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REVIEW ARTICLE

Dialectical Behaviour Therapy for Emotion Regulation Difficulties: A Systematic Review

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Abstract

While dialectical behaviour therapy (DBT) appears efficacious in reducing suicidal and self-harming behaviour, it is unclear whether DBT reduces emotion regulation (ER) difficulties, a purported mechanism of change of treatment. This review aims to investigate and evaluate the current evidence to understand the effectiveness of DBT in improving ER difficulties. A qualitative synthesis of studies investigating the effectiveness of DBT on self-reported ER difficulties as measured by the Difficulties in Emotion Regulation Scale (DERS) was performed, identifying eligible studies using PsycINFO, PubMed, MEDLINE and EMBASE databases. Fourteen studies were identified. Current evidence indicates that DBT does not show consistent benefits relative to existing psychological treatments in improving ER difficulties. The literature is compromised by significant methodological limitations increasing risk of bias across study outcomes. Furthermore, high variability across DBT programs and a lack of investigation regarding adherence and participant engagement within interventions was observed. Further research is needed in order to conclude regarding the effectiveness of DBT in improving ER difficulties. Consistent use of active treatment conditions, greater standardisation of DBT-based interventions, in addition to further examination of participant engagement level in DBT-based interventions in the long term may assist understanding as to whether DBT improves ER difficulties.

Keywords: dialectical behaviour therapy; DBT; emotion regulation; emotion regulation difficulties; systematic review; psychotherapy

Dialectical Behaviour Therapy: From Past to Present

Since the advent of the seminal Linehan (1987) paper introducing dialectical behavioural therapy (DBT) as a potential treatment strategy for borderline personality disorder (BPD), there have been high expectations and increasing research interest regarding its treatment efficacy. A PsycINFO search of all publications containing the term *dialectical behavioural therapy* over the past 30 years has revealed an exponential rise in publication output, principally within the last 15 years (see Figure 1). Kliem, Kröger, and Kosfelder (2010) state that DBT has become one of the most frequently investigated psychological treatments for BPD. This level of research interest is unsurprising, given that individuals with BPD have a suicide rate 50 times greater than that encountered in the general population (Substance Abuse and Mental Health Services Administration [SAMHSA], 2012), and previous attempts to treat the disorder were often unsuccessful (Tucker, Bauer, Wagner, Harlam, & Sher, 1987).

Development and Background of DBT

DBT was initially developed as a cognitive-behavioural treatment to target symptoms of severe emotion dysregulation commonly experienced by those diagnosed with BPD (Linehan, 1993). BPD has been conceptualised by the American Psychiatric Association (APA, 2013) as a condition of pervasive

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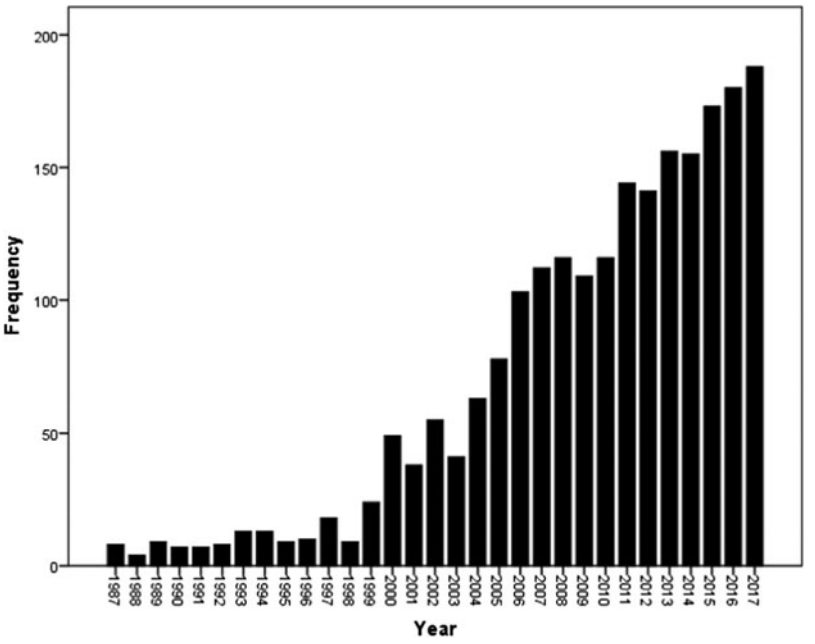


