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Dialectical Behavior Therapy Programming for Adolescents: A Systematic Review and Meta-Analysis of Clinical and Implementation Outcomes

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ABSTRACT

Objective: The purpose of this systematic review and meta-analysis is to provide an updated examination of the adolescent Dialectical Behavioral Therapy (DBT) literature and synthesize study findings across treatment settings (e.g. inpatient, outpatient, school), and treatment levels (e.g. clinical intervention, targeted, universal prevention). We also provide meta-analytic findings of the impact of DBT across key problem behaviors: depression, emotion dysregulation, suicidal and self-harm behaviors, externalizing problems, and eating disorders.

Method: A reference database search was used to identify studies conducted on adolescent DBT interventions from 2000 through 2023 ($N = 72$). In addition to ensuring that the review process conformed to the PRISMA statement, we independently verified that each study met inclusion criteria before triple coding each article to examine variables of interest and extracted outcome data needed to conduct meta-analyses.

Results: DBT appears to demonstrate effectiveness in improving mental health outcomes in adolescents across a range of psychiatric problems. To meet these treatment needs, DBT interventions have been appropriately adapted based on care setting, suggesting empirical support in inpatient, residential, partial hospitalization, and intensive outpatient programs, as well as in outpatient settings, juvenile correctional facilities, and schools.

Conclusions: The growing evidence base for adolescent DBT appears to reflect its promise and versatile clinical utility. Clinical implications and recommendations for future directions are discussed, including the need for more randomized controls and representation of diverse communities.

Dialectical behavior therapy (DBT) is a multimodal treatment approach originally created to treat borderline personality disorder and self-harm behaviors (Linehan, 1993) but has since been examined across a variety of diagnoses, settings, and populations. DBT was designed to increase a client's desire for change, build emotional skills and capabilities, generalize gains in treatment to larger settings and contexts, restructure client's environments to reinforce therapeutic gains, and increase therapist motivation and competence in his or her abilities to teach the tenants of DBT (Rizvi et al., 2013).

Based upon mounting positive evidence for efficacy in adult populations, DBT was first adapted for use with adolescents by Rathus and Miller in 1999 (DBT-A). They found that DBT-A significantly ameliorated self-harm and offered promise as a treatment for adolescents (Rathus & Miller, 2002). Encouraging findings from this seminal study led to further examinations on the effectiveness of DBT-A across many other settings and diagnoses. Though there have been fewer randomized controlled trials (RCTs) of DBT conducted with youth populations as compared to adults, review articles and meta-analyses that examined outcome studies, including primarily quasi-experimental designs, have determined that DBT for adolescents is similarly effective overall (Groves et al., 2012; Haktanir et al., 2023; Jakubovic & Drabick, 2023; Jones et al., 2023; Kothgassner et al., 2021; MacPherson et al., 2013; Vijayapriya & Tamarana, 2023). Much of DBT interventions have been implemented in adolescent tertiary prevention and treatment settings, including inpatient programs (Fleischhaker et al., 2011; Katz et al., 2004; Memel, 2012; Salbach et al., 2007), partial hospitalization programs (Lenz & Del Conte, 2018), residential care units (Sunseri, 2004), and intensive outpatient programs (Johnston et al., 2015). DBT has also been implemented in high-need settings with vulnerable youth populations, such as juvenile detention centers (Fasulo et al., 2015; Trupin et al., 2002), foster children (James et al., 2011) and transitional youth (Rakfeldt, 2005). It is possible that DBT may be particularly effective for these populations, given that youth who have experienced

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chronic stress and trauma often experience emotion regulation difficulties (Fasulo et al., 2015). DBT studies have also demonstrated effectiveness in lower-intensity treatment settings, such as outpatient programs (Goldstein et al., 2007; Safer et al., 2007; Salbach-Andrae et al., 2008) and community care (James et al., 2008). Other investigations in clinical populations have also found support for DBT-A as a treatment for oppositional defiant disorder (ODD) (Nelson-Gray et al., 2006), substance use (Beckstead et al., 2015), trauma-related symptomatology (Geddes et al., 2013), and depression and anxiety (Lenz et al., 2016). Further, studies that investigated DBT for adolescents with suicidal behavior often measured symptom changes in anxiety and depression and found significant decreases in these outcomes as well (Fleischhaker et al., 2011; Geddes et al., 2013; Woodberry & Popenoe, 2008).

Fewer studies have explored the effectiveness of DBT prevention programs for selective and universal youth populations. Early intervention presents a crucial, time-sensitive opportunity to preemptively improve mental health outcomes, given that untreated symptoms of psychopathology, such as for depression and anxiety, are associated with more severe pathology and related adverse outcomes in adulthood (Neil & Christensen, 2009), as well as the fact that developmentally, adolescence is already a time of elevated stress sensitivity (Van Loon et al., 2019).

