SELF-EFFICACY AND ITS RELATION TO SKILLS COACHING IN THE CONTEXT OF

DIALECTICAL BEHAVIOR THERAPY AUGMENTED WITH A MOBILE PHONE APP

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Abstract

**Background:** Change in self-efficacy is a frequent mediator of positive outcomes in studies of cognitive behavioral therapy. Dialectical Behavior Therapy (DBT) is a cognitive behavioral therapy designed to increase self-efficacy beliefs by teaching patients a set of behavioral skills; however, no prior studies have looked at change in self-efficacy during DBT. Mobile app technology is a promising way to enhance self-efficacy beliefs by increasing skills acquisition and practice. **Aims:** The present study explores 1) changes in self-efficacy during six months of DBT treatment augmented with a mobile app (the "DBT Coach") and, 2) differences in self-efficacy when using skills coaching with the therapist versus the DBT Coach. **Method:** Four adults with borderline personality disorder and a history of suicidal behavior received comprehensive DBT treatment and the DBT Coach. Every three months, participants completed a measure to assess general self-efficacy. They also completed daily ratings of skills effectiveness. Average and modal ratings of skills effectiveness on days using the types of skills coaching were calculated for each participant. **Results:** All participants began treatment with low levels of self-efficacy and saw at least some positive change over the course of treatment. One participant rated skills effectiveness as higher when using some type of skills coaching than no coaching, and two reported the opposite pattern. The final participant reported the lowest skills effectiveness on days using the DBT Coach, followed by days using no coaching and days using phone coaching. Participants were divided on which type of skills coaching was associated with higher skills effectiveness ratings. **Conclusions:** This study provides preliminary support for the assumption that DBT enhances self-efficacy beliefs and suggests potential benefits of augmenting standard psychotherapy with skills-based mobile app technology. One potential benefit of using mobile apps in the context of psychotherapy may be increased self-efficacy beliefs in patients.

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Chapter I

**Introduction**

**Self-Efficacy**

Self-efficacy is defined as an individual's belief in his/her ability to organize and execute a course of action necessary to deal with a given situation (Bandura, 1997). Strength of self-efficacy beliefs has been found to influence whether a task is attempted (Bandura, 1977) and how much energy is expended on a task before giving up (e.g., Collins, 1982). The concept is also associated with level of success at a task and achievement of goals. Bandura proposed that self-efficacy is vital for learning new behaviors, stopping existing behaviors, and resuming behaviors that have ceased (Strecher, DeVellis, Becker, & Rosenstock, 1986).

The concept of self-efficacy was first articulated by Bandura after noting individual differences in phobic patients' generalization outside of therapy. These patients had the same mastery experiences with a feared object during therapy sessions (Zimmerman, 2000); however, despite having conquered a fear, some continued to hold beliefs about their lack of ability to do so, which interfered with engaging in non-phobic behavior outside of therapy. Bandura distinguished efficacy expectations from outcome expectations by defining outcome expectations as the belief that one's behaviors will lead to the hoped-for outcome and efficacy expectations as the belief in one's ability to successfully execute the necessary behaviors in order to achieve the hoped-for outcome (Bandura, 1977).

Self-efficacy has long been considered relevant to the therapeutic context, as low self-efficacy beliefs can be a risk factor for psychopathology and high self-efficacy beliefs can be a protective factor. For example, low self-efficacy has been found to be associated with depression and anxiety symptoms in a sample of non-clinical adolescents (Muris, 2002). Specific types of

self-efficacy beliefs pertaining to social and academic situations have also been found to predict higher levels of depression in children (Steca et al., 2013). Low emotional self-efficacy differentiated clinically anxious children from non-referred children (Landon, Ehrenreich, & Pincus, 2007). Low self-efficacy has also been shown to predict binge eating behavior in non-clinical female college students (Bardone-Cone, Abramson, Vohs, Heatherton, & Joiner, 2006) and clinical-level bulimia in women (Etringer, Altmaier, & Bowers, 1989). Conversely, high self-efficacy related to eating behaviors has been shown to be a protective factor against negative body image and disordered eating among college women (Kinsaul, Curtin, Bazzini, & Martz, 2014). While no study to date has examined vulnerability to low self-efficacy in a borderline personality disorder (BPD) population, one might hypothesize that low self-efficacy would be correlated with BPD symptoms, given that depression, anxiety, and eating disorders are all highly comorbid conditions with BPD (Zimmerman & Mattia, 1999).

Because low self-efficacy is associated with risk for psychopathology, it naturally follows that psychotherapy should work to increase patients' self-efficacy beliefs. Bandura proposed that all forms of psychological treatment work by creating and strengthening people's beliefs in their self-efficacy (1977). Self-efficacy has consistently been found to be a mediator of change in CBT research. Turner, Holtzman, and Mancl (2007) found that self-efficacy beliefs were the only uniquely significant mediator of positive pre- to post-treatment change in a randomized controlled trial of CBT for chronic pain. Panic self-efficacy, defined as an individual's perceived ability to cope with the perceived danger associated with panic attacks, has been found to predict panic severity (Casey, Oei, Newcombe, & Kernardy, 2004). Furthermore, changes in panic self-efficacy mediate treatment outcome in CBT for panic disorder and are more predictive of panic severity than assignment to waitlist or CBT treatment (Casey, Newcombe, & Oei, 2005).

In a study of specific phobia patients, Biran and Wilson (1981) analyzed self-efficacy to compare the effects of guided exposure versus cognitive restructuring for treating fears of heights, elevators, and darkness. The study showed that guided exposure treatment was associated with more approach behaviors towards feared stimuli than cognitive restructuring therapy. The authors' explanation for this difference was that the performance-based aspect unique to exposure treatment provided mastery experiences for patients to learn new information about their personal efficacy (Biran & Wilson, 1981). Changes in the strength of self-efficacy beliefs were significantly greater in the exposure condition than in the cognitive condition; furthermore, those in the exposure condition exhibited a high correlation between self-efficacy and actual success at approach tasks than those in the cognitive condition, who tended to overestimate their ability to cope successfully in approach situations (Biran & Wilson, 1981).

Finally, perceived coping self-efficacy has been found to be important in posttraumatic recovery (Bandura, 1997). A review by Benight and Bandura (2004) cites evidence for self-efficacy as a mediator of change in studies on posttraumatic stress resulting from all types of trauma. Benight and Bandura (2004) propose that creating mastery experiences is one of the strongest ways to produce change within individuals post-trauma. In-vivo and imaginal exposures to trauma-related stimuli with the help of a therapist restore individuals' beliefs in their ability to cope in the presence of these stimuli (e.g., Bandura, Adams, Hardy, & Howells, 1980; Ozer & Bandura, 1990).

Similar research on self-efficacy has been conducted in the area of health behavior change and maintenance. Success in quitting cigarette smoking, losing weight, using contraception, achieving abstinence from alcohol abuse, and establishing exercise habits have all been linked to increased self-efficacy beliefs (Strecher et al., 1986). One study experimentally manipulated self-

efficacy beliefs among smokers by administering a battery of tests prior to participation in a

smoking cessation program (Blittner, Goldberg, & Merbaum, 1978). The researchers then

randomly told some participants that they had been admitted to the program over other volunteers

due to their great potential for being able to quit smoking and told other participants that they were

selected at random (the control comparison group). Fourteen months post-treatment, the efficacy-

enhanced group had reduced smoking frequency by an average of 67 percent, while the

comparison group had reduced smoking frequency by an average of 35 percent (Blittner,

Goldberg, & Merbaum 1978). In another study in the area of heart disease, a study of men with a

history of a heart attack revealed that change in self-efficacy as a result of practicing treadmill

exercise in the laboratory was a significant predictor of intensity and amount of treadmill exercise

completed at home (Ewart, Taylor, Reese, & Debusk, 1984).

Self-efficacy as a mediator of positive therapeutic change in cognitive behavioral

treatments and health behavior change has been well established. Creating and strengthening self-

efficacy beliefs in therapy allows patients to feel confident in their ability to manage challenging or

feared situations using the skills they are taught.

**Dialectical Behavior Therapy**

Dialectical Behavior Therapy (DBT), a cognitive behavioral treatment originally developed

by Marsha Linehan for the treatment of suicidal individuals with BPD, emphasizes and targets

self-efficacy by encouraging patients to develop and master a set of skills. DBT has become the

most widely researched and practiced treatment for BPD. Although increasing self-efficacy has

always been understood as an underlying goal of DBT, to date, changes in perceived self-efficacy

within the context of DBT treatment have not been studied.

DBT is a comprehensive treatment involving individual therapy, skills training, as-needed skills coaching, and a therapist consultation team. The skills training curriculum targets the areas that people with BPD typically struggle with most: emotion regulation, interpersonal effectiveness, distress tolerance, and mindfulness. DBT is considered an evidence-based treatment as a complete package; however, current research has shifted towards conducting component-analyses of DBT to determine its essential components. DBT has been adapted for numerous other clinical populations, including eating disorders, substance abuse, and suicidal adolescents.

Linehan and other DBT researchers have long hypothesized that patients learning skills is essential to the efficacy of DBT. In DBT, BPD is conceptualized from a skills-deficit model. In the skills-deficit model, people with BPD are thought to have significant deficits in major areas of functioning, such as emotion regulation and interpersonal relationships, which may lead to maladaptive behaviors such as non-suicidal self-injury (NSSI), substance abuse, and interpersonal conflict. From this perspective, increasing behavioral skills is thought to decrease these maladaptive behaviors.

The skills-deficit model of BPD is supported by a study by Neacsiu, Rizvi, and Linehan (2010), which found that skills use fully mediated decreases in suicide attempts and depression and increases in anger control over time, as well as partially mediated decreases in NSSI over time. This study provides evidence that much of the positive change in maladaptive behaviors associated with BPD in patients receiving DBT can be explained by patients' use of skills. Use of skills warrants further investigation as a mechanism of change in DBT.

Group skills training without individual therapy has demonstrated efficacy for certain clinical populations, such as women with binge eating disorder (Telch, Agras, & Linehan, 2001) and adults with attention deficit hyperactivity disorder (Hesslinger et al., 2002). More current

research is investigating whether skills training without individual therapy may be sufficient for patients with BPD. Regardless of whether skills training alone may be effective and feasible for all patients with BPD, skills are often thought to play an important role in DBT. Thus, increasing patients' use of and understanding of DBT skills is a worthwhile goal.

One of the overarching goals of DBT is to teach patients new coping skills to replace dysfunctional behaviors. DBT therapists do not assume skills learned by patients in therapy generalize to outside-of-treatment unless there is active effort to facilitate this (Linehan, 1993a). Linehan outlines procedures for encouraging skills generalization, which are to: 1) increase the flexibility with which patients can use skills, including practicing them in a variety of settings and with different people, 2) have patients listen to recordings of individual therapy between sessions, 3) engage patients in in-vivo behavioral rehearsal, 4) change the patient's environment to reinforce use of skills over dysfunctional behavior, and 5) offer between-session consultation with the individual therapist (Linehan, 1993a).

At the time that Linehan wrote the manual for DBT, she conceived between-session consultation as happening mostly through conversations with the therapist over the phone. In today's age of modern technology, between-session consultation can happen in a myriad of ways including phone calls, texts, and emails. Regardless of the form that consultation takes, therapists work with patients to problem solve for the most effective skills to implement in the midst of challenging or distressing situations in their natural environment. The goal is for use of skills in patients' day-to-day lives to be reinforced by the positive consequences of their skillful behavior or desirable responses from the therapist or significant others. If patients experience reinforcement when they use skills, they will be more likely to use skills in future situations.

**The DBT Coach**

It is always preferable for patients to call before engaging in a dysfunctional behavior rather than after (Linehan, 1993a). However, individual therapists are rarely available immediately all hours of the week, and patients may prefer to try something on their own before calling their therapist. Therefore, it would be potentially beneficial for patients to have skills coaching that they can access on their own, without the need for their therapist's assistance. Rizvi and colleagues (2011) developed a mobile phone app called the "DBT Coach" to create an additional form of DBT skills coaching that can be used in the moment without having to contact the therapist. The DBT Coach utilizes modern mobile technology to help patients acquire DBT skills and generalize these skills to their own environments. It serves as an interactive skills coach, helping patients determine an appropriate DBT skill to use given their current emotion and situation. The DBT Coach simulates what an individual therapist does with a patient during phone consultation by providing patients with multiple options for skills implementation and asking about how helpful the skill was. One of the potential benefits of using adjunct, outside-of-session coaching such as a mobile phone app is that it may increase patients' self-efficacy in using coping skills.

A pilot study of the DBT Coach, which contained one DBT skill ("opposite action"), was conducted with a sample of patients with comorbid BPD and substance use disorder. The pilot study demonstrated that use of the DBT Coach was associated with a decrease in emotional intensity and urges to use substances during DBT Coach sessions and a decrease in depression and general distress over the trial period of 10 to 14 days (Rizvi, Dimeff, Skutch, Carroll, & Linehan, 2011). Participants gave high ratings for the helpfulness and usability of the DBT Coach. Study therapists reported increased use of opposite action by patients over the course of treatment. Of note, the number of calls for phone consultation did not change over the course of the study,

suggesting that use of an adjunct DBT Coach does not replace use of the phone consultation mode of treatment. However, given that the study duration was only two weeks, the effect of the DBT Coach on phone consultation over a longer period of time is unknown.

Another important finding was that participants reported a significant increase from pre- to post-trial of confidence in their ability to identify the components of opposite action as well as implement the skill appropriately (Rizvi et al., 2011). The study's measure of behavioral confidence may be considered a comparable construct to self-efficacy. The authors suggest that the DBT Coach helped participants behave skillfully more often, leading to increases in perceived self-efficacy and thus reducing problem behaviors. This potential explanation for their findings is supported by the wealth of literature on self-efficacy and behavior change (e.g., Bandura, 1977).

