August 2020

Treatment Predictors of Dialectical Behavior Therapy Among Adolescent Females in Residential Care

Taylor Davine
University of Wisconsin-Milwaukee

TREATMENT PREDICTORS OF DIALECTICAL BEHAVIOR THERAPY AMONG

ADOLESCENT FEMALES IN RESIDENTIAL CARE

by

Taylor Davine

A Dissertation Submitted in

Partial Fulfillment of the

Requirement for the Degree of

Doctor of Philosophy

in Psychology

at

The University of Wisconsin-Milwaukee

August 2020

ABSTRACT

TREATMENT PREDICTORS OF DIALECTICAL BEHAIVOR THERAPY AMONG
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The University of Wisconsin-Milwaukee, 2020
Under the Supervision of Professor Han-joo Lee, Ph.D.

Dialectical Behavior Therapy (DBT) is a comprehensive intervention for the treatment of

borderline personality disorder (BPD), which is characterized by significant emotion

dysregulation and associated parasuicidal behaviors. Findings from 21 randomized-controlled

trials indicated that DBT is effective in the treatment of BPD symptoms. While effective, some

individuals do not obtain symptoms reductions after completing DBT. The aim of the current

study was to identify factors that predict treatment response among adolescent females ($N = 107$)

receiving DBT in a residential setting. It was hypothesized that residents with elevated scores of

emotion regulation difficulties, intolerance of uncertainty, experiential avoidance, social anxiety

symptoms, and PTSD-related symptoms would show less improvement of BPD symptoms. On

average, there were no significant predictors to response to DBT. The results showed that

irrespective of pre-treatment clinical predictors, DBT was effective, on average, in reducing

clinical outcome symptoms for approximately half of the sample: 55% of the residents showed

reliable change (RC) from pre-treatment to post-treatment, 41% showed no RC, and 3% showed

RC toward deterioration. Further, 22% of the residents in the current study showed clinically

significant change, meaning that their post-treatment outcome scores would indicate symptom

remission. None of the study predictors were able to predict whether a resident showed clinically

significant change or no clinically significant change at post-treatment. Limitations and future

directions were discussed.

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Dialectical Behavior Therapy (DBT) is an evidenced-based cognitive behavioral treatment that was originally developed to treat chronically suicidal women who were unresponsive to standard cognitive-behavioral intervention (Linehan, Armstrong, Suarez, Allmon, & Heard, 1991), and later evolved into a treatment for borderline personality disorder (BPD; Linehan, 1993a; 1993b). The word dialectic refers to the belief that two opposing ideas can be true at the same time, and a dialectic approach to therapy searchers for the synthesis between opposite forces. For instance, DBT therapists are deliberate in their use of acceptance (e.g., mindfulness, validation) and change (e.g., problem solving, cognitive restricting) strategies.

Empirical Support of DBT for BPD

To date there are at least 20 randomized controlled trials of DBT for BPD (see Linehan, Dimeff, Koerner, & Miga, 2014) and several reviews (Bloom, Woodward, Susmaras, & Pantalone, 2012; Lynch, Trost, Salsman, & Linehan, 2007; Panos, Jackson, Hasan, & Panos, 2014; Robins & Chapman, 2004). Together, the results are robust and provide strong support of DBT as a treatment for BPD that reduces self-harm and suicide-related behaviors. DBT is currently listed as an empirically supported treatment for BPD by Division 12 of the American Psychological Association.

Support is also growing for the use of DBT to treat BPD and co-occurring psychiatric disorders, including substance use disorder (DBT-SUD; Axelrod, Perepletchikova, Holtzman, & Sinha, 2010; Dimeff & Linehan, 2008), eating disorders (Chen, Matthews, Allen, Kuo, & Linehan, 2008; Lynch, et al., 2013; Palmer et al., 2003; Telsh, Agras, & Linehan, 2001), post-traumatic stress disorder (Harned & Linehan, 2008; Harned, Korslund, Foa, & Linehan, 2012; Steil, Dyer, Priebe, Kleindienst, & Bohus, 2011), and transdiagnostic emotion regulation (Neasciu, Eberle, Kramer, Wiesmann, & Linehan, 2014; Ritschel, Lim, & Stewart, 2015).

Adolescent DBT

The effectiveness of DBT to treat adult population prompted the developed of DBT to treat adolescents with BPD-like symptoms. DBT was adapted to treat adolescents (DBT-A; Miller, Rathus, Linehan, Wetzler, & Leigh, 1997; Miller, 1999; Rathus & Miller, 2000) in the following ways. First, the duration of DBT-A was shortened by reducing the number of DBT skills. This was done in an effort to increase retention of adolescents in treatment and reduce financial burden of treatment. There is no standardized length of time that DBT-A is completed; although, a 16-week format has been proposed (Miller, Rathus, & Linehan, 2007). Second, caregivers are asked to join DBT skills groups. Incorporating caregivers into skills group is intended to reduce maladaptive environmental barriers (e.g., arguments, "invalidating environment"). Third, the language and layout of DBT training materials (e.g., handouts, diary cards) were simplified for DBT-A in consultation with Dr. Linehan. Fourth, DBT-A organized DBT skills into five modules instead of four. The additional module is called Middle Path and includes validation, dialectical thinking, and behavioral skills, which are part of the current "core skills" of Interpersonal Effectiveness module of the adult manual. The Middle Path module is aimed to help adolescents and their caregivers resolve conflict more effectively.

While there is some disagreement about diagnosing BPD in adolescents (Chanen & McCutcheon, 2008), increasing evidence suggests that diagnosis of BPD in adolescents is as reliable and valid as diagnosis of BPD in adults (Chanen, Jovev, McCutcheon, Jackson, & McGorry, 2008; Kaess, Brunner & Chanen, 2014; Miller, Muehlenkamp, & Jacobson, 2008). Irrespective of BPD diagnosis, among young people aged 15 to 24, suicide remains a major health concern and was the second leading cause of death in 2016 with 5,723 deaths (Centers for Disease Control; CDC), and suicidal ideation among youth has been reported in the range of

19.8% and 24% (Cha et al., 2017; Nock et al., 2008). Trends of suicide-related behaviors and deaths have increased since 2010, with the greatest increases among adolescent females (Twenge, Joiner, Rogers, & Martin, 2018).

Research of DBT-A has grown significantly since the first trial of DBT-A was conducted, and the data suggests that DBT-A is effective for treating BPD-like symptoms in adolescents (MacPherson, Cheavens, & Fristad, 2013; McCredie, Quinn, & Covington, 2017). DBT-A has been employed in different treatment settings, including inpatient hospitalization (Katz & Cox, 2002; McDonell et al., 2010; Swenson, Sanderson, Dulit, & Linehan, 2001), residential hospitalization (McCredie et al., 2017; Wasser, Tyler, McIlhaney, Taplin, & Henderson, 2008), partial hospitalization (Memel, 2012), and outpatient (James, Winmill, Anderson, & Alfoadari, 2011; Rathus & Miller, 2002; Woodberry & Popenoe, 2008). A review of DBT-A supports the use of DBT-A in reducing BPD symptomatology, suicidal ideation and comorbid depression, and hospitalizations for adolescents across treatment settings (Groves, Backer, van den Bosch, & Miller, 2012).

Treatment Predictors of DBT

While the findings of DBT clinical trials are robust and show that DBT provides significant symptom reductions, DBT does not work for all individuals (Rizvi, 2011), and 25% or more of adults enrolled in a trial tend to drop out prematurely (Linehan et at. 2006; McMain et al., 2009; Steuwe, Berg, Driessen, Beblo, 2017). Kröger, Harbeck, Armbrust, and Kliem (2013) examined data from 1,423 individuals with BPD who were admitted to a 3-month inpatient unit conducing DBT. They found that 45% of patients responded to DBT, 30.6% remained unchanged, 11.0% deteriorated, and 10% dropped out, highlighting the need for research that assesses idiographic outcome of individuals receiving DBT, and attention to treatment predictors

of DBT may prove fruitful. Identification of treatment predictors of DBT can promote clinical gains for individuals receiving DBT and providers delivering DBT. In turn, fewer resources may be needed to obtain meaningful clinical outcome.

Several studies have been conducted to identify factors associated with premature dropout of DBT and/or treatment response of DBT among adults. Factors associated with premature DBT dropout included low education level (Perroud, Uher, Dieben, Nicastro, & Huguelet, 2010), higher levels of baseline experiential avoidance, higher trait anxiety, fewer past suicide attempts (Rüsch et al., 2008), a lack of motivation (Soler et al., 2008), substance use disorder, younger age at pre-treatment (Kröger et al., 2013) childhood neglect (Steuwe, Berg, Driessen, & Beblo, 2017), higher anger, poorer therapeutic alliance, higher number of life-time suicide attempts, and greater Axis I comorbidity (Wnuk et al., 2013). Factors not associated with premature DBT dropout include length of hospitalizations, severity of BPD symptoms, comorbid diagnoses, and socio-economic status (Barnicot, Katsakou, Marougka, & Priebe, 2011). Factors related to poor treatment response (as indicated by self-report measures) to DBT include schizoid features, low narcissistic traits, a second course of treatment (Perroud et al., 2010), higher baseline levels of depression, more emergency department visits, and higher unemployment (McMain et al., 2017).

In summary, DBT is an effective treatment for adults and adolescents with BPD or BPD-like symptoms. DBT can be applied in different health care setting, and for different psychiatric concerns. However, opportunity remains to increase the effectiveness of DBT, and more research is needed to identify factors that contribute to treatment response.

Therefore, the current study investigated potential treatment predictors of DBT. The following pre-treatment predictors of DBT outcome were selected based on theoretical support

and clinical experience: (1) difficulty regulating emotions, (2) intolerance of uncertainty, (3), experiential avoidance, (4) social anxiety symptoms, and (5) trauma symptoms.

Emotion dysregulation.

Thompson (1994) defined emotion regulation as 'the extrinsic and intrinsic processes responsible for monitoring, evaluating, and modifying emotional reactions, especially their intensive and temporal features, to accomplish one's goals.' An inability to effectively regulate emotions often leads to experiences of emotion dysregulation, which is a central feature across a range of psychiatric symptoms including depression (Jormann & Gotlib, 2010), anxiety (Mennin, Heimberg, Turk, & Fresco, 2002), PTSD (Tull, Barrett, McMillan, & Roemer, 2007), substance use (Fox, Axelrod, Paliwal, Sleeper, & Sinha, 2007), and nonsuicidal self-injury (Gratz and Roemer, 2008; McKenzie & Gross, 2013). Emotion dysregulation is also core to conceptualizations of BPD (Glenn & Klonsky, 2009), including Linehan's biosocial model of BPD (1993a). Linehan's model posits that BPD symptoms arise from a transaction between a biological vulnerability of the emotion regulation system (high emotional sensitivity, high emotional reactivity, and slow return to emotional baseline) and an invalidating environment. DBT skills are aimed to increase one's ability to regulate emotions, thus reducing BPD symptoms. While emotion dysregulation is a target of DBT and a likely mechanism of change (Gratz, Levy, & Tull, 2012), it is unclear how pre-treatment levels of emotion regulation difficulties affect DBT outcome.

Intolerance of uncertainty.

Intolerance of uncertainty is characterized by significant distress resulting from ambiguity of a future event that has the possibility of a negative outcome regardless of the probability. Intolerance of uncertainty has received the most research attention in the area of

generalized anxiety disorder and obsessive-compulsive disorder (Dugas, Gosselin, & Ladouceur, 2001; Wilhelm & Steketee, 2006). However, there is growing evidence in adult populations that intolerance of uncertainty is a transdiagnostic feature across multiple disorders (Boswell, Thompson-Hollands, Farchione, & Barlow, 2013; Carleton et al., 2012; Gentes & Ruscio, 2011), including depression (Yook, Kim, Suh, & Lee, 2010), social anxiety (Boelen & Reijntjes, 2009; Carleton, Collimore, & Asmundson, 2010), eating disorders (Sternheim, Startup, & Schmidt, 2011), and serves as a mechanism of change (McEvoy & Mahoney, 2012). Research of adolescents also supports a strong relationship between intolerance of uncertainty and anxiety symptoms, including anxiety sensitivity and health anxiety (Wright, Adams, Lebell, & Carleton, 2016).

