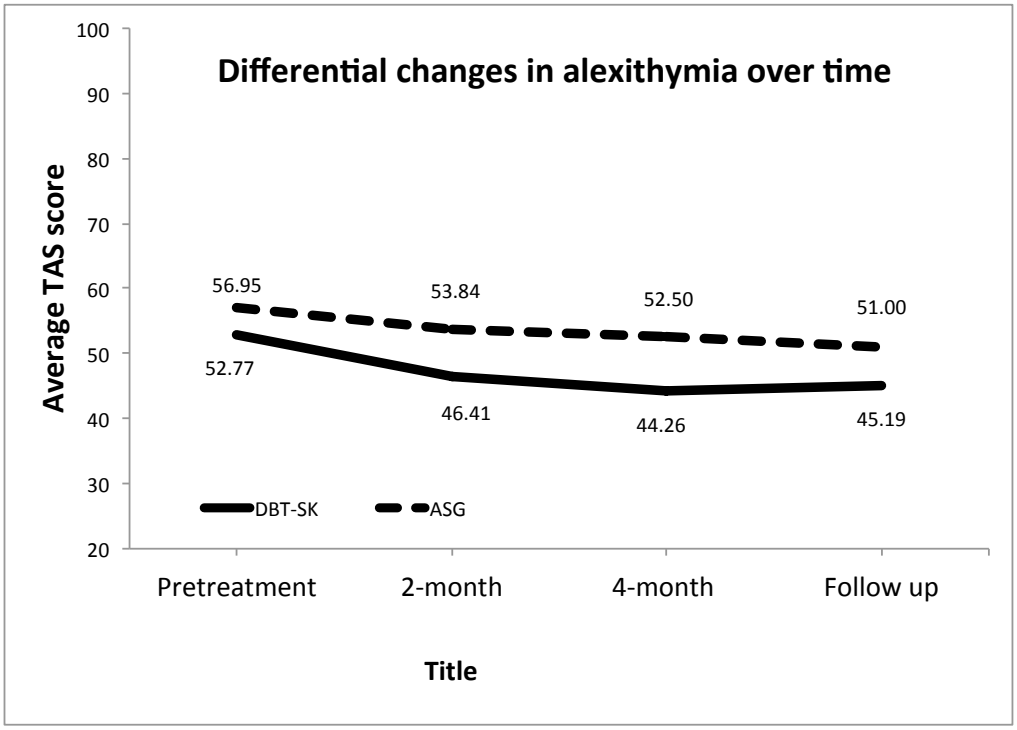

Figure 5. Alexithymia Graph

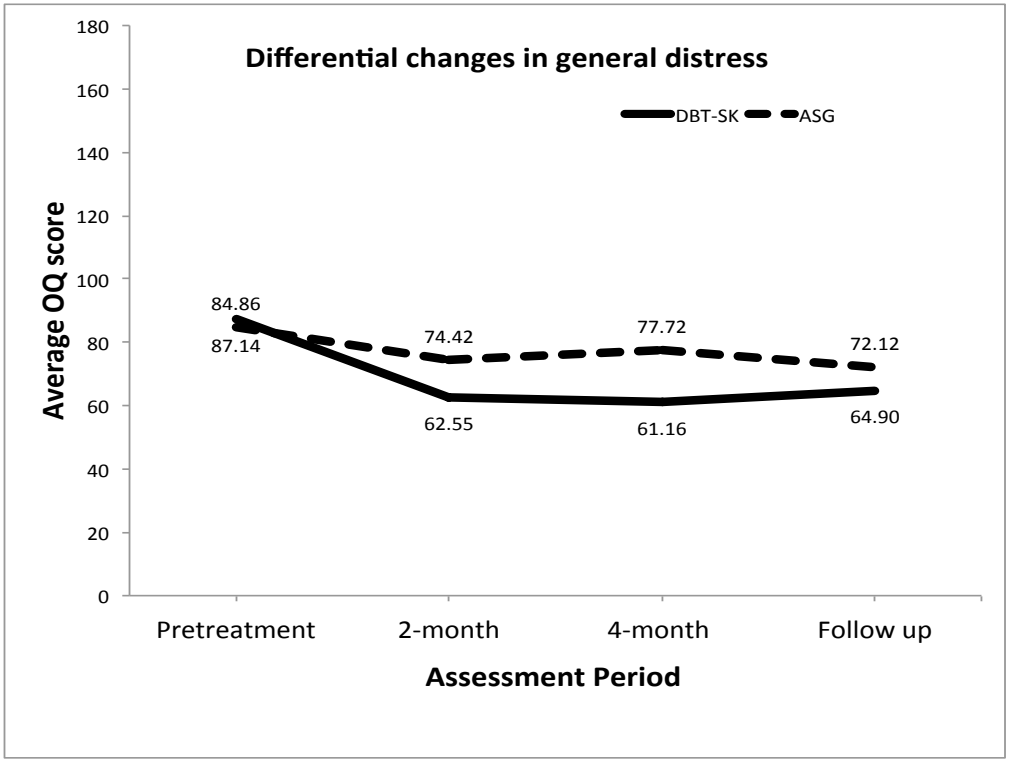

Figure 6. General Distress Graph

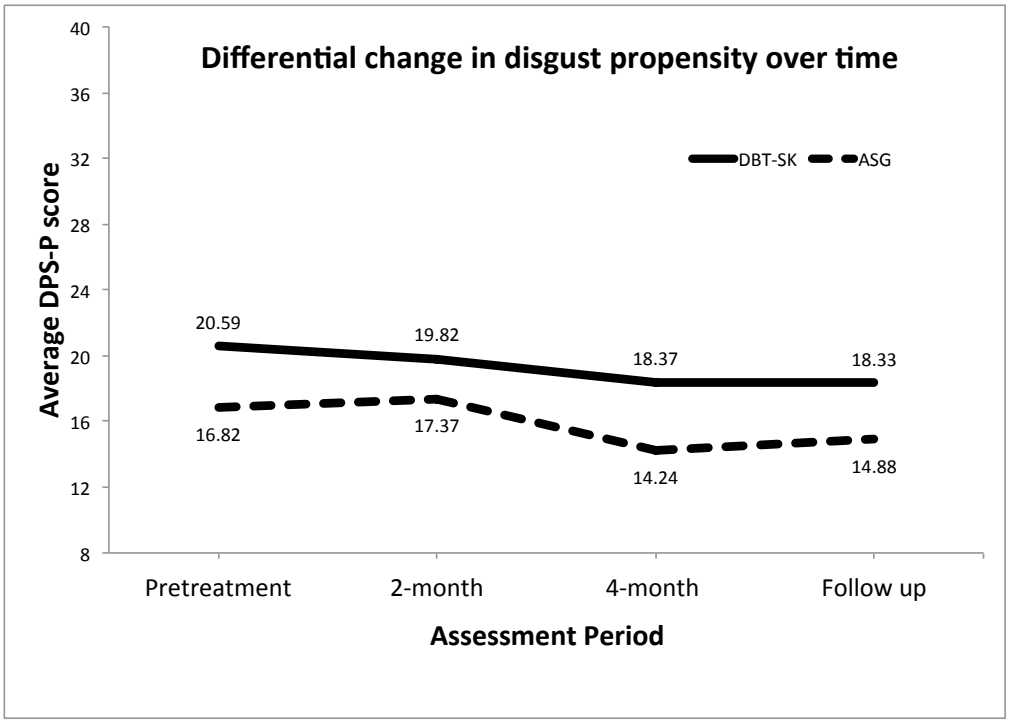

Figure 7. Disgust Propensity Graph

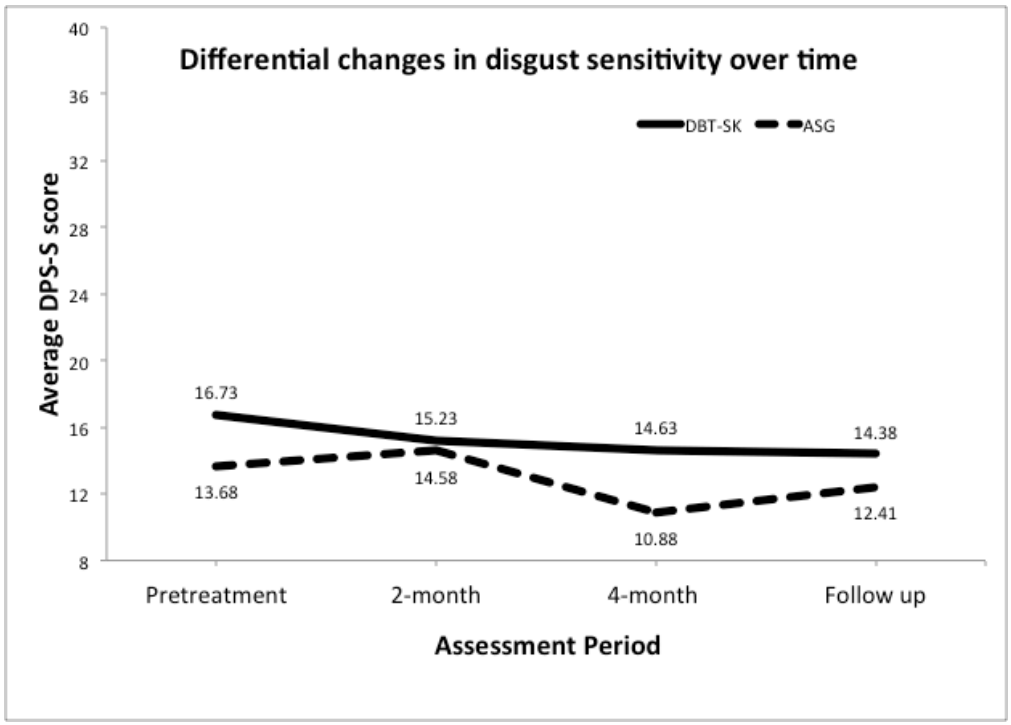

Figure 8. Disgust Sensitivity Graph

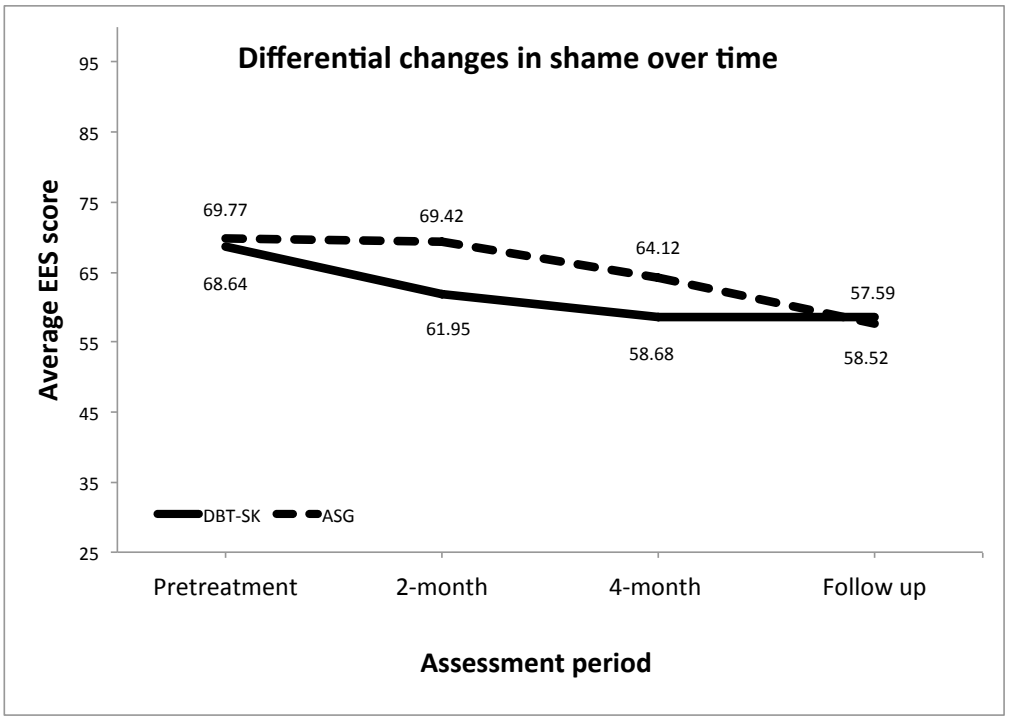

Figure 9. Experience of Shame Graph

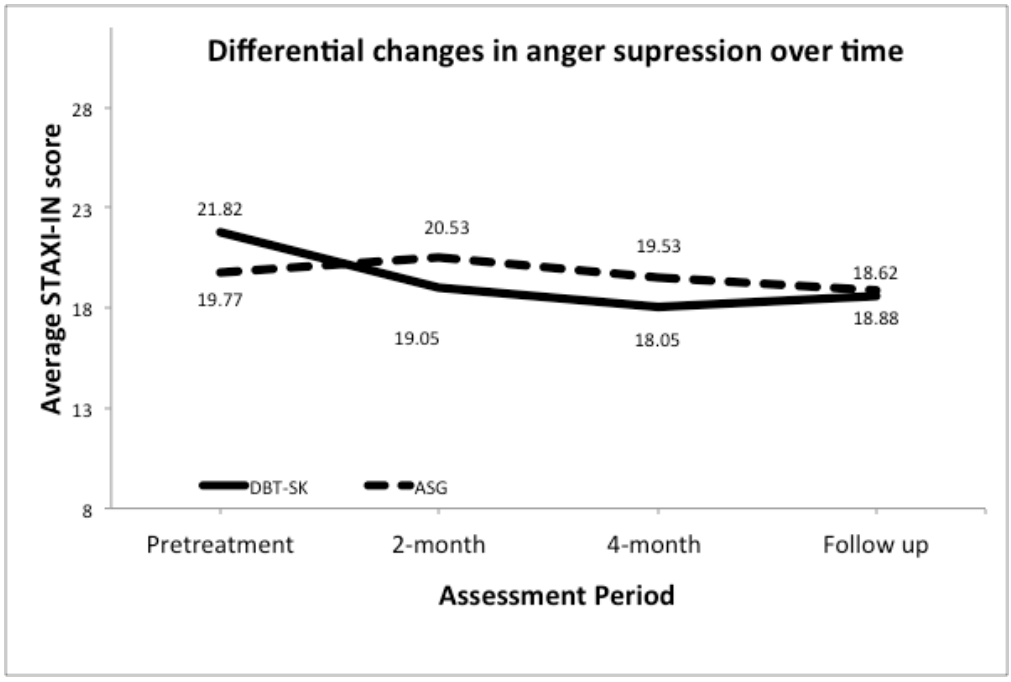

Figure 10. Anger Suppression Graph

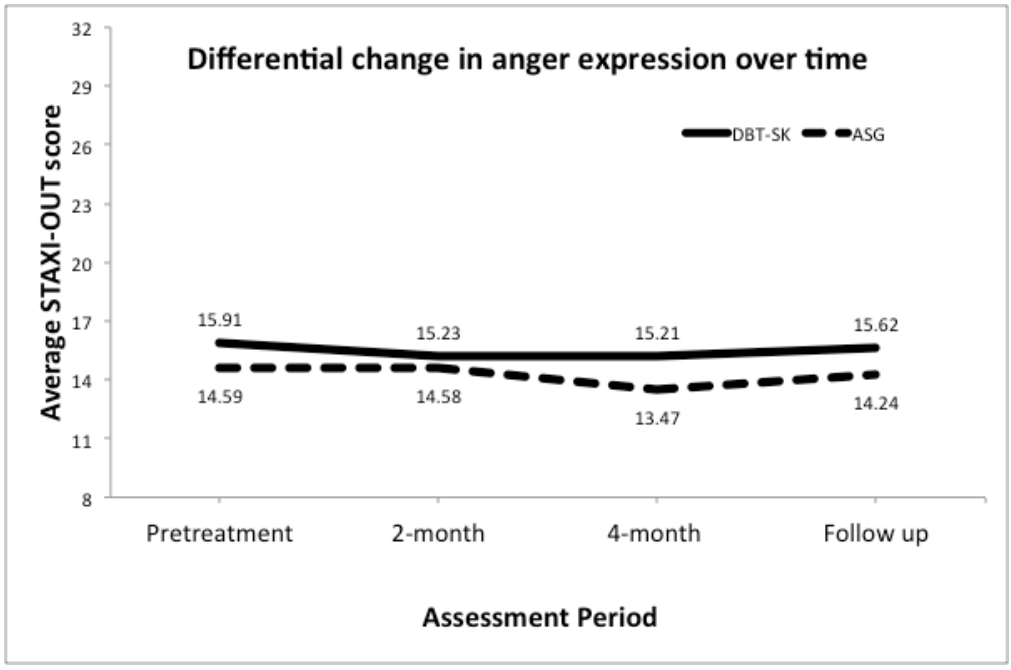

Figure 11. Anger Expression Graph

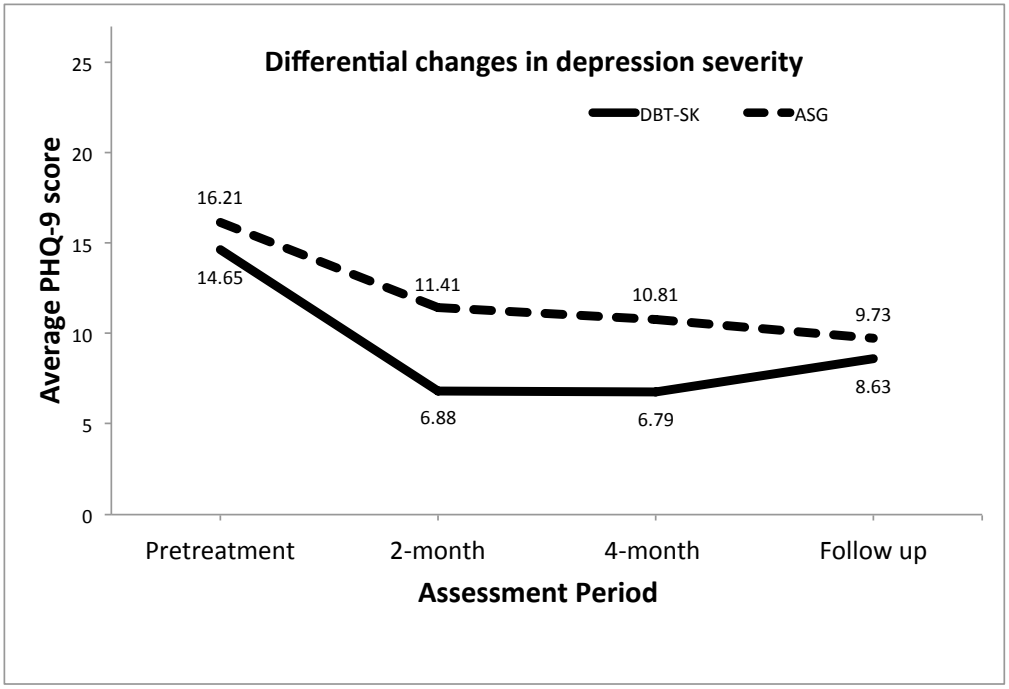

Figure 12. Depression Graph

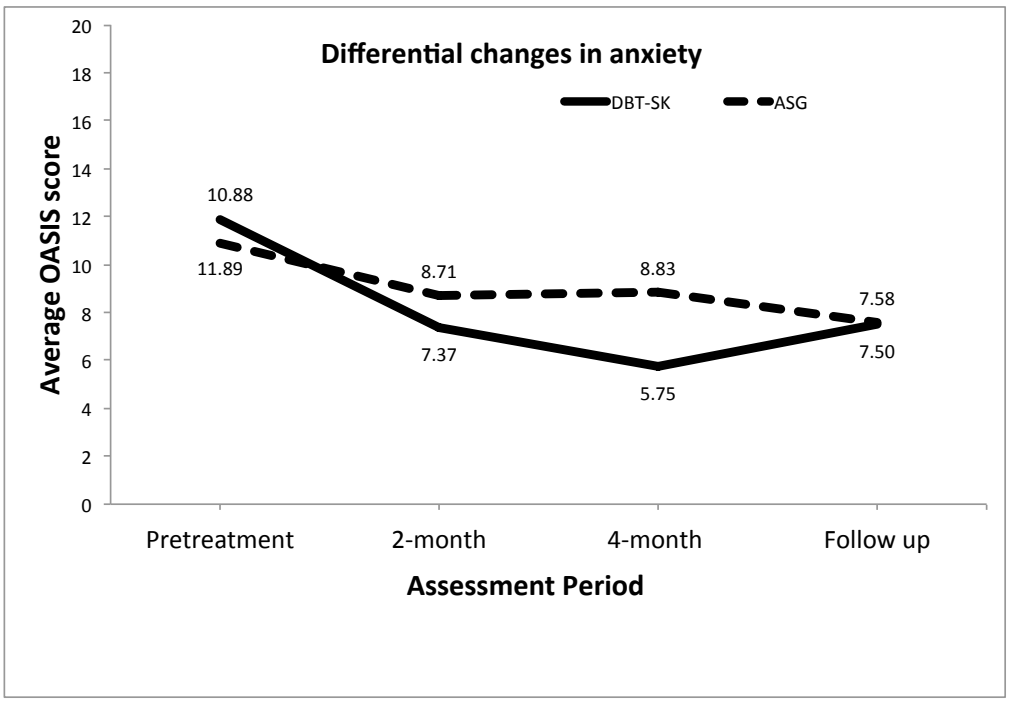

Figure 13. Anxiety Graph

Appendix

Appendix I. Adherence coding form for the activities support group