The DBT Coach used in the current study is more comprehensive than the pilot study, and it includes skills from all four skills training modules outlined by Linehan (1993b). (For screenshots of the DBT Coach, see Appendix A.) Another difference from the pilot study is that the DBT Coach in the current study is being used over a longer period of time (six months). The DBT Coach starts by asking participants what they need help with (e.g., "I need to prepare for an interpersonal situation," "I want to change my current emotion now.") Each option corresponds to a different skills training module (e.g., interpersonal effectiveness, emotion regulation). Participants select a category and are then asked more specific questions to help them determine the most effective skill to use in the moment. Once participants select a skill, several options for implementing the skill are outlined for the patient. Participants are asked to implement the skill and then answer a question about whether or not the skill helped, with the option to continue to a different skill. The DBT Coach provides encouraging statements (e.g., "Ok. We can help," "Hang in there," "Good work") along the way.

**Adjunct Technology in Therapy**

Technology such as the DBT Coach offers a new way to increase self-efficacy by making therapy more accessible to patients at all hours of the day and increasing the likelihood of using skillful behavior more often. The DBT Coach and other technology-based interventions can help resolve the issue of the dose-response effect, which refers to the problem of the average psychotherapy patient not getting enough exposure to psychotherapy to maximize its benefits (Hansen, Lambert, & Forman, 2002). Furthermore, previous studies have shown that fewer, longer sessions do not promote skills learning as well as more frequent, shorter sessions (Bjork & Bjork, 2011); therefore, the DBT Coach, which involves easy access to brief sessions of skills training, will likely encourage DBT skills learning and practice, which in turn will increase self-efficacy of DBT skills use. The present study is not unique in its incorporation of technology into a standard psychosocial treatment. More recently, there has been accumulating clinical and research interest in incorporating new technology such as mobile phone apps into the context of therapy.

Given the growing regularity with which people own and use cell phones, mobile technology is a particularly compelling way to facilitate treatment. As of 2013, more than 50 percent of mobile phone users in the United States were smart phone users, and the total number of smart phone users was estimated at 140 million (McDermott, 2013). Not only is having a mobile phone very common, but people also tend to carry their phones with them at all times and check them frequently. Mobile technology is predicted to be one of the most powerful forms of media to influence clinical practice in the next decade (Fogg & Eckles, 2007). To date, mobile apps have been designed to help with breathing and relaxation, reduction of anxiety, smoking cessation, behavioral activation, among other areas. Although these types of apps are growing in popularity with therapists and patients, there is a dearth of empirical studies of their efficacy. The current

literature is dominated by studies of technology-assisted interactions with therapists or other

mental health professionals and computer-based coaching, rather than coaching facilitated by

mobile phone apps.

Boschen and Casey (2008) outline two goals for incorporating technology in therapy: 1) to

improve therapeutic outcomes by increasing the dose of active treatment ingredients and 2) to

increase efficiency by decreasing time required by a therapist. Most technology-assisted treatments

have been designed to replace therapists' time, and there are numerous studies of self-help

treatments in combination with mobile phone coaching. Phone coaching in addition to a cognitive

behavioral self-help treatment for chronic fatigue syndrome was found to decrease functional

impairment and fatigue (Burgess & Chalder, 2001). Adjunct phone coaching has also been utilized

with self-help programs for binge eating disorder and bulimia (e.g., Palmer, Birchall, McGrain, &

Sullivan, 2002), and eating disorder patients have been shown to make use of and appreciate the

convenience of a phone coaching component (Wells, Garvin, Dohm, & Striegel-Moore, 1997).

Other studies have looked at the utility of adding phone coaching and other types of

technology to standard psychological interventions in order to improve therapeutic outcomes.

Clough and Casey (2011) reviewed literature on how technology has been used to decrease

treatment dropout, increase engagement during and between sessions, and assist with post-

treatment aftercare. The use of phone calls and texting as adjunct to treatment has been shown to

be effective for multiple clinical populations. A weekly brief phone intervention used with

schizophrenia patients after release from hospitalization was associated with greater community

survival and shorter hospital stays if readmitted, as compared to waitlist control (Beebe, 2001).

Shapiro and colleagues (2010) conducted an uncontrolled study of women with bulimia receiving

group cognitive behavioral therapy (CBT) who were asked to submit nightly text messages to

report number of binges and purges and urges to engage in these behaviors. After sending the

texts, participants received automated feedback tailored to their report. The authors found that this

form of self-monitoring was feasible and acceptable to participants, and eating disorder and

depression symptoms decreased significantly from baseline to post-treatment and follow-up.  In

the area of health psychology, a mobile phone texting intervention adjunct to medical treatment

has been used successfully to facilitate diabetes management (Kim, Yoo, & Shim, 2005).

Very little research has examined the use of phone coaching and technology intended to

promote skills generalization in particular, which is the function of between-session consultation in

DBT. One intervention designed to increase engagement with skills between sessions for

individuals with substance dependence involved a biweekly computer-based skills training

program in addition to standard CBT (Carroll et al., 2008). In a randomized controlled trial by

Carroll and colleagues (2008), CBT with and without access to this skills training computer

program were compared. Those receiving the adjunct computer program in addition to CBT

produced more clean urine samples and had longer periods of abstinence than those not receiving

the computer component.

Another adjunct skills generalization intervention was developed by Perivoliotis at the

University of Pennsylvania. He developed a wristwatch that sends scrolling messages to patients

with schizophrenia instructing them to engage in skills such as deep breathing to deal with the

stress of hearing voices (Trudeau, 2010). This technology has yet to be empirically studied for its

efficacy, yet its development suggests a promising future for the incorporation of adjunct

technological interventions into standard psychosocial treatment.

Finally, in-vivo phone coaching to promote skills acquisition has been studied in the

context of treatment for the fear of driving (Wiederhold, Wiederhold, Jang, & Kim, 2000). In a

study by Wiederhold and colleagues (2000), participants underwent virtual reality therapy followed by in-vivo exercises, which involved driving in a car and being followed by their therapist in another vehicle. During these in-vivo exercises, participants were given the option to communicate with their therapist over the phone (with safety concerns accounted for) when their anxiety increased to an uncomfortable level. Even when phone coaching was not utilized, participants reported feeling more comfortable taking on more challenging exposures knowing that they had the therapist mobile contact as a "security net" (Wiederhold, Wiederhold, Jang, & Kim, 2000). Although this study was uncontrolled and relied on case examples, it demonstrates the potential utility of in-vivo mobile phone skills coaching during CBT exposures for anxiety.

Relatively few studies have tested the use of therapeutic mobile app technology. A series of case studies examined the use of a standalone cell phone app intended to increase emotional self-awareness and decrease stress by teaching cognitive-behavioral techniques (Morris et al., 2010). Participants were able to learn and apply the skills taught in the app and readily used the app when experiencing intense emotions. Experience sampling and interviews with the participants revealed that many participants saw changes in their mood and coping skills over the one-month period. This study provides support for use of cell phone apps as a standalone treatment.

Other mobile apps have been tested as adjunct to standard evidence-based treatments. In the area of posttraumatic stress disorder (PTSD), the Department of Defense's National Center for Telehealth and Technology and the Center for Deployment Psychology developed a mobile app called the "PE Coach" to augment prolonged exposure therapy (PE), in collaboration with the developers of PE. The PE Coach is designed to facilitate implementation of the treatment components of PE, including completion of in-vivo and imaginal exposure homework assignments and skills practice such as breathing retraining. A study on clinician perceptions of using the PE

Coach in conjunction with PE revealed generally favorable perceptions of the app, including beliefs that it could augment the existing components of PE, was not overly complex, and was in line with their own values and their patients' values (Kuhn et al., 2014). Clinicians' younger age and familiarity with smartphone and app technology predicted more favorable evaluations of the PE Coach (Kuhn et al., 2014). Two current randomized controlled trials are testing the efficacy of the PE Coach as well as its influence on treatment engagement (Kuhn & Hoffman, 2012).

An adjunct skills-enhancing app has also been incorporated in the treatment of depression using behavioral activation. A case study of an adult male receiving CBT for depression and an adjunct behavioral activation app entitled "MoodKit" revealed many benefits of incorporating app technology in all aspects of treatment, including psychoeducation, symptom monitoring, and learning and implementation of skills (Erhardt & Dorian, 2013). Among other features, the MoodKit app guides patients through the skill of problem solving and provides suggestions for mood-enhancing activities and tips on how to implement these activities. MoodKit allows patients to commit to behavioral activation goals, share their goals with others, and schedule reminders for themselves. The patient in the study reported that the app helped solidify the rationale behind behavioral activation and helped him follow through on implementing the skills taught in treatment (Erhardt & Dorian, 2013). This case study illustrates many potential benefits of using app technology in conjunction with CBT, including the portable nature of apps, which encourages engagement in treatment and more frequent interaction with skills material.

All of the above studies provide evidence for the feasibility and usefulness of adding technology into therapy, often without taking anything away from the standard form of care. Outside of session phone calls, texting, and use of mobile phone apps all serve the same function of facilitating acquisition and generalization of skills and increasing engagement, although mobile

apps do so without the need for contact with another human being. These types of technology are a promising way to strengthen patients' self-efficacy beliefs by encouraging more regular practice of skills.

**Aims and Hypotheses**

The current study aims to explore changes in self-efficacy over the course of six months of receiving standard DBT treatment plus access to a DBT Coach mobile app intended to promote skills generalization. The second aim is to explore the relationship between self-efficacy and the use of coaching, either through the DBT Coach or phone consultation with the individual therapist.

In regard to the first aim, we hypothesize that general self-efficacy will increase over the course of treatment. Given that promoting self-efficacy is an underlying goal of DBT and all CBT treatments, it is expected that patients will improve on this variable over time. The second aim will be addressed in an exploratory way to examine two potential predicted patterns. The first possibility is that: 1) self-efficacy of skills implementation will be higher on days that patients use either type of skills coaching than days they do not use any coaching, and 2) self-efficacy of skills implementation will be higher on days patients use the DBT Coach than days they use phone consultation. Because both the DBT Coach and phone consultation are designed to promote skills acquisition and generalization, it is possible that participants will feel more effective in using skills when assisted by some type of coaching. In addition, the self-help form of coaching—the DBT Coach— may be associated with higher perceived self-efficacy than phone consultation with the therapist. When using the DBT Coach, participants may attribute more of their success in skills use to their own efforts rather than to assistance from their therapist.

On the other hand, it is possible that participants might rate their self-efficacy of skills implementation as higher on days *not* using skills coaching, particularly in the second half of

treatment. The goal of coaching is to have patients generalize skills and eventually use skills effectively without assistance. It is possible that patients will start to experience higher self-efficacy later in treatment by using skills more automatically and on their own, without coaching. These two potential outcomes will be explored for the first three months and the second three months of treatment to consider whether different patterns fit for different stages of treatment.

Chapter II

**Method**

**Participants**

Study participants were adults with a diagnosis BPD and recent suicidal behavior who participated in a research study at Rutgers University, which included six months of comprehensive DBT plus the addition of a mobile app (the DBT Coach). The current study was conducted within the context of a larger study testing the acceptability and safety of incorporating the DBT Coach into standard DBT. Participants were recruited for the overarching study by contacting hospitals and practitioners in the surrounding community and distributing flyers to clinicians and lay people at community events. Interested participants called the study's research office, at which point they completed a brief phone screen with a graduate student. During the phone screen, interested participants were asked questions about BPD symptomatology, as defined in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR; APA, 2000), and history of suicide attempts and NSSI to begin to determine eligibility for the study. Those who met at least five of the nine BPD criteria and had a recent history of suicide attempts and/or NSSI were either asked to schedule an intake or were placed on a waitlist to be scheduled for an intake in the next few months. Recent history of suicidal behavior was an inclusion criterion for the study and was defined as having had at least one suicide attempt or episode of NSSI in the past six months and a second suicide attempt or episode of NSSI within the past five years.

**Procedures**

Those eligible from the phone screen participated in an in-depth, in-person intake interview to determine final eligibility for the study. During this assessment, study procedures were outlined and consent for participation and videotaping was obtained before proceeding. Intake assessments

took place over a period of one to three appointments of approximately three hours duration each, during which graduate students administered standardized interviews including the Structured Clinical Interview for DSM Axis II Diagnoses (SCID-II; First, Gibbon, Spitzer, Williams & Benjamin, 1997) to confirm a diagnosis of BPD. In addition to self-report measures for the overarching study, participants completed the General Self Efficacy Scale (Schwarzer & Jerusalem, 1995; Appendix B), which was specific to the current study.

The assessor consulted with the research team upon completion of the intake to determine whether the individual was eligible. Beyond a history of recent suicidal behavior, other inclusion criteria for the study included meeting full criteria for BPD, being between the ages of 18 and 60, being able to speak and read English fluently, and living within 45 minutes of the Rutgers University Psychological Clinic. In addition, participants had to have an iPhone or be willing to carry an iPod Touch lent to them for the duration of the study, have availability to attend the weekly skills training meetings, agree to participate in assessments and have their assessments and therapy sessions videotaped, and be willing to discontinue other forms of therapy in order to be considered eligible. Exclusion criteria included an IQ of less than 70, life-threatening anorexia, chronic and current absence of shelter, impending jail/prison for more than three weeks, court order to treatment, diagnosis of schizophrenia or other psychotic disorder, severe alcohol or substance dependence that required medical management of withdrawal, and having had more than six months prior experience receiving comprehensive DBT treatment. Eligible participants were assigned to a treatment provider and began treatment immediately. If participants were deemed ineligible, there were informed immediately and provided with referrals.

All participants received six months of comprehensive DBT: an hour of weekly individual therapy, two hours of weekly group skills training, and as-needed phone consultation for help

using DBT skills in the moment. All individual and group therapists attended a one-hour weekly consultation team. DBT was implemented following the procedures outlined by Linehan in the DBT manual (1993a; 1993b). All therapy was provided by doctoral-level students who were intensively trained in DBT and supervised by an expert in DBT. Participants were required to pay for treatment, and therapy session fees were determined by a sliding scale based on participants' household gross income. Fees were collected on a weekly basis.