Current Study

The purpose of this systematic review and meta-analysis is to survey the available literature published on DBT for adolescents and synthesize study findings across treatment settings (e.g., inpatient, outpatient, school), treatment levels (e.g., clinical intervention, targeted, universal prevention), and problem behaviors (e.g., suicidal ideation, depression, eating disorders). While earlier review papers have explored the overall effectiveness of DBT for adolescents, both were published over a decade ago and require updating due to the rapidly evolving nature of the field (Groves et al., 2012; MacPherson et al., 2013). Newer reviews have concentrated on particular disorders, which does not provide a comprehensive overview of DBT (e.g., for anger management (Haktanir et al., 2023); mood symptoms (Jones et al., 2023); self-harm and suicidal ideation (Cook, 2016; Kothgassner, 2021); and externalizing problems (Jakubovic & Drabick, 2023)). They have also extracted limited data (e.g., sample size, design, findings), whereas we have coded for additional variables of interest, such as setting, race, ethnicity, socio-economic status, and comorbidities of participants. We have also coded for multiple implementation outcomes of interest, including information about the implementer, any training or supervision provided, adaptations made, and the total number of sessions and duration. Table 1 summarizes the existing reviews and meta-analyses of adolescent DBT.

Method

A reference database search, including PsycINFO, PubMed, Google Scholar as well as a manual search of review articles, was used to first identify studies that used DBT interventions for adolescent populations. Keywords were a combination of "adolescent," "teen," "DBT intervention," and "Dialectical Behavioral Therapy." After completing a pre-screening of titles and abstracts, we retained 101 unique studies. Studies met inclusion criteria for review if 1) the sample mean age was between 12 and 18 years and 2) at least one standardized assessment (e.g., depression symptoms as measured by the Beck Depression Inventory) or quantifiable behavior change (e.g., number of self-harm behaviors) youth outcome was analyzed and reported. Studies with small sample sizes were not automatically excluded; however, criterion 2 required that samples were large enough to determine statistical significance, thus only one case series found was eligible for review. Of the articles in the initial search, 26 were excluded: case studies with limited sample sizes ($n = 5$), no standardized adolescent outcomes ($n = 9$), unavailable in English ($n = 3$), and conducted primarily with either young adults or pre-adolescent children ($n = 9$). Our search included unpublished studies ($n = 14$) (one was excluded due to examining dropout rates) and all dissertations. Searches on Trial Registries, Open Grey, ClinicalTrials.Gov, and Google Scholar did not identify additional unpublished studies that met review criteria. A PRISMA (Page et al., 2021) flow diagram depicting this study identification process is included in our supplementary downloads.

Three authors independently reviewed each article to determine whether it met inclusion criteria. All eligible articles were then examined in greater detail using Microsoft Excel in order to code information of interest such as participant and intervention characteristics, treatment setting, number of sessions administered, completion rate, delivery format, and assessment timepoints. The articles were "triple coded," meaning that three authors independently coded every article. The authors met weekly to resolve any discrepancies and discuss other eligibility concerns until all articles had been coded. In total, 78 eligible articles representing 71 unique studies were reviewed and coded. In addition, articles measuring outcomes that fall into five domains: depression symptoms ($n = 33$); emotion dysregulation

Table 1. Meta-Analyses and Systematic Reviews of Adolescent DBT compared to current study.

Reference	Methodology	Focus	Dates	Inclusion criteria	N	Finding
Current study	Systematic Review & Meta-analysis	Overall in teenagers	up to December 2023	Published in English Peer reviewed journals, masters theses, or doctoral dissertations Experimental studies Adolescents with reported pre and post test data	71	DBT is effective across a range of settings, levels of care and presenting problems for adolescents.
Haktanir et al. (2023)	Systematic Review	Anger Management	up to September 2022	Published in English Peer reviewed journals, masters theses, or doctoral dissertations Experimental studies Adolescents with reported pre and post test data related to anger	11	DBT is promising approach for adolescent anger management.
Jones et al. (2023)	Systematic Review	Mood symptoms in Bipolar Disorder	1980 to April 2022	Older than 12 years old Diagnosis of bipolar disorder RCTs or cluster RCTs	11	DBT may be an effective treatment for bipolar disorder.
Vijayapria & Tamarana (2023)	Systematic Review	Transdiagnostic treatment for improving cognitive functions	up to June 2022	Adolescent and Adults ages 12 to 60 RCTs and non-RCTs, pre-post study design Published in English Masters and doctoral dissertations Measures of cognitive functions administered	12	DBT may be a treatment option to reach optimal levels of cognitive functioning.
Kothgassner et al. (2021)	Systematic Review & Meta-analysis	Self-harm and suicidal ideation	up to July 2020	RCT or CCT comparing DBT-A with a control Pre-post evaluation for DBT-A Reported outcomes of self-harm	21	DBT showed a small to moderate effects for reducing self-harm and suicidal ideation.
Jakubovic et al. (2023)	Meta-analysis	Externalizing problems	up to February 2022	Peer-reviewed articles Reporting on DBT-based interventions among teens Measuring externalizing problems	17	DBT showed a small to medium effect in reducing externalizing symptoms.
Groves et al. (2011)	Review	Overall in teenagers	2000–2011	Studies of DBT for adolescents with borderline personality disorder symptoms, suicide ideation, and/or non-suicidal self-injury	12	DBT is promising approach for adolescent across problem areas.
Cook & Gorraiz (2016)	Meta-analysis	Non-suicidal self-injury and depression	2002–2013	Studies evaluating DBT for adolescents ages 12 to 18, include both pre and post treatment of NSSI or depression, a sample size of at least 10 adolescents	12	Preliminary effectiveness suggests DBT can be effective for non-suicidal self-injury and depressive symptoms.