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Part I. Code each of the following sections as 0 or 1 (0 = No; 1 = Yes)

_____TPs do not do problem solving with clients

_____TPs do not refer Cs to other treatments

_____TPs do not offer skills or coping strategies to Cs

_____TPs are supportive of Cs finding their own solutions to problems

_____TPs run the group for approximately 2 hours

_____TPs start every session with a check in

_____TPs do a support building activity

_____TPs run an educational discussion of a predetermined topic

_____TPs offer information about psychological disorders

_____TP's focus is on providing support and keeping Cs safe

_____TPs convey that client has the capacity to solve his/her own problems

_____TPs highlight C's progress and ability to function and make decisions.

_____TPs are compassionate, interested, & caring, but do not provide solutions for Cs and insist that Cs trust herself to have the wisdom and inherent ability to care for self.

_____TPs appear interested, active, and awake to Cs. TPs do not appear bored or sleepy.

_____TPs actively listen to Cs, reflect understanding, and communicate concern for Cs.

_____TPs develop rapport with Cs

- _____TPs use humor to strengthen relationship with C

_____TPs assure Cs that they can do what is needed to get through problems in life.

_____TPs do not push Cs to do anything they do not want to do.

_____Overall, did this session appear to be uniquely a support group?

Part II. Please rate the helpfulness and appropriateness of the counselor's interventions during the group session using the 7-point rating scale below. Mark your rating in the blank to the immediate left of each item.