**DBT Coach.** If participants owned an iPhone, the DBT Coach was installed on their iPhone by a research assistant. If participants did not own an iPhone, they were given an iPod Touch to borrow for the duration of the study. The research assistant met with each participant individually to give an orientation to the DBT Coach and answer participants' questions.

The DBT Coach provided immediate, in-vivo coaching on using DBT skills. The DBT Coach was presented as a supplement to the phone consultation provided by individual therapists between sessions. Participants were not required to use the app for a specified amount of time, and they were allowed to use it as frequently as they wanted. Individual therapists and group skills trainers were allowed to encourage use of the DBT Coach, within their clinical discretion, to help facilitate treatment plans and skills acquisition.

Participants were instructed by the group leaders each week during group skills training to send the data from their DBT Coach. Participants pressed a button on their device that said "Submit Data," which electronically sent their history of usage to a database from which the data was retrieved by the research assistant. If participants missed a group skills training session, the research assistant contacted the participants to instruct them to submit their data from home.

**Assessments.** Formal assessments after the intake occurred every three months. Each follow-up assessment was approximately two hours in duration. At each of the follow-up

assessments, the General Self Efficacy Scale (Schwarzer & Jerusalem, 1995) was re-administered.

Participants were compensated $50 for each follow-up assessment completed.

**Measures**

      **Structured Clinical Interview for DSM Axis II Diagnoses (SCID-II).** The SCID-II

(First, Gibbon, Spitzer, Williams & Benjamin, 1997) is a semi-structured, clinician-administered

clinical interview used to assess diagnoses of personality disorders as described in the Diagnostic

and Statistical Manual of Mental Disorders, 4th Edition (DSM-IV-TR; APA, 2000). This study

utilized the data from the BPD diagnostic section in order to determine eligibility.

      **General Self Efficacy Scale.** The General Self Efficacy Scale (Schwarzer & Jerusalem,

1995; Appendix B) is a ten-item self-report measure that assesses beliefs about one's ability to

cope in difficult situations and accomplish goals using a four-point Likert Scale. The scale's

psychometric properties have been studied in 25 different countries, demonstrating internal

consistencies between $\alpha = .75$ and $\alpha = .91$ and test-retest reliability ranging from $r = .47$ for a two

year period to $r = .75$ for a one year period (Scholz, Gutiérrez-Doña, Sud, & Schwarzer, 2002).

Perceived general self-efficacy has been found to be a universal construct (Scholz, Gutiérrez-

Doña, Sud, & Schwarzer, 2002).

      **The DBT Coach.** The DBT Coach (Appendix A) collected data on when and how

participants used the app. After data was submitted and downloaded each week, a log was created

that recorded each time participants used the DBT Coach. The current study utilized only the data

on dates the participants used the DBT Coach.

      **The DBT Diary Card.** The DBT Diary Card (Appendix C) is a self-report measure used to

record daily ratings of emotions, urges to use substances, NSSI urges and behaviors, level of

suicidal ideation, whether or not patients used DBT skills, and their perceived effectiveness in their

implementation of DBT skills. Diary cards were reviewed with the individual therapist and

collected on a weekly basis. Participants' daily rating of effectiveness in use of DBT skills was the

variable of interest for this study. This variable was rated using a five-point Likert scale ranging

from 1, "I felt very ineffective in my use of skills," to 5, "I felt very effective in my use of skills."

**Phone consultation.** Dates during which phone consultation was utilized by participants

were recorded in clinical session notes produced by study therapists. Phone consultation was

defined as texting or phone contact with participants' individual therapists that involved coaching

in DBT skills. If a participant attempted to contact his/her therapist and the therapist was unable to

return the contact the same day, this instance was not coded as phone coaching.

## Plan of Analysis

Analyses will consist of descriptive reporting using a case series of a portion of the

participants in the broader study. The stated hypotheses will be explored for each participant,

followed by a discussion of patterns that can be drawn from the case series. To explore the first

aim of whether self-efficacy changes over the course of DBT treatment, changes from pre- to mid-

to post-treatment in general self-efficacy, as reported on the General Self Efficacy Scale (GSE;

Schwarzer & Jerusalem, 1995), will be examined. Weekly averages of participants' self-efficacy in

skills implementation, as reported daily on the diary card, will be calculated. Days during which

participants report no skills use will not be included in these calculations, as this research question

will explore self-efficacy *when using skills*. Changes in average weekly self-efficacy ratings over

the course of treatment will be examined.

To explore the second aim regarding the relationship between self-efficacy and the two

different types of coaching, mean and modal ratings of self-efficacy in skills implementation for

each participant will be calculated for four categories: 1) days participants used the DBT Coach, 2)

days they used phone consultation, 3) days they used both types of coaching, and 4) days they used

no coaching. These means and modes will be calculated using daily diary card ratings and will be

compared within each participant, distinguishing between the first three months of treatment and

the last three months of treatment. Again, only days during which participants report using skills

will be included in these calculations in order to explore participants' perceived self-efficacy *when*

*using skills*. See summary of variables of interest and data sources in Table 1.

Chapter III

**Results**

**Participants**

Participants selected for analysis had completed their post-treatment assessment by May 1, 2014. Three participants who dropped out of treatment prior to the post-treatment assessment were excluded from the analyses, as there were insubstantial data from these participants to evaluate the proposed questions. This left a total of four participants, all of whom were treatment completers. These participants ranged in age from 19 to 33 ($M = 25.75$, $SD = 3.97$). At the time of the intake assessment, all participants met criteria for BPD, as determined by the SCID-II. All had multiple comorbid diagnoses, in addition to a prior history of suicidal behavior. Each participant will be briefly described.

**Participant A**. Participant A was a 25-year-old single Caucasian/South Asian female. She had a master's degree and was unemployed and seeking full-time employment at the time of intake. She endorsed current symptoms of dysthymia (early onset, since age five), panic disorder with agoraphobia, social phobia, generalized anxiety disorder, and eating disorder not otherwise specified. Participant A met criteria for avoidant, obsessive-compulsive, and paranoid personality disorders. In the past, she had met criteria for major depressive disorder (recurrent) and posttraumatic stress disorder. Participant A had a history of suicidal ideation and hospitalizations, starting at age 13 when she was hospitalized two times within the same month for suicidal ideation and NSSI (cutting). She reported being in and out of therapy throughout high school and college. In the year prior to the intake, Participant A began psychotherapy again and shortly after was hospitalized for two weeks for suicidal ideation. Four months prior to the intake, she made a suicide attempt (overdose), which led to a second hospitalization that year. Afterwards, she participated in partial hospitalization and intensive outpatient programs. While Participant A

estimated a total of 100 instances of NSSI in her history (e.g., cutting, hitting herself, opening wounds), she reported that she had not engaged in or thought about NSSI in the month prior to intake.

**Participant B.** Participant B was a 33-year-old married Caucasian female. She had a Bachelor's degree and was a stay-at-home mother for her preschool-aged daughter. At her intake assessment, she endorsed current symptoms of panic disorder, generalized anxiety disorder, social phobia, specific phobia (situational type), somatization disorder, and hypochondriasis. Participant B had a history of major depressive disorder (recurrent) and alcohol, marijuana, and cocaine dependence, all in early partial remission at the time of intake. Participant B met criteria for avoidant and dependent personality disorders. Participant B had a history of two suicide attempts, the first at age 15 and the second at age 25. A few weeks prior to her intake, Participant B had made vague plans to kill herself, but had not acted on them. She reported that she had made approximately six threats to kill herself in the past year. Participant B also had a history of NSSI, beginning at age 12. She estimated that she had intentionally harmed herself 250 times in her life. At the start of treatment, she was cutting herself approximately every other day. After graduating college and prior to seeking treatment through this study, Participant B was in therapy with a cognitive-behavioral therapist for eight years.

**Participant C.** Participant C was a 28-year-old single Caucasian male. He was a student at a community college and a part-time grocery store employee at the time of intake. He endorsed symptoms of bipolar II disorder with rapid cycling, and was currently in a major depressive episode at the time of intake. Participant C also endorsed current symptoms of substance dependence (Clonazepam) and panic disorder, in partial remission. He had a history of alcohol abuse, in sustained full remission. Participant C also met criteria for avoidant personality disorder.

Participant C had a history of four suicide attempts, starting at age 18. One of these attempts (overdose) was approximately one month prior to his intake. He reported having engaged in NSSI (e.g., hitting a wall, cutting) approximately five times in his life, the last time being approximately a year prior to intake. Prior to seeking treatment through this study, he was in long-term psychodynamic therapy for two years. He first received mental health treatment as a child for nervous tics. He had also attended a rehabilitation program and an intensive outpatient program for problems with alcohol and panic attacks.

**Participant D.** Participant D was a 19-year-old single black female. She was a college student and a part-time convenience store employee at the time of intake. She endorsed current symptoms of major depressive disorder (recurrent), social phobia, posttraumatic stress disorder (related to an instance of childhood sexual abuse perpetrated by a family friend), body dysmorphic disorder, and eating disorder not otherwise specified. She had a history of alcohol abuse but reported current abstinence from alcohol at the time of intake. Participant D met criteria for avoidant and paranoid personality disorders. Participant D had been hospitalized twice, once at age 12 for a suicide attempt (overdose) and another in the year prior to intake for a severe episode of NSSI (cutting). She began cutting herself at age 17. She estimated a total of seven instances of cutting in her life. Prior to starting treatment as part of this study, Participant D received several months of counseling at her college counseling center.

**Aim One: Self-Efficacy Changes Over the Course of Treatment**

**General Self Efficacy Scale.** At baseline, the four participants had a mean score of 21.25 (*SD* = 0.83) on the GSE. Participants' GSE scores varied over the course of treatment. These scores are graphed in Figure 1. Participant A had a baseline score of 21, a mid-treatment score of 23, and a post-treatment score of 20. These scores indicate that Participant A's perceived self-

efficacy remained relatively the same over the course of treatment, with a peak at the mid-

treatment mark. Participant B had a baseline score of 20, a mid-treatment score of 25, and a post-

treatment score of 28, indicating that her perceived self-efficacy consistently improved in moderate

increments over the course of treatment. Participant C had a baseline score of 22, a mid-treatment

score of 27, and a post-treatment score of 25. Participant C demonstrates improvement in

perceived self-efficacy over treatment, ending with a slightly higher self-efficacy rating than at

baseline. Finally, Participant D had a baseline score of 22 and a score of 31 at both mid- and post-

treatment. She experienced more drastic improvement in self-efficacy than the other participants

from baseline to mid-treatment and maintained this increase at post-treatment.

**Weekly skills effectiveness ratings.** Participants' perceived self-efficacy was also

measured by averaging daily ratings of perceived effectiveness in skills use to generate weekly

average skills effectiveness ratings over the course of treatment. These averages are graphed in

Figure 2. Weeks in which participants did not submit diary cards with skills effectiveness ratings

were omitted from this graph (indicated by no data point corresponding to that week). Dates during

which participants reported a skills effectiveness score of "0," indicating "not applicable, no skills

used," were also not included in these calculations, as this question intended to analyze self-

efficacy *when using skills*. Out of all days in treatment for which skills effectiveness ratings were

submitted, Participant A reported attempting to use DBT skills on 97.08% of her days in treatment.

Participants B, C, and D reported attempting to use skills on 93.15%, 74.8%, and 80.95% of their

days in treatment, respectively.

The following results refer to average skills effectiveness on the days out of each week

during which DBT skills use was attempted. All four participants' baseline weekly averages were

relatively similar and in the neutral to moderately effective range (3.67, 4, 3, and 4 out of a 5-point

Likert scale). A "4" indicates "felt mostly effective in my use of skills," and a "3" indicates "felt neither effective nor ineffective." Therefore, at the start of treatment, participants on the whole felt neutral to mildly positive about their effectiveness in using skills when skills use was attempted.

Beyond baseline, the participants showed varied patterns of weekly averages. Participant A's average weekly ratings show a drop to the negative range (i.e., an average rating of below 3) week three, followed by several weeks of moderate fluctuations above and below a rating of 3. These fluctuations are followed by steady increases back towards baseline during weeks 10 through 12, followed by three weeks of steadily declining ratings back into the negative range. Participant A ended treatment with five consistently negative ratings roughly one point below her trend at the start of treatment. Participant B's ratings demonstrate a fair amount of consistency until a drop in skills effectiveness ratings during week eight. She experienced a return to baseline in week nine and ended with consistently positive ratings for the last 13 weeks of treatment. Participant C's ratings demonstrate the greatest range of scores. He had several fluctuations from negative to positive average skills effectiveness during weeks one through nine, followed by a sharp increase in ratings during week ten. After three weeks of missing data, Participant C's ratings return to slightly below his baseline and gradually increase with a positive trend until the end of treatment.

Participant D was less consistent than the other participants in regards to submitting diary cards with skills effectiveness ratings. She submitted skills effectiveness ratings on her diary card for 32.8% of her days in treatment. Because of her low percentage of ratings submitted, there were a total of ten weeks of average skills effectiveness ratings that could be calculated for Participant D. The infrequency of her ratings makes it challenging to discern any clear patterns about changes in skills effectiveness over the course of treatment. Her scores demonstrate three fairly consistent

positive average skills effectiveness ratings in weeks three, five, and seven. After a large gap in

ratings submitted, Participant D had four fairly consistent averages in the neutral to mildly positive

range. Finally, she had two averages in the high positive range (4.29 and 4.71) during weeks 23

and 28 (her final week in treatment), which were above her baseline. These two high averages

were split by a neutral average during week 24.

