

RUNNING head: PREDICTORS OF DBT SKILLS USE

PREDICTORS OF DIALECTICAL BEHAVIOR THERAPY SKILLS USE
IN CLIENTS WITH
BORDERLINE PERSONALITY DISORDER

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PREDICTORS OF DBT SKILLS USE

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Abstract

Borderline Personality Disorder (BPD) is a severe psychological disorder associated with social, occupational, and educational impairment (American Psychiatric Association [APA], 2013; Bender, 2011; Ritschel & Kilpela, 2015; Zanarini, Frankenburg, Reich, Conkey, & Fitzmaurice, 2014), heavy healthy service utilization (Kroll, Sines, & Martin, 1981; Widiger & Frances, 1989), and suicidal behaviors (Oldham, 2006; Ritschel & Kilpela, 2015). Dialectical Behavior Therapy (DBT) has demonstrated efficacy for treating BPD in multiple randomized controlled trials (RCTs; Kliem, Kroger, & Kosfelder, 2010; Panos, Jackson, Hasan, & Panos, 2014) and was designed to address skills deficits in cognitive, behavioral, and emotion regulation (Linehan, 1993). Multiple studies have found that DBT skills use is a significant mediator of DBT treatment outcomes, including a decrease in: BPD symptoms (Stepp, Epler, Jahng, & Trull, 2008), suicide attempts and non-suicidal self-injury episodes (Neacsiu, Rizvi, & Linehan, 2010), and dropouts (Barnicot, Gonzalez, McCabe, & Priebe, 2016). However, there is a dearth of research examining baseline client characteristics that could predict subsequent DBT skills use. The current study explored the relationship between baseline predictors—treatment expectancy, social anxiety disorder diagnosis, baseline symptom severity, skills module order, baseline employment status—and change in DBT skills use between the beginning and end of treatment. Data was collected at baseline and post-treatment from 76 adult clients with BPD who participated in a 6-month comprehensive DBT program. Results indicated that higher baseline levels of emotion dysregulation predicted a greater magnitude of change in DBT skills; no other predictors were significantly related with change in skills use. Results have implications for predicting which clients are more or less likely to use DBT skills, which could allow clinicians to adjust interventions early in treatment to maximize skills learning.

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Introduction

Dialectical Behavior Therapy and Borderline Personality Disorder

Dialectical Behavior Therapy (DBT) was originally developed as a treatment for individuals diagnosed with borderline personality disorder (BPD) and has been shown to be an efficacious treatment for BPD in multiple randomized control trials (RCTs; Kliem, Kroger, & Kosfelder, 2010; Panos, Jackson, Hasan, & Panos, 2014). BPD is a complex psychological disorder that is associated with severe social, occupational, and educational impairment (American Psychiatric Association [APA], 2013; Bender, 2011; Ritschel & Kilpela, 2015; Zanarini, Frankenburg, Reich, Conkey, & Fitzmaurice, 2014) and heavy utilization of health services; an estimated 14-20% of inpatient (Widiger & Frances, 1989; Widiger & Weissman, 1991), and 8-11% of outpatient clients (Kroll, Sines, & Martin, 1981; Modestin, Abrecht, Tschaggelar, & Hoffman, 1997; Widiger & Frances, 1989) meet criteria for BPD. Rates of suicidal behaviors are extremely high in this population: 60% to 70% of individuals with BPD make at least one suicide attempt in their lifetime and 8% to 10% die by suicide, which is 50 times greater than rates in the general population (Oldham, 2006; Ritschel & Kilpela, 2015). BPD is also associated with high rates of non-suicidal self-injury (NSSI), with 69% to 80% of those diagnosed engaging in NSSI (Chapman, Derbidge, Cooney, Hong, & Linehan, 2009).

DBT is built on a skills deficit model of BPD (Linehan, 1993). The biosocial theory, which forms the theoretical underpinning of the treatment, posits that BPD is a disorder of emotion dysregulation that develops when an individual with a biologically based emotional vulnerability confronts a pervasively invalidating environment. The invalidating environment ignores or punishes the individual's emotion expression, which increases the individual's emotional vulnerability and inhibits them from learning adaptive cognitive and behavioral skills needed to

regulate their own emotions. Standard, comprehensive DBT was designed to address these skills deficits. It consists of four main treatment components: weekly individual therapy and skills group training, as-needed phone coaching, and a weekly consultation team for therapists.

Individual therapy is designed to increase client motivation, increase skills acquisition and generalization, and decrease life-threatening, therapy-interfering, and quality-of-life-interfering behaviors (Linehan, 1993). Skills group training is composed of four modules intended to address skills deficits in distress tolerance, emotion regulation, interpersonal effectiveness, and mindfulness (for a full description of these skills, see Linehan, 2014). Phone coaching allows therapists to help clients generalize skills use to their everyday lives, particularly in times of crisis, and for therapist and client to repair the therapeutic relationship following a rupture in session. Consultation team is designed to help therapists maintain adherence to the treatment model and increase their motivation to treat clients.

Skills use: A Mediator of DBT Outcomes

In accordance with the skills deficit model of BPD, multiple studies have investigated skills acquisition as a significant mediator of outcomes in DBT. For example, Stepp, Epler, Jahng, and Trull (2008) conducted a nonrandomized, uncontrolled study of 27 participants who received 12-months of standard DBT in an outpatient, university-affiliated mental health clinic. All participants demonstrated clinically significant elevations on at least one subscale of the Personality Assessment Inventory- Borderline Features Scale (PAI-BOR; Morey, 1991), which was required for inclusion in the study, and 17 (63%) met criteria for BPD via the Structured Interview for DSM-IV Borderline Personality Disorder Section (SIDP-IV-BPD; Pfohl, Blum, & Zimmerman, 1997). Skills utilization was measured by weekly diary cards. Each day on the

diary card, clients circled which of the 22 DBT skills listed they had practiced, and the average number of skills that clients practiced per week was calculated. Multilevel analyses examined skills practice data from a range of 2 to 52 weeks of treatment and found that both overall and individual (e.g. mindfulness, distress tolerance) skills use increased over the first year of treatment. The authors found that increased overall skills use was associated with an overall decrease in BPD features and with a reduction specifically in the Affective Instability, Negative Relationships, and Identity Disturbance subscales of the PAI-BOR.