Because intolerance of uncertainty is present in many disorders that are characterized by negative affect, it is likely present among individuals with BPD who show high comorbidity with disorders of negative affect (Grant et al, 2008). Research of intolerance of uncertainty within the context of DBT is important. Given that DBT is a behavioral treatment that requires individuals to learn and apply new skills, individuals higher in intolerance of uncertainty may not engage in treatment as much as someone lower in intolerance of uncertainty, thus hindering beneficial outcome. However, there is no known research that has examined the effect of intolerance of uncertainty as a treatment predictor of DBT.

Experiential avoidance.

Experiential avoidance is characterized by a broad range of maladaptive behaviors that individuals use to avoid distressing experiences. Hayes and colleagues (2004, p. 554) describe experiential avoidance as "a phenomenon that occurs when a person is unwilling to remain in contact with particular private experiences (e.g., bodily sensations, emotions, thoughts,

memories, images, behavioral predispositions) and takes steps to alter the form or frequency of these experiences or the contexts that occasion them, even when these forms of avoidance cause behavioral harm." In BPD, experiential avoidance is associated with BPD symptoms including deliberate self-harm, which often functions to avoid negative emotions (Chapman, Gratz, & Brown, 2006; Hulbert & Thomas, 2010; Rosenthal et al., 2005).

Many of the DBT skills require an individual to experience difficult emotions and sensations in order to replace ineffective coping strategies (e.g., dissociation, self-harm, self-invalidation) with more effective coping strategies (e.g., mindfulness, distress tolerance). Avoidance of internal experiences may be a barrier to fully engaging in treatment, potentially hindering treatment effects. Rüsch and colleagues (2008) found that among 60 adult women receiving inpatient DBT, premature dropout was associated with higher levels of experiential avoidance than lower levels among completers than non-completers. Experiential avoidance is also associated with less improvement of depressive symptoms over psychological treatment (Berking, Neacsiu, Comtois, & Linehan, 2009). To date, it appears that no published studies have examined the association between EA and treatment outcomes for adolescents with BPD. To further our understanding of role of experiential avoidance in DBT, it is important to examine the relationship between experiential avoidance on BPD symptoms.

Co-occurring psychiatric symptoms.

Social anxiety symptoms.

Social anxiety disorder is characterized by a significant fear and avoidance of social interactions where evaluation (generally negative) is possible. Individuals with social anxiety symptoms may fear specific situations (e.g., public speaking, attending a party) or most situations in general. These symptoms can manifest cognitively (e.g., distorted beliefs of one's

self) and behaviorally (e.g., avoidance). These symptoms, when present among DBT clients may be problematic given that DBT skills are taught in a group setting, thus potentially limiting skills acquisition and generalization.

People who report social anxiety symptoms (without BPD symptoms) are more likely to benefit from treatment for social-anxiety symptoms when the therapy is conducted individually rather than in group settings (Stangier, Heidenreich, Peitz, Lauterbach, and Clark 2003). Dimeff, Rizvi, Brown, and Linehan (2000) conducted a pilot study to test the efficacy of DBT in treating with co-morbid BPD and methamphetamine -dependence. They reported that one-third of the sample met criteria for social anxiety disorder, and these individuals did not respond as well to treatment compared to individuals without social anxiety disorder. Dimeff and colleagues (2000) found success in treating social anxiety symptoms prior to individuals starting DBT skills group.

Trauma symptoms.

Many individuals with BPD experience co-occurring post-traumatic stress disorder (PTSD). Grant et al. (2008) reported from a large-scale epidemiological survey that 47.2% of women with BPD had comorbid PTSD. This is not surprising given that trauma history (e.g., sexual abuse, physical abuse) is a strong predictor of self-harm behaviors (see review, Lang & Sharma-Patel, 2011) and was proposed to have a causal relationship to BPD (Ball & Links, 2009). Comorbid BPD and PTSD significantly increases the rate of suicide attempts, with two to five times more likely than BPD or PTSD alone (Pagura et al., 2010). The high prevalence of BPD and PTSD prompted the development a prolonged exposure protocol for comorbid BPD and PTSD (DBT-PE; Harned et al., 2012), and the findings are promising.

Research (not specific to DBT) of the role of trauma symptoms is not well understood in the treatment outcome literature and more research is needed. Some evidence suggests that a

history of sexual trauma is a moderator of treatment outcome for PTSD (Markowitz, Neria, Lovell, Meter, & Petkova, 2017). Markowitz and colleagues (2017) found that interpersonal psychotherapy, prolonged exposure, and relaxation therapy were all efficacious in reducing PTSD symptoms, individuals with a sexual trauma history responded better to interpersonal therapy than prolonged exposure or relaxation therapy. However, another study does not show sexual trauma as a moderator of treatment outcome (Diamond, Creed, Gillham, Gallop, & Hamilton, 2012). The disparate findings may be accounted for by treatment type and population. Markowitz and colleagues (2017) tested Prolonged Exposure (PE; Foa & Rothbaum, 1998), Interpersonal Psychotherapy (IPT; Markowitz, 2016), and Progressive Relaxation (PR; Jacobsen, 1938) for adults with PTSD, while Diamond and colleagues (2012) tested Attachment-based Family Therapy (ABFT; Diamond, Reis, Diamond, Siqueland, & Isaacs, 2002) for suicidal adolescents with sexual trauma history. These findings highlight the need for further research of the effects of pre-existing PTSD-symptoms on treatment outcome.

The proposed study is important for several reasons. First, it provides researchers and clinicians with a better understanding of factors that predict treatment response of DBT. This information can guide treatment adaptations that may increase treatment effectiveness for DBT clients. Second, this information can guide how an organization (e.g., psychiatric hospital) implements DBT. Third, the results can guide future adaptations and iterations of DBT. For instance, DBT-skills protocols have been developed for co-occurring BPD and substance use disorder (DBT-SUDS; Linehan, 2014), PTSD (DBT-PE; Harned, Korslund, Foa, & Linehan, 2012), and binge eating disorder (DBT-BED; Telch, Agras, & Linehan, 2001).

Hypotheses

The aim of the proposed study was to identify treatment predictors of DBT among adolescent patients in a residential treatment program. There were five hypotheses of the proposed study.

1. As residents' level of emotion dysregulation difficulties increased at pre-treatment (DER-36 scores), they would show less change of BPD symptoms at post-treatment.

2. As residents' level of social-anxiety symptoms increased at pre-treatment (BFNE scores), they would show less change of BPD symptoms at post-treatment.

3. As residents' level of PTSD symptoms increased at pre-treatment (PCL-5 scores), they would show less change of BPD symptoms at post-treatment.

4. As residents' level of intolerance of uncertainty increased at pre-treatment (IUSC scores), they would show less change of BPD symptoms at post-treatment.

5. As residents' level of experiential avoidance increased at pre-treatment (AAQ-II), they would show less change of BPD symptoms at post-treatment.

Method

Data Collection Procedures

Adolescent females ($N = 107$) aged 13 to 18 (*mean age* = 15.88, *SD* = .96) who were admitted to a residential program with significant emotion dysregulation and/or self-harm urges/actions and suicidal ideation. During the admission process, residents provided informed assent and their parents provide informed consent to allow data to be used for research purposes. Residents and their parents completed a battery of questionnaires that included demographic information, medical history, and clinical measures. All clinical measures administered at pre-treatment were administered again at post-treatment. The current study was approved by the institutional review board (IRB) of the psychiatric hospital.

Adolescent DBT program

To ensure the fidelity of DBT, the psychiatric hospital employed a DBT consultant who was certified by Behavioral Tech (a Linehan-founded organization) to aid in program development and implementation.

DBT-skills training for residents.

Clients in the residential program received group-based DBT-A skills training five days per week, with a different module taught each day: Mondays = Core Mindfulness; Tuesdays = Distress Tolerance; Wednesdays = Emotion Regulation; Thursdays = Interpersonal Effectiveness, and Fridays = Middle Path. The schedule was developed to ensure that all skills are taught at least twice prior to discharge. Clients also received weekly individual therapy, medication management, and adjunctive activities (e.g., art therapy, experiential therapy, outings). DBT skill use was reinforced by the milieu.

DBT-A includes five core modules: Mindfulness, Distress Tolerance, Emotion Regulation, Interpersonal Effectiveness, and Walking the Middle Path. Mindfulness skills teach clients to consciously bring awareness to the present moment without judgment. For instance, clients are taught how to bring awareness to the breath and how to non-judgmentally observe thoughts and behaviors. Distress Tolerance skills provide clients with ways to cope in the short-term that are more effective than engaging in self-harm behaviors. The primary goal of Distress Tolerance skills is help manage difficult situations without making them worse. Emotion Regulation skills provide clients with an in-depth understanding of emotions and their associated responses. Clients learn how to mitigate and/or prevent negative emotions with these skills. Interpersonal Effectiveness skills help clients achieve interpersonal goals including effectively asking for or denying a request, preserving a relationship, and maintaining self-respect. Walking

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the Middle Path skills help parents and adolescents to better understand each other's perspective, which can deescalate volatile situations and promote effective resolution. Validation strategies are emphasized in this module. Skills-based phone coaching, therapist consultation team, and phone coaching are included with comprehensive DBT-A. Skill use and generalization is an important aspect of DBT. It was shown to fully mediate the likelihood of suicide attempts, depression, and anger control, and partially mediated the likelihood of non-suicidal self-injury (Neacsiu, Eberle, Kramer, Wiesmann, & Linehan, 2014).

Measures

Treatment predictors.

Emotional dysregulation.

The Difficulties in Emotion Regulation Scale (DERS-36; Gratz & Roemer, 2004) is a 36-item self-report measure that assesses emotion regulation across six factors (Goals, Clarity, Strategies, Impulse, Awareness, and Nonacceptance). The DERS-36 was designed to measure a broad range of relevant difficulties of emotion regulation as described by several theories of emotion regulation. Factor analysis supported a six-factor structure of the measure. Factor 1 (Nonacceptance) reflects a tendency to reject/not accept one's own emotional distress. Factor 2 (Goals) is characterized by inhibited goal attainment when experiencing negative emotions. Factor 3 (Impulse) indicated difficulties inhibiting maladaptive action urges when emotionally distressed. Factor 4 (Awareness) reflects a lack of attention or awareness of emotional responses. Factor 5 (Strategies) represents one's belief that little can be done to regulate difficult emotions. Factor 6 (Clarity) taps into the extent to which an individual can accurately identify experienced emotions. The DERS Total score has demonstrated high internal consistency ($\alpha = .93$), construct validity, predictive validity, and preliminary test-retest reliability. There is also empirical support

for the use of the DERS with adolescent populations (Neumann, van Lier, Gratz, & Koot, 2010;

Perez, Venta, Garnaat, & Sharp, 2012; Weinberg & Klonsky, 2009). The DERS contains items

that are rated on a 5-point Likert-type scale: 1 (almost never), 2 (sometimes), 3 (about half the

time), 4 (most of the time), and 5 (almost always). Several items are reversed scored. The total

score range is from 36 to 180 with higher scores indicative of greater emotion regulation

difficulties. Internal consistency within the current sample was high (α = .87).

Social anxiety symptoms.

The Brief Fear of Negative Evaluation Scale (BFNE; Leary, 1983) is 13-tiem self-report

measure that assesses one's tolerance of the possibility they will be judged negatively in social

situations. The BFNE assesses the degree to which an individual experiences apprehension

toward the prospect of being evaluated negatively. Items are rated on a 5-point scale: 1 (not at all

characteristic of me), 2 (slightly characteristic of me), 3 (moderately characteristic of me), 4

(very characteristic of me), and 5 (extremely characteristic of me). Total scores range from 13 to

65, with higher scores indicating a greater degree of fear of negative evaluation than lower

scores. The BFNE has shown excellent internal consistency (α = .90) and high test-retest

reliability (r = .68) after four weeks (Leary, 1983). Internal consistency within the current sample

was acceptable (α = .65).

Trauma symptoms.

The PTSD Checklist for DSM-5 (PCL-5; Blevins, Weathers, Davis, Witte, & Domino,

2015) is a 20-item self-report measure that assess key features of PTSD. The PCL probes PTSD

symptoms experienced within the past month on a scale from 1 (not at all) to 5 (extremely). Total

scores range from 17 to 85, and cut-off scores are interpretations are provided: 17-29 (little to no

severity), 30-44 (moderate to moderately high severity), 45-85 (high severity). In a non-clinical

sample, the PCL-C total score demonstrated excellent internal consistency ($\alpha = .94$), high test-retest correlations coefficients after one-week ($r = .92$) and two-weeks ($r = .68$), and evidence of convergent validity (Ruggiero, Del Ben, Scotti, & Rabalais, 2003). Internal consistency within the current sample was excellent ($\alpha = .94$).