**Aim Two: Self-Efficacy and the Use of Skills Coaching**

        **Total averages during treatment.** The second aim was to explore the relationship

between self-efficacy and the use of skills coaching, either through use of the DBT Coach or phone

coaching with the individual therapist. Using skills effectiveness ratings recorded daily on

participants' diary cards, four means and four modes were calculated for each participant: average

and modal self-rated skills effectiveness on days using skills and 1) using the DBT Coach, 2) using

phone coaching with the therapist, 3) using *both* the DBT Coach and phone coaching with the

therapist, and 4) using *neither* type of skills coaching. These descriptive statistics are listed in

Table 2, along with the total number of days of use and total number of ratings available for each

type of coaching. Days during which participants reported no use of skills were not included in

these calculations. Additionally, dates for which corresponding skill effectiveness ratings were not

submitted were not included.

        The four categories of skills coaching were further broken down into first half of treatment

ratings (operationalized as days up to and including the date of mid-treatment assessment) and

second half of treatment ratings (days after the date of mid-treatment assessment). These averages

and modes are listed in Table 3, along with the total number of days of use and number of ratings

available for each type of coaching for each half of treatment.

   ***Participant A.*** Participant A used the DBT Coach five days over the course of treatment,

with a corresponding average skills effectiveness rating of 3 ($SD = 0.71$) and a modal score of 3.

She contacted her individual therapist one time for phone coaching during the course of treatment,

on a day during which she rated her skills effectiveness as a 4. This day fell within the first half of

treatment. Participant A had 163 days during which neither type of coaching was used. On days

during which skills were used without using either form of skills coaching, Participant A rated her

skills effectiveness as 2.89 on average ($SD = 0.93$), with a modal score of 3.

   ***Participant B.*** Participant B utilized the DBT Coach during a total of 37 days over the

course of treatment, with an average skills effectiveness of 3.88 ($SD = 0.41$) and a modal score of 4

on these days. She contacted her individual therapist for phone coaching 33 days during treatment,

with an average skills effectiveness rating of 3.7 ($SD = 0.65$) and a modal score of 4 on these days.

Participant B had 88 days during which she did not use either type of coaching. On days during

which Participant B used skills without skills coaching, her skills effectiveness was on average

3.92 ($SD = 0.28$), with a modal rating of 4.

   ***Participant C.*** Participant C used the DBT Coach 15 days over the course of treatment,

rating his skills effectiveness as 3 on average ($SD = 0.82$) on these days, with a modal rating of 3.

He contacted his individual therapist for phone coaching on 28 days during treatment, with an

average skills effectiveness of 3.24 ($SD = 0.97$) and a modal rating of 3 on these days. Participant

C had 122 days of treatment during which he did not use either type of coaching. His skills

effectiveness ratings were 3.55 ($SD = 0.81$) on average on days using skills without skills

coaching. His modal rating was 4 on these days.

   ***Participant D.*** Participant D used the DBT Coach 13 days over the course of treatment,

rating her skills effectiveness as 3.25 on average ($SD = 0.5$) on these days, with a modal rating of

3. She contacted her individual therapist for phone coaching on four days during treatment, with an average skills effectiveness of 5 on these days (only one rating was available, so standard deviation and mode calculations are not applicable). There were 175 days during Participant D's treatment that she did not use either type of coaching. Her average skills effectiveness on days using skills without skills coaching was 3.57 ($SD = 0.86$), with a modal rating of 3.

**Use of both types of skills coaching together.** Given that both phone coaching and the DBT Coach were hypothesized to be associated with greater perceived self-efficacy, whether the two types of coaching combined were associated with even greater perceived self-efficacy was also examined. Participants A and D had no days during which both types of coaching were utilized; therefore, this possibility was only examined for Participants B and C. There were 12 days during which Participant B used both phone coaching and the DBT Coach, and she reported an average skills effectiveness rating of 4 ($SD = 0$) on these days, with a modal rating of 4. For Participant B, use of the two types of coaching on the same day was associated with higher ratings of skills effectiveness than days using phone coaching ($M = 3.88$, $SD = 0.41$) and days using the DBT Coach ($M = 3.7$, $SD = 0.65$).

Participant C used both types of coaching on two days during treatment, which had a corresponding average skills effectiveness rating of 2.5 ($SD = 0.71$). This average is lower than his average on days using phone coaching ($M = 3.24$, $SD = 0.97$) and the DBT Coach ($M = 3$, $SD = 0.82$). However, the limited sample of days during which Participant C used both types of coaching suggests that this data may be less meaningful than Participant B's data.

**Skills coaching in the first versus second half of treatment.** In addition to comparing average and modal ratings of skills effectiveness among the different categories of skills coaching use during treatment as a whole, these averages and modes were further divided into use during the

first and second half of treatment to see whether different patterns emerged for these two time periods.

Because of Participant A's limited sample of coaching usage (use of the DBT Coach on five days and use of phone coaching with her individual therapist one day), her data were not analyzed for differences between the first and second half of treatment. Similarly, because of Participant D's limited reporting of skills effectiveness in combination with her relatively low use of both types of skills coaching, her data were not analyzed for differences between periods of treatment.

Participant B's large sample of coaching usage illustrates a number of interesting differences between the first and second half of treatment. While she used the DBT Coach nine days in the first half of treatment, she used it 28 days in the second half of treatment. Her corresponding average skills effectiveness ratings on days using the DBT Coach increased from 3.67 ($SD = 0.82$) to 3.93 ($SD = 0.26$) from the first to second half of treatment. Participant B's modal rating on days using the DBT Coach was 4 for both halves of treatment. Her use of phone coaching demonstrates the opposite effect: she called her individual therapist for phone coaching 21 days in the first half of treatment and 12 days in the second half of treatment. Participant B's corresponding skills effectiveness ratings on days using phone coaching increased from the first to second half of treatment, starting at 3.5 ($SD = 0.8$) and ending at 4 ($SD = 0$). The modal rating associated with phone coaching was 4 for both halves of treatment. Participant B's perceived skills effectiveness on days using skills without either type of skills coaching was higher in the second half of treatment ($M = 3.98$, $SD = 0.14$) than it was in the first half of treatment ($M = 3.78$, $SD = 0.42$).

Participant C had much less frequent use of both types of skills coaching in the second half of treatment than in the first. He used the DBT Coach 14 days in the first half and one day in the second half of treatment; he called his individual therapist for phone coaching 19 days in the first half and nine days in the second half of treatment. It is important to note that Participant C's mid-treatment assessment occurred roughly three weeks later than it was scheduled to occur; therefore, his frequency data from the first and second half of treatment may be somewhat skewed by including fewer days in the second half of treatment. Participant C's corresponding ratings of skills effectiveness on days using the DBT Coach also decreased from the first half ($M = 3.08$, $SD = 0.79$, mode $= 3$) to second half (one rating of 2) of treatment. His skills effectiveness when using phone coaching was on average 3 ($SD = 0.94$) in the first half of treatment and 3.57 ($SD = 0.98$) in the second half of treatment. Similarly, his modal rating when using phone coaching increased from 3 to 4 from the first to second half of treatment. When examining days during which Participant C used skills but neither type of coaching, his average skills effectiveness increased minimally from the first half ($M = 3.54$, $SD = 0.88$) to the second half ($M = 3.57$, $SD = 0.77$) of treatment. Participant C's modal rating when using neither type of coaching increased from 3 to 4 from the first to second half of treatment.

Chapter IV

**Discussion**

**Conclusions**

   **Aim one: Self-efficacy changes over the course of treatment.** The first aim was to

explore changes in self-efficacy over the course of six-months of DBT treatment augmented with

the DBT Coach. The four participants' average GSE score at baseline (21.25) is relatively low in

comparison to the U.S. national average of 29.49 found in a study by Scholz, Gutiérrez-Doña, Sud,

and Schwarzer (2002). This indicates that the participants began treatment with lower-than-

average self-efficacy, which may be indicative of a broader pattern in treatment-seeking adults

with BPD.

   The BPD diagnosis is associated with a high level of emotion dysregulation, interpersonal

difficulty, anger, and impulsivity, which is accompanied by a lack of modeling of effective coping

strategies in a person's developmental history. This lack of skillful behavior often leads to less

effective efforts to regulate emotions and deal with interpersonal difficulty, such as NSSI,

substance abuse, and avoidance. In light of this skills-deficit perspective of BPD (e.g., Linehan,

Bohus, & Lynch, 2007; Kremers, Spinhovan, Van Der Does, & Van Dyck, 2006), it makes sense

that a population of patients with BPD would have lower-than-average self-efficacy. Self-efficacy

beliefs would presumably be negatively influenced by a lack of effective coping strategies to solve

problems in one's life and facilitate one's emotional and relationship needs being met. Anger and

impulsivity that interfere with successful achievement of goals also likely negatively influence

self-efficacy beliefs. The pervasiveness of these challenges in BPD would, therefore, lead to low

self-efficacy scores.

Participants' low average self-efficacy score at baseline further make sense in light of research on the likelihood of adults with BPD maintaining relationships and full-time jobs. In a study by Zanarini, Frankenburg, Reich, and Fitzmaurice (2010), only 25.9% of individuals with BPD were functioning well socially and vocationally in the two years prior. Well-functioning was defined as having at least one healthy, emotionally sustaining relationship and being able to work or go to school full-time successfully. This was a significantly smaller percentage than the 58.3% of the Axis II comparison group who were functioning well. Over a ten-year follow-up period, individuals with BPD were significantly less likely than the Axis II comparison group to achieve social and vocational functioning (Zanarini, Frankenburg, Reich, & Fitzmaurice, 2010). These life achievements require a certain amount of skillful execution of goal-directed behavior, which individuals with BPD may lack. The decreased psychosocial functioning found in this population is likely associated with lower self-efficacy beliefs. Further research is needed to confirm whether BPD is in fact associated with lower levels of perceived self-efficacy and how this population differs from other clinical populations in this area.

The four participants' GSE scores at mid- and post-treatment indicate that perceived self-efficacy is a changeable construct within the context of six months of DBT treatment. This is in line with Bandura's proposition that all psychotherapy works by changing self-efficacy beliefs (1977) and the multitude of studies finding that changes in self-efficacy beliefs mediate improvement in various CBT treatments. The first hypothesis—that self-efficacy would improve over the course of treatment—was confirmed for three out of the four participants. Participant A was the only participant whose post-treatment score was lower than her baseline score, although only by one point. Notably, all four participants reported at least two points improvement on the GSE Scale from intake to mid-treatment. This suggests that the DBT approach may be associated

with some positive change in self-efficacy within just three months, even for patients starting with significant deficits in this area.

Furthermore, the participants' GSE scores suggest that it may be possible for BPD patients receiving DBT to achieve a GSE level comparable to that of the "normal" population by the end of six months of treatment. Participant B's post-treatment self-efficacy score was 1.5 points below the U.S. national average. For Participant D, both mid- and post-treatment scores were above the U.S. national average. Given the potential for the BPD population to start with lower-than-average GSE and the potential negative consequences of low perceived self-efficacy, two of the participants' GSE scores hovering around the "normal" range of scores by the end of treatment is encouraging. Whether the three participants' positive change in self-efficacy was sustained after treatment termination is unknown and warrants attention in future studies.

Findings regarding improvement in GSE in the context of DBT are not surprising given the similarity between the construct of self-efficacy and the skills training focus in DBT. Skills training is one of the central components of DBT, and DBT skills use has been found to fully mediate positive change in problematic behaviors associated with BPD, including suicide attempts, depression, and anger dyscontrol (Neacsiu et al., 2010). DBT patients learn more effective, less-damaging ways of dealing with difficult interpersonal situations and intense emotional vulnerability. An explicit goal of DBT is to teach patients interpersonal, emotion regulation, distress tolerance, and mindfulness skills in order to deal with the challenges of life. Self-efficacy as a construct refers to one's perceived ability to organize and execute the necessary behaviors to deal with a situation (Bandura, 1997). Therefore, skills training and self-efficacy should go hand in hand.

The GSE Scale as a measure illustrates the overlap between self-efficacy beliefs and the knowledge and use of skillful behavior. For example, item number two on the GSE Scale, "If someone opposes me, I can find means and ways to get what I want," corresponds to DBT interpersonal effectiveness skills and item number eight, "When I am confronted with a problem, I can usually find several solutions," corresponds to the DBT skill of problem solving. In summary, the goal of increasing DBT skills knowledge and skills use is in line with the goal of increasing perceived self-efficacy. Thus, it makes sense that participants' self-efficacy changed positively over the course of DBT. Increased self-efficacy is frequently assumed to be an outcome of DBT treatment, although it has not been directly researched to date; thus, this study provides preliminary evidence in favor of this assumption.

Participants' scores also demonstrate that perceived self-efficacy changes in a non-linear way. Two of the participants saw a decrease in GSE scores from mid- to post-treatment, after having had an increase from baseline to mid-treatment. One of the participants' score was the same at mid- and post-treatment after increasing from baseline to mid-treatment, and one participant saw increases in GSE scores at both mid- and post-treatment. These data suggest that for some people, after increases in GSE, perceived self-efficacy may reach a plateau, either temporarily or potentially more continuously. There may be a maximum level of perceived self-efficacy for people, which would likely differ by individual. The data in this study also show that for some people, GSE may temporarily increase and then drop back down. Given that this study included only two assessments beyond the intake, it is unclear whether there may have been several fluctuations in GSE throughout treatment if the measure had been administered to participants more frequently.

The second method of assessing change in perceived self-efficacy over the course of DBT treatment was examining skills effectiveness ratings that participants completed daily on the DBT diary card. This rating scale measures a specific type of self-efficacy, designed for the purposes of this study. It measures one's perceived ability to use DBT skills effectively. Average weekly ratings of this variable were calculated, and the participants' graphed averages reveal a great amount of variability in skills effectiveness over the course of treatment. All participants saw several shifts up and down in average skills effectiveness, particularly in the first third of treatment.