1	2	3	4	5	6	7
Not at All		Some		Considerably		Very Much

Rating	Therapists' intervention has elements of supportive therapy
_____	1. Encouraging clients to discuss problems with anxiety/ depression/ emotions.
_____	2. Encouraging continued attendance in treatment.
_____	3. Encouraging clients to share problems and concerns regarding emotions.
_____	4. Giving feedback regarding progress to clients.
_____	5. Encouraging clients to state a concrete plan for moving forward
Rating	**Therapists facilitate group participation**
_____	1. Encouraging members to participate.
_____	2. Encouraging clients to give each other constructive, reality based feedback.
_____	3. Modeling and providing constructive feedback and positive reinforcement.

_____ 4. Creating an atmosphere of trust and confidentiality.

_____ 5. Facilitating group opening and closing.

_____ 6. Passing out materials for session topic.

_____ 7. Educating group about session topic.

_____ 8. Discussing major points identified in session outline.

_____ 9. Relating these points to clients' lives.

_____ 10. Assisting clients to identify and prioritize personal problems or concerns for discussion.

_____ 11. Facilitating discussion among clients.

_____ 12. Keeping discussion on the topics identified by clients.

VITA

Andrada Delia Neacsiu was born in Arad, Romania. She earned a Bachelor of Arts degree with a double major in Psychology and Computer Science from Middlebury College in Vermont. At Middlebury, Andrada began her research career in psychology by completing an honors thesis in unwanted sex following alcohol abuse. She joined Dr. Linehan's group in 2006 and continued refining her research interests through various research projects, research assistant positions and relevant course work. She received her Masters of Science degree from the University of Washington in 2008. She also completed a yearlong internship in behavioral medicine and neuropsychology at the University of Washington Medical Center in 2012. Currently, her research interests include identifying and evaluating mechanisms of change within evidence based interventions especially in the context of emotion dysregulation. In 2012 she earned a Doctor of Philosophy at the University of Washington in Clinical Psychology.