Intolerance of uncertainty.

The Intolerance of Uncertainty Scale for Children (IUSC; Comer et al., 2009) is a 27-item measure that assess children's (aged 7 to 17) level of negative reactivity to ambiguous situations. The IUSC was adapted from the adult version of the intolerance of uncertainty scale (Buhr & Dugas, 2002). Respondents rate each item on a 5-point Likert-type scale which three anchor points: 1 (not at all), 3 (somewhat), and 5 (very much). Total scores range from 27 to 135. The IUSC has demonstrated strong internal consistency ($\alpha = .92$) and convergent validity (Comer et al., 2009). Internal consistency within the current sample was excellent ($\alpha = .94$).

Experiential avoidance.

The Acceptance and Action Questionnaire-II (AAQ-II; Bond et al., 2011) is a 7-item self-report measure that assesses experiential avoidance and cognitive inflexibility. The AAQ-II was adapted from the original Acceptance and Action Questionnaire (AAQ; Hayes et al., 2004). Each item is rated on a 7-point scale from 1 (never true) to 7 (always true). Items 1, 6, and 10 are reverse scored. The total score range is from 7 to 49, and lower scores indicate greater levels of experiential avoidance. The AAQ-II has shown strong psychometric properties across six independent samples. The mean internal consistency across samples was good ($\alpha = .84$), test-retest reliability after 3-months and 12-months was high ($r = .81$ and $r = .79$, respectively), and convergent and incremental validity was supported. Internal consistency within the current sample was good ($\alpha = .86$).

Primary outcome measure.

DBT aims to reduce borderline symptoms. Thus, the primary outcome measure for the current study is the Borderline Symptom List (Bohus et al., 2009), a validated measure that is listed as an assessment instrument for use in DBT research by the Linehan Institute.

The Borderline Symptom List short-version (BSL-23; Bohus et al., 2009) is a briefer version of the original BSL with 95 items (Bohus et al., 2007). The BSL-95 was developed to assess symptoms of BPD according to DSM-IV-TR criteria. Clinical experts and clients with BPD were also interviewed. The BSL-23 was developed to provide a valid measure of BPD symptoms with less respondent burden than the BSL-95. The items selected for the BSL-23 showed the greatest sensitivity to change and the largest discriminant validity when identifying individual with and without BPD. Across multiple samples, the BSL-23 showed large correlations with the BSL-95, $rs > .95$), excellent internal consistency ($\alpha = .93$), and a strong discriminant validity (*mean effect size* = 1.13). Internal consistency within the current sample was excellent ($\alpha = .90$).

Secondary outcome measures.

Secondary outcome measures were selected to assess improvements in other important areas of life, including depressive symptoms and quality and satisfaction with life.

The Quick Inventory of Depressive Symptomatology (QIDS-SR; Rush et al., 2003).

The QIDS-SR is a 16-item self-report measure that was developed to assess DSM-IV symptom criterion domains of depression (e.g., mood, sleep, suicidal ideation). The QIDS-SR has high internal consistency ($\alpha = .86$), high convergent and concurrent validity, and is sensitive to change. Items are rated on a 0 to 3 scale, with no standardized anchor points. Not all item scores are included in the total score (see scoring instructions), and that total score range is 0 to

27. High scores represent greater severity than lower scores. Internal consistency within the current sample was excellent (α = .99).

The Pediatric Quality of Life Enjoyment and Satisfaction Questionnaire (PQ-LES-Q; Endicott, Nee, Yang, & Wohlberg, 2006).

The PQ-LES-Q is a 15-item self-report measure that assesses a broad range of life aspects relevant to children and adolescents. Across three independent samples, the PQ-LES-Q demonstrated good internal consistency (alphas ranged = .87 to .90) and test-retest reliability (screening to baseline = .78). Items are rated from 1 to 5 ("very poor," "poor," "fair," "good," and "very good," respectively). The first 14 items are summed to form a total score ranging from 14 to 70, with higher scores representing greater enjoyment and satisfaction. Internal consistency within the current sample was excellent (α = .99).

Data Analytic Plan

Methodological Consideration for Primary Outcome Indices: Residual change scores.

Linear regression analyses were conducted to test the study hypotheses. There is, however, discussion about how to best assess outcome in the literature. It is common for researchers to employ simple change (gain) scores to assess intervention effects. Simple change scores are calculated by subtracting Time 2 scores from Time 1 scores (e.g., depression before intervention was 60, after intervention it was 20; thus, there was a decrease of 40 points in depression). This method of assessing treatment effects has drawn controversy in the literature with some advocating that they can be useful under certain conditions (Castro-Schilo & Grimm, 2018; Gottman & Rusche, 1993; Rogosa & Willett, 1983; Williams, & Zimmerman (1996), while others argue that simple change scores provide spurious findings (Cattell, 1983).

Cronbach and Furby (1970) highlighted a common concern with simple changes scores, that subtracting pretest scores from posttest scores leads to erroneous conclusions due to random error of the measurement. For instance, obtaining "observed" data at two time points results in an amalgam of measurement error that may indicate "true" change when in fact it is not. Rather, inferred "true" change may merely represent the measurement error at two time points. Another issue with simple change scores is regression to the mean (Barnett, van der Pols, & Dobson, 2005). That is, observing atypically high/low scores during one observation will be observed less during subsequent observations as scores trend toward the "true" score (i.e., mean score). This is problem is highlighted by Adams, Houle, Parker, and Burkee (2012) who examined changes to depressive symptoms during substance abuse treatment. They found that participants showed significant improvements in symptoms reductions; however, further analyses indicated regression to the mean accounted for some of the observed change.

Residual change scores were computed in SPSS by conducting a simple linear regression with post-treatment outcome scores (e.g., BSL-23) regressed onto pre-treatment outcomes scores with 'standardized' residuals saved. Data points that fall below the regression slope produce negative residual change scores, which indicate that a resident showed more symptom reductions at post-treatment than would be expected after controlling for pre-treatment scores (see Figure 1). Values that fall above the regression line produce positive residual change scores, which indicate that there were less symptom reductions than would be expected after controlling for pre-treatment scores. Therefore, residual change scores can index the magnitude of symptom change while taking into consideration the baseline level of symptom severity. The primary outcome measure was residual change scores of the BSL-23. Secondary outcome indices were residual change scores of the QIDS and PQ-LES-Q.

Reliable change, reliable change index, and clinically significant change.

Assessing symptom changes from pre-treatment to post-treatment is essential to clinical research. Yet, many studies rely on examining between-group symptom changes, and this group-level of analysis does not allow researchers to draw conclusions about individual changes. Barlow and Nock (2009) proposed that an individual is the primary unit of analysis in the psychological sciences.

This goal of assessing ideographic phenomena can be partially achieved with a statistical approach developed by Jacobson and Truax (1991) called reliable change (RC) and the reliable change index (RCI). RC represents the amount of change (or difference between pre-treatment and post-treatment) in SD units rather than simple change scores. Unless there is equal change among individuals, each individual will have a different RC score. Given the use of SD units to assess change, an RC greater than 1.96 (2 SDs) indicates a statistically reliable change (beyond what would be expected from measurement error alone). RCI represents the absolute value of the difference score (which is computed based on the reliability and variability information of the particular measure) needed to determine whether observed changes were statistically reliable and not a function of measurement error.

Once it is established that observed changes are statistically reliable, the next step is to assess whether the changes are clinically meaningful. That is, has clinically significant change (CSC) occurred to extent than an individual moved from an affected group (BPD) to an unaffected group (Normal Control)? CSC can also be used to assess whether an individual deteriorated during an intervention. Jacobson, Follette, and Revenstorf (1984) provided the following definition of clinical significance: "a change in therapy is clinically significant when the client moves from the dysfunctional to the functional range during the course of therapy"

(p.340). This definition of clinical significance is predicated on the assumption that the "normal" or "functional" range of the population is known. Normative data were available from the psychometric study of the original BSL with 95 items (Bohus et al., 2007).

To calculate the RC, RCI and CSC, there are several pieces of information that are needed including, pre- and post-treatment scores, SD of measure, reliability of the measure (preferably test-retest or internal consistency), and a cutoff score or reported means of affected and unaffected samples of the outcome measure to establish a CSC threshold.

Procedures for establishing reliable change and reliable change index.

1. Calculate standard error of measurement ($SE_M = s\sqrt{1-r_{xx}}$)

   a. s = SD of reference group

   b. r_{xx} = reliability of the instrument (test-retest or Chronbach's alpha)

2. Calculate $S_{Diff} = \sqrt{2(SE_M^2)}$

   a. S_{Diff} = SD of the errors of measurement of the difference scores

3. Calculate the difference score for each individual

   a. $Diff = Mean_{T1} - Mean_{T2}$

4. $RC = (Mean_{T1} - Mean_{T2})/S_{Diff}$

   a. $RC > 1.96$ = reliable change (an individual's standardized score)

5. $RCI = (1.96)*S_{Diff}$

   a. The RCI for the BSL-23 was $(1.96)*(.46) = .89$ for the current study. Thus, any resident with a difference score greater than the absolute threshold of .89 was considered to show statistically reliable change.

Clinically Significant Change: BSL-23 Cutoff Score.

A cutoff score was calculated according to recommendations of Jacobson and Truax (1991) who proposed three different methods for calculating a cutoff point (methods: a, b, and c) that indicates a resident moved from the "dysfunctional" distribution to the "normal" distribution.

Cutoff score method 'a' is recommended when data from a "normal" distribution is unknown. Cutoff score 'a' is calculated by using the "dysfunctional" distribution mean and moving two SDs in the direction of the "normal" distribution (i.e., symptom reductions). Jacobson and Truax (1991) posited that cutoff score 'a' will be too conservative when the distributions overlap, as is the case of the psychometric data provided by Bohus and colleagues (2007) that showed that individuals with BPD ($n = 308$) had a BSL-95 mean score of 2.0 ($SD = .76$) and healthy controls ($n = 204$) had a BSL-95 mean score of 0.4 ($SD = .22$). Cutoff score 'b' represents the mean of the "normal" distribution plus 2*SD of the pre-treatment scores. Cutoff score 'b' is relatively lenient relative to 'a' and 'c' and equaled .84 in the current study. Cutoff score 'c' represents the mid-point between the "dysfunctional" and "normal" distributions. Using the Jacobson and Truax (1991) formula to calculate cutoff score 'c,' mean BSL-23 score at post-treatment equaled .77 in the current study. This was problematic, given that the mean of the "dysfunctional" distribution was 2.0 and SD was .76 (Bohus et al., 2007). Thus, using cutoff score 'c' according to Jacobson and Truax would be too lenient in the current sample, with the CSC threshold approximately half of a SD away rather than the two SD recommendations.

Given that cutoff scores computed with 'b' and 'c' did not make theoretical sense given the obtained cutoff scores, method 'a' was employed, which is justified considering that the obtained CSC cutoff score of the current study was .48, which is closer to the "normal" distribution mean of .44 reported by Bohus and colleagues (2007) than cutoff 'b' (.84) or 'c'

(.77). Cutoff score 'a' was the most conservative of the three and selected to protect against Type I error. Residents who met the RC and RCI threshold were classified as CSC if their mean BSL-23 score was .48 or lower at post-treatment; Resident were classified as no CSC if they met the RC and RCI threshold but not the cutoff score. Finally, residents were classified as deteriorated if they met the RC and RCI threshold in the opposite direction (i.e., increased borderline symptoms). See Figure 2 for illustration.

<div align="center">

Results

</div>

Study Hypotheses

Do emotion dysregulation symptoms at pre-treatment predict symptom change on BSL-23?

Simple-linear regressions were conducted to test the hypotheses that residents with greater DERS-36 scores at pre-treatment would show less reductions of borderline symptoms, depressive symptoms, and poorer quality of life than residents with lower DERS-36 scores at pre-treatment. The hypotheses were not supported, see Table 2. Pre-treatment DERS-36 scores did not predict residual change of BSL-23scores, $F(1, 89) = .01$, $b = .01$, $t = .09$, $p = .93$. Additionally, DERS-36 scores did not predict QIDS, $F(1, 89) = .72$, $b = -.09$, $t = -.85$, $R^2 < .01$, $p = .40$, or PQ-LES-Q, $F(1, 89) = 1.19$, $b = .12$, $t = 1.09$, $R^2 = .01$, $p = .28$, residual change scores.