Only one participant, Participant B, demonstrated a clear positive trend in average skills effectiveness ratings over the course of treatment. Participant B's graphed weekly ratings of skills effectiveness indicate gradual return to baseline (an average rating of 4) after lower ratings in the first third of treatment. After returning to her positive-level baseline, she maintained similar ratings until the end of treatment. These findings are fairly consistent with the hypothesis that perceived self-efficacy would increase over the course of treatment. Participant C demonstrated much more drastic fluctuation in skills effectiveness throughout treatment, with a somewhat positive trend towards the end of treatment. His final average skills effectiveness rating, 3.8, was higher than his baseline rating of 3. Participant C also had a very positive average score of 5 in week ten, which was an outlier in comparison to his other weekly averages. These findings provide some additional support for the hypothesis that perceived self-efficacy would increase during treatment, albeit more erratically for Participant C. While Participant D's ratings offer minimal data from which to draw conclusions, the averages she did submit indicate a somewhat positive trajectory towards the end of treatment, with the exception of a sharp decline in skills effectiveness during week 24. None of her weekly skills effectiveness averages dipped below a neutral level.

Participants A's ratings over time do not demonstrate positive change and consistently fluctuate with no positive trend. In fact, Participants A's final average skills effectiveness rating, 2.57, was lower than her baseline average skills effectiveness rating of 3.67. These findings are in opposition to the hypothesis that self-efficacy would increase over the course of treatment; however, when considering certain portions of Participant A's treatment, one could say that she experienced increases in skills effectiveness for certain periods of time.

It is important to note that the majority of average weekly skills effectiveness ratings were in the positive range (i.e., ratings higher than 3). Out of a total of 70 weekly average ratings submitted from all participants combined, 64 were in the positive range. The average skills effectiveness rating across all participants was 3.42 ($SD = 0.61$), which indicates somewhere between "felt neither effective nor ineffective in my use of skills" and "felt mostly effective in my use of skills." The modal score was a 4, indicating that moderately positive ratings were most common. Therefore, on the whole, participants felt somewhat effective in their use of DBT skills.

Only one participant, Participant D, had a final skills effectiveness average rating at a 4 or above, indicating that even in the final weeks of treatment, participants were not feeling overly confident about their ability to use DBT skills. There are several potential explanations for these ratings. One is that patients with BPD have been found to exhibit a bias towards accessing negative memories and having negative evaluations of themselves (Baer, Peters, Eisenlohr-Moul, Geiger, & Sauer, 2012), which has been hypothesized to bias their responses to self-report questionnaires (Lazarus, Cheavens, Festa, & Rosenthal, 2014). If this is the case, it may be unlikely for BPD patients to report overly positive skills effectiveness ratings, even when they objectively understand and use the skills appropriately.

Another explanation is that six months of DBT was not enough to see consistent perceived effectiveness in implementation of skills in the high positive range. As originally designed and researched by Linehan, DBT treatment was one year (Linehan, 1993a), whereas this study's duration was six months. In the one-year treatment, participants go through the skills modules twice, presumably leading to greater consolidation of skills knowledge and self-efficacy in implementing skills. It is possible that six months was not enough time in DBT treatment for skills effectiveness ratings to enter the high positive range in a consistent way. Finally, a third potential explanation relates to many of the participants not making frequent use of the DBT Coach or phone coaching. Skills coaching is considered an essential strategy for skills generalization. It is possible that more frequent, consistent use of skills coaching is necessary for producing sustained positive changes in self-efficacy in implementing DBT skills. Therefore, some participants' intermittent and infrequent use of skills coaching may not have been enough to have a significant effect on skills use self-efficacy.

Participants' changes in skills effectiveness ratings can also be considered in light of their reported GSE scores over the course of treatment. Participant A's lack of improvement beyond baseline skills effectiveness ratings and dip below baseline at the end of treatment correspond to the lack of sustained positive change in her GSE scores. Participant B's positive, sustained improvement in skills effectiveness also corresponds to the trajectory of her GSE scores. Participant C's increase on the GSE from intake to mid-treatment aligns with his jump to a high positive average skills effectiveness rating during week ten, roughly halfway through treatment. Participant C's skills effectiveness ratings and GSE scores both see a lack of fully sustained positive improvement at the end of treatment. Participant D's two very positive skills effectiveness ratings towards the end of treatment correspond with her high GSE score at post-treatment. Taken

together, at least some portions of participants' graphed skills effectiveness ratings map onto their

GSE scores over time; therefore, it may be the case that general self-efficacy and self-efficacy in

implementing DBT skills are related and change in a similar way. The two variables likely tap into

a similar construct.

        **Aim two: Self-efficacy and the use of skills coaching.** The second aim of this study was

to explore differences in ratings of perceived self-efficacy in DBT skills use when using different

categories of skills coaching, including no skills coaching at all. We hypothesized that perceived

skills effectiveness would be rated by participants as higher on days using skills coaching than on

days not using skills coaching, and that perceived skills effectiveness would be rated by as higher

on days using the DBT Coach than on days using phone coaching with the therapist.

        Participant A's limited used of both types of skills coaching makes it challenging to

identify any substantial patterns; however, her ratings provide some evidence of greater perceived

self-efficacy on days using skills coaching than days using no coaching, as well as greater self-

efficacy on days receiving phone coaching than days receiving coaching from the DBT Coach.

Participant B exhibited a slightly higher average on days not use skills coaching than days using

coaching, which is in opposition to our initial hypothesis. The slightly higher skills effectiveness

average on days in which Participant B used the DBT Coach, as compared with days in which she

used phone coaching, is in line with the hypothesis that DBT Coach use would be associated with

higher self-efficacy ratings than phone coaching use. Participant C's data reveal higher ratings of

skills effectiveness on days not using coaching (as compared to days using coaching), with a

slightly higher skills effectiveness average associated with phone coaching than with the DBT

Coach. Finally, Participant D's data reveal higher ratings of skills effectiveness on days using

phone coaching than days using no type of coaching, with her lowest skills effectiveness ratings

being those associated with days using the DBT Coach. However, Participant D's average skills effectiveness on days using phone coaching was calculated using only one daily rating provided out of four days of use; therefore, these findings should be interpreted with caution.

One of the most interesting findings was that for three participants, skills effectiveness ratings were, on average, higher on days not using skills coaching than days using phone coaching, and for two participants, skills effectiveness ratings were, on average, higher on days not using coaching than days using the DBT Coach. It was hypothesized that the opposite effect would be found, given that both types of skills coaching are designed to enhance practice of skills. It is possible that these three participants used skills coaching on "tougher" days during which more challenging problems or crises arose. The difficulty level of the situations to which participants attempted to apply skills likely influenced participants' ratings of perceived skills effectiveness. For example, when applying DBT skills to more minor situations, participants may have more easily rated their skills effectiveness as higher than if they were attempting to apply DBT skills to very challenging life situations. It is also possible that no matter how far along in treatment, these participants associated the need for skills coaching with a failure or inadequacy on their part, which could potentially have negatively affected their ability to implement skills and/or colored their ratings of skills effectiveness. The relatively low number of days using skills coaching in comparison to days not using coaching for Participants A, C, and D, may be evidence of participants' negative association with seeking help. Furthermore, infrequent use of the two types of coaching by these three participants may have prevented them from experiencing the full benefits of skills coaching in terms of its influence on self-efficacy.

In comparing skills effectiveness on days using phone coaching versus days using the DBT Coach, the participants were split in terms of which was associated with higher perceived skills

effectiveness. Three participants reported higher skills effectiveness when receiving phone coaching with their therapists, while the fourth participant reported higher skills effectiveness when using the DBT Coach. Therefore, the majority of participants' data revealed the opposite effect from our hypothesis that skills effectiveness would be rated as higher when using the DBT Coach. It is possible that the three participants found coaching with the therapist to be more helpful for clarifying skills components than coaching with the DBT Coach. The ability to ask an expert in DBT specific questions about skills use or one's personal situation may be an important distinction between phone coaching and use of the DBT Coach. Particularly when patients are experiencing a high intensity of emotions, it may be more challenging to self-coach using the DBT Coach.

Given that one participant's skills effectiveness was higher on days using the DBT Coach, which type of coaching is more favorable for self-efficacy may be individualized based on certain patient characteristics. Patient characteristics such as frustration with using the DBT Coach and unfamiliarity with app technology might be accompanied by less favorable ratings of self-efficacy on days using the DBT Coach than on days when the participant called the therapist and using app technology was unnecessary. Alternatively, patient characteristics such as shame associated with how one interacts interpersonally or the belief that asking other people for help is a sign of a weakness would potentially be accompanied by less favorable ratings of self-efficacy on days when a patient needed to call her therapist than on days when the patient was able to coach herself using the DBT Coach. The nature of the situation requiring skills coaching may also interact with patient characteristics to influence the patient's perceived self-efficacy. For example, if a patient believes that it is only acceptable to ask for someone's help in crisis situations, this patient may report lower perceived self-efficacy when receiving phone coaching for smaller situations, such as

an interpersonal interaction, than when receiving phone coaching surrounding issues such as a financial crisis.

Another goal of this study was to explore whether using both types of skills coaching on the same day was beneficial. Two out of the four participants did not have any days during which they used both types of coaching, and one participant used both types of coaching on only two days out of the six-month treatment period. Participant C used both types of coaching on two days, during which he reported lower skills effectiveness than on days using either type of skills coaching alone. A greater sample of days during which Participant C used both types of coaching together would be needed to assess whether these ratings were outliers or if there was indeed something about combining the two types of coaching that was associated with lower perceived skills effectiveness for Participant C. It is possible that needing to use both types of coaching in one day made Participant C feel more helpless and, in turn, less self-efficacious. If needing to use skills coaching in general is actually associated with negative self-efficacy beliefs for some participants because of an association between needing help and failure, having to use *both* forms of skills coaching on the same day may have amplified this effect for Participant C. It is also possible that he was more likely to use both types of coaching on particularly "tough" days, thus he may have been less likely to rate skills effectiveness as high, given the increased difficulty of the situations to which he was applying DBT skills.

Only one participant, Participant B, used the two types of skills coaching together on multiple days. This leads to the question of whether there was something different about Participant B that led her to use the two types of coaching together more frequently than the other participants. Three hypotheses about what was different about Participant B will be outlined.

One possibility is that Participant B had more severe BPD symptoms and greater skills deficits than the other participants. If this were the case, she may have required more of both types of skills coaching, creating more opportunities for days with overlap between the two types of coaching. This hypothesis is plausible, given that Participant B struggled with intense, frequent urges to engage in NSSI throughout treatment, as well as a high severity of interpersonal difficulty, both of which were greater than the other three participants at times. However, all participants in this study met criteria for BPD and had a recent history of suicidal behavior. Given this, Participant B may not be considered any more severe than the other participants, depending on which variables are considered.

A second possibility for why Participant B used the two types of coaching on the same day more frequently is that Participant B may have been more invested in learning the DBT skills and learning how to apply them to her day-to-day life. This may have made her more likely to seek out the two types of coaching, including their combination, to clarify how to use particular skills. Finally, a third possibility for why Participant B used the two coaching types together more frequently is that her therapist encouraged her or asked her to do so.  Future studies might inquire about participants' thought process in selecting which type of skills coaching to use and reasons for using the two in combination.

Participant B reported, on average, higher skills effectiveness when using both types of coaching together than when using either type of coaching alone, suggesting that this was a positive experience for Participant B. Thus, it would be beneficial to determine which variables were associated with Participant B's more frequent use of both types of skills coaching and benefit from doing so. It is possible that for patients like Participant B who are more severe in BPD

symptomatology, demonstrate greater skills deficits, and are highly motivated for treatment, it may be beneficial to encourage use of the two types of skills coaching together.

Participants A and D never used the two types of coaching on the same day and Participant C used them together on only two days. These three participants may have believed that one type of coaching was sufficient to guide them through skills use, or that the two types of skills coaching were applicable for different types of situations. However, even if these three participants *believed* that one type of coaching was sufficient, it is still possible that using the two together would have been objectively more beneficial for skills acquisition and effective use. These three participants also had significantly less use of skills coaching in general, in comparison to Participant B. It is possible that these participants believed that they did not need skills coaching and that they could effectively use skills without coaching, which is supported by relatively high average ratings of skills effectiveness on days participants used skills without skills coaching. Another potential reason for participants' low use of coaching is that participants believed skills coaching or DBT skills more broadly to be unhelpful. Therapist and group skills leaders' encouragement of skills coaching, strength of participants' relationships with their therapists, engagement in treatment, and memory for skills coaching being an option are additional factors that may have influenced participants' frequency of coaching use.

A final goal related to the second aim was to explore how ratings of skills effectiveness associated with the two types of skills coaching differed from the first to second half of DBT treatment. It was hypothesized that not needing to rely on skills coaching might be associated with greater skills effectiveness in the second half of treatment, as this would potentially indicate a more advanced level of skills use. Due to the low use of either type of skills coaching by two participants, only Participants B and C's data were used to explore these differences.

In the second half of treatment, Participant B appears to have started to rely more on the DBT Coach than phone coaching from her individual therapist, as evidenced by the frequency of use of these two types of coaching. Participant B's skills effectiveness ratings increased overall, including on days during which she used DBT skills without using either type of skills coaching. Participant B demonstrated favorable ratings in association with days not using coaching in the *first* half of treatment, which is in line with the second potential pattern predicted at the start of this study. However, it was expected that this pattern would be more likely found in the second half of treatment, while for Participant B it was more pronounced in the first half of treatment. Her average skills effectiveness rating on days using skills without skills coaching in the first half of treatment was slightly higher than days using either type of skills coaching alone, though lower than days using both types of coaching in combination. In the second half of treatment, her skills effectiveness average when not using coaching was somewhat higher than it was in the first half of treatment. However, this average was roughly the same as it was when using the various types of coaching in the second half of treatment.

It is possible that in the second half of treatment, Participant B became more comfortable seeking out coaching (i.e., less feelings of failure or perceived inadequacy) and more effective in applying this coaching to difficult situations; therefore, her perceived skills effectiveness on days using coaching managed to catch up to her skills effectiveness on days using skills without coaching. She also may have sought out coaching for less difficult situations in the second half of treatment than the first half, which might have led to increased average perceived skills effectiveness on days using coaching in the second half of treatment.