Neacsiu, Rizvi, and Linehan (2010) compared the change in skills use between clients in DBT versus control treatment and examined whether DBT skills use mediated treatment outcomes (i.e. suicide attempts, non-suicidal self-injury, anger, and depression). Participants were 108 women with BPD who were part of three larger DBT outcome studies. Interviewers diagnosed BPD using both the International Personality Disorders Examination (Loranger, 1995) and Structured Clinical Interview for DSM-IV Axis II Personality Disorders (SCID-II; First, Spitzer, Gibbons, Williams, & Benjamin, 1996). The authors used the DBT Ways of Coping Checklist (DBT-WCCL; Neacsiu, Rizvi, Vitaliano, Lynch, & Linehan, 2010) to measure skills use. DBT-specific language and terms were avoided in the DBT-WCCL to minimize potential response bias. The authors found that 1) clients in DBT reported higher skills use over time than control condition clients, 2) The relationship between time in treatment and a reduction in suicide attempts and NSSI episodes was fully and partially mediated by DBT skills, respectively, and 3) DBT skills fully mediated the relationship between time in treatment and anger control and depression.

Additionally, Barnicot, Gonzalez, McCabe, and Priebe (2016) examined whether skills use mediates treatment outcomes (frequency of self harm, rate of treatment dropouts) in DBT, when

controlling for therapeutic factors common across treatment models (i.e., self-efficacy, therapeutic alliance, and perceived treatment credibility). The study consisted of 70 participants with BPD who received standard, 12-month DBT in an outpatient community clinic; some participants concurrently took part in a randomized control trial (Priebe et al., 2012). BPD was diagnosed using the SCID-II for DSM-IV, and skills use was measured through an unnamed self-report questionnaire, which asked participants how many days in the prior week they had used skills from each of the four skills modules. The authors found that more frequent skills use at any time point was negatively correlated with concurrent self-harm, controlling for common treatment processes. They also found that less frequent skills use at any time point predicted an increased likelihood of drop out in the subsequent two months, also controlling for common treatment processes. Participants' skills use was also positively correlated with perceived treatment credibility, as well as the other treatment process variables, across multiple time points.

Predictors of Skills Use

With at least three studies demonstrating that skills use mediates DBT outcomes, an important question that emerges from these findings is: what predicts skills use in clients with BPD? The ability to predict which clients are more or less likely to attach to the skills could help clinicians predict potential obstacles to skills use and adjust interventions accordingly, thus enhancing the effectiveness of treatment from the start. To date, little extant research addresses this question.

An unpublished master's thesis (Miller; 2004) examined self-efficacy as a potential predictor of skills use, and is, to the author's knowledge, the only study that has directly studied potential predictors of DBT skills utilization. Miller examined the relationship between DBT skills self-

efficacy, which was described as an individual's belief regarding his/her abilities to use DBT skills effectively, and subsequent DBT skills use. The study sample was composed of 34 individuals diagnosed with BPD using the BPD section of the SCID-II (SCID-II, First, Gibbon, Spitzer, Williams, & Benjamin, 1997). Skills use self-efficacy was measured by the DBT Skills Self-Efficacy Scale (DBT SSES), developed by Miller, and skills use was defined by frequency of skills homework practice. Participants were randomized to either a treatment or control condition. In the treatment condition, participants watched DBT skills training videos and were assigned corresponding skills homework from the Linehan (1993) skills manual. Participants completed pre- and post-DBT SSES measures before and after watching the videos. A week later, interviewers conducted in-person assessments with participants to determine frequency of skills use and perceived helpfulness of the skills. The study did not find a significant relationship between self-efficacy and skills use but had notable limitations: participants only received one mode of DBT, skills training, which was conducted through video instead of a live, group context and may have limited participants' self-efficacy and commitment to homework completion; and the frequency of homework completion was captured in categories—for example, 1-2 times per week instead of separating once and twice—that may have reduced the variability of responses.

Predictors of Outcomes in Clients with BPD

Because skills use has been found to be a mediator of DBT outcomes in clients with BPD, examining predictors of outcomes may point to predictors of skills use. Various studies have examined what baseline factors—such as sociodemographic variables, history of suicidal behaviors and non-suicidal self-injury, BPD symptom severity, Axis I disorder severity—may

predict psychotherapy outcomes for individuals with BPD, but a meta-analysis by Barnicot and colleagues (2011) concluded that there continues to significant variability and discrepancy between study outcomes; notably, this meta-analysis examined studies with disparate treatment approaches, including DBT, Mentalization-based Treatment (Bateman & Fonagy, 2006), psychodynamic therapy, schema-focused therapy (Young, 1994), amongst others.

A few studies, however, point to the importance of employment status in predicting outcomes for clients with BPD. In a longitudinal outcome study for clients with BPD, Zanarini, Frankenburg, Hennen, Reich, and Silk (2006) conducted diagnostic interviews with 290 individuals with BPD during admission to an inpatient unit, which served as baseline, and then two, four, six, eight, and 10 years following the initial interview. They found that greater job stability in the two years prior to baseline was a strong predictor of shorter remission time for individuals with BPD, independent of treatment and controlling for baseline severity of borderline symptoms and assessment period. Further, McMMain et al. (2017) studied treatment response trajectories for 180 clients with BPD randomized to either DBT or General Psychiatric Management. Three trajectories emerged: rapid and sustained improvement post-discharge, slow and sustained improvement post-discharge, and rapid improvement with return to baseline symptoms post-discharge. Participants in the third group were significantly more likely to be unemployed at baseline than groups one and two. Lastly, in a non-controlled, naturalistic study, Ryle et al. (2000) interviewed 27 patients with BPD 6 months after receiving cognitive analytic therapy for BPD, and they found that the patients who no longer met criteria for BPD were significantly more likely to be employed at the time of the follow up interviews.