Figure 1. Frequency of Publications containing the term 'Dialectic* AND Behavio?r* AND Therapy' or DBT from 1987 to December, 2017 on PsycINFO.

emotion dysregulation that subsequently affects everyday functioning. Individuals who present with this disorder often experience significant difficulty forming interpersonal relationships, which are often highly unstable; they have difficulty establishing a sense of self, in addition to engaging in highly impulsive behaviours with adverse consequences. Often, such individuals present with chronic suicidal or self-harming behaviour. These features generally arise during early adolescence and persist into adulthood across multiple contexts (Biskin, 2015).

According to Linehan's (1993) biosocial model, it is believed that such pervasive emotional dysregulation evolves via an interaction between the individual's biology and their social environment, beginning in childhood. Often such individuals present with high emotional sensitivity and intensity in that an emotional response is more likely to be provoked in a given situation at a more extreme level, and subsequently lasts longer as the individual experiences a slow return to their original emotional baseline. There is some preliminary but inconclusive neuroimaging evidence to support these claims (see van Zutphen, Siep, Jacob, Gobel, & Arntz, 2015, for a review). Furthermore, such individuals often have difficulty modulating their responses to aversive emotional states, often engaging in chronic inhibition, and have difficulty shifting and controlling their attention in the presence of aversive emotional stimuli (Marissen, Meulemen, & Franken, 2010; Posner et al., 2002).

Linehan (1993) purports that not all individuals with an emotionally sensitive temperament develop BPD. Rather, this development is dependent on the fit between the individuals' temperament and the social environment in which they are raised (including the influence of caregivers, siblings, peers, or their school environment). For example, if an individual's emotional sensitivity is consistently met with invalidating, erratic or punishing responses, it is more likely that they will develop patterns of pervasive emotional dysregulation, as they do not have the opportunity to learn requisite means of coping with and understanding their emotional experiences. Furthermore, Linehan states that such individuals may develop a mistrust of their emotional experiences, in addition to having to escalate their emotional responses to an extreme level to get their needs met. It is then that the transaction between the individual's emotional response and their invalidating social environment creates a vicious cycle where pervasive emotional dysregulation becomes ingrained.

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Indeed, although Linehan (1993) noted that many existing cognitive-behavioural approaches focus on changing behaviour, focusing solely on change without acceptance may work to reinforce the invalidating social environment in which the individual ordinarily operates. DBT thus attempts to address features of emotional dysregulation using an integrated, synthesised approach primarily focused on validating one's experience of the self, others and the world using Zen principles and a practice that emphasises acceptance. At the same time, DBT attempts to extinguish problem behaviours and reinforce adaptive responses to emotional states using existing cognitive-behavioural approaches that emphasise problem solving (Robins & Chapman, 2004).

Inherently, the goal of DBT is to create a life that the individual perceives as worth living. Treatment is often delivered across different stages reflecting the diverse treatment targets involved to achieve this aim. Stage 1 of treatment targets life-threatening behaviours such as suicidal or parasuicidal behaviours, where the principal goal is to extinguish these behaviours. Stage 2 of treatment involves exposing the individual to their emotional states to experience and respond to these in an adaptive way, while also addressing therapy interfering behaviours (e.g., attending and participating in all treatment sessions). Stage 3 of treatment involves focus on decreasing quality-of-life interfering behaviours (e.g., substance use or other risk-taking behaviours) and increasing general happiness, self-esteem, and the quality of one's relationships. Finally, Stage 4 of treatment focuses on building connection with the self, others and life, in addition to increasing opportunities for joy and finding meaning. During this last stage, focus moves to achieving mastery of skill use and greater autonomy is taken by the individual within the treatment process.