($n = 22$); suicidal and self-harm behaviors ($n = 17$); externalizing problems ($n = 9$); and eating disorders ($n = 4$) were selected for additional coding to prepare for a series of meta-analyses. More than one article could be represented in each domain, given that a given article could measure outcomes in more than one domain (e.g., a study on DBT for comorbid youth with internalizing problems may have measured outcomes in depression, emotion dysregulation, and suicidal behaviors). As such, studies could be represented in an outcome domain that was not their primary treatment target (e.g., a study targeting eating disorders may also be represented in the depression domain if they measured depression outcomes).

Effect Size (ES) Calculation

We extracted sample sizes, means, and standard deviations/errors at pre- and post-test for all DBT groups from 46 studies. The other 25 studies were excluded due to: (a) using study designs that did not collect pre-post outcome data ($n = 11$); (b) studies that did not completely report the necessary statistics to calculate ESs and their authors did not respond to our e-mail requests ($n = 6$); universal prevention studies ($n = 6$), and studies that only had outcomes from uncommon domains (e.g., substance use; $n = 3$). Within-group hedge's g was calculated using the below formula, with −1 multiplied on outcomes for which larger scores indicate improvement:

$$Hedges'g = \frac{M_1 - M_2}{\sqrt{\frac{(n_1-1)SD_1{}^2+(n_2-1)SD_2{}^2}{n_1+n_2-2}}} \times \left(1 - \frac{3}{4(n_2-1)-1}\right)$$

The variance of g was calculated as:

$$\frac{n_1 + n_2}{n_1 \times n_2} + \frac{g^2}{2(n_1 + n_2)}$$

When studies did not report the posttest N, the pretest N was substituted. For two studies, Cohen's d was calculated using conversation formulas (below) for partial eta-squared values or odds ratios, and then converted to hedge's g:

$$cohen's\ d = \sqrt{\left(\frac{N-1}{N}\right) \times \left(\frac{partial\,\eta 2}{1 - partial\,\eta 2}\right)}\ cohen's\ d = \frac{\ln(OR) \times \sqrt{3}}{\pi}$$

Aggregated ESs were computed using Comprehensive Meta-Analysis Version 4 (Borenstein et al., 2022). The unit of analysis was subgroups within studies, as some studies reported data on multiple DBT programs. ESs were aggregated by diagnostic domain. Studies could have outcomes in multiple domains. Studies could also have multiple outcomes within the same domain, in which case a combined effect size was calculated for outcomes within the respective domain.

Meta-Analysis

We used a random-effect model for the analyses on mean ESs. We examined mixed effects for the Z-test of each mean ES. We also calculated Q-statistics to test for heterogeneity between studies that were within each mean ES. For bias checks, we generated a funnel plot (Torgerson, 2006), calculated Egger's weighted regression test (Egger et al., 1997) and ran a cumulative meta-analysis.

Results

Participant Characteristics

Across the 71 outcome studies analyzed, 4,119 adolescents have participated in a DBT intervention (mean of 59 per study), excluding those that received a control or alternative intervention for comparison. The mean age of these adolescents was approximately 15.42 years, and approximately 78.86% of these participants were female. Thirty-seven studies reported inclusion of participants from ethnic minority backgrounds, separated broadly into the following categories: Black, Hispanic/Latin, Asian, Native American/Alaska Native, Biracial, Multiracial, and Other. In particular, 18 of these studies reported that one or more ethnic minority groups comprised 50% or more of their total participant sample. Twenty-two studies were conducted internationally, and only five of these studies included demographic information regarding their participants' ethnicities. Overall, 24 studies did not report their participants' demographics. Across all studies, 77.46% did not provide information about participants' socioeconomic statuses.

Participants exhibited a wide range of psychiatric diagnoses and presenting problems across studies. We coded for diagnoses of participants in each study (percentage of studies that included at least one of these disorders as an inclusion criterion for their participants): self-harm (45%), borderline personality disorder (42%), depressive disorders (41%), anxiety disorders (38%), conduct or behavioral problems (28%), eating disorders (24%), bipolar disorders (20%), disordered substance use (20%), trauma or post-traumatic stress disorder (14%), attention deficit hyperactivity disorder (11%), obsessive-compulsive disorder (6%), psychotic disorders (6%), and less than 5% of studies noting

a participant experiencing autism spectrum disorders, sleep disorders, or other personality disorders. Full demographic information, including age, gender, socioeconomic status, race/ethnicity, diagnostic conclusion, and comorbidities, is reported in Supplementary Table 1.