Client Experience of Learning and Using Skills

Research on clients' experience of acquiring and practicing DBT skills may also provide insight into the question of baseline predictors of skills use. Both qualitative and quantitative studies have examined clients' perception of DBT skills. Barnicot, Couldrey, Sandhu, and Priebe (2015) conducted qualitative interviews with treatment completers and dropouts to better understand barriers to learning and using DBT skills. They found that a major reported barrier to learning skills was anxiety during skills group (e.g. concern about judgments from others), which led to difficulty concentrating, hesitation to ask for clarification about the material, and urges to leave group or the treatment as a whole. Also, treatment dropouts were more likely to identify anxiety during group as a barrier to learning skills. The study also found that once clients learned skills, overwhelming emotions made them feel unable or willful about practicing skills outside of group. Some clients believed that when intense emotions arose, they were not in control of their behavior and therefore were incapable of practicing skills. For other participants, trying skills while emotionally dysregulated was exhausting, which increased negative thoughts about the skills (e.g. that they are too difficult or do not work) and willfulness about using them. Additionally, some clients worried that using skills would push them to confront avoided situations and to let go of maladaptive coping behaviors to which they had become accustomed. This study points to the severity of clients' anxiety symptoms and emotion dysregulation as potential predictors of skills acquisition.

Furthermore, Miller, Wyman, Huppert, Glassman, and Rathus (2000) conducted a quantitative analysis of adolescent ratings of the usefulness of individual DBT skills. Participants filled out the DBT Skills Rating Scale for Adolescents, which rates helpfulness of skills on a 5-point scale between *not at all helpful* to *extremely helpful*. In the study, Mindfulness skills (do

what works, observe, stay focused) and one Distress Tolerance skill (self soothe) were rated the highest, between *very helpful* and *extremely helpful*. In a study examining homework compliance and the type and frequency of skills practice, Lindenboim, Comtois, and Linehan (2007) also found that participants practiced distress tolerance and mindfulness skills most often, following by emotion regulation and lastly interpersonal effectiveness. Given that participants across these two studies shared preferences for certain skills, the order in which clients experience the skills group modules may influence their subsequent skills practice. Interestingly, Lindenboim and colleagues (2007) did not find an interaction effect between the order of modules clients were taught and their overall rate of skills practice or rate of skills practice per module. This corroborates Landes, Chalker, and Comtois' (2016) study, which found that order of skills modules did not predict drop out in clients with BPD. Given the importance of skills use in mediating DBT outcomes and so few studies analyzing the impact of module order on skills use, it is important to reexamine whether module order is a predictor of skills use in other clinical samples.

The Current Study

There is a dearth of studies examining what baseline/pretreatment characteristics may predict DBT skills use in clients with BPD. Because of the complex presentation of individuals with BPD, the frequent challenge of keeping them in treatment, and the importance of DBT skills use in clinical outcomes, the ability to predict which clients are more or less likely to use skills is of utmost importance. This knowledge would potentially enable clinicians to identify barriers to skills acquisition and generalization and adjust treatment early on to maximize its effectiveness.

The current study aims to explore the relationships between baseline characteristics of clients with BPD and changes in their skills use over the course of DBT treatment. More specifically, the study aims to explore whether a baseline diagnosis of social anxiety disorder, baseline employment status, treatment expectancies, skills group module order, as well as baseline client symptom severity, are related to change in DBT skills use. It is hypothesized that: 1) a social anxiety disorder diagnosis will be associated with a smaller magnitude of change in skills use, 2) baseline full-time employment or full-time student status will predict a greater increase in skills use than part-time employment or unemployment, 3) greater positive treatment expectancy will predict a greater increase in skills use, and 4) clients whose first skills module is distress tolerance will show a greater increase in skills than that of clients start with emotion regulation or interpersonal effectiveness. Given the inconsistency in prior research findings, no hypotheses have been made about the relationship between baseline symptom severity and change in skills use.

Method

Participants

Participants were 76 adults diagnosed with BPD who received treatment at a training clinic DBT program between April 2013 and February 2018. Inclusion criteria for enrolling in the program consisted of: a diagnosis of BPD; being age 18 or older; agreement to participate in assessments; consent to audio and video recording of sessions and assessments; availability for 6 months of treatment; living within 45 minutes of the clinic; and agreement to discontinue all other forms of therapy, with the exception of pharmacotherapy and support groups (e.g. Alcoholics Anonymous). A subset of participants ($n = 13$) took part in a smaller sub-study, which required additional inclusion criteria: at least two instances of either non-suicidal self-

injury (NSSI) or a suicide attempt within the last 5 years, with one instance occurring in the 6 months before receiving treatment; and agreement to carry a mobile device installed with the DBT Coach application (see Rizvi, Hughes, & Thomas, 2016). Exclusion criteria consisted of: mental health problems requiring services outside the scope of the clinic (i.e., life-threatening anorexia, schizophrenia); an inability to communicate in English; having an IQ of 70 or below; and an inability to understand and/or sign research consent forms. For more details about methodology, see Rizvi, Hughes, Hittman, and Vieira Oliveira (2017). The current study included one additional inclusion criteria: completion of either a mid- or post-treatment assessment, in order to have two data time points per client for data analyses. The university's institutional review board approved the study and all participants provided written informed consent.