Treatment is typically delivered using a multimodal format on an outpatient basis, including group skills training, individual treatment, telephone coaching between sessions, and ongoing therapist consultation meetings. The multimodal format assists to achieve the four key functions of DBT, including: (a) assisting the individual to develop new skills to help regulate their emotions; (b) addressing obstacles to engaging in skill use; (c) emphasising skill generalisation to everyday settings; and (d) reducing therapist burnout (Robins & Chapman, 2004). Skills are taught according to four modules: (1) core mindfulness skills to assist individuals to become more attuned to their lived experiences in an authentic, non-judgmental way; (2) emotion regulation skills to identify and modulate emotional states in an adaptive way; (3) distress tolerance skills to identify crisis situations and modulate emotional states so as not to make the situation worse (e.g., by using impulsive behaviour); and (4) interpersonal effectiveness skills to help the individual foster interpersonal relationships and respond to demands and conflicts assertively (Valentine, Bankoff, Poulin, Reidler, & Pantalone, 2015). Originally, DBT was developed to be delivered across 12 months, with the first 6 months focusing on skill acquisition, and the later 6 months focusing on skill generalisation (Linehan, 2015).

State of the Current Research

Given the growing body of literature within DBT research, several meta-analyses have been conducted over the past 10 years investigating the effectiveness of this approach. Findings to date demonstrate that the majority of research has focused on examining the effectiveness of DBT on Stage 1 treatment targets (reducing life-threatening behaviour), with limited research examining further treatment targets. Kliem et al. (2010) investigated the effectiveness of DBT for BPD for suicidal behaviour and self-harm and found a moderate effect size for DBT treatment as compared with treatment as usual (TAU; e.g., community therapy by experts). However, this effect was reduced when compared with more BPD-specific treatments (e.g., transference-focused psychotherapy), and the effect of DBT compared with TAU decreased at follow-up (up to 12 months). Panos, Jackson, Hasan, and Panos (2014) similarly found a global effect of DBT across trials in reducing suicide risk (pooled $OR = .31$) and parasuicidal behaviour (pooled Hedges' $g = -.62$) compared with TAU. However, although DBT was also demonstrated to have lower attrition throughout treatment as compared with TAU, DBT was similarly effective relative to TAU in reducing symptoms of depression. More recently, Cristea et al. (2017) concluded psychotherapies such as DBT for BPD were generally effective in the short term,

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and DeCou, Comtois, and Landes (2018) demonstrated evidence for the efficacy of DBT in targeting suicidal and self-harm behaviours relative to TAU (e.g., waitlist control or psychotherapy/case management). However, this effect did not hold for suicidal ideation. Thus, it can be concluded that while DBT appears to be primarily efficacious for suicidal behaviour and self-harm, principally in the short term, this is influenced by the comparison group.

Research has also started to examine whether modifications to Linehan, Armstrong, Suarez, Allmon and Heard's (1991) original protocol alters the effectiveness of treatment. Bloom, Woodward, Susmaras, and Pantalone (2012) concluded in their systematic review that DBT may be effective for use within inpatient settings; however, there is considerable variability as to how DBT interventions are implemented. In addition, a further, more recent systematic review conducted by Valentine et al. (2015) provided preliminary evidence that skills training alone may be effective in treating symptoms of Axis I disorders (including major depressive disorder [MDD], attention-deficit hyperactivity disorder [ADHD] and binge-eating disorder [BED]). However, they were unable to make conclusions regarding the efficacy for DBT skills training alone in reducing suicidal or self-harming behaviours, given the high variability across the included studies and the several limitations in the research evidence reviewed. These limitations included a lack of standardisation with regard to delivery of content across studies, limited use of randomised controlled designs, lack of active treatment comparison groups, and limited follow-up periods.