Do social anxiety symptoms at pre-treatment predict symptom change on BSL-23?

Due to the low sample size of the BFNE responses ($n = 10$), there was not enough statistical power to detect a significant effect. Nevertheless, the analyses were conducted to provide preliminary data on the association between pre-treatment BFNE scores and outcome by examing effect sizes (i.e., R^2). Three separate simple-linear regressions were conducted to test the hypotheses that residents with increased BFNE scores at pre-treatment would show less

reductions of borderline symptoms, depressive symptoms, and poorer quality of life. The hypotheses were not supported, see Table 2. Pre-treatment BFNE scores did not predict residual change of BSL-23 scores, $F(1, 9) = .01$, $b = .01$, $t = -.02$ $p = .95$, $R^2 < .01$. Additionally, BFNE scores did not predict QIDS, $F(1, 9) = .20$, $b = .15$, $t = -.85$, $R^2 = .02$, $p = .66$, or PQ-LES-Q, $F(1, 19) = .13$, $b = .08$, $t = .36$, $R^2 < .01$, $p = .72$, residual change scores. Only 2% of the variance in residual change of BSL-23 was account for by pre-treatment BFNE scores, and less than 1% variance was accounted in residual change of QIDS and PQ-LES-Q.

Do PTSD symptoms at pre-treatment predict symptom change on BSL-23?

Three separate simple-linear regressions were conducted to test the hypotheses that residents with increased PCL-5 scores at pre-treatment would show less reductions of borderline symptoms, depressive symptoms, and poorer quality of life than residents with lower PCL-5 scores at pre-treatment. The hypotheses were not supported, see Table 2. Pre-treatment PCL-5 scores did not predict residual change of BSL-23 scores, $F(1,19) = .05$, $b = .05$, $t = .23$, $R^2 < .01$, $p = .82$. Additionally, PCL-5 scores did not predict QIDS, $F(1, 19) = .01$, $b = .02$, $t = .08$, $R^2 < .01$, $p = .94$, or PQ-LES-Q, $F(1, 19) = .13$, $b = .08$, $t = .36$, $R^2 < .01$, $p = .72$, residual change scores.

Does level of intolerance of uncertainty at pre-treatment predict symptom change on BSL-23?

Three separate simple-linear regressions were conducted to test the hypotheses that residents with increased IUSC scores at pre-treatment would show less reductions of borderline symptoms, depressive symptoms, and poorer quality of life than residents with lower IUSC scores at pre-treatment. The hypotheses were not supported, see Table 2. Pre-treatment IUSC scores did not predict residual change of IUSC scores, $F(1, 89) = 2.98$, $b = .18$, $t = 1.73$, $R^2 = .03$,

$p = .09$. Additionally, IUSC scores did not predict QIDS, $F(1, 89) = .97$, $b = .12$, $t = 1.16$, R^2 $= .02$, $p = .25$, or PQ-LES-Q, $F(1, 89) = 1.88$, $b = -.14$, $t = -.14$, $R^2 = .02$, $p = .17$, residual change scores.

Does Level of Experiential Avoidance at Pre-treatment Predict Symptom Change on BSL-23?

Due to the low sample size of the AAQ-II responses ($n = 6$), there was not enough statistical power to detect a significant effect. Nevertheless, the analyses were conducted to provide preliminary data on the association of AAQ-II and outcome by examing effect sizes (i.e., R^2). Three separate simple-linear regressions were conducted to test the hypotheses that residents with increased AAQ-II scores at pre-treatment would show less reductions of borderline symptoms, depressive symptoms, and poorer quality of life.. Three separate simple-linear regressions were conducted to test the hypotheses that residents with increased AAQ-II scores at pre-treatment would show less reductions of borderline symptoms, depressive symptoms, and poorer quality of life.. The hypotheses were not supported, see Table 2. Pre-treatment AAQ-II scores did not predict residual change of AAQ-II scores, $F(1, 5) = 2.89$, $b = .61$, $t = 1.70$, $R^2 = 37$, $p = .15$. Additionally, AAQ-II scores did not predict QIDS, $F(1, 5) = 1.37$, $b = .46$, $t = 1.17$, $R^2 = .22$ $p = .30$, or PQ-LES-Q, $F(1, 5) = 2.28$, $b = .56$, $t = -1.51$, $R^2 = .31$, $p = .19$, residual change scores. Power for the current regression was not sufficient; however, the effects sizes were small to medium, and the slopes suggest that as AAQ-II scores increase at pre-treatment, residents were more likely to show more BSL-23 reductions than expected. This trend is in the direction of the study hypothesis.

Secondary Data Analyses

Reliable Change, Reliable Change Index, and Clinically Significant Change.

An RC score was computed for each resident on the BSL-23 (see Data Analytic Plan). Resident were classified as (RC = 1, No RC = 0). Results of the classification revealed that 51 of 92 (55%) of the residents showed reliable change on the BSL-23 from pre- to post-treatment. Next, the RCI was computed (RCI absolute threshold = .89) to determine the direction of the reliable change by classification (RC = 1, No RC = 0, Deteriorated = -1). Results of the classification revealed that 51 of 92 (55%) of the residents showed RC, 38 of 92 (41%) showed no RC, and 3 of 92 (3%) showed RC toward deterioration. Finally, CSC classification was done by assessing residents who met the RC/RCI threshold and whose BSL-23 post-treatment score was below the cutoff score (*mean* = .44). Of the 51 residents who met the RCI threshold, 22 were considered CSC, meaning that 27% showed enough improvement on the BSL-23 that they would likely fall within the "normal" distribution. Sixty-seven of the residents (73%) showed RCI but not CSC, and 3 of the 92 residents (3%) showed CSC toward deterioration. Table 3 provides RC, RCI, and CSC status for each of the residents in the analysis.

Do pre-treatment clinical symptom scores predict clinically significant change?

Binary logistic regressions were conducted to test the extent to which pre-treatment clinical scores (e.g., DERS-36, AAQ-II) predicted a resident's group classification at post-treatment: 1 = clinically significant change (CSC) or 0 = no clinically significant change (No CSC; see Table 4). Those who deteriorated were classified as No CSC for purposes of the analyses.

The DERS-36 Total score at pre-treatment was not a significant predictor of group classification, $B = .01$, $SE = .01$, $Wald = 1.33$, $p = .25$, $Exp(B) = 1.01$, $Cox \& Snell\ R^2 = .02$. For every one-unit increase in DERS-36 Total score at pre-treatment, there was a 1.01 increased chance that the resident would be classified into the CSC group. A secondary analysis of the six-

factor subscales of the DERS-36 at pre-treatment revealed that they were not significant predictors of group classification (*ps* ranged = .11 to .99). Awareness was approaching significance, *p* = .11, *Exp(B)* = 1.11, trending in the direction of a 1.11 increased chance of being classified as CSC for every one-unit increase in Awareness at pre-treatment.

Social anxiety symptoms at pre-treatment did not predict group classification, *B* = .03, *SE* = .13, *Wald* = .05, *p* = .83, *Exp(B)* = 1.03, *Cox & Snell R^2* = <.01. However, the analysis was underpowered (*n* = 7). The data trend reflected a 1.03 increase chance of being classified in the CSC group for every one-unit increase in BFNE score at pre-treatment.

Trauma symptoms at pre-treatment did not predict group classification, *B* = .02, *SE* = .13, *Wald* = .65, *p* = .42, *Exp(B)* = 1.02, *Cox & Snell R^2* = .03. This analysis was also underpowered (*n* = 8). The data trend reflected a 1.02 increase chance of being classified in the CSC group for every one-unit increase in PCL-5 pre-treatment score.

Experiential avoidance symptoms at pre-treatment did not predict group classification, *B* = -0.13, *SE* = .12, *Wald* = 1.10, *p* = .29, *Exp(B)* = .88, *Cox & Snell R^2* = .18. The analysis was underpowered (*n* = 4); however, the results trended in the opposite direction of the study hypothesis. For every one-unit increase in AAQ-II score at pre-treatment, there was a 1.12 decreased chance of being classified as CSC.

Intolerance of uncertainty was not a significant predictor of group classification, *B* = -.01, *SE* = .01, *Wald* = .19, *p* = .66, *Exp(B)* = 1.00, *Cox & Snell R^2* <.01. See Table 5 for a summary of the results.

Discussion

While DBT is an effective treatment for adults and adolescents with BPD and BPD-like features, it is not effective for all individuals (Kröger et al., 2013; Rizvi, 2011). Thus, there are

opportunities for researchers to identify ways to increase treatment response. This line of research can help improve outcome for individuals receiving DBT, reduce the amount of resources needed to provide the treatment (e.g., shorter intervention duration), and inform ways to adapt future DBT protocol iterations.

Thus, the aim of the current study was to test the extent to which pre-treatment factors predicted response to DBT among adolescent females in residential care. We predicted that as residents' clinical symptom scores increased at pre-treatment, they would show less symptom reductions than residents with decreased baseline clinical symptoms. Independent linear regression analyses did not support the study hypotheses. While there were symptom improvements across most measures from pre-treatment to post-treatment, no predictive variables accounted for a significant amount of variance in residual change scores of the BSL-23, QIDS, or PQ-LES-Q.

Neither difficulty in emotion regulation or intolerance of uncertainty scores at pre-treatment were significant predictors of residual change of outcome. While the ability to regulation one's emotions is a proposed mechanism of change in BPD symptom (Gratz et al., 2012), the current results suggest that emotion regulation difficulties at pre-treatment do not interfere with treatment response. Intolerance of uncertainty has not been studied within the context of BPD and treatment response. McEvoy and Mahoney (2012) posited that intolerance of uncertainty is a mechanism of change across several psychiatric disorders, particularly those associated with negative affect. The current study was first to assess the relationship between pre-treatment intolerance of uncertainty severity and treatment outcome. The study hypothesis was not supported, pre-treatment intolerance of uncertainty did not predict residual change of outcome measures. Given the highly structured environment of residential settings, it is possible

that uncertainty levels decrease quickly; thus, limiting the extent to which it affects treatment response.

There was an inadequate sample size to analyze three of the study predictor measures (i.e., AAQ-II, BFNE, and PCL-5); thus, interpretations of these results should be taken with caution and serve to provide preliminary data and trends. The results indicated that level of pre-treatment experiential avoidance was not a significant predictor of residual outcome in the current study, which is counter to the results of Perroud and colleagues (2010) and Rüsch and colleagues (2008) who found that individuals with higher levels of pre-treatment experiential avoidance were associated with higher levels of premature dropout than individuals with lower levels of pre-treatment experience avoidance. Of note, Perroud and colleagues (2010) assessed response from an outpatient sample, and both Perroud and colleagues and Rüsch and colleagues (2008) assessed treatment dropout rather than symptom reductions. Social anxiety symptoms were also not a significant treatment predictor, which is inconsistent with the findings of Dimeff and colleagues (2000) who that social anxiety interfered with response to DBT among individuals with comorbid BPD and substance use disorder. There are two important distinctions between the study by Dimmeff and colleagues (2010) and the current study. First, the current study was conducted in a residential setting where residents cohabitate with each other 24-hour per day rather than an outpatient setting (Dimeff et al., 2010) where contact between individuals is generally once per week for two to three hours per interaction. Second, substance use disorder was not a treatment target of the current study and, in fact, was a rule out for admission. Together, these differences in social contexts and profile of psychiatric comorbidity may have contributed to the divergent findings between the studies. Pre-treatment trauma symptoms did not predict residual outcome. Interestingly, across residents, there were reductions of trauma

symptoms from pre-treatment to post-treatment; however, trauma symptoms were not a target of DBT among this resident population who were considered Stage 1 DBT clients (i.e., those with active self-harm urges/action and suicidal ideation). Again, the analysis was underpowered. Preliminary results suggest that core DBT skills may reduce PTSD symptoms, even when not a target of treatment however, the mechanism of change remains unclear.

Secondary analyses assessing individual-level analyses (i.e., RC, RCI, CSC) showed that 23% of the current sample showed CSC, 72% showed no CSC, and 3% deteriorated. While these values are lower than the response rates of reported by Kröger and colleagues (2013; CSC = 45%, no CSC = 30.6%, deterioration = 11%, premature dropout = 10%), these authors calculated a CSC threshold of .80 which is more liberal than the .40 CSC threshold of the current study. Additionally, Kröger and colleagues (2013) sample was older (*mean age* = 32.0, *SD* =10.27) than the mean age of the current sample (*mean age* = 15.88, *SD* = .96).