Of the sample, 57 participants (75%) were female. The average age was 29.16 (standard deviation [SD] = 9.34), range: 18 to 59 years. Race/ethnicity breakdown was as follows: 57 (75%) Caucasian, five of whom identified as Hispanic, 10 (13.2%) more than one race, two of whom identified as Hispanic, five (6.6%) Asian, and four (5.3%) Black. The majority of the sample (71.1%) was single, never married. In terms of education, five individuals (6.6%) graduated high school or had a GED, 39 (51.3%) completed some college or training beyond high school, 19 (25%) were college graduates, and 11 (14.5%) had at least some postgraduate schooling. Twenty-seven participants (35.53%) were unemployed.

Therapists and Training

The therapists and assessors in this study consisted of 22 graduate students (mean age [M] = 26.75, SD = 2.61), from either a PhD (n = 15) or PsyD (n = 9) clinical psychology

program; the clinic director, Dr. Shireen Rizvi, conducted individual therapy with two clients because of an insufficient number of student therapists during those periods. Students were eligible for the practicum after completing a one-semester course on the fundamentals of DBT taught by Dr. Shireen Rizvi, who received intensive training from Dr. Linehan and is an international trainer and consultant in DBT. Students applied to the practicum, to begin in their second year or higher. Study therapists participated in the practicum for 1–2 years and worked under the supervision of Dr. Rizvi.

Procedure

Recruitment, screening, and assessment. Participants were self-referred or referred by local clinicians or agencies. Potential participants completed a brief screening assessment by phone. If deemed eligible for further assessment, they came to the clinic for a pre-treatment assessment, which included diagnostic interviews and baseline measures to determine eligibility for participation in the full 6-month treatment. Trained doctoral students in clinical psychology conducted all phone screens and intake assessments. Participants completed a mid-treatment assessment at 3 months and a post-treatment assessment at the end of 6 months. Participants were paid up to \$60 for the mid- and post-treatment assessments.

Treatment. Participants engaged in 6 months of comprehensive DBT as described by the DBT treatment manuals (Linehan, 1993, 2014), which consisted of weekly, 1-hour individual therapy sessions, weekly, 2-hour skills group training, and as-needed phone coaching available 24/7. New clients joined skills group at the start of every mindfulness module. The first half of skills group focused on skills homework review, and the second half concentrated on teaching new skills. A client was considered a dropout after missing four consecutive sessions of

individual therapy or four consecutive sessions of skills group. Participants' fee for treatment sessions was determined by a sliding scale fee structure that ranged from \$10 to \$100 per week.

Data collection. Data on pre-treatment severity and diagnoses were obtained from measures given at intake assessment. Data on skills use was obtained from the Ways of Coping Checklist (WCCL, described below) given at pre-, mid-, and post-treatment assessments. Data on treatment expectancy was collected from an expectancy measure filled out by participants at the end of their first individual therapy session. Data on module order was determined by participant clinical records.

Measures

DBT skills use. The DBT-Ways of Coping Checklist (DBT-WCCL; Neacsiu, Rizvi, Vitaliano, Lynch, & Linehan, 2010) is a 59-item self-report questionnaire developed to measure the use of DBT skills and dysfunctional, non-DBT coping strategies over the previous month. DBT-specific language and terms are avoided in this measure to minimize potential response bias. Respondents rated items from 0 ("never use") to 3 ("always use"). The DBT-WCCL includes two subscales, the DBT Skills Subscale (DSS), which assesses use of DBT skills as coping strategies, and the Dysfunctional Coping Subscale (DCS), which assesses dysfunctional coping strategies. In this study, the DSS was used to measure coping via the use of DBT skills at pre-treatment, mid-treatment, and post-treatment assessments. The DBT-WCCL has demonstrated excellent internal consistency over a 4-month period (Cronbach's α ranging between .92 and .96), adequate test-retest reliability ($r = .71$), and sensitivity to receiving DBT skills training (Neacsiu et al., 2010).

Baseline symptom severity.

BPD symptoms. The Borderline Symptoms List short version (BSL-23; Bohus et al., 2009) is a 23-item self-report questionnaire designed to assess the global severity of BPD symptoms. Respondents reported on BPD symptoms during the past week on a scale ranging from 0 (*not at all*) to 4 (*very strong*). The BSL-23 has demonstrated excellent internal consistency ($\alpha = .97$) good test-retest reliability at 1 week ($r = .82$), and good convergent validity, and it is sensitive to the effects of therapy (Bohus et al., 2009).

Emotion dysregulation. The Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) is a 36-item self-report questionnaire designed to assess difficulties in emotion regulation. The DERS has demonstrated high internal consistency (DERS total $\alpha = .93$ and all subscales $\alpha > .80$), good test-retest reliability during a span of 4 to 8 weeks (intraclass correlation coefficient .88), and adequate construct and predictive validity (Gratz & Roemer, 2004). In the current study, the DERS total score was used to measure overall emotion dysregulation.

Global psychological distress. The Brief Symptom Inventory (BSI; Derogatis, 1993) is a 53-item self-report measure of global psychological distress. Respondents ranked each of the items on a 5-point scale ranging from 0 (*not at all*) to 4 (*extremely*). The BSI has three global indices of distress: Global Severity Index (GSI), Positive Symptom Distress Index (PSDI), and Positive Symptom Total. In this study, the GSI was used as an overall measure of global psychological distress. If no items were skipped, the GSI is calculated as the mean for all 53 items; if some items have missing responses, it is calculated by summing all available responses

and dividing by the total number of items to which the individual responded. In research, the BSI has been shown to be valid and reliable across all nine dimensions (Cronbach's α ranging from .71 to .85; Derogatis & Melisaratos, 1983).