The Current Review

Despite clinical consensus that DBT is considered a treatment for pervasive emotional dysregulation, and ER is perceived as a key mechanism of change (Rudge, Feigenbaum, & Fonagy, 2017), there has been little research literature examining the direct link between DBT and ER (Lynch, Chapman, Rosenthal, Kuo, & Linehan, 2006). This is unexpected, given there is increasing literature examining DBT in non-BPD populations who experience emotion dysregulation, such as bulimia nervosa (Safer, Telch, & Agras, 2001), BED (Telch, Agras, & Linehan, 2001), substance use disorders (Dimeff & Linehan, 2008), and problem gambling (Christensen et al., 2013).

Furthermore, preliminary research has found that use of DBT skills acts as a mediator for change in treatment outcomes in BPD clients (Neacsiu, Rizvi, & Linehan, 2010). Given that one of the primary purposes of DBT is to increase ER abilities to promote a life worth living, it is imperative that a more systematic investigation is conducted to examine whether DBT delivers on this outcome. In order to meet this timely objective, the current review attempted to qualitatively synthesise the existing research regarding the effectiveness of DBT in improving ER abilities. Given the heterogeneity in defining and understanding ER conceptually, the current focus examined ER as defined by the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). Importantly, DERS scores are one of the most common outcome measures used to evaluate the effectiveness of DBT in improving emotion dysregulation. The DERS examines the following facets of ER: (a) emotional awareness and understanding; (b) emotional acceptance; (c) ability to enact impulse control and engage in desired goal-directed behaviour in the face of negative emotion; and (d) ability to adaptively employ appropriate ER strategies, depending on contextual or situational demands. It was hypothesised that overall, DBT would produce significant reductions in DERS scores relative to control treatments.

Method

Search Strategy and Screening

The following systematic review adheres to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher et al., 2015). Studies were identified using PsycINFO, PubMed, MEDLINE and EMBASE databases. Electronic searches of published literature were conducted up to April 2018. The following key terms were searched [dialectic* AND behaviour*

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AND therap* (OR DBT) AND (emotion*OR affect) AND (regulat* OR dysregulation)]. No date or language exclusions were applied. Searches were restricted to published literature and research performed with human participants. Additional manual searching of reference lists of past meta-analyses and systematic reviews, in addition to articles indexed on the Behavioural Tech (2017) website, was conducted.

Initially, the titles and abstracts identified from database and manual searches were merged, with duplicates removed. Titles and abstracts were subsequently screened according to the inclusion and exclusion criteria listed below. Screening was initially performed independently by two reviewers with good interrater agreement ($\kappa = .75$). Any disagreements were resolved by consensus. A third independent reviewer was consulted in cases where consensus could not be reached. Following this, full-text articles were retrieved and again screened independently by two reviewers according to the specified inclusion and exclusion criteria. Where articles were not published in English, the corresponding author of these papers was contacted, and an English version was requested. Articles were excluded if no response was obtained.

Selection Criteria

Given the broad conceptualisation of ER, lack of consensus regarding definition of the construct, and multiple measures examining overlapping constructs, the definition for the current review was adopted from the most widely used measure within the DBT literature, the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). The current review thus included studies that adopted this measure to ensure consistency in measuring ER as a construct. Eligible studies were comprised of (1) controlled clinical trials (either randomised or non-randomised), (2) those published in peer-reviewed journals that (3) included a DBT-based intervention and (4) examined difficulties in ER using the DERS. There were no age restrictions on samples included.

Publications were excluded if (a) the treatment group was provided an intervention that was not based on a pure-DBT treatment (e.g., DBT and family therapy provided simultaneously) or (b) data collection was not finalised or still ongoing (e.g., study protocol).