Overall, the results trended in the direction that higher clinical symptom scores at pre-treatment were predictive of greater residual change on outcome. While these trends are counter to the current hypotheses, they suggest that DBT in residential settings is robust against pre-treatment clinical symptoms and is effective for treating those with a range of pre-treatment clinical severity. Further, the disparate findings can also be attributed to methodological differences, particularly the way in which outcome was assessed among most treatment-outcome studies (simple change scores) compared to the current study (residual change scores). Simple change scores are affected by ceiling and floor effects (i.e., regression to the mean).

A possible explanation for the non-significant effects of pre-treatment clinical symptoms on outcome can be attributed to the 'high dose' of DBT that residents receive. For instance, each resident attended up to three DBT skills groups per day, five days per week. Additionally, they

received individual therapy sessions, family sessions (to intervene in the environment), and DBT-skills generalization group. Line therapists (residential counselors and behavior specialists) were also trained in DBT and reinforced effective skill use, while blocking or redirecting residents who were dysregulated and not effectively using skills. The 'high dose' of DBT received in a residential setting is vastly different than outpatient settings where adolescents attend a 2-hour skills group and a 1-hour individual session per week. Another possible explanation is that DBT is a comprehensive treatment that effectively addresses multiple clinical features characterized by emotion dysregulation difficulties (e.g., social anxiety, experiential avoidance). Indeed, recent research suggests that DBT skills can be applied for transdiagnostic emotion dysregulation difficulties (Neacsiu et al., 2014; Ritschel, 2015). Therefore, an individual's clinical presentation at pre-treatment may not be as important in residential settings as it may be in other treatment settings.

Importantly, the CSC rate of the current study (22%) was low. While Kröger and colleagues (2013) found a CSC rate of 45% among an inpatient sample, as mentioned before, their cutoff score (.8) was more liberal than the cutoff score (.4) of the current study. Additionally, their sample included adults rather than adolescents. Further, it has been noted that residential programs are not designed specifically to reduce symptoms to a level of remission. Instead, residential programs are tasked with the goal of reducing acute harm and providing an environment for stabilization to occur (Whittaker et al., 2016). After discharge, residents often take a step-down approach in treatment, with some residents continuing with partial hospitalization program (PHP), intensive outpatient program (IOP), or general outpatient (Garrison & Daigler, 2006).

Feasibility Limitations

There were several limitations to the current study. First, there were barriers to the feasibility of conducting a treatment outcome study within a large medical setting; thus, a feasibility analysis is provided below. Second, the current study was not a randomized controlled trial, so there was no comparison group to assess similarities and difference between the current sample. So, although the aim of current study was to assess treatment predictors, inferences of treatment efficacy are limited. Additionally, comparison of CSC rates at post-treatment without a similarly representative pre-treatment control group limit interpretation. Third, the sample consisted of female adolescents in a residential setting; thus, the generalizability of the results to other populations is limited. Fourth, obtaining data at multiple time points throughout treatment (e.g., weekly) would provide a greater understanding of the idiographic patterns of treatment response. For instance, if a resident showed elevated intolerance of uncertainty at pre-treatment, weekly assessment would help to flesh out how these symptoms progress (increase, decrease, remain unchanged) during the course of treatment. Finally, the exploratory nature of this study and large number of analyses relative to sample size increases the likelihood of Type I error; thus, the findings are preliminary and in need of further investigation.

Feasibility Analysis.

The primary purpose of a feasibility analysis is to ensure that an objective (e.g., research, treatment implementation) can be done effectively. Bowen and colleagues (2009) posited eight areas to focus on when considering feasibility research. Three areas (Implementation, Practicality, and Integration) are particularly relevant for barriers experienced in the current study. *Implementation* is the area that focuses on the extent to which an objective can be implemented as planned. *Practicality* focuses on whether an objective can be completed when

resources are constrained in some way. *Integration* addresses the level of system change needed to integrate a new objective.

In the current study, there were several barriers to data collection including changes to the planned data collection procedures, implementation of formal IRB procedures, and lower rates of assent/consent for study enrollment than expected. The current study was conducted in a large psychiatric hospital system whose primary aim is to deliver high-quality clinical services. As such, there were limited research resources (Practicality) and IRB protocols (Implementation). Recently, the organization increased its focus to collect clinical data for research purposes (Integration), but with some systematic challenges.

The hospital has seen a rapid expansion, locally and nationally. This growth strains existing resources, including the availability of those who maintain and process data. Further, there were procedural changes to obtaining the de-identified data from the organization, which made it difficult to obtain data for analyses. It is unclear how procedural changes were communicated (e.g., electronic communication, scheduled trainings) to units within the organization.

Recommendations for Future Research in Community Settings.

Pilot studies.

Prior to data collection, a pilot study should be conducted to evaluate whether data collection procedures were implemented as intended. McHugh and Barlow (2010) defined implementation as "the process of transferring the treatment to the clinical setting (e.g., training)." A pilot study will increase the likelihood that an intervention or objective (e.g., data collection) can be administered and completed with high fidelity, which in turn will protect against threats to internal validity. A pilot study will also ensure that implementing new protocols can be completed given the current resources of an organization (Damschroder et al., 2009). Finally, a

pilot study is often short-term; thus, if there are challenges integrating an objective, changes can be made or terminated with minimal impact to the organization.

In retrospect, if the current study was pilot tested, the research investigators would have been involved, or have communication with, relevant departments who administer the organizational protocols such as screening, recruitment, retention, treatment adherence, treatment fidelity, and assessment (Leon, Davis, & Kraemer, 2011).

Effective collaboration with IRBs across multiple organizations.

The IRB is tasked with ensuring that research of animals and humans is conducted ethically, with minimal harm, and with benefit to populations being examined (Schneider, 2013). While precedent has been set for IRB guidelines and standards, there remains variability across organizations in IRB procedures (Shore et al., 2011). Given these differences in IRB procedures, it is important for researchers to remain in regular contact with involved IRBs across organizations. In the current study, IRB procedures and which organization to defer to was unclear. Further complicating IRB approval were changes to the IRB procedures among one of the organizations that implemented a formal IRB procedure after data collection for the current study began. Thus, regular communication between the study investigators and organization's IRB may have decreased the barriers to data collection. Additionally, it would ensure that involved organizations and research investigators have a shared definition and clear guidelines for executing a study. It was unclear how the organization that implemented a formal IRB during active data collection communicated changes to relevant parties.

Proactive communication between departments to ensure data collection fidelity and accessibility.

In the current study, data was collected and shared between different organizations. This was challenging given that access to data for analyses was delayed (sometimes up to several weeks). Additionally, different organizations had different infrastructure (e.g., software), and different procedures for collecting, deidentifying, and storing data. Therefore, research investigators should have a procedure (e.g., monthly communication) with each department involved in the study protocol to ensure that data is being collected as intended and accessible when needed. This will ensure that any unknown/uncommunicated changes in protocols can be identified prior to the completion of data collection.

   Assent and consent.

   Clinical data in real-world settings is needed to affirm that interventions developed under tightly controlled conditions translate into real-world results. This can be challenging when conducting research with vulnerable populations, including minors under the age of 18. Researchers have an ethically duty to ensure that minors and their parents understand the scope of the study and their rights as participates to make an informed decision.

   Obtaining assent of child/adolescent to participate in research, in addition to their parent/guardian, poses challenges given their vulnerable status. Vitielllo (2003) described assent as a clear agreement to participate, rather than the absence of objection. Among individuals admitted into the residential program of the current study, approximately 75% of the residents/families assented/consented to use data for research purposes. It is unclear whether this was a function of refusal or lack of obtaining written documentation.

   Improving assent/consent procedures may increase enrollment rates. Dockett, Perry and Kearney (2011) developed assent and information forms for minors, with the aim of promoting discussion about research enrollment. Their qualitative study revealed that minors valued being

asked to make decisions about their own participation in research, and they found information on the forms helpful. Many of these forms have been developed from research that sought advice from minors in the development of information packages (Connors & Stalker, 2007; Jones, 2004). Institutions may benefit from an increase in enrollment of research when using innovative approaches to obtaining assent/consent. Thus, an organization should adopt the spirit of evidence-based assessment and treatment so that they can design their measures in a way that contributes to research mission.

Conclusions

The current study was the first to examine the extent to which pre-treatment clinical symptoms predicted borderline symptom residual change among adolescent females receiving DBT in a residential setting. Despite the relatively low sample size, which suggests results should be interpreted with caution and more research needed, the results of the current study provided preliminary evidence that further supports the use of DBT to treat adolescents with emotional dysregulation and BPD-like symptoms within a higher level of care. On average, residents showed reductions of symptoms across clinical measures from pre- to post-treatment. Further, most residents (55%) showed RC in the direction of improvement and 24% showed CSC. Importantly, the findings from the current study suggest that DBT delivered in a residential setting is robust against pre-treatment symptom severity as pre-treatment clinical scores across several disorder-related measures did not predict treatment response.

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Appendix

Table 1. Means and standard deviations of study measures.

Predictor Variables	Pre		Post	
	Mean	SD	Mean	SD
DERS				
Nonacceptance	19.91	6.05	12.21	5.24
Goals	19.72	4.19	13.94	5.32
Impulse	17.31	5.97	9.57	3.6
Aware	20.61	4.74	13.64	5.55
Strategies	28.83	6.89	16.81	7.4
Clarity	16.85	4.23	11.51	4.07
Total	123.48	21.56	77.45	26.38
BFNE				
Total	39.07	5.20	30.25	4.57
PCL-5				
Total	43.62	18.09	21.33	13.80
IUSC				
Total	86.09	20.20	63.73	22.00
AAQ-II				
Total	19.27	7.53	37.17	9.37

Outcome Measures	Pre		Post	
	Mean	SD	Mean	SD
BSL-23				
Total	2.18	0.85	1.03	0.81
QIDS				
Total	16.57	4.59	7.91	5.02
PQ-LES-Q				
Total	45.93	14.24	68.86	15.59

Note. DERS = Difficulty of Emotions Regulation Scale; BFNE = Brief Fear of Negative Evaluation Scale; PCL-5 = PTSD Checklist for DSM-5; IUSC = Intolerance of Uncertainty Scale for Children; AAQ-II = Acceptance and Action Questionnaire-II; BSL-23 = Borderline Symptom List; QIDS = Quick Inventory of Depressive Symptomatology; PQ-LES-Q = Pediatric Quality of Life Enjoyment and Satisfaction Questionnaire.

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Table 2. Independent linear regression analyses with BSL-23, QIDS, and PQ-LES-Q residual change scores regressed onto predictor variables.

Measures	F	b	t	R^2	p
DV = BSL-23 residualized change scores.					
DERS-36 Total	$F(1, 89) = .01$	0.01	0.09	$< .01$	0.93
BFNE Total	$F(1, 9) = .01$	-0.02	-0.07	$< .01$	0.95
PCL-5 Total	$F(1, 19) = .05$	0.05	0.23	$< .01$	0.82
AAQ-II Total	$F(1, 5) = 2.89$	0.61	1.70	0.37	0.15
IUSC Total	$F(1, 89) = 2.98$	0.18	1.73	0.03	0.09
DV = QIDS residualized change scores.					
DERS-36 Total	$F(1, 89) = .72$	-0.09	-0.85	$< .01$	0.40
BFNE Total	$F(1, 9) = .20$	0.15	0.45	0.02	0.66
PCL-5 Total	$F(1, 19) = .01$	0.02	0.08	$< .01$	0.94
AAQ-II Total	$F(1, 5) = 1.37$	0.46	1.17	0.22	0.30
IUSC Total	$F(1, 89) = .97$	0.12	1.16	0.02	0.25
DV = PQ-LES-Q residualized change scores.					
DERS-36 Total	$F(1, 89) = 1.19$	0.12	1.09	0.01	0.28
BFNE Total	$F(1, 9) = .82$	0.29	0.91	0.08	0.39
PCL-5 Total	$F(1, 19) = .13$	0.08	0.36	$< .01$	0.72
AAQ-II Total	$F(1, 5) = 2.28$	-0.56	-1.51	0.31	0.19
IUSC Total	$F(1, 89) = 1.88$	-0.14	-0.137	0.02	0.17

Note. DERS-36 = Difficutlies in Emotion Regulation Scale; BFNE = Brief Fear of Negative Events Scale; PCL-5 = PTSD Checklist for DSM-5; IUSC = Intolerance of Uncertainty Scale for Children; AAQ-II = Acceptance and Action Questionnaire-II; BSL-23 = Borderline Symptom List; QIDS = Quick Inventory of Depressive Symptomatology; PQ-LES-Q = Pediatric Quality of LIfe Enjoyment and Satisfaction Questionnaire.