Social anxiety disorder diagnosis. At intake, assessors used the Structured Clinical Interview for DSM-IV Axis I and Axis II Disorders (SCID-I; First, Gibbon, Spitzer & Williams, 1996; and SCID-II; First, Gibbon, Spitzer, Williams & Benjamin, 1997) to evaluate *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.; DSM-IV-TR; APA, 2000) psychological diagnoses. The SCID is a semi-structured interview widely used for assessing all five axes with moderate to excellent inter-rater reliability for the *DSM-IV* Axis I disorders and excellent inter-rater reliability for Axis II disorders (Lobbestael, Leurgans, & Arntz, 2011). The clinic transitioned to the Structured Clinical Interview for DSM-5 Disorders (SCID; First, Williams, Karg, & Spitzer, 2013) to evaluate *Diagnostic and Statistical Manual of Mental Disorders* psychological diagnoses (5th ed., DSM-5, APA, 2013) for a subset of the participants. To date, no psychometric data have been published for the SCID-5. Diagnoses were recorded and added to the research clinic's de-identified data set. These records were reviewed to determine which clients met criteria for Social Anxiety Disorder.

Baseline employment status. At the start of the study, participants completed a demographics questionnaire. When asked about employment status, participants chose between full-time employment, part-time employment, unemployment, volunteering, and student. They could choose more than one category, if applicable (e.g. part-time employment while being a

student). For the current study, because so few clients endorsed being engaged in volunteer work at baseline, volunteering was removed as a category for this variable.

Expectations for treatment. The Expectancy Questionnaire (EQ) is a self-report questionnaire intended to evaluate the respondent's beliefs about how quickly they will see psychological improvement and how much by the end of treatment, and how likely they are to recommend the treatment to someone else with similar problems. The Expectancy Questionnaire used at DBT-RU was adapted from a similar measure used by Dr. Linehan's research clinic at the University of Washington. There are no psychometric properties published for the Expectancy Questionnaire.

Order of modules. DBT skills group co-leaders wrote weekly notes to track when clients attended group, if they did their homework, and the skills taught each week. These records were reviewed to determine the DBT skills taught in each client's first skills group.

Data Analytic Strategy

Primary predictor variables included the pre-treatment scores on the Expectancy Questionnaire, BSI, BSL-23, and DERS; baseline diagnosis of Social Anxiety Disorder, which was dichotomously coded; module order; and employment status. The outcome variable was the change score for participants' DBT-WCCL scores, which was calculated by subtracting the pre-treatment from the post-treatment score and then dividing that by the pre-treatment score. For those clients who did not complete a post-treatment assessment, their mid-treatment scores on

the DBT-WCCL were treated as their post-treatment score, using the last-observation-carried-forward method.

Bivariate correlation analyses were conducted to examine the relationships between the WCCL change score and the Expectancy Questionnaire, BSI, BSL-23, DERS, and Social Anxiety disorder diagnosis. One-way between-subjects ANOVAs were run to test for relationships between the WCCL change score and baseline employment status and module order, the categorical variables with more than two categories. Linear regression analyses were then conducted to understand the predictive strength of variables that were significantly correlated with the WCCL change score. These analyses were conducted through IBM SPSS Statistics 25.0.

Aim 1. Explore whether baseline client symptom severity is related to the magnitude of change in skills use between the beginning and end of treatment.

Hypothesis 1. Due to inconsistent findings in the literature, BPD symptoms, emotion dysregulation, and global distress were chosen as exploratory variables, and therefore no specific hypotheses were made.

Aim 2. Explore whether baseline client diagnoses of social anxiety disorder is related to the magnitude of change in skills use between the beginning and end of treatment.

Hypothesis 2. Based on the Barnicot and colleagues (2015) qualitative study, which found that anxiety and urges to escape were large barriers to skills training, clients diagnosed with social anxiety disorder will demonstrate a smaller increase in skills use in comparison to those without the diagnosis.

Aim 3. Explore whether greater positive expectancies are related to the magnitude of change in skills use between the beginning and end of treatment.

Hypothesis 3. Based on the positive correlation found by Barnicot and colleagues (2016) between perceived treatment credibility and skills use, greater positive expectancy will predict a greater increase in skills use.

Aim 4. Explore whether the order of modules through which clients learn skills predicts is related to the magnitude of change in skills use between the beginning and end of treatment.

Hypothesis 4. Given clients' preference for distress tolerance skills in the Miller and colleagues (2000) and Lindenboim et al. (2007) studies, clients whose first skills module is distress tolerance will show a greater increase in skills than that of clients whose first skills module is either emotion regulation or interpersonal effectiveness.

Aim 5. Explore whether baseline employment status is related to the magnitude of change in skills use between the beginning and end of treatment.

Hypothesis 5. Given the results of Zanarini et al. (2006), McMMain et al. (2017), and Ryle et al. (2000), it is hypothesized that clients who start treatment either as full-time employees or students will show a greater magnitude of change in skills use than clients who start treatment working part-time or unemployed.

Results

Descriptive Analyses

Predictors consisted of both categorical (employment status, module order, social anxiety disorder diagnosis) and continuous (DERS, GSI, BSL) variables. Frequencies for module order and baseline employment status are listed in Table 2 and 3, respectively. Thirty (39.47%) participants met criteria for Social Anxiety Disorder at the start of treatment. Means, standard deviations, and ranges for the DERS total score, GSI score, and BSL mean score for all 76 participants are listed in Table 1. Total score on the DERS can range from 36-180, with higher scores indicating greater difficulties in emotion regulation. The GSI score can range from 0-4, with higher scores indicating greater symptom severity. Data from the DERS total score and GSI were normally distributed with skewness and kurtosis in acceptance ranges; all data for these variables were therefore included in the analyses. While the BSL-23 variable's distribution did not pass tests of normality, it had no outliers and its skewness and kurtosis were in acceptable ranges for multivariate analysis. All data for the BSL-23 were therefore included in analyses.