Eligible Studies

Initially, 703 citations were retrieved from databases. A further 98 citations were located from articles indexed on the Behavioural Tech (2017) website and from hand searching reference lists. Following removal of duplicates, 460 titles and abstracts were screened according to the specified inclusion and exclusion criteria. Eighty-five articles were identified as suitable for full-text review based on selection criteria once 100% agreement was reached between the two independent reviewers. Following full-text review, 14 articles were deemed eligible for inclusion. A flow chart of this process is reported in Figure 2. The more frequent reasons for exclusion included the absence of the DERS as an outcome measure, non-peer-reviewed article (e.g., conference proceedings or poster) or no comparison group identified within the study design.

Data Extraction and Quality Assessment

The following data were extracted from the 14 articles meeting the inclusion criteria: (a) author, (b) year, (c) study location, (d) study design, (e) sample characteristics (sample size, gender, age and recruitment setting), (f) participant inclusion/exclusion criteria, (g) delivery and format of the DBT intervention, (h) intervention provided to the comparison group, and (i) points of assessment. Effect sizes were calculated by dividing the difference between group means by the pooled standard deviation (Cohen's *d*) where this information was available.

A risk of bias assessment was performed on the included studies according to items based on the Cochrane Risk of Bias Tool (Higgins & Green, 2011). These included: selection bias (sequence

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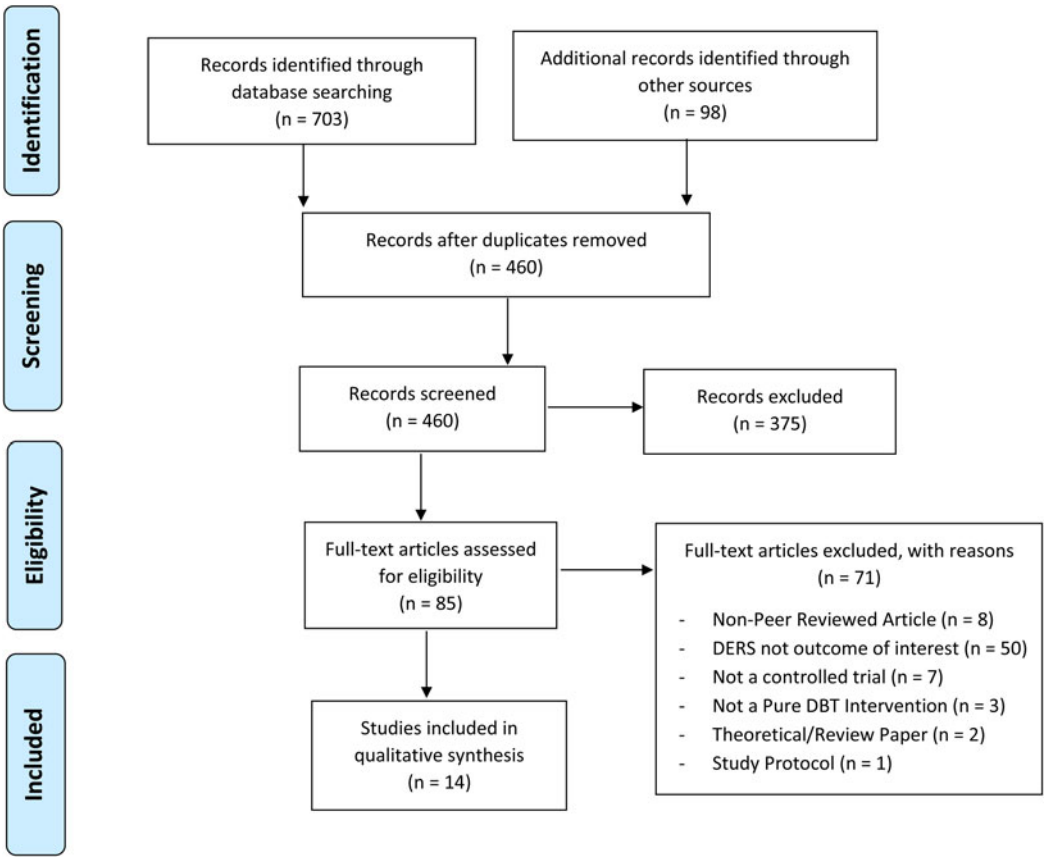