Setting Characteristics

Studies were conducted across several settings appropriate to the level of care and presenting problems, including outpatient community clinics (28%), outpatient hospitals (20%), schools (21%), inpatient and residential programs (15%), intensive outpatient programs or partial hospitalization programs (13%), and juvenile correctional facilities (3%). At the higher levels of care, including inpatient and residential programs, intensive outpatient programs or partial hospitalization programs, and outpatient hospitals and community clinics, adolescents receiving DBT typically presented with one or more of the following, as per each study's inclusion criteria: suicidal ideation and/or behaviors, self-harm behaviors, mood disorders, borderline personality disorder or traits, eating disorders, and substance use. Two studies at the community outpatient level also included "demonstration of emotional and behavioral dysregulation" (Del Conte et al., 2016; Flynn et al., 2019) as a key inclusion criterion, while one of the intensive outpatient programs included aggressive behaviors toward self or others as part of their criteria (Memel, 2012). In terms of school-based DBT interventions, four of these were universal prevention programs without any exclusion criteria, while three were selective interventions that targeted students exhibiting behavioral problems. Full study implementation details, including setting, completion rate, key study findings, and information about the interventions themselves and their delivery, can be found in Supplementary Table 2.

Workforce Characteristics

Most DBT interventions were reportedly delivered by mental health professionals who were a part of the site where treatment was provided (73%). A total of 47 studies indicated that DBT training was provided to those who delivered the intervention (66%). In 19 studies, DBT supervision information was either not provided or not reported (27%).

Study Designs and Intervention Characteristics

Over half of the studies evaluated used a one-group quasi-experimental design (55%), consisting of pre-post outcome comparisons. Other studies compared the pre-post outcomes of the DBT intervention with those of a control group, but without randomizing study subjects (21%). As these studies used other non-random methods of assigning participants, the investigators referred to their study designs as either two-group quasi-experimental studies or controlled clinical trials (CCTs). Only nine studies conducted true randomized controlled trials (RCTs; 13%). The remaining studies (11%) consisted of six retrospective or archival data, one feasibility study, and one case series.

DBT interventions for adolescents are typically derived from Rathus and Miller's 1999 DBT-A manual, including 16 weeks of individual therapy, multifamily skills training group therapy, telephone coaching, and ongoing consultations for therapists. For the studies reviewed, 43 (61%) reported that they made modifications to the DBT-A intervention. Some indicated that they only adjusted the timeframe of the intervention (12%), while others made minor adaptations to tailor the intervention to a specific diagnosis or demographic (26%), such as removing out-of-hours phone coaching and including age-appropriate wording and examples. The studies that incorporated more moderate changes either added or removed certain components (16%) or decided to only deliver skills-training interventions (8%), such as DBT STEPS-A (Mazza et al., 2016). A total of 18 studies indicated that fidelity was measured (25%). The average number of reported sessions across all interventions was 28, with the amount ranging from 4 to 60 sessions. Treatment completion rates ranged from 50% to 100%, with an overall average completion rate of 81%.

Systematic Review of Outcomes by Setting

Support for DBT was found across all quasi-experimental and randomized controlled designs, though for four out of nine RCTs, the DBT intervention did not significantly outperform the active control groups. One of the studies was a universal prevention delivery of DBT, with participants not presenting with clinically significant mental health problems (Burckhardt et al., 2018). Two of the studies explored eating disorder outcomes and had active control conditions (CBT) and a weight management program (Jaite et al., 2020; Mazzeo et al., 2016). The fourth RCT compared DBT to a mindfulness

program and saw improvements in life problems and emotion dysregulation in both groups. Significant outcomes are further explored in terms of setting and care level.

Psychiatric Concerns in Inpatient Care

There have been a few studies to date that have investigated adolescent DBT interventions in inpatient hospital settings, targeting depression symptoms, self-harm, suicidal ideation, and suicidal attempts. In the early 2000s, Miller et al. (2000) and Katz et al. (2004) published the first studies of adolescent DBT in inpatient care and saw improvements. In 2010, McDonell et al. (2010) and colleagues noted the limited research on adolescent DBT interventions used in inpatient psychiatric settings and implemented a milieu DBT adaptation. Results indicated that the DBT conditions were associated with significant increases in global improvement as well as reductions in psychotropic medications prescribed, NSSI, and seclusion time. Similarly, Swales et al. (2016) noted significant improved self-reported general health status among DBT participants. Additionally, Saito et al. (2020) investigated the effects of a modified DBT intervention in an acute-care inpatient unit for adolescents experiencing manic or depressive symptoms, with findings revealing significant reductions in depressive symptoms. Baudinet et al. (2021), examined the common overcontrolled personality traits underlying self-harm, low mood, and disordered eating. Results of this case series indicated that their Radically-Open DBT adaptation was associated with reduced symptoms of depression, self-harm, and eating disorders, as well as improvements in cognitive flexibility, reward processing, and emotional expression.