Participant C's data were also assessed for changes from the first to second half of treatment. In the second half of treatment, he used both types of coaching less frequently than in

the first half of treatment. He reported lower average skills effectiveness ratings in the second half of treatment than in the first half of treatment for days using the DBT Coach. His average skills effectiveness on days using phone coaching increased slightly from the first to second half of treatment, possibly due to a stronger relationship with his therapist or decreased shame related to reaching out to another person for help. His skills effectiveness on days using skills without any skills coaching remained relatively the same from the first to second half of treatment.

In contrast to Participant B, Participant C's ratings do not demonstrate the same consistently positive changes in skills effectiveness for the various types of skills coaching over the course of treatment. This is also in line with his drop in GSE scores from mid- to post-treatment. The lack of positive change seen by Participant C is likely attributable to the chain of events that occurred during his treatment, rather than anything directly related to his use of skills coaching. Shortly before his mid-treatment assessment, Participant C made a suicide attempt with full intent to die that was followed by a several week stay in the hospital. Having had this failed suicide attempt, Participant C likely experienced a great amount of shame and disappointment in still being alive. This likely affected his trajectory in treatment, including the gains he made in the second half of treatment, as well as his perceived self-efficacy ratings after this the attempt.

**Consideration of other variables.** Life events, such as Participant C's suicide attempt during treatment, are just one example of other variables that may have influenced participants' reported GSE scores and skills effectiveness ratings in this study. Given that this is not a controlled study, it cannot be determined whether changes in GSE scores were due to receiving DBT treatment, or whether differences in skills effectiveness ratings were in fact due to the use of different types of skills coaching. Other life events that may influence ratings include negative interpersonal interactions with people in a patient's life (including the therapist), termination of

relationships, job loss, financial difficulties, and stressful periods of work or school. These life events would likely affect daily ratings of skills effectiveness as well as reflections on GSE over the prior three-month period.

The ineffective behaviors associated with BPD and behaviors associated with participants' comorbid diagnoses also likely influenced participants' self-efficacy ratings in this study. Ineffective behaviors associated with BPD include NSSI, impulsive sexual behavior, physical or verbal fights with others, avoidance, and anger outbursts, among others. If a participant engaged in any of these behaviors on a given day, it would likely have reduced the participant's rating of skills effectiveness at the end of the day, regardless of how effectively the patient used DBT skills at other points during the day. Skills effectiveness ratings may have been even more strongly affected if these behaviors were being explicitly targeted in treatment with the patient's individual therapist.

Other comorbid diagnoses that may have influenced perceived self-efficacy ratings include depression and substance use disorders. Depression is often accompanied by worthlessness, guilt, and hopelessness, which would negatively affect self-efficacy beliefs. Even without being clinically depressed, having a "bad day" in which a participant felt particularly sad or down might have negatively influenced ratings of self-efficacy. Furthermore, if a participant who was trying to cut down on use of substances had an episode of use, he may have rated skills effectiveness as lower, despite some effective use of skills that day. One instance of poor skills implementation during the day may have colored participants' evaluations of their average skills effectiveness that day. This may be particularly true given the bias that BPD patients demonstrate in retrieval of negative memories over positive memories (Baer et al., 2012).

On a more technical note, average ratings of skills effectiveness may have been influenced by inclusion of incomplete phone calls in the phone coaching category. In looking at therapists'

session notes, it was evident that some phone coaching attempts made by participants were terminated early after the therapist found out that the patient had already engaged in the problematic behavior, e.g., cutting (as per the 24-hour rule of phone coaching in DBT; Linehan, 1993a). These types of calls were coded as phone coaching because the intent of the communication was for skills coaching and not enough details were known about the calls to determine whether some skills coaching was actually received prior to the therapist ending the phone call. When phone coaching calls are ended abruptly like this, patients often experience shame and anger towards the therapist. This might have affected the perceived helpfulness of phone coaching calls and participants' level of emotion dysregulation, which in turn would influence corresponding perceived skills effectiveness ratings on those days. The presence of this type of call may have negatively weighted participants' average ratings of skills effectiveness on days using phone coaching.

**Implications for Practice**

The findings in this study suggest that for some patients, it may be beneficial for DBT providers to encourage use of skills coaching, either through phone coaching, use of the DBT Coach, or the two types of coaching combined. Providers should work with patients to determine the barriers to using the two types of skills coaching and engage in problem solving with them to reduce these barriers. Frequent discussion in individual therapy sessions about the use of and helpfulness of the two types of skills coaching would likely be valuable. If further research confirms that seeking out skills coaching can be associated with feelings of failure or inadequacy in some patients, providers should focus on normalizing the need for help and challenging related irrational beliefs.

This study also provides support for the feasibility of positive change in self-efficacy beliefs over the course of DBT treatment. All of the participants in this study had a diagnosis of BPD and recent suicidal behavior; yet, they still saw improvements in general self-efficacy beliefs over a six-month period. This study suggests that, at times, changes in self-efficacy may be nonlinear, and patients may experience temporary decreases in self-efficacy before improvement is seen. Providers should use this information to remind themselves and their patients that change is possible, even when patients exhibit a number of skills deficits and are encountering a number of crises. These findings may also help normalize the experience of patients who feel less self-efficacious at times during treatment and prevent them from getting discouraged about the possibility of improvement.

**Limitations and Future Directions**

In addition to the uncontrolled, exploratory nature of this study, there are several other limitations that affect the conclusions that can be drawn from this data. Due to the correlational nature of this data, no directional relationships can be assumed. Furthermore, the high percentage of dropouts, and in turn, the small sample size, provided only a small number of participants to examine patterns of skills coaching usage and self-efficacy beliefs. The data was further limited by two participants' very limited use of both types of skills coaching and some participants' infrequent completion of ratings on the diary card. To improve upon the current study, a future exploratory study might include a greater number of participants to account for the dropout rate and make improvements to the method of diary card completion and collection to ensure the accuracy and amount of data for analysis. It would be beneficial to check data submission throughout the study and be in contact with participants accordingly in order to prevent an

abundance of missing data. Future research about the reasons involved in some patients' infrequent use of skills coaching in DBT is warranted.

Another potential limitation is the possibility of a restricted range in the skills effectiveness scale, in that the participants did not use the full range of responses. Participants were unlikely to rate their skills effectiveness as a "1" or a "5." Out of all of the days rated for skills effectiveness by all four participants combined, 2.33% of the days were rated as "1." All but one of these ratings of "1" were reported by the same participant. 4.02% of the days were rated as "5." One participant never rated their skills effectiveness as a "5" and another only rated their skills effectiveness as a "5" once. It is unclear whether this was due to participants actually not experiencing these two extreme levels of skills effectiveness, or whether there were other factors playing into them not rating these ends of the scale, such as the wording of the Likert-scale items. A greater range of ratings may have allowed for greater differentiation among the types of skills coaching.

Additional limitations include the reliance on diary card data and therapist session notes for data collection. While participants' use of the DBT Coach was time-stamped and submitted electronically, therapists' recording of phone coaching dates and participants' ratings of skills effectiveness relied on memory. Patients in DBT often fill out diary cards retrospectively when they arrive at their individual therapy session; therefore, the participants may at times have confused dates or forgotten events that occurred when completing skills effectiveness ratings. This may have prevented skills effectiveness ratings from properly aligning with DBT Coach use, which was time-stamped and not subject to the same memory problems. To improve upon the current study, a future study might include a follow-up research question regarding perceived skills effectiveness within the design of the DBT Coach itself.

Based on the preliminary findings of this study, future research might use controlled studies to investigate: 1) whether adults with BPD more broadly exhibit lower general self-efficacy beliefs and how this differs from other clinical populations, 2) whether using both types of skills coaching is more helpful for self-efficacy beliefs than one type alone; 3) whether one type of skills coaching is more helpful over the other in certain situations in regards to self-efficacy in skills implementation, and 3) how other variables, such as beliefs about the acceptability of asking for help, influence decisions to use the different types of skills coaching and the benefit received while using them.

**Summary**

In summary, this study explored the self-efficacy beliefs of four patients with BPD and a history of suicidal behavior that received six-months of DBT treatment augmented with the DBT Coach mobile app. In line with our initial hypothesis, all participants saw positive changes in general self-efficacy at some point during treatment, and by the end of treatment, some reported general self-efficacy scores that approached the normal range for adults in the U.S. One participant reported greater perceived skills effectiveness on average when using skills coaching than when not using skills coaching. In disconfirmation of our initial hypothesis, two participants reported greater skills effectiveness when not using skills coaching than when using either type of skills coaching, and one participant reported greater skills effectiveness when not using coaching than when using the DBT Coach. Skills coaching may have been used more frequently on particularly challenging days, which may have decreased the likelihood of participants rating self-efficacy as high on these days. Whether the DBT Coach or phone coaching with the therapist was associated with greater skills effectiveness varied by participant. The hypothesis that skills effectiveness would be higher on days using the DBT Coach than on days using phone coaching was confirmed

for only one participant. One participant demonstrated evidence in support of an additive benefit of using both forms of skills coaching on the same day.

The hypothesis that not having to use skills coaching would be perceived as an advanced form of skills use in the second half of treatment and, thus, skills effectiveness when not needing coaching would exceed skills effectiveness when using the two types of skills coaching, was not confirmed for the two participants examined. For one participant, skills effectiveness when not using coaching increased in the second half of treatment, but was comparable to skills effectiveness when using skills coaching. Greater skills effectiveness when not using skills coaching was more pronounced in the *first* half of treatment for this participant. For the other participant, skills effectiveness ratings only increased from the first to second half of treatment for days using phone coaching.

The findings in this study are in line with the assumption that DBT treatment produces positive changes in self-efficacy, which is likely closely related to the teaching and coaching of DBT skills. This study provides some preliminary evidence of the utility of mobile app technology in the context of standard psychotherapy, particularly in regards to encouraging skills acquisition, skills use, and general self-efficacy beliefs.

References

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.

Baer, R. A., Peters, J. R., Eisenlohr-Moul, T. A., Geiger, P. J., & Sauer, S. E. (2012). Emotion-related cognitive processes in borderline personality disorder: A review of the empirical literature. *Clinical Psychology Review*, *32*, 359–369.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, *84*, 191-215.

Bandura, A., Adams, N. E., Hardy, A. B., & Howells, G. N. (1980). Tests of the generality of self-efficacy theory. *Cognitive Therapy and Research*, *4*, 39–66.

Bardone-Cone, A. M., Abramson, L. Y., Vohs, K. D., Heatherton, T. F., & Joiner Jr, T. E. (2006). Predicting bulimic symptoms: An interactive model of self-efficacy, perfectionism, and perceived weight status. *Behaviour Research and Therapy*, *44*(1), 27-42.

Beebe, L. H. (2001). Community nursing support for patients with schizophrenia. *Archives of Psychiatric Nursing*, *15*(5), 214-222.

Ben-Porath, D. D. (2004). Intersession telephone contact with individuals diagnosed with borderline personality disorder: Lessons from dialectical behavior therapy. *Cognitive and Behavioral Practice*, *11*(2), 222-230.

Benight, C. C., & Bandura, A. (2004). Social cognitive theory of posttraumatic recovery: The role of perceived self-efficacy. *Behaviour Research and Therapy*, *42*(10), 1129-1148.

Biran, M., & Wilson, G. T. (1981). Treatment of phobic disorders using cognitive and exposure methods: A self-efficacy analysis. *Journal of Consulting and Clinical Psychology*, *49*(6), 886-99.

Bjork, E. L., & Bjork, R. A. (2011). Making things hard on yourself, but in a good way: Creating

    desirable difficulties to enhance learning. In M .A. Gernsbacher, R. W. Pew, L. M. Hough,

    & J. R. Pomerantz (Eds*.), Psychology and the real world: Essays illustrating fundamental

    contributions to society* (pp. 56-64). New York, NY: Worth.

Blittner, M., Goldberg, J., & Merbaum, M. (1978). Cognitive self-control factors in the reduction

    of smoking behavior. *Behavior Therapy*, *9*, 553-561.

Boschen, M. J., & Casey, L. M. (2008). The use of mobile telephones as adjuncts to cognitive

    behavioral psychotherapy. *Professional Psychology: Research and Practice*, *39*(5), 546.

Burgess, M., & Chalder, T. (2001). Telephone cognitive behaviour therapy for chronic fatigue

    syndrome in secondary care: A case series. *Behavioural and Cognitive*

    *Psychotherapy*, *29*(4), 447-456.

Carroll, K. M., Ball, S. A., Martino, S., Nich, C., Babuscio, T. A., Nuro, K. F., ... & Rounsaville,

    B. J. (2008). Computer-assisted delivery of cognitive-behavioral therapy for addiction: a

    randomized trial of CBT4CBT. *The American Journal of Psychiatry*, *165*(7), 881.

Casey, L. M., Newcombe, P. A., & Oei, T. P. (2005). Cognitive mediation of panic severity: The

    role of catastrophic misinterpretation of bodily sensations and panic self-efficacy.

    *Cognitive Therapy and Research*, *29*(2), 187-200.

Casey, L. M., Oei, T. P., Newcombe, P. A., & Kenardy, J. (2004). The role of catastrophic

    misinterpretation of bodily sensations and panic self-efficacy in predicting panic severity.

    *Journal of Anxiety Disorders*, *18*(3), 325-340.

Clough, B. A., & Casey, L. M. (2011). Technological adjuncts to increase adherence to therapy: A

    review. *Clinical Psychology Review*, *31*(5), 697-710.

Collins (1982). *Self-efficacy and ability in achievement behavior*. Paper presented at the Annual

      Meeting of the American Educational Research Association, New York.

Erhardt, D., & Dorian, E. (2013). Going mobile: A case vignette illustrating the integration of

      mobile technology in psychotherapy. *Independent Practitioner*, *33*, 15.

Etringer, B. D., Altmaier, E. M., & Bowers, W. (1989). An investigation into the cognitive

      functioning of bulimic women. *Journal of Counseling and Development*, *68*(2), 216-219.