Table 3. RC, RCI, and CSC status for each resident. Total represents the sum of absolute values.

ID	RC Yes = 1 No = 0	RCI Yes = 1 No = 0 Decline = -1	CSC Yes = 1 No = 0	ID	RC Yes = 1 No = 0	RCI Yes = 1 No = 0 Decline = -1	CSC Yes = 1 No = 0 Decline = -1
1	1	1	0	50	1	1	0
2	1	-1	-1	51	0	0	0
3	1	1	0	52	1	1	0
4	0	0	0	53	1	1	0
5	0	0	0	54	1	1	1
6	0	0	0	55	1	1	0
7	1	-1	0	56	0	0	0
8	0	0	0	57	1	1	1
9	0	0	0	59	1	1	0
10	1	1	0	60	1	1	1
11	0	0	0	61	0	0	0
12	0	0	0	62	1	1	0
13	1	1	0	64	1	1	0
14	1	1	0	65	0	0	0
15	0	0	0	67	0	0	0
16	1	1	0	68	1	1	0
17	1	1	0	69	1	1	1
18	0	0	0	70	1	1	1
19	1	1	1	72	0	0	0
21	1	1	0	73	0	0	0
22	0	0	0	74	1	1	1
23	0	0	0	75	1	1	0
24	0	0	0	76	1	1	0
25	1	1	0	77	1	1	1
26	1	1	0	79	0	0	0
27	1	1	0	80	1	1	0
28	0	0	0	81	1	1	1
29	0	0	0	82	0	0	0
30	1	1	0	83	0	0	0
31	0	0	0	84	1	1	1
32	0	0	0	85	1	1	1
33	1	1	0	86	0	0	0
34	1	1	1	87	1	1	1
35	1	1	1	88	0	0	0
36	1	1	0	89	0	0	0
37	0	0	0	90	1	1	1
38	1	1	1	91	1	-1	0
40	1	1	1	92	0	0	0
42	0	0	0	93	1	1	0
43	1	1	0	94	0	0	0
44	1	1	1	95	1	1	1
45	0	0	0	96	0	0	0
46	0	0	0	98	1	1	0
47	1	1	0	99	1	1	1
48	0	0	0	100	0	0	0
49	1	1	1	104	1	1	1

RC = 54, No RC = 38; RCI = 51, No RCI = 38, Deteriorated = 3; CSC = 22, No CSC = 67, Deteriorated = 3.

Note. RC = reliable change; No RC = no reliable change. RCI = met relaible change index threshold for improvement; No RCI = did not meet reliable change index threshold for improvement; Deteriorated = met relabile change index threshold for deteriroation.

Table 4. Means and standard deviations of pre and post scores of residents who showed CSC, No CSC, or Deterioration.

Measures	Clinically Significant Change (n = 22)				No Clinically Significant Change (n = 67)				Deteriorated (n = 3)			
	Pre		Post		Pre		Pre		Pre		Post	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
BSL-23 (n = 92)												
Total	52.23	12.05	6.55	3.02	47.94	21.08	27.45	16.40	39.00	3.00	67.67	15.28
QIDS (n = 92)												
Total	16.41	4.17	3.59	1.56	16.27	4.86	8.94	4.67	18.50	0.71	18.00	4.58
PQ-LES-Q (n = 92)												
Total	45.83	15.49	84.58	8.17	46.51	14.39	65.06	13.19	43.75	3.79	41.67	11.89
DERS-36 (n = 92)												
Nonacceptance	20.27	4.88	7.77	1.85	19.88	6.46	13.18	4.70	20.00	2.00	23.67	6.51
Goals	19.64	4.38	9.23	4.28	19.31	4.25	15.09	4.80	19.33	1.16	20.00	1.73
Impulse	18.14	6.95	6.41	0.59	16.33	5.25	10.27	3.49	22.33	2.31	16.00	2.00
Awareness	21.82	5.15	8.68	2.27	20.30	4.44	14.93	8.68	18.00	2.65	20.00	4.36
Strategies	29.50	4.74	10.14	2.05	28.01	7.50	18.27	6.78	31.00	2.65	33.00	3.00
Clarity	17.00	3.19	7.23	1.77	16.55	4.34	12.64	3.70	15.67	1.15	16.00	2.65
Total	126.36	16.96	49.45	8.91	120.39	21.52	84.37	22.74	126.33	10.02	128.67	2.52
BFNE (n = 7)												
Total	39.25	3.59	31.00	1.41	38.57	6.21	23.00	1.41	-	-	-	-
PCL-5 (n = 21)												
Total	46.88	12.62	12.45	9.10	40.23	21.54	26.94	11.93	-	-	-	-
AAQ-II (n = 7)												
Total	16.33	8.33	45.00	3.16	23.25	8.66	33.25	9.00	-	-	-	-
IUSC (n = 91)												
Total	83.64	15.50	43.86	9.68	85.91	21.18	68.52	21.07	79.50	17.68	91.00	12.53

Note. CSC = clinically significant change; No CSC = no clinically signficiant change; Deterioration = clinically significant change toward deterioration*;* DERS-36 = Difficutlies in Emotion Regulation Scale; BFNE = Brief Fear of Negative Events Scale; PCL-5 = PTSD Checklist for DSM-5; IUSC = Intolerance of Uncertainty Scale for Children; AAQ-II = Acceptance and Action Questionnaire-II; BSL-23 = Borderline Symptom List; QIDS = Quick Inventory of Depressive Symptomatology; PQ-LES-Q = Pediatric Quality of LIfe Enjoyment and Satisfaction Questionnaire.

Table 5. Independent binary logistic regression with CSC group classification as the criterion variable (CSC, No CSC), and pre-treatment scores of clinical measures as the predictor variable.

Measures	B	SE	Wald	p	Exp(B)	Cox & Snell R^2	Nagelker ke R^2
DERS (*n* = 92)							
Total	0.01	0.01	1.33	0.25	1.01	0.02	0.02
DERS (*n* = 92)						0.05	0.07
Nonacceptance	<.01	0.05	<.01	0.99	1.00		
Goals	-0.07	0.08	0.64	0.42	0.94		
Impulse	0.06	0.06	1.31	0.25	1.07		
Awareness	0.10	0.06	2.58	0.11	1.11		
Strategies	0.03	0.06	0.29	0.59	1.03		
Clarity	-0.05	0.08	0.37	0.45	0.95		
BFNE (*n* = 7)							
Total	0.03	0.13	0.05	0.83	1.03	<.01	0.01
PCL-5 (*n* = 8)							
Total	0.02	0.03	0.65	0.42	1.02	0.03	0.04
AAQ-II (*n* = 4)							
Total	-0.13	0.12	1.10	0.29	0.88	0.18	0.24
IUSC (*n* = 91)							
Total	-0.01	0.01	0.19	0.66	1.00	<.01	<.01

Note. CSC = clinically significant change; No CSC = no clinically signficiant change; Deterioration = clinically significant change toward deterioration; DERS-36 = Difficutlies in Emotion Regulation Scale; BFNE = Brief Fear of Negative Events Scale; PCL-5 = PTSD Checklist for DSM-5; IUSC = Intolerance of Uncertainty Scale for Children; AAQ-II = Acceptance and Action Questionnaire-II.
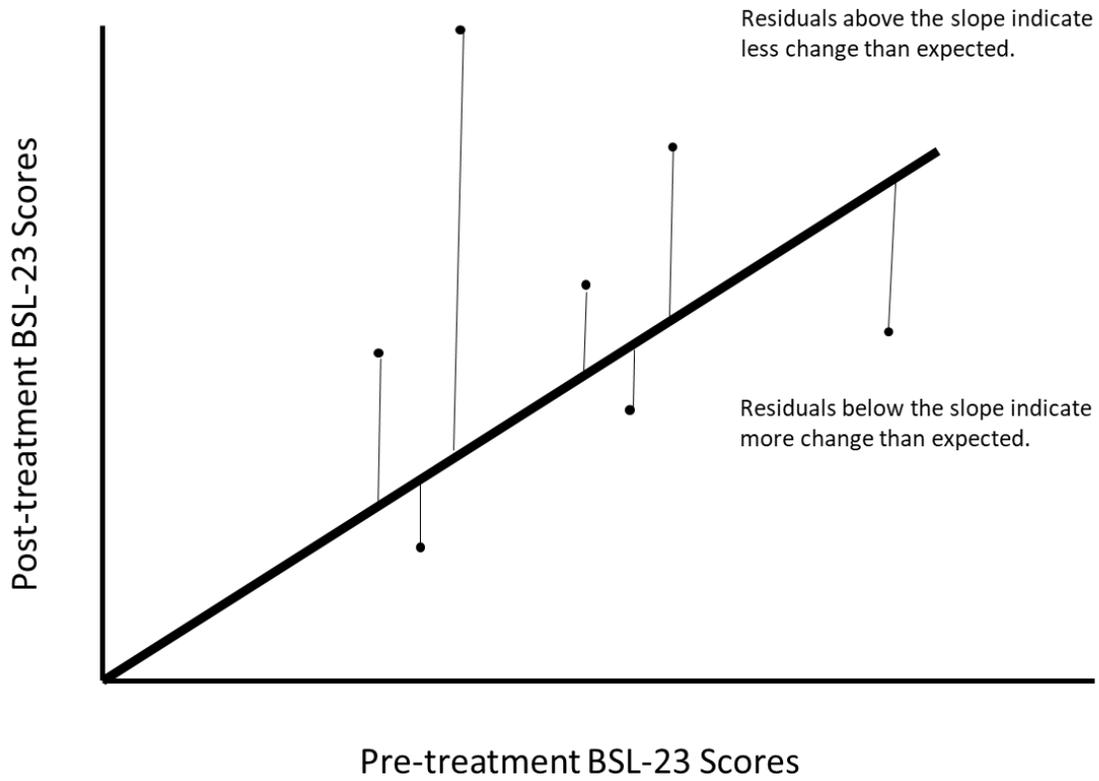
Figure 1. Illustration of calculation of residualized change scores computed from a simple linear regression model with post-treatment BSL-23 scores regressed onto pre-treatment BSL-23 scores.
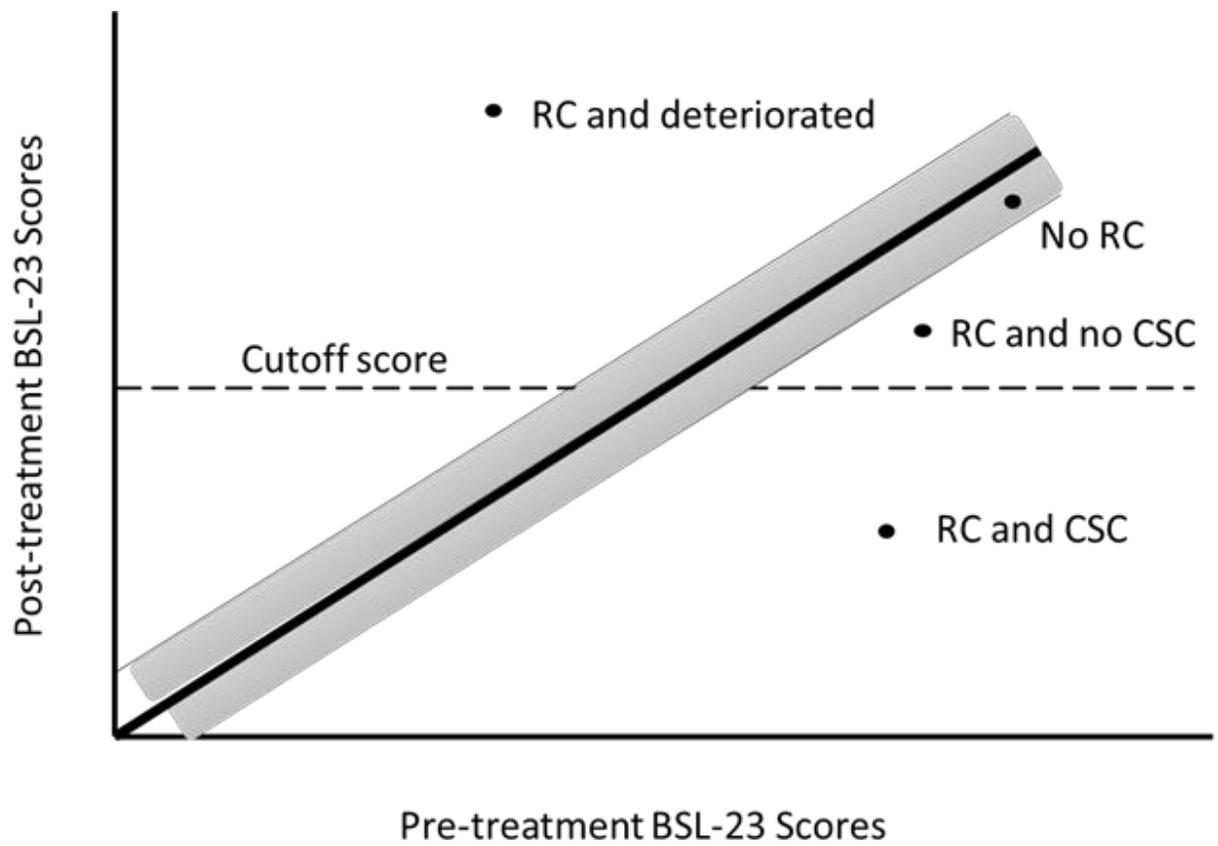
Figure 2. Illustration of RC and CSC classification.