Because the original WCCL change score was non-normally distributed, a series of transformations were conducted to try to bring the distribution closer to normality, including: recoding of outliers through winsorizing, bringing all negative scores to the fence by changing them to 0, and conducting a square root transformation¹. None of these transformations resulted in a distribution that passed the Shapiro-Wilk and the Kolmogorov-Smirnov tests of normality. The square root transformation and winsorizing, however, resulted in skewness and kurtosis values in the acceptable range for multivariate analyses. Therefore, the original change score and

¹ A Poisson regression was also conducted to account for skewness of the WCCL change score distribution. These analyses were not significant, however. This is likely a function of the change variable not being a good fit for the Poisson model.

these two transformations were included in subsequent analyses. The mean, standard deviation, and range for these variables are listed in Table 1.

Correlations

Bivariate correlations were conducted to examine relationships between the WCCL change score, winsorized change score, and square-root-transformed change score, pre-treatment scores on the BSI, BSL-23, and DERS, and a baseline diagnosis of Social Anxiety Disorder; the relationship between the three change score variables and module order and employment status were examined via one-way ANOVAs (described below). Because the Expectancy Questionnaire has no established psychometric properties, an initial bivariate correlation analysis between the WCCL change scores and each of the items on the Expectancy Questionnaire was conducted to examine whether the questionnaire captures a construct that is related to change in skills use. No individual items were significantly correlated with any of the three change scores, and the Expectancy Questionnaire was therefore excluded from the subsequent correlation analysis. Predictors entered into the second bivariate correlation analysis were: BSI, BSL-23, DERS, and Social Anxiety Disorder diagnosis. As shown in Table 5, the original WCCL change score was significantly and positively correlated with the DERS total score ($r = 0.23, p = .05$), while the square root transformed and winsorized change scores were not significantly correlated with the DERS or any of the other predictors.

Relationship between module order, employment status, and the WCCL

Because module order and employment status were categorical variables with more than two categories, one-way between-subjects ANOVAs were performed. The effect of employment status on the WCCL change score for the four employment conditions was approaching

significance [$F(3,72) = 2.245, p = .09$], while the effect on the winsorized change score [$F(3,72) = 1.71, p = .17$] and the square root transformed change score [$F(3,72) = 1.59, p = .19$] was non-significant. Because the effect was approaching significance for the WCCL change score, post-hoc tests were conducted to examine potential differences between groups. The results of a Tukey post-hoc test indicated a higher mean score for full-time (1.23) and students (.69) than unemployed (.49) and part-time (.06). The effect of module order on the WCCL change score [$F(2,73) = 1.87, p = .16$], winsorized change score [$F(2,73) = 1.01, p = .37$], and square root transformed change score [$F(2,73) = 1.89, p = .16$] were all non-significant.

Predictive power of the DERS

Given the results of the bivariate correlation analyses, a linear regression analysis was conducted in which the DERS were entered as the predictor and the original WCCL change score as the dependent variable. The DERS total score had significant main effects on the WCCL change score ($B = .012, t = 1.99, p = .05$), indicating that for every one unit increase of the total DERS score, the WCCL change score increased by .012. This indicates that the more a client was emotionally dysregulated at baseline, the more they gained skills over the course of treatment. In this model, the DERS total score explained 5.1% of the total variance in the WCCL change score.

Discussion

Dialectical Behavior Therapy has been demonstrated to be efficacious for individuals with borderline personality disorder, a disorder associated with severe impairment in multiple domains of functioning, significant health service utilization, and high rates of self-injurious behaviors and suicidality. Previous studies indicate that DBT skills use is a significant mediator

of outcomes for individuals with BPD undergoing DBT treatment. Therefore, the ability to predict which clients are more or less likely to acquire and use skills is of utmost importance; with this knowledge, therapists can target potential barriers to skills use and maximize the effectiveness of treatment from the start.

The current study examined potential predictors of change in DBT skills use in clients with BPD between their pre-treatment and final assessment. The first aim was to explore whether baseline client symptom severity predicts the magnitude of change in skills use and, due to inconsistency in the literature, was considered exploratory. It was found that baseline borderline personality disorder symptom severity and global symptom severity were not significantly related to change in skills use in the study sample. Baseline emotional dysregulation was positively and significantly related to change in skills use, such that higher levels of emotional dysregulation at the start of treatment predicted a greater magnitude of change in skills use over the course of the therapy. It is possible that clients who enter treatment with higher levels of dysregulation are more receptive to learning and using skills because of the intensity of their suffering. This may instill hope and confidence in clinicians who worry their clients' severe emotion dysregulation will prevent them from engaging with DBT treatment and reaping the benefits of the skills. On the other hand, a closer look at the data shows a negative correlation (albeit statistically non-significant) between baseline DERS and baseline WCCL scores ($r = -.184$, $p = .112$). This indicates the possibility that clients who started with a lower baseline DERS score, and therefore a higher baseline WCCL score, simply had less room to improve on the WCCL measure, resulting in smaller change scores for these clients.

The second aim was to explore the relationship between a baseline diagnosis of social anxiety disorder and the magnitude of change in skills use, and it was predicted that a SAD

diagnosis would predict a smaller change in skills use. Results did not indicate a relationship between this predictor and the WCCL change score. Perhaps with a greater sample size, analyses would have found significant differences. Because the SAD diagnosis variable was binary (i.e. meeting criteria for the diagnosis or not), this may have restricted the data's variance; a variable that accounted for the severity of social anxiety, rather than the absence or presence of the diagnosis, may have provided more nuanced data and led to significant outcomes. The assessment battery at DBT-RU lacks a social anxiety-specific self-report measure, but perhaps the number of endorsed social anxiety disorder criteria could have been used instead. Future studies might use either the number of endorsed criteria or a self-report assessment to measure social anxiety severity.