Psychiatric Concerns in Residential Care

Residential care programs and partial hospitalization programs (PHP) offer an intermediate level of care between inpatient hospitalization and intensive outpatient programs for a variety of acute psychiatric treatment needs (James et al., 2006; Lenz et al., 2014). In the present review, five studies examined the effectiveness of adolescent DBT interventions in treating moderate to severe emotional and behavioral disorders in residential treatment settings. In 2004, Sunseri and colleagues led the first investigation into an adolescent DBT intervention in a residential care program, citing support for DBT found in adult outpatient and inpatient settings and adolescent outpatient settings. The study participants were adolescent girls who had multiple disorders and had functional difficulties. Findings revealed that the DBT intervention was significantly associated with reductions in suicidal and self-harm behaviors (Sunseri, 2004). A controlled clinical trial also determined that DBT was statistically more effective than Standard Therapeutic Milieu in reducing depressive symptoms in a small sample of adolescents in residential treatment who had been diagnosed with a mood disorder, attention deficit hyperactivity disorder (ADHD), posttraumatic stress disorder (PTSD), oppositional defiant disorder, or conduct disorder (Wasser et al., 2008). Beckstead et al. (2015) implemented a DBT intervention for American Indian/Alaska Native adolescents attending a Youth Regional Treatment Center for substance use, determining that based on clinically significant change criteria, 96% of the youth were recovered or improved following program participation. Similarly promising findings were found in DBT delivered in partial hospitalization programs for eating disorders (Murray et al., 2015), life threatening behaviors (Memel, 2012) and mood symptoms (Del Conte et al., 2016).

Schools

A growing body of literature has been investigating the use of school-based, DBT-skills group interventions for both intervention and prevention. Several pilot studies that have been published developed their own modified and condensed versions of the DBT-A protocol to fit the needs of their specific school curriculums.

In 2018, Burckhardt et al. (2018) conducted a randomized controlled trial to explore the preliminary feasibility of a brief DBT-skills workshop, determining that though there were no statistically significant findings, qualitative responses suggested subjective improvements in emotion regulation abilities. Four universal DBT-skill interventions examined the effectiveness of DBT STEPS-A (Mazza et al., 2016). When implemented in an Irish school system to determine whether the intervention predicted decreases in emotion symptoms, dysfunctional coping, and DBT skill use as compared to a nonrandomized control, results indicated that there were significant reductions in depression, anxiety, and social stress symptoms for adolescents in the DBT STEPS-A condition (Flynn et al., 2018). At a rural school district in the United States, DBT STEPS-A was associated with increased social resiliency, emotion regulation, and understanding of DBT skills when compared to a nonrandomized control (Martinez et al., 2022). A DBT STEPS-A study, conducted in Catalonia, Spain, compared pre-to-post intervention differences in socioemotional and quality of life outcomes (Gasol et al., 2022). The study researchers determined that DBT STEPS-A was associated with statistically significant improvements in

peer relationships and pro-social behaviors, along with positive, though non-significant trends, in emotional dysregulation, mental health, and life satisfaction. Most recently, Harvey et al. (2023) noted a deterioration in outcomes when implementing DBT STEPS-A (called "WISE Teens") in high schools in Australia. Qualitative analyses indicated that youth were bored with the intervention, were not completing their practice assignments, found it difficult to understand the program, and experienced implementation difficulties (not enough time). Post-hoc analyses following these qualitative findings indicated that youth who completed home practice of DBT skills saw an improvement in their mental health outcomes.

Systematic Review and Meta-Analysis of Outcomes by Diagnostic Area

Of the 45 articles included in the meta-analysis, we calculated effect sizes for: depression symptoms from 33 articles, emotion dysregulation from 21 articles, self-harm and suicidal behaviors from 17 articles, externalizing programs from 9 articles, and eating disorders from 4 articles. See the Supplemental Materials for forest plots of all studies' effect sizes. For those studies for which effect sizes could not be calculated for any measures ($n = 6$) or some measures ($n = 6$), their findings are still summarized within the respective diagnostic section.

Suicidal and Self-Harm Behaviors

Approximately 30% of studies reviewed included suicidal and self-harm behaviors as inclusion criteria, which entailed a combination of active suicidal ideation or attempts, non-suicidal self-harm behaviors, or features of borderline personality disorder that necessitated measuring one or more of these symptoms. Included among these studies are the findings reported by Rathus and Miller (2002), the first DBT intervention that was adapted for youth and targeted suicidal behavior. All of the studies reviewed reported significant findings indicative of improvement in emotion dysregulation symptoms. Twenty of these studies, including randomized controlled trials (Adrian et al., 2019; Mehlum et al., 2014; Santamarina-Perez et al., 2020) also reported statistically significant reductions in suicidal or self-harm behaviors. Across 19 subgroups from 17 studies, the within-group effect size for suicidal or self-harm behaviors was g = −0.69, suggesting a large effect, with a 95% confidence interval (CI) of −0.84 to −0.55. The mixed-effects Z-value was −9.56, $p < .001$, indicating that the true mean effect size is unlikely to be zero. The Q-value was 30.81, df = 18, $p = .03$, suggesting heterogeneity of effect size across studies with suicidal and self-harm behavior outcomes.