CURRICULUM VITAE

Taylor Davine

EDUCATION

2016-present	**Doctor of Philosophy in Clinical Psychology (Expected 2020)** University of Wisconsin-Milwaukee, Milwaukee, WI APA-Accredited Clinical Psychology Program Dissertation (defended June 2019): Treatment predictors of dialectical behavior therapy for adolescent females in residential care
2013-2016	**Master of Science in Clinical Psychology** University of Wisconsin-Milwaukee, Milwaukee, WI Thesis: Testing the effects of attention training at later stages of processing among socially anxious individuals: A web-based randomized controlled trial
2010-2013	**Bachelor of Arts in Psychology** San Diego State University, San Diego, CA Honors: Magna Cum Laude Senior Thesis: The theory of planned behavior in schizophrenia: A qualitative study
2008-2010	**Transfer Studies** San Diego City College, San Diego, CA

CLINICAL EXPERIENCE

2019-2020	**Pre-doctoral Internship in Clinical Psychology** Cheyenne Veterans Affairs Medical Center APA-Accredited Pre-doctoral Internship Program Training Director: Rebecca Bailly, PhD Co-training Director: Tamara Morris, PsyD Major Rotations: Psychosocial Residential Rehabilitation Treatment Program (6 months) for Veterans with Substance Use Disorder and/or PTSD; and General Mental Health Outpatient (6 months). Minor Rotations: Psychological assessments focused on diagnostic clarification, and pre-surgical evaluations for bariatric surgery and spinal cord stimulators (12 months); Leadership rotation focused on program development, evaluation, and leadership skills (6 months); and Evidenced-

Based Practices rotation focused on applying evidenced-based techniques (6 months).

Responsibilities: Conducted intakes and assessments, individual and group therapy, psychological assessment, and program evaluation and development. Used several different evidence-based treatments including Prolonged Exposure (PE), Cognitive Processing Therapy (CPT), Cognitive Behavioral Therapy for Substance Use Disorder (CBT-SUD), Acceptance and Commitment Therapy (ACT), Dialectical Behavior Therapy (DBT), and Motivational Interviewing (MI). Attended weekly didactic presentations, individual and group supervision, and conducted presentations for the Cheyenne VAMC staff.

2018-2019   **Extern/Advanced Practicum Student**
Rogers Behavioral Health, Oconomowoc, WI
Nashotah Residential Program
Program Director: Erik Ulland, MD
Clinical Supervisor: Amanda Heins, PsyD

The Nashotah Program is a 12-bed residential unit within Rogers Behavioral Health. Admitted residents are adolescent females with significant emotion regulation difficulties with a history of self-harm and/or suicidal behaviors.

Responsibilities: Co-facilitated DBT-skills group, manuscript development, conference presentations, and participated in the treatment milieu.

2017-2019   **First Year Practicum Supervisor**
University of Wisconsin-Milwaukee, Milwaukee, WI
UWM Psychology Clinic
Supervisors: Bonnie Klein-Tasman, PhD, and Kristin Smith, PhD

Responsibilities: Led class discussions for first year clinical students that included topics related to clinical interviewing, psychodiagnostic and psychoeducational assessment, non-specific factors, and multicultural considerations. Conducted live observation of first year clinical students who administered assessments to student volunteers. Completed student evaluations and provided end-of-year feedback ratings.

2016-2019   **Extern/Advanced Practicum Student**
Center for Behavioral Medicine, Brookfield, WI
DBT®- Linehan Board Certified Program
Clinical Supervisor: Kim Skerven, PhD

The Center for Behavioral Medicine is an outpatient clinic that conducts comprehensive DBT for adults and adolescents with borderline personality disorder. The center is a Linehan-board certified DBT clinic and Kim Skerven, my supervisor, is a Linehan-board certified DBT clinician.

Responsibilities: Conducted comprehensive Dialectical Behavior Therapy with adults and adolescents, co-facilitated DBT skills groups, co-facilitated family-skills training, administered psychodiagnostic assessments using the Structured Clinical Interview for DSM-5 (SCID-5) and Montreal Cognitive Assessment (MoCA), managed the program-outcomes database, and presented independent research at national conferences.

2017-2018   **Student Therapist Supervisor**
University of Wisconsin-Milwaukee, Milwaukee, WI
UWM Psychology Clinic
Supervisors: Stacey Nye, PhD, and Robyn Ridley, PhD

Responsibilities: Led group discussions, conducted case conceptualizations, provided feedback to therapists, and supervised two graduate student therapy cases.

2015-2018   **Graduate Student Therapist**
University of Wisconsin-Milwaukee, Milwaukee, WI
UWM Psychology Clinic
Supervisors: Christopher Martell, PhD (2015-2016), Robyn Ridley, PhD (2015-2018), and Shawn Cahill, PhD, (2016-2017)

Responsibilities: Conducted individual therapy with clients from the university and the surrounding community using empirically supported treatments that included cognitive behavioral interventions (e.g., Behavioral Activation, cognitive therapy, exposure therapy).

2014-2015   **Assessment Practicum Student**
University of Wisconsin-Milwaukee, Milwaukee, WI
UWM Psychology Clinic
Supervisors: Kristin Smith, PhD. and Han-joo Lee, PhD

Responsibilities: Administered psychodiagnostic and psychoeducational assessments using instrumented that included the Wechsler Adult Intelligence Scale 4th Edition (WAIS-IV), Wechsler Achievement Test 3rd Edition (WIAT-III), Wechsler Intelligence Scale for Children 4th Edition (WISC-4), Woodcock Johnson 3rd Edition (WJ-3), California Verbal Learning Test 2nd Edition (CVLT-2), Delis-Kaplan Executive Function System (D-KEFS), Minnesota Multiphasic Personality Inventory 2nd Edition (MMPI-2),

Personality Assessment Inventory (PAI), Conners Continuous Performance Test 3rd Edition (CPT-3). Completed scoring of all measures, interpretation and write up of results and provided feedback.

RESEARCH EXPERIENCE

2013-2019	**Graduate Research Assistant** University of Wisconsin-Milwaukee, Milwaukee, WI Anxiety Disorders Laboratory Department of Psychology Principal Investigator: Han-joo Lee, PhD

Responsibilities: Development and execution of independent research projects, database management and analysis, manuscript and conference preparations, attended weekly supervision meetings, and supervised and trained undergraduate research assistants. Independent evaluator on three randomized controlled studies:

1. Attention training for individuals with social anxiety: administered the Mini International Neuropsychiatric Interview (MINI)
2. Inhibition control for children with trichotillomania: administered the Trichotillomania Scale for Children (TSC)
3. Inhibition control for adults with OCD and Obsessive-Compulsive Related Disorders (OCRDs): administered the Yale-Brown Obsessive-Compulsive Scale (Y-BOCS) and the Anxiety Disorder Interview Schedule (ADIS-IV)

2012	**Undergraduate Research Assistant** Yale University, New Haven, CT Yale Depression and Cognition Program Department of Psychology Principal Investigator: Susan Nolen-Hoeksema, PhD

Responsibilities: Assisted with data management, participant recruitment, attended didactic seminars, and presented an oral presentation of a capstone research project examining the effects of perceived stress on rumination among ethnically diverse adolescent females.

2012	**Undergraduate Research Assistant** Yale University, New Haven, CT Dialectical Behavior Therapy Program Department of Psychiatry Principal Investigator: Seth Axelrod, PhD

Responsibilities: Transcribed Dialectical Behavior Therapy (DBT) sessions from the National Education Alliance for Borderline Personality Disorder (NEA-DBT) conference held in April 2011.

2011-2013   **Undergraduate Research Assistant**
University of California-San Diego, San Diego, CA
Skills Training and Empowerment Program (STEP)
Department of Psychiatry
Principal Investigator: Brent Mausbach, PhD

Responsibilities: Co-led a psychosocial intervention for individuals with schizophrenia and schizoaffective disorder, assisted with data management, participant recruitment, prepared conference presentations, conducted literature searches, co-authored peer-reviewed manuscripts and an unpublished treatment manual, was and independent evaluator for a NIMH-R01 randomized controlled trial for older adults with schizophrenia and schizoaffective disorder. Certified to administer the Positive and Negative Syndrome Scale (PANSS), University of California, San Diego Performance-based Skills Assessment (UPSA), and the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS).

2011   **Undergraduate Research Assistant**
San Diego State University, San Diego, CA
Intergroup Relations Laboratory
Department of Psychology
Principal Investigator: Thierry Devos, PhD

Responsibilities: Assisted with data collection and management, participated in lab meetings, provided feedback on lab presentations, contributed to group discussions, and conducted literature reviews.

MANUSCRIPTS

Mathew, A., **Davine, T.**, Snorrason, I., Houghton, D., & Woods, D. (2020). Body-focused repetitive behaviors and non-suicidal self-injury: A comparison of clinical characteristics and symptom features. *Journal of Psychiatric Research*, *124*, 115-122.

Davine, T., Snorrason, I., Berlin, G., Harvey, A., Lotfi, S., & Lee, H-J. (2019). Development of a picture-based measure for "not just right" experiences associated with compulsive sorting, ordering, and arranging. *Cognitive Therapy and Research, 43*(2), 481-497.

Siwiec, S. G., **Davine, T.**, Kresser, R. C., Rohde, M. M., & Lee, H-J. (2017). Modifying thought-action fusion via a single-session computerized interpretation training. *Journal of Obsessive-*

Compulsive and Related Disorders, 12, 15-22.

Goetz, A. R., **Davine, T.,** Siwiec, S. G., & Lee, H-J. (2016). The functional value of preventive and restorative safety behaviors: A systematic review of the literature. *Clinical Psychology Review*, *44*, 112–124.

Ho, J., Moore, R. C., **Davine, T.**, Cardenas, V., Bowie, C. R., Patterson, T. L., & Mausbach, B. T. (2014). Direct and mediated effects of cognitive function with multidimensional outcome measures in schizophrenia: The role of functional capacity. *Journal of Clinical and Experimental Neuropsychology*, *35*(8), 882-895

Mausbach, B. T., Moore, R. C., **Davine, T**., Cardenas, V., Ho, J., Bowie, C. R., Jeste, D. V., & Patterson, T. L. (2013). Theory of Planned Behavior to predict engagement in functional behaviors in schizophrenia. *Psychiatry Research*, *205*(1-2), 36-42.

Moore, R. C., **Davine, T**., Harmell, A. L., Cardenas, V., Palmer, B. W., & Mausbach, B. T. (2013). Using the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) effort index for predicting treatment group attendance in patients with schizophrenia. *Journal of the International Neuropsychological Society, 19*(2), 198-205.