Figure 2. PRISMA Flow Chart highlighting the search strategy and results for the current systematic review.

generation, allocation concealment); performance bias (blinding of participants and study personnel); attrition bias, and relevant other sources of bias, namely management of confounders and whether appropriate analyses were used. Intervention integrity was also assessed to examine: risk of bias in outcomes due to inconsistency and non-adherence in treatment delivery, risk of contamination within the control condition, risk of another intervention being provided in addition to the specified DBT intervention, and risk of bias in outcomes due to participants not actually completing or engaging sufficiently within the interventions provided.

Results

Summary of Included Studies

A summary of the included studies is provided in Table 1. A total of 875 participants were included and participants between the ages of 14 and 60 years were recruited. The mean age of participants across the 14 samples was 33.12 years. Sample size ranged from 19 to 101 (median = 60 participants). Three studies (Burckhardt et al., 2018; Chugani, Ghali, & Brunner, 2013; Uliaszek, Rashid, Williams, & Gulamani, 2016) examined ER outcomes in young people, whereas the remaining studies ($k = 11$; 78.57%) examined ER outcomes in adults. Three samples included female participants only.

Studies included individuals undergoing treatment for general ER difficulties ($k = 4$), BPD ($k = 3$) or obesity or binge-eating related difficulties ($k = 3$). A further study recruited individuals seeking treatment for suicidal ideation (Ward-Ciesielski, Tidik, Edwards, & Linehan, 2017), and another looked at a sample with suicidal ideation and comorbid heavy alcohol use (Wilks et al., 2018). One

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Table 1. Study Characteristics

Study	Sample	Country	Participants Randomised?	Inclusion/Exclusion Criteria	DBT Intervention	Control Condition	Assessment Points
Azizi, Borjali, & Golzari (2010)	*N* = 39 Participant gender information not stated. DBT: (*n* = 13) Cognitive therapy: (*n* = 13) Control: (*n* = 13) Adult sample *M* age = 26.68 years Outpatient sample of individuals with opioid dependence	Iran	Yes	**(I)** Meet DSM-IV criteria for SUDs; aged 20–45; currently not attending psychotherapy. **(E)** Comorbid schizophrenia, drug-induced psychosis, organic brain syndrome; personality disorder; bipolar disorder; intellectual disability; current major depressive episode.	**Delivery:** 90-minute workshops delivered over 10 sessions on outpatient basis (15 hours in total). Format: Skills Training Only in Group Format (Mindfulness and ER only).	**TAU:** Either a or b. **a) Cognitive therapy** Designed using Beck's cognitive group therapy treatment. Groups were matched with DBT in terms of time and dose of delivery. Treatment involved identifying and modifying drug-related dysfunctional beliefs and replacing these with more adaptive beliefs. **b) Naltrexone** Did not participate in any form of group therapy and took Naltrexone over the course of the trial.	Pre-treatment Post-treatment
Burckhardt et al., (2018)	*N* = 96 DBT: (*n* = 50) Control: (*n* = 46) Adolescent Sample M age = 15.50 years 100% Female community sample of high school students	Australia	Yes	**(I)** Students attending participating high school. **(E)** None listed.	**Delivery:** 50-minute workshops delivered over six sessions (5 hours in total). **Format:** Skills training only in group format (all four modules).	**WLC** (Class as per usual; learning material regarding future careers)	Pre-treatment Post-treatment 6-month F/U

(*Continued*)

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Table 1. (*Continued.*)