The current study's third aim was to explore whether greater positive treatment expectancies predicted a greater magnitude of change in skills use. While analyses did not indicate a significant relationship between treatment expectancy and skills use, limited conclusions can be drawn from this result. The expectancy Questionnaire used in this study has no established psychometric properties and therefore may not have adequately captured the construct of treatment expectancy. Examining prior treatment experiences, such as the theoretical orientation (e.g. supportive, psychodynamic, CBT), modality (i.e. group, individual), or setting (e.g. outpatient, inpatient, IOP), may have produced more informative results; a client that primarily has received supportive or psychodynamic treatment, for example, may find DBT's more structured approach off-putting and thus may be less receptive to the skills. Unfortunately, DBT-RU intake assessment reports did not provide sufficient data on the nature of clients' prior psychotherapy experience.

The fourth aim was to examine the relationship between the module order of skills group and the magnitude of change in skills use over treatment, and it was predicted that starting with distress tolerance would predict a greater increase in skills use as compared to emotion regulation or interpersonal effectiveness. The data did not demonstrate a significant relationship between module order and change in skills use, which aligns with prior research described above. This supports the idea that therapists should start clients in DBT as soon as possible instead of waiting for the module that appears most clinically relevant for them. This finding also supports a partially-closed, partially open group format, in which the group reopens to new clients at the start of each skills module and remains closed until the following, as opposed to one in which a single cohort progresses through all modules together.

The fifth aim of the study was to explore whether baseline employment status was a significant predictor of change in DBT skills use over the course of treatment, and it was predicted that clients who start treatment as full-time employees or students would demonstrate a greater change in skills use than those who were part-time employees or unemployed at baseline. Although none of the ANOVA tests produced significant results, the effect of employment status on the WCCL change score approached significance, and post-hoc test results aligned with the hypothesis that full-time and student baseline status predict a greater change in skills use than part-time or unemployment. The non-significant ANOVA results may be explained by unequal sample sizes between the four employment categories. Unfortunately, this could not be controlled in the current study due to the relatively small client base served by the DBT-RU clinic and inclusion/exclusion criteria for the clinic being unrelated to employment status. Future research might select for these baseline characteristics in order to maximize statistical power.

Strengths and Limitations

To the author's knowledge, this study was one of the first to examine predictors of DBT skills use in clients with BPD and to begin building an empirical base for this research question. The DBT clinic at Rutgers has demonstrated clinical outcomes comparable to benchmark studies on DBT (see Rizvi et al., 2017), which provides greater confidence that DBT skills were taught and reinforced in a treatment-adherent manner. The comprehensiveness of intake assessment batteries at DBT-RU increases diagnostic accuracy and therefore strengthens the ability to generalize these findings to other individuals with BPD. Additionally, because the current study utilized data from a community sample, outcomes may be more likely to reflect the clinical reality of outpatient settings, thus increasing the generalizability of results.

The current study also had notable limitations. The first major limitation involves the characteristics of the sample: with a sample size of 76 participants, the study was underpowered and with a larger sample size may have found more associations that reached significance. Furthermore, because participants were not deliberately recruited based on baseline characteristics (other than the aforementioned inclusion and exclusion criteria), there were unequal group sample sizes for analyses involving categorical variables, thus decreasing the likelihood of finding true group differences. It is also possible that with longer treatment (i.e. standard one-year DBT vs. 6 months) and therefore more time for skills acquisition between assessments, the WCCL would have revealed more pronounced changes in skills use.

The WCCL as a measure of skills use also presents limitations. With a retrospective self-report measure, clients may not accurately recall their skills use. Additionally, the WCCL assesses the *frequency* but not the *quality* of skills use; a client's misunderstanding of a skill and/or how it is effectively applied to real-world scenarios could also lead to inaccurate reporting

and distorted change scores. For example, if a client has no prior exposure to DBT, they may over-report their skills use at baseline, and therefore a decrease in skills use between two time points could actually reflect the client's increased understanding of DBT skills. Furthermore, the WCCL change score used in this study only reflects a change in overall DBT skills use and does not account for potential differences in skills acquisition between the four skills modules.

Future Directions

The limits of autobiographical memory pose a challenge for accurate recall of skills use. Future research might improve the accuracy of patient reporting through ecological momentary assessment (EMA; e.g., Shiffman, Stone, & Hufford, 2008), potentially through a cell phone app. The app could utilize a sampling approach that includes event-based recording (i.e. clients record as soon as possible after they use skills), time-based recording (i.e. clients are prompted to input skills used since the last prompt), or a combination of both (Shiffman, Stone, & Hufford, 2008). Even using EMA, however, there is no way to be certain that clients are correctly identifying which skill they had practiced or that they had used the skill correctly. This could be mitigated by giving participants a test at the end of treatment that assesses their understanding of the basic concepts and practical uses for each skill; participant performance on the test could be used as a proxy for the accuracy of the EMA data.

Furthermore, there is a need for measures that capture whether a client has achieved the three phases of skills learning in DBT: acquisition, strengthening, and generalization (Linehan, 1993). Citing an article in press by Christine Dunkley, DCLinP, Swales (2018) states that to have acquired a skill, a client should be able to: name the skill; understand the situation in which the skill is used; understand the function of the skill and steps involved in executing it; and

demonstrate the skill with and then without the help of the therapist. Strengthening and generalization involve shaping the client's use of a skill, increasing the likelihood the client uses that skill, and helping the client use the skill effectively in as many situations as possible (Linehan, 1993). To assess strengthening and generalization, it is important to understand which components of the skill were completed effectively and which need further shaping; if the client can identify when a particular skill is needed, and whether the skill chosen matches the situation; and whether the client can identify obstacles to effective skills use (Swales, 2018).

The WCCL appears to provide very limited information about these three components of skill acquisition; it primarily seems to capture whether a skill was used or not, but not whether the client understands the function of the skill, the steps involved in executing the skill, whether the skill was used effectively (i.e. with the correct steps, in situations the skill was intended for), etc. As such, it would be important to develop measures and methodology to capture these components of skills learning. A measure could be developed that asks clients to label skills used recently and then provide in-depth responses about how they decided to use the skill, the scenario in which they used it, and the steps they took to execute it. Alternatively, a standardized interview could be developed in which clients are presented with a hypothetical distressing or challenging scenario and then asked to explain how they would problem solve to the interviewer. This could potentially capture a client's ability to select appropriate skills for a given situation and to apply skills to novel situations. Developing new measures and methodology will be important in determining whether certain baseline characteristics have disparate effects on the different phases of skills learning.