TREATMENT MANUAL

Abel, S., Bordon, J., **Davine, T.,** Ho, J., Moore, R. C., Cardenas, V., & Mausbach, B. T. (2012). Improving Recovery in Schizophrenia (I.R.I.S.). A manual for improving functional capacity in patients with schizophrenia or schizoaffective disorder. Unpublished treatment manual, University of California, San Diego.

PRESENTATIONS

Davine, T., McVey, A., Bittner, K. A., & Ulland, E. (2018). Intolerance of uncertainty as a predictor of borderline symptoms. Poster presented at the 2018 International Society for the Improvement and Teaching of Dialectical Behavior Therapy conference in Washington, D. C.

Kirkman, M., **Davine, T.,** Schwarz, G. N., Lee, C. B., Wessels, K., & Skerven, K. (2018). Skill use moderates the relationship between emotion dysregulation and borderline symptoms. Poster presented at the 2018 International Society for the Improvement and Teaching of Dialectical Behavior Therapy conference in Washington, D. C.

Davine, T., Lee, H-J., Skerven, K., & Ulland, E. (2018). Effectiveness of Dialectical Behavior Therapy for adolescent females with borderline symptoms admitted for residential care. Poster presented at the 2018 Annual Behavioral Cognitive Therapy conference in Washington, D. C.

Berlin, G., Matthew, A., **Davine, T.,** & Lee, H-J. (2018) Unpacking inhibitory differences between OCD and trichotillomania. Poster presented at the 2018 Annual Behavioral Cognitive Therapy conference in Washington, D. C.

Davine, T., McVey, A., Yadlosky, L., & Skerven, K. (2017). Dialectical Behavior Therapy family skills training: Program evaluation ratings. Poster presented at the 2017 International Society for the Improvement and Teaching of Dialectical Behavior Therapy in San Diego, CA.

Davine, T., Snorrason, I., Berlin, G., Harvey, A. M., Lotfi, S., & Lee, H-J. (2017). Developing a picture-based measure of "not just right" experiences. Poster presented at the 2017 Annual Behavioral Cognitive Therapy conference in San Diego, CA.

Mathew, A. S., **Davine, T.,** Harvey, A. M., Snorrassson, I., & Lee, H-J. (2017). The role of incompleteness in body-focused repetitive behaviors and nonsuicidal self-injury. Poster presented at the 2017 Annual Behavioral Cognitive Therapy conference in San Diego, CA.

Siwiec, S., Rohde, M., Kresser, R., Dietzen, K., **Davine, T.,** & Lee, H-J. (2017). The relation of the NIMH Trichotillomania Impairment/Global Scale to other common measures of trichotillomania. Poster presented at the 2017 Annual Behavioral Cognitive Therapy conference in San Diego, CA.

Davine, T., Haworth, K., Fritz, J., Yadlosky, L., Johnson, B., & Skerven, K. (2016). Examining the effect of Dialectical Behavior Therapy on emotion regulation and effective coping: A preliminary uncontrolled trial. Poster presented at the 2016 annual ISIT-DBT conference in New York City, NY.

Berlin, G., Garrow, J., **Davine, T.,** & Lee, H-J. (2016). Predicting disability scores in an OCD community sample. Poster presented at the 2016 Annual Behavioral Cognitive Therapy conference in New York, NY.

Branback, H., **Davine, T.,** & Lee, H-J. (2016). Do perceived parental criticisms and expectations predict an overvalued sense of responsibility? Poster presented at the 2016 UWM undergraduate research symposium.

Davine, T., Turkel, J. E., Goetz., A. G., Berlin, G., Siwiec, S., & Lee, H-J. (2015). Evaluation of the relationship between attention-bias and cigarette-related cues among nicotine dependent individual. Poster presented at the 2015 Annual Behavioral Cognitive Therapy conference in Chicago, IL.

Davine, T., Goetz., A. G., Turkel, J. E., Spencer, S., Siwiec, S., Berlin, G., & Lee, H-J. (2015). Testing the efficacy of attention bias modification to reduce attentional bias to cigarette-related cues among nicotine dependent individuals. Poster presented at the 2015 Annual Behavioral Cognitive Therapy conference in Chicago, IL.

Spencer, S., **Davine, T.,** & Lee, H-J. (2015). Examining attention bias to cigarette-related cues among nicotine-dependent individuals. Poster presented at the 2015 UWM undergraduate research symposium, Milwaukee, WI.

Qualls, W., **Davine, T.,** Machak, M., Park, M-Y., Koster, T., Wollert, E. . . Lee, H-J. (2014). Is experiential avoidance associated with attentional bias among individuals with high social anxiety? Poster presented at the 2014 UWM undergraduate research symposium, Milwaukee, WI.

Davine, T., Turkel, J. E., Siwiec, S. G., Goetz, A. R., Spencer, S., & Lee, H-J. (2014). Evaluating the relevance of 'not just right' experiences for specific symptom domains of OCD. Poster presented at the 2014 Annual Behavioral Cognitive Therapy conference in Philadelphia, PA.

Davine, T., Turkel, J. E., Siwiec, S. G., Goetz, A. R., Rohde, M., & Lee, H-J. (2014). Autogenous and reactive obsessions and their association with different types of OCD symptoms. Poster presented at the 2014 Annual Behavioral Cognitive Therapy conference in Philadelphia, PA.

Davine, T., Turkel, J. E., Goetz, A. R., Siwiec, S. G., Janichek, B., & Lee, H-J. (2014). A comparison study of three response inhibition measures in people with and without OCD. Poster presented at the 2014 Annual Behavioral Cognitive Therapy conference in Philadelphia, PA.

Davine, T., Van Liew, C., Wallace, S. J., Lee, H-J., & Nolen-Hoeksema, S. (2014). Rumination as a mediator between perceived stress and depression in ethnically diverse adolescent females. Poster presented at the 2014 Annual Behavioral Cognitive Therapy conference in Philadelphia, PA.

Goetz, A. R., Siwiec, S. G., **Davine, T.,** & Lee, H-J. (2014). Contamination-related safety behaviors and their association with experiential avoidance and general anxiety symptoms. Poster presented at the 2014 Annual Behavioral Cognitive Therapy conference in Philadelphia, PA.

Janichek, B., Spencer, S., Rohde, M., Cotter, C., **Davine, T.,** Turkel, J., & Lee, H-J. (2014). A Comparison study of three response inhibition measures in people with and without OCD. Poster presented at the University of Wisconsin-Milwaukee Undergraduate Research Symposium, Milwaukee, WI.

Rohde, M., Janichek, B., Spencer, S., Cotter, C., **Davine, T.,** Turkel J., & Lee, H-J. (2014). Examining the Relationship between cognitive OCD subtypes and OCD symptoms. Poster presented at the University of Wisconsin-Milwaukee Undergraduate Research Symposium, Milwaukee, WI.

Siwiec, S. G., Goetz, A. R., **Davine, T.,** Kresser, R., Rohde, M., & Lee, H-J. (2014). Lowering thought-action-fusion conviction through computerized interpretation training. Poster presented at the 2014 Annual Behavioral Cognitive Therapy conference in Philadelphia, PA.

Siwiec, S. G., **Davine, T.,** Goetz, A. R., Kresser, R., Standal, B., & Lee, H-J. (2014). Development of the primary obsession evaluation for thought-action-fusion scale. Poster presented at the 2014 Annual Behavioral Cognitive Therapy conference in Philadelphia, PA.

Spencer, S., **Davine, T.,** & Lee, H-J. (2014). Cue exposure effects on heart rate variability among cigarette smokers. Poster presented at the 23rd Annual National Ronald E. McNair Research Conference.

Spencer, S., Rohde, M., Janichek, B., Cotter, C., Turkel, J., **Davine, T.,** & Lee, H. (2014). Not just right experience and its differential association with various symptom domains of OCD. Poster presented at the University of Wisconsin-Milwaukee Undergraduate Research Symposium.

Davine, T., Bordon, J., Ho, J., Head, J., Cardenas, V., & Mausbach, B. T. (2013). The Theory of Planned Behavior in schizophrenia: A qualitative study. Poster presented at the Western Psychological Association Conference, Reno, NV.

Davine, T., Wallace, S. J., Van Liew, C., & Nolen-Hoeksema, S. (2013). Examining the relationship between stress and rumination among ethnic adolescent females. Regional Psi Chi award winning poster presented at the Western Psychological Association Conference, Reno, NV. Oral presentation presented at the Leadership Alliance National Symposium in Hartford, CT.

Ho, J., Moore, R. C., **Davine, T.,** Abel, S., Cardenas, V., Patterson, T. L., & Mausbach, B. T. (2012). Predictors of general life satisfaction and mental wellbeing in middle-aged to older persons with schizophrenia. Poster presented at the Gerontological Society of America Conference, San Diego, CA.

Lannon, E., **Davine, T.,** & Zion, K. (2012). Hot or not: The likelihood of accepting an unacquainted friend on Facebook. Poster presented at the San Diego State University Student Research Symposium, San Diego, CA.

Moore, R. C., Harmell, A. L., **Davine, T.,** Cardenas, V., Palmer, B. W., & Mausbach, B. T. (2012). Predicting treatment group attendance in patients with schizophrenia: The utility of the RBANS effort index. Poster presented at the University of California, San Diego 7th Annual Junior Faculty and Postdoctoral Fellows Research Symposium.

Tiznado, D., Abel, S., **Davine, T.,** Mausbach, B. T., Cardenas, V., Patterson, T. L., & Jeste, D. V.

(2012). The UCSD SORT Test (U-SORT): Assessment of organizational skills in patients with schizophrenia. Poster presented at the Gerontological Society of America conference, San Diego, CA.

Davine, T., Le, L., Ho, J., Cardenas, V., & Mausbach, B. T. (2011). Effects of class size and intervention type on functional outcomes for schizophrenia. Poster presented at the Western Psychological Association conference, San Francisco, CA.

TEACHING EXPERIENCE

Spring 2017	**Adjunct Instructor** Alverno College Department of Psychology Course: Experimental Psychology (Psy350) Department Chair: Kim Skerven, PhD
Fall 2016	**Adjunct Instructor** Mount Mary University Department of Psychology Course: Social Psychology (Psy256) Department Chair: Laurel End, PhD
Spring 2014	**Teaching Assistant** University of Wisconsin-Milwaukee Department of Psychology Course: Personality Psychology (Psych205) Instructor: Molly O'Connor, MS
Fall 2013	**Teaching Assistant** University of Wisconsin-Milwaukee Department of Psychology Course: Social Psychology (Psych230) Instructor: Morgan Hodge, MS
Spring 2013	**Teaching Assistant** San Diego State University Department of Psychology Course: Intermediate Statistics Instructor: Charles Van Liew, MS

GUEST LECTURES

11/27/17	**Guest Lecturer** University of Wisconsin-Milwaukee

Helen Bader School of Social Work
Topic: Overview of Dialectical Behavior Therapy (DBT)

2/4/15   **Guest Lecturer**
University of Wisconsin-Milwaukee
Department of Psychology
Course: Personality Psychology (Pych205)
Topic: Research Methods for Personality Psychology (Psych205)
Instructor: Kristin Smith, PhD

Fall 2013 (6 classes)   **Guest Lecturer**
University of Wisconsin-Milwaukee
Department of Psychology
Course: Social Psychology (Psych230)
Topics: Social Cognition, Prosocial Behavior, Social Influence & Persuasion, Prejudice and Intergroup Relations
Instructor: Morgan Hodge, MS

3/11/13; 3/13/13   **Guest Lecturer**
San Diego State University
Department of Psychology
Course: Intermediate Statistics
Topic: Correlation and Linear Regression
Instructor: Charles Van Liew, MS

HONORS/AWARDS/FELLOWSHIPS

2015	UWM Department of Psychology Summer Research Fellowship
2014-2017	UWM Advanced Opportunity Program (AOP) Fellowship
2014	UWM Excellence in Teaching Award
2013	Psi Chi regional poster award
2012-2013	NIMH (T34) Undergraduate Diversity Training Supplement
2012	Yale Summer Undergraduate Research Fellowship (SURF)
2011-2012	NIMH (T34) Career Opportunities in Research Scholar
2011-2013	SDSU - Ronald E. McNair Scholar
2011-2013	Psi Chi, National Honor Society in Psychology
2009-2013	Dean's Honors List

PROFESSIONAL MEMBERSHIPS

2014-present	Association for Behavioral and Cognitive Therapies (ABCT)
2010-present	American Psychological Association (APA)