Ewart, C. K., Taylor, C. B., Reese, L. B., & Debusk, R. F. (1984). Effects of early

      postmyocardial infraction exercise testing on self-perception and subsequent physical

      activity. *American Journal of Cardiology*, *41*, 1076-1080.

First, M, B., Gibbon M., Spitzer R. L, Williams, J. B. W., & Benjamin, L. S. *Structured Clinical

      Interview for DSM-IV Axis II Personality Disorders, (SCID-II)*. Washington, D.C.:

      American Psychiatric Press, Inc., 1997.

Fogg, B. J., & Eckles, D. (2007). *Mobile persuasion: 20 perspectives of the future of behavior

      Change.*  Palo Alto, CA: Stanford Captology Media.

Hansen, N. B., Lambert, M. J., & Forman, E. M. (2002). The psychotherapy dose-response effect

      and its implications for treatment delivery services. *Clinical Psychology: Science and

      Practice*, *9*(3), 329-343.

Hesslinger, B., van Elst, L. T., Nyberg, E., Dykierek, P., Richter, H., Berner, M., & Ebert, D.

      (2002). Psychotherapy of attention deficit hyperactivity disorder in adults. *European

      Archives of Psychiatry and Clinical Neuroscience*, *252*(4), 177-184.

Kim, H., Yoo, Y., & Shim, H. (2005). Effects of an Internet-based intervention on plasma

      glucose levels in patients with Type 2 diabetes. *Journal of Nursing Care Quality, 20,* 335–

      340.

Kinsaul, J. A., Curtin, L., Bazzini, D., & Martz, D. (2014). Empowerment, feminism, and self-efficacy: Relationships to body image and disordered eating. *Body Image*, *11*, 63-67.

Kremers I. P., Spinhoven, P., Van der Does A. J. W., & Van Dyck, R. (2006). Social problem solving, autobiographical memory and future specificity in outpatients with borderline personality disorder. *Clinical Psychology & Psychotherapy*, *13*, 131–137.

Kuhn, E., Eftekhari, A., Hoffman, J. E., Crowley, J. J., Ramsey, K. M., Reger, G. M., & Ruzek, J. I. (2014). Clinician perceptions of using a smartphone app with prolonged exposure therapy. *Administration and Policy in Mental Health and Mental Health Services Research*, 1-8.

Kuhn, E., & Hoffman, J. E. (2012). Mental and behavioral health apps for service members, veterans, and providers. Retrieved from http://www.apa.org/divisions/div46/vet%20apps.html

Landon, T. M., Ehrenreich, J. T., & Pincus, D. B. (2007). Self-efficacy: A comparison between clinically anxious and non-referred youth. *Child Psychiatry and Human Development*, *38*(1), 31-45.

Lazarus, S. A., Cheavens, J. S., Festa, F., & Zachary Rosenthal, M. (2014). Interpersonal functioning in borderline personality disorder: A systematic review of behavioral and laboratory-based assessments. *Clinical Psychology Review*, *34*(3), 193-205.

Linehan, M. M. (1993a). *Cognitive behavioral treatment of borderline personality disorder*. New York, NY: Guilford Press.

Linehan, M. M. (1993b). *Skills training manual for treating borderline personality disorder*. New York, NY: Guilford Press.

Linehan, M. M., Bohus, M., & Lynch, T. (2007) Dialectical Behavior Therapy for Pervasive Emotion Dysregulation: Theoretical and Practical Underpinnings. In: J. Gross (Ed.), *Handbook of Emotion Regulation*. New York, NY: Guilford.

McDermott, J. (2013, May 28). A majority of U.S. mobile users are now smartphone users.

Retrieved from http://adage.com/article/digital/a-majority-u-s-mobile-users-smartphone-

users/241717/.

Morris, M., Kathawala, Q., Leen, T., Gorenstein, E., Guilak, F., Labhard, M., & Deleeuw, W.

(2010). Mobile therapy: Case study evaluations of a cell phone application for emotional

self-awareness. Journal Of Medical Internet Research, 12(2), 3.

Muris, P. (2002). Relationships between self-efficacy and symptoms of anxiety disorders and

depression in a normal adolescent sample. *Personality and Individual Differences*, *32*(2),

337-348.

Neacsiu, A. D., Rizvi, S. L., & Linehan, M. M. (2010). Dialectical behavior therapy skills use as

a mediator and outcome of treatment for borderline personality disorder. *Behaviour

Research and Therapy*, *48*(9), 832.

Ozer, E. M., & Bandura, A. (1990). Mechanisms governing empowerment effects: A self-

efficacy analysis. *Journal of Personality and Social Psychology*, *58*, 472–486.

Palmer, R., Birchall, H., McGrain, L., & Sullivan, V. (2002). Self-help for bulimic disorders: A

randomized controlled trial comparing minimal guidance with face-to-face or telephone

guidance. *British Journal of Psychiatry*, *181*, 230–235.

Rizvi, S. L., Dimeff, L. A., Skutch, J., Carroll, D., & Linehan, M. M. (2011). A pilot study of the

DBT coach: An interactive mobile phone application for individuals with borderline

personality disorder and substance use disorder. *Behavior Therapy*, *42*(4), 589-600.

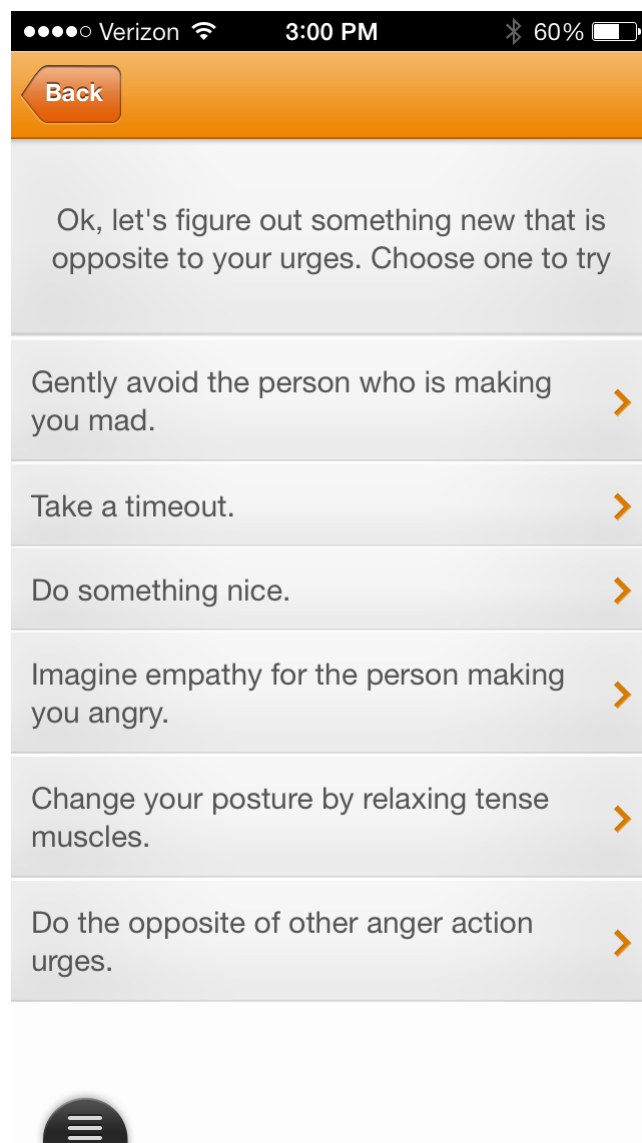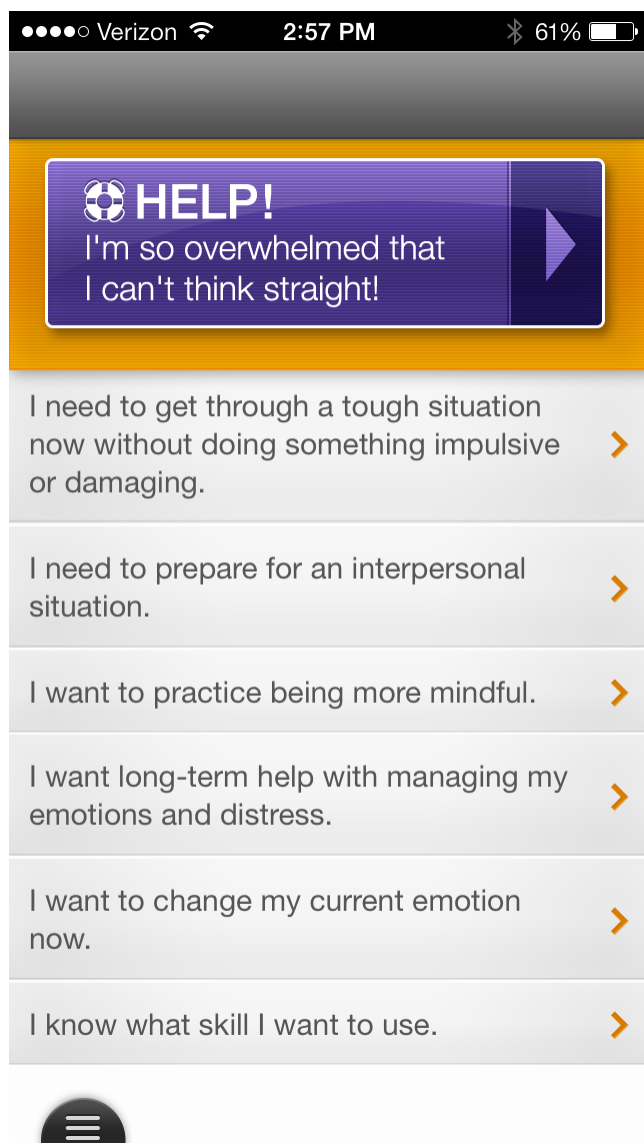Scholz, U., Gutiérrez-Doña, B., Sud, S., & Schwarzer, R. (2002). Is general self-efficacy a

universal construct? Psychometric findings from 25 countries. *European Journal of

Psychological Assessment, 18*(3), 242-251.

Schwarzer, R., & Jerusalem, M. (1995). Generalized Self-Efficacy Scale. In J. Weinman,

S. Wright, & M. Johnston, *Measures in health psychology: A user's portfolio. Causal and control beliefs* (pp. 35-37). Windsor, UK: NFER-NELSON.

Shapiro, J. R., Bauer, S., Andrews, E., Pisetsky, E., Bulik-Sullivan, B., Hamer, R. M., & Bulik, C. M. (2010). Mobile therapy: Use of text-messaging in the treatment of bulimia nervosa. *International Journal of Eating Disorders*, *43*(6), 513-519.

Steca, P., Abela, J. R. Z., Monzani, D., Greco, A., Hazel, N. A., & Hankin, B. L. (2014). Cognitive vulnerability to depressive symptoms in children: The protective role of self-efficacy beliefs in a multi-wave longitudinal study. *Journal of Abnormal Child Psychology*, *42*(1), 137-148.

Strecher, V. J., DeVellis, B. M., Becker, M. H., & Rosenstock, I. M. (1986). The role of self-efficacy in achieving health behavior change. *Health Education Quarterly*, *13*, 73-91.

Telch, C. F., Agras, W. S., & Linehan, M. M. (2001). Dialectical behavior therapy for binge eating disorder. *Journal of Consulting and Clinical Psychology*, *69*(6), 1061-1064.

Trudeau, M. (2010). Mental health apps: Like a 'therapist in your pocket.' *NPR News*. Retrieved from http://www.npr.org/templates/story/story.php?storyId=127081326.

Turner, J. A., Holtzman, S., & Mancl, L. (2007). Mediators, moderators, and predictors of therapeutic change in cognitive–behavioral therapy for chronic pain. *Pain*, *127*(3), 276-286.

Wells, A., Garvin, V., Dohm, F., & Striegel-Moore, R. (1997). Telephone-based guided self-help for binge eating disorder: A feasibility study. *International Journal of Eating Disorders*, *21*, 341–346.

Wiederhold, B. K., Wiederhold, M. D., Jang, D. P., & Kim, S. I. (2000). Use of cellular telephone

    therapy for fear of driving. *CyberPsychology & Behavior*, *3*(6), 1031-1039.

Zanarini, M. C., Frankenburg, F. R., Reich, D. B., & Fitzmaurice, G. (2010). The 10‑year course

    of psychosocial functioning among patients with borderline personality disorder and axis II

    comparison subjects. *Acta Psychiatrica Scandinavica*, *122*(2), 103-109.

Zimmerman, B. J. (2000). Self-efficacy: An essential motive to learn. *Contemporary*

    *Educational Psychology*, *25*, 82-91.

Zimmerman, M. & Mattia, J. I. (1999). Axis I diagnostic comorbidity and borderline personality

    disorder. *Comprehensive Psychiatry, 40,* 245-252.