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Tables

Table 1

Means, Standard Deviations, Ranges for WCCL Change Score and Transformations

Variables	M	SD	Range	Skewness	Kurtosis
WCCL change score	0.64	1.11	-0.65-5	2.15	5.62
WCCL winsorized	0.53	0.76	-0.65-2.3	.71	-0.43
WCCL sqrt trans.	0.62	0.58	0-2.24	.78	0.15

Standard Deviations, and Ranges for DERS, GSI, and BSL

Table 2

Means,

Variables	M	SD	Range
DERS	120.11	20.53	66-157
GSI	2.66	0.72	1.12-4.64
BSL	2.08	0.81	0.35-3.61

Table 3

First Skills Module

Variables	Frequency	Percentage
Distress Tolerance	23	30.26
Interpersonal Effectiveness	29	38.16
Emotion Regulation	24	31.58

Table 4

Baseline Employment Status

Variables	Frequency	Percentage
Full-time	13	17.11
Part-time	8	10.53
Unemployed	27	35.53
Student	28	36.84

Table 5

Correlations among WCCL Change Scores, DERS, GSI, BSL-23, and SAD Diagnosis

	1	2	3	4	5	6	7
1. WCCL Change Score	_____	.918**	.942**	.226*	-.078	.021	-.056
2. WCCL winsorized		_____	.970***	.174	.000	.023	-.054
3. WCCL square root			_____	.207	-.022	.021	-.066
4. DERS				_____	.146	.438**	.248*
5. GSI					_____	.076	-.069
6. BSL-23						_____	.335**
7. SAD Diagnosis							_____

Note. * $p < .05$, ** $p < .01$,

Table 6

Predicting WCCL Change Score Using Simple Linear Regression

WCCL Change Score (DV)	<i>B</i>	<i>SE B</i>	β	<i>t</i>	<i>p</i>
Block 1: DERS $\Delta R^2 = .051$.012	.006	.226	1.997	.05

* $p < .05$, ** $p < .01$, † trend level effect

Table 7

One-Way ANOVA: Predicting WCCL change score by Employment Status

Source	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Between Groups	3	7.84	2.62	2.245	0.09
Within Groups	72	83.86	1.17		
Total	75	91.70			

Table 8

One-Way ANOVA: Predicting WCCL change score by Module Order

Source	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Between Groups	2	4.46	2.23	1.866	.162
Within Groups	73	87.24	1.20		
Total	75	91.70			

Table 9

One-Way ANOVA: Predicting winsorized WCCL by Employment Status

Source	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Between Groups	3	2.904	.968	1.170	.172
Within Groups	72	40.743	.566		
Total	75	43.647			

Table 10

One-Way ANOVA: Predicting winsorized WCCL change score by Module Order

Source	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Between Groups	2	1.176	.588	1.010	.369
Within Groups	73	42.471	.582		
Total	75	43.647			

Table 11

One-Way ANOVA: Predicting square root transformed WCCL by Employment Status

Source	<i>df</i>	<i>SS</i>	MS	<i>F</i>	<i>p</i>
Between Groups	3	1.563	.521	1.592	.199
Within Groups	72	23.560	.327		
Total	75	25.122			

Table 12

One-Way ANOVA: Predicting square root transformed WCCL by Module Order

Source	<i>df</i>	<i>SS</i>	MS	<i>F</i>	<i>p</i>
Between Groups	2	1.239	.620	1.894	.158
Within Groups	73	23.883	.327		
Total	75	25.122			

Figures

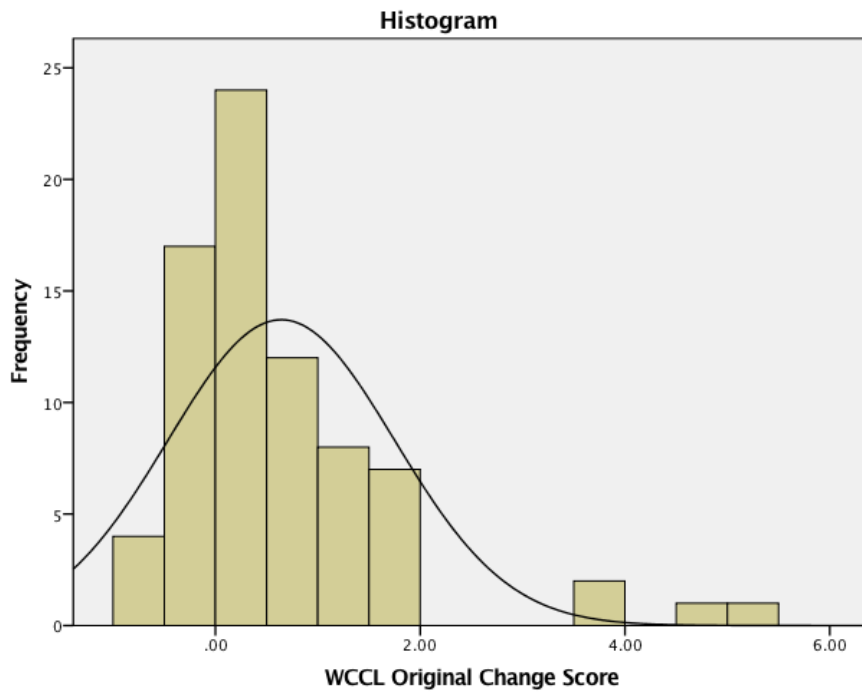


Figure 1. Histogram of WCCL Original Change Score