Eating Disorders

Nine studies (12.8%) included in the present review targeted disordered eating symptoms in adolescents, including one that overlapped with NSSI as an inclusion criterion (Fischer & Peterson, 2015). The first study to examine an adolescent adaptation of DBT for eating disorders was a pilot study conducted by Salbach et al. (2007); however, as this article was unavailable in English, their larger, follow-up study is included in this review in its place (Salbach-Andrae et al., 2008). While only two of the studies were randomized controlled trials (Jaite et al., 2020; Mazzeo et al., 2016), all of the studies reviewed reported significant improvements in eating disorder symptoms, including decreases in food restriction, purging, and binge-eating behaviors, with many also noting improvements in related symptoms, such as depression, BMI, and disordered eating attitudes. Specifically, these studies targeted youth with both overcontrolled eating disorders such as anorexia nervosa (e.g., Jaite et al., 2020; Peterson et al., 2020; Salbach-Andrae et al., 2008) and undercontrolled eating disorders such as bulimia nervosa and binge eating (e.g., Fischer & Peterson, 2015; Kamody et al., 2019, 2020; Mazzeo et al., 2016; Murray et al., 2015).

Across four subgroups within the studies, the within-group effect size for eating disorders was g = −0.59, suggesting a large effect size with a 95% CI of −0.96 to −0.23. The mixed-effects Z-value was −3.19, $p < .001$, indicating that the true mean effect size is unlikely to be zero. The Q-value was 3.20, df = 3, $p = .3$, suggesting no significant heterogeneity of effect size across studies with eating disorders outcomes.

Depression & Bipolar Disorder

DBT interventions have also been effectively implemented in outpatient settings for the treatment of bipolar disorder ($n = 2$; Goldstein et al., 2015, 2024) and depression ($n = 3$; Del Conte, 2016; Dixius & Möhler, 2023; Turan & Akıncı, 2022). For example, Goldstein et al. (2015, 2024) conducted randomized controlled trials of DBT versus treatment as usual for adolescents with bipolar disorder, using the rationale that bipolar disorders often share features of emotional dysregulation, as well as suicidal and self-harm behaviors, in common with borderline personality disorder. The researchers determined that compared to treatment as usual, adolescents in the DBT condition showed reduced suicidality, emotion dysregulation, and symptoms of depression. Recently, Turan and Akıncı (2022) delivered a DBT intervention to adolescents who met criteria for a depressive

disorder in a psychiatry outpatient clinic, focusing primarily on DBT skills. Results indicated that this DBT intervention was associated with reduced symptoms of depression, emotional problems, hyperactivity, and peer problems, as well as improved psychosocial and physical health. Similar results were found in another outpatient community setting (Hiller & Hughes, 2023).

Although only three studies explicitly targeted depression in their treatment, 41 studies administered at least one depression measure, 33 of which reported results that could be calculated into an effect size. Across 35 subgroups within these studies, the within-group effect size for depression was g = −0.70, suggesting a large effect size, with a 95% CI of −0.79 to −0.60. The mixed-effects Z-value was −14.70, $p < .001$, indicating that the true mean effect size is unlikely to be zero. The Q-value was 43.60, df = 34, $p = .13$, suggesting no significant heterogeneity of effect size across studies with suicidal and self-harm behavior outcomes.

Emotion dysregulation. Emotion dysregulation is a common feature across problem behaviors – both internalizing and externalizing. Therefore, while it is often measured in DBT studies ($n = 27$ studies); only six studies explicitly state that emotion dysregulation is an inclusion criterion. These studies often had other treatment goals alongside emotional dysregulation, such as suicidal ideation or behaviors, self-harm, and borderline personality traits. While 27 studies examined at least one emotion dysregulation outcome, only 21 of them reported results that could be calculated into an effect size. Across 22 subgroups within these studies, the within-group effect size for emotion dysregulation was g = −0.60, suggesting a large effect size, with a 95% CI of −0.79 to −0.41. The mixed-effects Z-value was −6.31, $p < .001$, indicating that the true mean effect size is unlikely to be zero. The Q-value was 51.21, df = 21, $p < .001$, suggesting there was heterogeneity of effect size across studies with emotion dysregulation outcomes.

Externalizing behaviors. DBT interventions have also been implemented to support improved externalizing behavioral outcomes, in both correctional and educational settings. Given that evidence suggests a pathway between emotion dysregulation and behavioral dysregulation, of which one possible outcome is delinquent behavior, Trupin et al. (2002) delivered an adapted DBT intervention to incarcerated female adolescents. Results of the study revealed that when examined against a matched comparison group, adolescents in the DBT condition experienced a decrease in behavior problems and use of punitive responses by staff. Similarly, another adapted DBT intervention, Dialectical Behavioral Therapy – Corrections Modified (DBT-CM) intervention, was delivered to a sample of incarcerated male adolescents (Shelton et al., 2011), and post-assessment analyses revealed significant decreases in physical aggression and number of disciplinary tickets. Increasingly, school-based DBT interventions have also been used to target problematic externalizing behaviors. For example, results of a DBT-skills group piloted in a Disciplinary Alternative Education Program (DAEP) found significant post-assessment reductions in both parent and youth-reported indicators of behavioral distress, such as aggression and conduct problems (Ricard et al., 2013). Another modified DBT-skills group administered to adolescents who met criteria for oppositional defiant disorder (ODD) was shown to predict significant posttest decreases in caregiver-reported ODD and externalizing symptoms, as well as youth-reported depression and internalizing behaviors (Nelson-Gray et al., 2006). Finally, a brief DBT-skills group intervention was delivered to middle school students who had been identified by school administrators as at increased risk for risk-taking behaviors due to experiencing behavioral or academic problems (Zapolski & Smith, 2017).