Appendix A

Screenshots of the DBT Coach

Appendix B

# **GSE**

*Please indicate how much following statements apply to you by writing the appropriate number from the scale below on the line beside each item:*

_____

1---------------------------------2---------------------------------3---------------------------------4
Not at all true                     Hardly true                    Moderately true                    Exactly true
_____


_____  1) I can always manage to solve difficult problems if I try hard enough.

_____  2) If someone opposes me, I can find means and ways to get what I want.

_____  3) It is easy for me to stick to my aims and accomplish my goals.

_____  4) I am confident that I could deal efficiently with unexpected events.

_____  5) Thanks to my resourcefulness, I know how to handle unforeseen situations.

_____  6) I can solve most problems if I invest the necessary effort.

_____  7) I can remain calm when facing difficulties because I can rely on my coping abilities.

_____  8) When I am confronted with a problem, I can usually find several solutions.

_____  9) If I am in trouble, I can usually think of something to do.

_____  10) No matter what comes my way, I'm usually able to handle it.

Appendix C

| DBT-RU Diary Card | | | | | | | ID # | | Filled out in session? Y N | | | How often did you fill this out? _ Daily __4-6x __ 2-3x __ 1x | | | | | Date started | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day and Date | Urge to Use | shame | fear | joy | anger | sad | Prescription Medications | | Alcohol and Drugs | | SI | Misery | Self-Harm | | Used Skills | Skills Rating* | Used App? | |
| | 0-5 | 0-5 | 0-5 | 0-5 | 0-5 | 0-5 | # | Specify | # | Specify | 0-5 | 0-5 | Urges 0-5 | Action Y/N | Y/N | 0-5 | Y/N | |
| Mon | | | | | | | | | | | | | | | | | | |
| Tue | | | | | | | | | | | | | | | | | | |
| Wed | | | | | | | | | | | | | | | | | | |
| Thu | | | | | | | | | | | | | | | | | | |
| Fri | | | | | | | | | | | | | | | | | | |
| Sat | | | | | | | | | | | | | | | | | | |
| Sun | | | | | | | | | | | | | | | | | | |

**\* SKILLS RATING**
0 = N/A, did not use skills
1 = Felt *very ineffective* in my use of skills
2 = Felt *mostly ineffective* in my use of skills
3 = Felt *neither effective or ineffective*
4 = Felt *mostly effective* in my use of skills
5 = Felt *very effective* in my use of skills

Urge to harm (0-5): Before therapy session: ____    After therapy session: _____
Urge to quit therapy (0-5): Before therapy session: ____    After therapy session: _____

| Dialectical Behavior Therapy SKILLS DIARY CARD | Instructions: Circle the days you worked on each skill. | | Filled out in session? Y N | | How often did you fill out this side? _ Daily __4-6x __ 2-3x __ 1x | | |
|---|---|---|---|---|---|---|---|
| 1. Wise mind | Mon | Tues | Wed | Thurs | Fri | Sat | Sun |
| 2. Observe: just notice | Mon | Tues | Wed | Thurs | Fri | Sat | Sun |
| 3. Describe: put words on | Mon | Tues | Wed | Thurs | Fri | Sat | Sun |
| 4. Participate: enter the experience | Mon | Tues | Wed | Thurs | Fri | Sat | Sun |
| 5. Nonjudgmental stance | Mon | Tues | Wed | Thurs | Fri | Sat | Sun |
| 6. One-mindfully: in-the-moment | Mon | Tues | Wed | Thurs | Fri | Sat | Sun |
| 7. Effectiveness: what works | Mon | Tues | Wed | Thurs | Fri | Sat | Sun |
| 8. Obj. effectiveness: DEAR MAN | Mon | Tues | Wed | Thurs | Fri | Sat | Sun |
| 9. Relationship effectiveness: GIVE | Mon | Tues | Wed | Thurs | Fri | Sat | Sun |
| 10. Self-respect effectiveness: FAST | Mon | Tues | Wed | Thurs | Fri | Sat | Sun |
| 11. Check the facts | Mon | Tues | Wed | Thurs | Fri | Sat | Sun |
| 12. Opposite action | Mon | Tues | Wed | Thurs | Fri | Sat | Sun |
| 13. Problem solving | Mon | Tues | Wed | Thurs | Fri | Sat | Sun |
| 14. Accumulate positives | Mon | Tues | Wed | Thurs | Fri | Sat | Sun |
| 15. Reduce vulnerability: PLEASE | Mon | Tues | Wed | Thurs | Fri | Sat | Sun |
| 16. Build MASTERy | Mon | Tues | Wed | Thurs | Fri | Sat | Sun |
| 17. Cope ahead | Mon | Tues | Wed | Thurs | Fri | Sat | Sun |
| 18. Mindfulness of Current Emotion | Mon | Tues | Wed | Thurs | Fri | Sat | Sun |
| 19. TIP | Mon | Tues | Wed | Thurs | Fri | Sat | Sun |
| 20. Distract | Mon | Tues | Wed | Thurs | Fri | Sat | Sun |
| 21. Self-soothe | Mon | Tues | Wed | Thurs | Fri | Sat | Sun |
| 22. Improve the moment | Mon | Tues | Wed | Thurs | Fri | Sat | Sun |
| 23. Pros and cons | Mon | Tues | Wed | Thurs | Fri | Sat | Sun |
| 24. Radical Acceptance | Mon | Tues | Wed | Thurs | Fri | Sat | Sun |

Table 1

*Variables of interest*

| Variable | Data Source | How assessed | Time point |
|---|---|---|---|
| Self-efficacy of skills use | DBT Diary Card | 5-point Likert scale (1 = "felt very ineffective," 5 = "felt very effective") | Daily |
| Average weekly self-efficacy | DBT Diary Card | Average of daily Likert scale ratings | Weekly |
| Use of phone coaching | Therapist report | Dates of Use | Weekly |
| Use of DBT Coach | DBT Coach Database | Dates of use | Weekly |
| General self-efficacy | General Self Efficacy Scale (Schwarzer & Jerusalem, 1995) | 10-item measure, 4-point Likert scale | Pre-, Mid-, Post-Treatment |

Table 2

*Average skills effectiveness ratings for types of coaching*

|  | **Participant A** | **Participant B** | **Participant C** | **Participant D** |
|---|---|---|---|---|
| **DBT Coach** |  |  |  |  |
| number of days | 5 | 37 | 15 | 13 |
| number of ratings | 5 | 34 | 13 | 4 |
| M (SD) | 3 (0.71) | 3.88 (0.41) | 3 (0.82) | 3.25 (0.5) |
| mode | 3 | 4 | 3 | 3 |
| **Phone Coaching** |  |  |  |  |
| number of days | 1 | 33 | 28 | 4 |
| number of ratings | 1 | 30 | 17 | 1 |
| M (SD) | 4 (n/a) | 3.7 (0.65) | 3.24 (0.97) | 5 (n/a) |
| mode | 4 | 4 | 3 | 5 |
| **Both** |  |  |  |  |
| number of days | 0 | 12 | 2 | 0 |
| number of ratings | 0 | 11 | 2 | 0 |
| M (SD) | n/a | 4 (0) | 2.5 (0.71) | n/a |
| mode | n/a | 4 | n/a | n/a |
| **Neither** |  |  |  |  |
| number of days | 163 | 88 | 122 | 175 |
| number of ratings | 127 | 72 | 65 | 46 |
| M (SD) | 2.89 (0.93) | 3.92 (0.28) | 3.55 (0.81) | 3.57 (0.86) |
| mode | 3 | 4 | 4 | 3 |

Table 3

*Average skills effectiveness ratings for types of coaching: first half vs. second half of treatment*

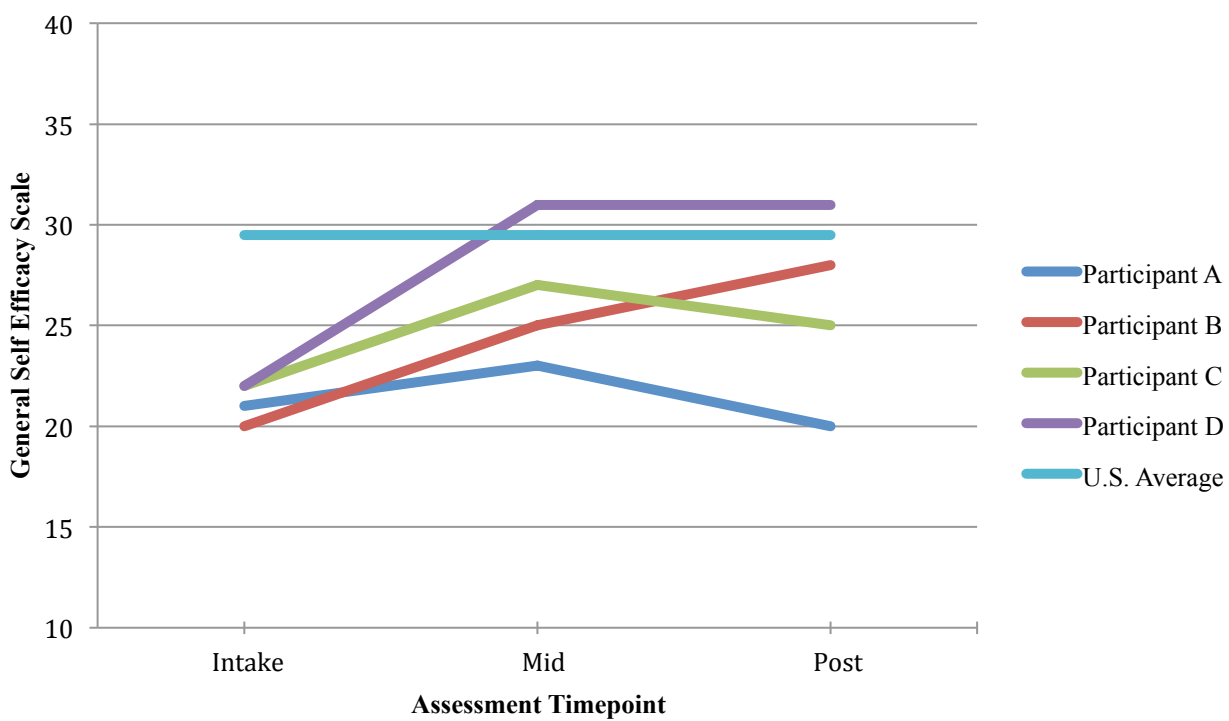| | Participant A | | Participant B | | Participant C | | Participant D | |
|---|---|---|---|---|---|---|---|---|
| | First | Second | First | Second | First | Second | First | Second |
| **DBT Coach** | | | | | | | | |
| number of days | 4 | 1 | 9 | 28 | 14 | 1 | 7 | 6 |
| number of ratings | 4 | 1 | 6 | 28 | 12 | 1 | 1 | 3 |
| M (SD) | 3.25 (0.50) | 2 (n/a) | 3.67 (0.82) | 3.93 (0.26) | 3.08 (0.79) | 2 (n/a) | 4 (n/a) | 3 (n/a) |
| mode | 3 | 2 | 4 | 4 | 3 | 2 | 4 | 3 |
| | | | | | | | | |
| **Phone Coaching** | | | | | | | | |
| number of days | 1 | 0 | 21 | 12 | 19 | 9 | 2 | 2 |
| number of ratings | 1 | 0 | 18 | 12 | 10 | 7 | 0 | 1 |
| M (SD) | 4 (0) | n/a | 3.5 (0.8) | 4 (0) | 3 (0.94) | 3.57 (0.98) | no data | 5 (n/a) |
| mode | 4 | n/a | 4 | 4 | 3 | 4 | no data | 5 |
| | | | | | | | | |
| **Both** | | | | | | | | |
| number of days | 0 | 0 | 3 | 9 | 2 | 0 | 0 | 0 |
| number of ratings | 0 | 0 | 3 | 9 | 2 | 0 | 0 | 0 |
| M (SD) | n/a | n/a | 4 (0) | 4 (0) | 2.5 (0.71) | n/a | n/a | n/a |
| mode | n/a | n/a | 4 | 4 | n/a | n/a | n/a | n/a |
| | | | | | | | | |
| **Neither** | | | | | | | | |
| number of days | 81 | 82 | 37 | 51 | 64 | 58 | 91 | 84 |
| number of ratings | 71 | 56 | 23 | 49 | 28 | 37 | 9 | 37 |
| M (SD) | 3.07 (0.88) | 2.66 (0.94) | 3.78 (0.42) | 3.98 (0.14) | 3.54 (0.88) | 3.57 (0.77) | 3.56 (0.73) | 3.57 (0.9) |
| mode | 3 | 3 | 4 | 4 | 3 | 4 | 4 | 3 |

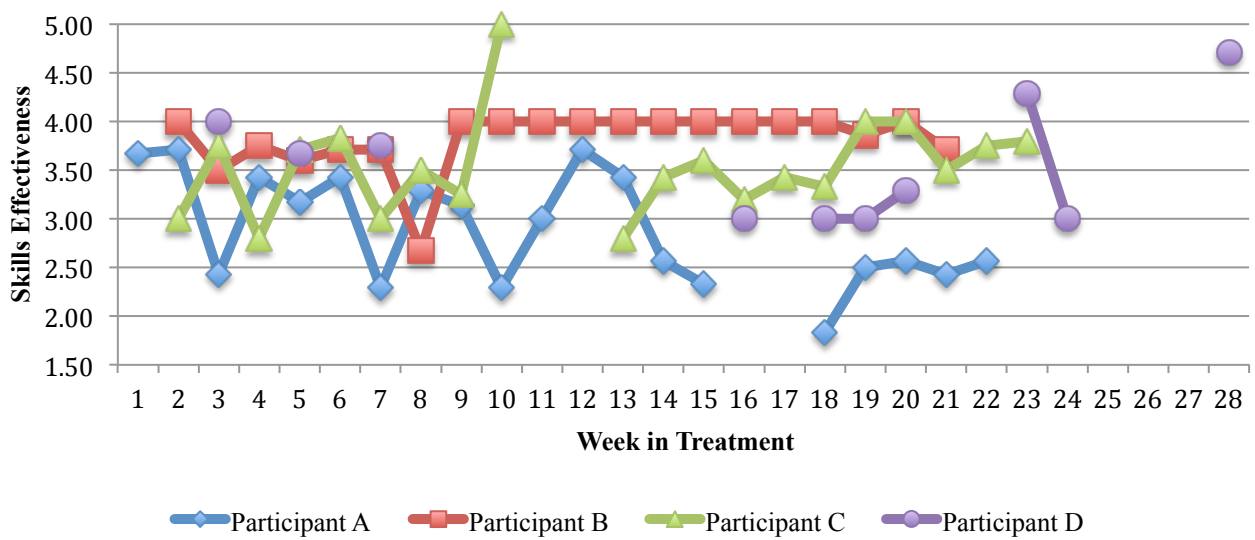*Figure 1.* General self-efficacy of participants over time as compared to U.S. average.

*Figure 2.* Participants' average weekly skills effectiveness ratings when using skills over the course of treatment.