Including the studies cited above that explicitly targeted youth with externalizing problems, there were 11 studies that examined externalizing behaviors as an outcome, from which we were able to calculate effect sizes for nine. Across nine subgroups, the within-group effect size for externalizing behaviors was g = −0.38, suggesting a medium effect, with a 95% CI of −0.53 to −0.23. The mixed-effects Z-value was −5.08, $p < .001$, indicating that the true mean effect size is unlikely to be zero. The Q-value was 5.88, df = 8, suggesting that the observed variation in effect sizes across the studies with externalizing outcomes is actually less than we would expect based on sampling error alone.

Borderline personality traits. A total of 21 studies included borderline personality traits as an inclusion criterion, although only nine focused on it exclusively. However, these studies measured related symptoms such as suicidal ideation and self-harm rather than borderline personality traits; therefore, we did not perform a meta-analysis on this problem area.

DBT as a universal intervention. A more recent literature highlights the use of DBT for prevention purposes. A manualized program for school-based DBT, titled Skills Training for Emotional Problem Solving for Adolescents (DBT STEPS-A), was recently developed by Mazza et al. (2016) as a social – emotional learning curriculum that can be delivered by educators. DBT STEPS-A, which includes 30 lesson plans of DBT skills for teachers to deliver to students from grades 6–12, has shown promise in four

recent pilot trials in terms of both feasibility and positive socioemotional outcomes (Flynn et al., 2018; Gasol et al., 2022; Martinez et al., 2022; Panish, 2021).

Meta-Analysis Bias Checks

First, we assessed whether effect sizes were inflated due to incomplete reporting of outcome data. We found no evidence of such bias, as the average effect size was exactly g = −0.64 for both (a) studies with complete pre- and posttest mean, standard deviation/error, and (b) studies requiring conversion from other metrics. We also ran a meta-regression to check if our five outcome domains predicted differences in average effect size. They did not (test of moderators: Q = 6.15, $p = .19$). Next, we assessed for publication bias. The funnel plot showed a symmetrical distribution, and Egger's weighted regression test yielded non-significant results ($t = 0.35$, $p = .73$). Together, these results suggest that publication bias was unlikely to have impacted obtained results. Finally, we assessed if the aggregated effect sizes were driven by studies with smaller samples. A cumulative meta-analysis was run and showed that the 95% CI for the effect size based on the five smallest studies contained zero. Otherwise, none of the subsequent effect size CIs contained zero. Thus, if anything, studies with small samples deflated the observed aggregate effect sizes. Moreover, removing one subgroup at a time, the resulting ES never changed more than 0.02, suggesting that no single study was driving results.

Discussion

This review of the adolescent DBT literature highlights the exciting expansion of DBT across age groups, problem areas, settings, and levels of care. With less than half of all studies reviewed here being RCTs, it is evident that a need remains for more rigorous comparative designs in order to establish DBT as an evidence-based intervention in these diverse settings and populations. Despite this, all the studies reported at least one positive mental health outcome for participants engaging in DBT, along with high retention rates. It was also exciting to see that all of the studies took place in real-world settings (hospitals, inpatient facilities, outpatient clinics, schools, etc.) and 88.5% were delivered by natural providers employed in these settings rather than researchers or graduate students. Furthermore, nearly every study in the present review notes one or more comorbid conditions experienced by participants, further highlighting the "real-world" nature of the participants across these studies. The observation of medium-to-large effect sizes despite DBT being adapted to a wide range of co-occurring disorders, in natural settings and delivered by natural providers is an encouraging finding for the effectiveness of DBT for youth struggling with a wide variety of presenting problems.

The effect sizes suggest that DBT is most effective for treating internalizing problems such as suicidal and self-harm behaviors. It is also effective at regulating emotions and treating eating disorders. The effect sizes for impacting externalization problems were smaller, though still in the medium range.

The implementation of DBT in prevention and early intervention settings is a relatively newer area of study. Teaching DBT skills to prevent emotional dysregulation and the development of psychopathology is an exciting avenue of research, especially given the intervention's origin in treating severe mental illness. Nevertheless, only few studies exist, with mixed findings. A natural next step in this area may be to consider how to train lay providers and non-licensed mental health providers to train youth in DBT skills. Until recently, DBT was predominantly administered exclusively by licensed providers certified in DBT (a lengthy and expensive process) for severe mental illness, limiting access to the intervention to more common mood disorders.

With these findings in mind, we propose below several areas of improvement for the field of adolescent DBT research in the areas of improved methodology and increased representation.

Recommendations for Future Research on Adolescent DBT

Recommendation # 1: Conduct RCTs with active control groups

As noted in prior reviews such as MacPherson et al. (2013), the literature continues to be characterized by an overall lack of randomized controlled trials (RCTs), which are considered the most reliable design for evaluating the effectiveness of interventions. As such, it remains unclear how the effectiveness of DBT interventions compares to other interventions for adolescents experiencing poor mental health. Studies using a quasi-experimental design with control comparisons often relied upon historical controls or treatment-as-usual (TAU) without random assignment. This raises the concern that there may have been systematic differences between the groups prior to the intervention, which could have influenced the observed results. While feasibility and quasi-experimental studies are essential when first establishing a treatment, we recommend that future research on the effectiveness of DBT in adolescents prioritizes rigorous RCTs with randomization to an active control group to improve the validity and reliability of any significant results.

Recommendation # 2: Increase sample sizes

Most studies within the present review ran analyses on small sample sizes (mean = 58.19; median = 26; mode = 31; range = 4–483 of DBT participants), and few reported information on statistical power analyses. Small sample sizes in clinical research increase the risk for lack of statistical power and thus may not accurately represent the population of interest, which can lead to incorrect conclusions and a higher likelihood of false positive or negative results (Faber & Fonseca, 2014). While most studies in the present review have small sample sizes, there appears to be some successful efforts toward larger samples in more recent years, with 15 studies featuring 50 or more participants in their DBT invention group. We recommend that future studies conduct power analyses and work toward recruiting adequate sample sizes based on these analyses.

Recommendation # 3: Increase collateral reports and objective reports of adolescent mental health

The majority of the studies included in this review relied exclusively on adolescent self-reports to assess symptoms and functioning, which do not necessarily reflect objective changes in either domain. Self-report measures in psychology research can be biased due to a variety of factors such as social desirability (Fisher & Katz, 2000), memory decay (Bhandari & Wagner, 2006), and response distortion (Kurtz & McCredie, 2022), which can affect the validity and reliability of the data collected and limit the conclusions that can be drawn from the results. Several studies relied on chart data (n = 12, 17%). However, only two studies relied on observational data (e.g., number of suicidal behaviors observed by staff) and just one study included a collateral report (parent report). Studies targeting eating disorders often included objective data in the form of weight or body mass index. No other type of objective data was reported. Thus, we recommend that future researchers include collateral reports to surveys, such as caregiver or teacher reports, clinician reports, observational coding, or objective data (e.g., urine toxicology reports for substance abuse treatment) when appropriate to supplement self-report data.

Recommendation # 4: Increase representation and reporting of diverse communities in DBT research

Existing studies on the effectiveness of DBT for adolescents continue to be characterized largely by samples of non-Hispanic white females. Many studies included in the present review, particularly those completed outside the United States, do not report race and/or ethnicity information at all. Most studies did not report data on the sexual and gender minority status of participants. Furthermore, only approximately 22% of studies provided any information regarding socioeconomic status. Accessing heterogeneous populations and using diverse samples in future research on DBT in youth populations is critical to ensure the generalizability and representativeness of any observed findings, reduce possible biases, and promote a more inclusive understanding of human behavior and mental health. We recommend conducting DBT research in diverse communities and reporting the demographics that reflect this effort (e.g., ethnicity, SES, sexual orientation).

Recommendation # 5: Leverage technology to improve youth access, engagement, and outcomes

No studies in the present review included technology as part of the delivery of DBT, and none examined how existing or emerging technologies may augment or improve outcomes for adolescents engaged in DBT treatment. The use of tools such as text messaging, smartphone apps, and online resources can provide patients with instant access to skills and support between therapy sessions, thereby reinforcing what they have learned and increasing their chances of long-term change (Gonzales et al., 2014). Moreover, interest in and use of teletherapy and videoconferencing have increased dramatically since the COVID-19 pandemic (Ahuvia et al., 2022), opening up an opportunity to expand DBT service delivery modalities to make DBT services more accessible to individuals in remote or underrepresented communities and those with mobility or transportation constraints (Willcox et al., 2019). By integrating technology-based resources and services, the accessibility and efficacy of DBT can be significantly boosted, leading to better outcomes for adolescents who are often particularly attuned to popular technology. Thus, we recommend utilizing technology to improve access and treatment engagement for youth receiving DBT.

Limitations of the Present Review

While this review aimed to locate all studies on DBT complete with adolescent populations, it is possible that some studies were missed, especially those that are unpublished in the scientific literature, showed no significant results, and were therefore less likely to be published at all (i.e., the file drawer effect), or those published solely in non-English languages. Furthermore, we did not code for the quality of each study to determine the strength of evidence. However, our inclusion criteria limited studies that did not perform statistical analyses and used standardized

measurement. In addition, we conducted a bias check across studies.

Conclusion

The popularity of DBT for adolescents has seen a substantial rise in the last decade. In contrast to the 20 publications included in the systematic reviews by Groves et al. (2012) and MacPherson et al. (2012), there have been 59 additional papers published on adolescent DBT since 2012. We are excited to see this growth and interest in adolescent populations, with DBT being tested in a variety of settings, levels of care and with diverse populations. We encourage DBT researchers to continue their efforts and improve the methodological rigor of future studies.

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*Studies included in the systematic review of denoted with an asterisk

**Studies included in both the systematic review and meta-analysis are denoted with two asterisks.

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