Study	Sample	Country	Participants Randomised?	Inclusion/Exclusion Criteria	DBT Intervention	Control Condition	Assessment Points
Cancian et al., (2017)	*N* = 79 DBT: (*n* = 25); 100% female Control: (*n* = 42); 88.23% female Adult sample *M* age = 39.81 years Outpatient sample of individuals seeking treatment for obesity-related difficulties.	Brazil	Yes	**(I)** BMI > 30; Adults aged 18–59; 8 years + of formal study. **(E)** Psychotic symptoms; active suicidal ideation or attempts in previous 12 months; substance use disorders; previous DBT treatment.	**Delivery:** Ten 2-hour workshops delivered twice per week over 5 weeks on outpatient basis (20 hours in total). **Format:** Skills training only (Mindfulness, ER and DT modules only) in group format with weekly therapist consult.	**WLC**	Pre-treatment Post-treatment
Chugani, Ghali, & Brunner (2013)	*N* = 19 95% females DBT: (*n* = 11); Control: (*n* = 8); Adult sample *M* age = 21.31 years Outpatient sample of individuals seeking treatment for emotion regulation difficulties.	USA	No	**(I)** Attending treatment at trial site; diagnosed with cluster B personality disorders or traits significant enough to impair functioning; 1.5 + SD above mean on GEDM. **(E)** Below average intellect; current psychosis; previously participated in prior group within the trial site.	**Delivery:** Eleven 90-min workshops delivered once per week over 11 weeks (16.5 hours in total). **Format:** Skills training only (all four modules) in group format with weekly therapist consult. phone/email coaching provided during business hours only.	**TAU** (Individual Therapy): Provided to individuals who were unable to attend or not interested in participating in DBT Intervention. Content not specified, however, treatment providers able to provide DBT in individual consultation sessions.	Pre-treatment Post-treatment
Dixon-Gordon, Chapman, & Turner (2015)	*N* = 19 DBT-IE: (*n* = 6) DBT-ER: (*n* = 7) Control: (*n* = 6) Adult sample *M* age = 34.47 years 100% female Outpatient sample of individuals diagnosed with BPD	USA	Yes	**(I)** Female aged 18–60; meeting criteria for BPD diagnosis; receiving ongoing treatment. **(E)** Diagnosis of current psychotic disorder.	**Delivery:** Eight 2-hour workshops across 7 weeks with orientation session delivered on outpatient basis (16 hours in total). **Format:** Participants randomly allocated to receive group skills training in ER skills only or IE skills only. Skills training only with weekly therapist consult.	**TAU**: Participants provided with BPD focused psychoeducation; medication and structured group activities. Information provided on the link between nutrition and exercise and the impact on mood.	Pre-treatment Mid-treatment Post-treatment 7-week F/U

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Gibson et al., (2014)	*N* = 91 DBT: (*n* = 70) 79% female Control: (*n* = 21) 57% female Adult sample *M* age = 35.11 years Inpatient sample of individuals diagnosed with BPD	Ireland	No	**(I)** 18 +, engaged in DSH 6 weeks prior to intervention and/or meet diagnostic criteria for BPD. **(E)** Receiving treatment within secure unit of hospital.	**Delivery:** One-hour workshops delivered daily over 4 days across a period of 6 weeks (24 hours in total). Delivered on an inpatient basis. Participants received ongoing treatment from their multidisciplinary team throughout the length of the study). **Format:** 'Living Through Distress' Program (Mindfulness, ER and DT modules only). Group skills training only.	**TAU:** inpatient treatment from multidisciplinary team (care plans; OT, social work, psychological therapy).	Pre-treatment Post-treatment 3-month F/U
Jamilian et al., (2014)	*N* = 32 DBT: (*n* = 16) Control: (*n* = 16) 100% female Adult sample *M* age = 30.22 years Outpatient sample of individuals with ER difficulties.	Iran	No	**(I)** Minimum Associate Degree level of Education; age range 25–35; Scores of 1 *SD* + on Barratt Impulsiveness Scale, DTS and DERS. **(E)** Currently undergoing adjunct pharmacological treatment.	**Delivery:** Eight sessions (length not explicitly stated) delivered weekly on outpatient basis with four sessions focusing on DT skills and four sessions on ER skills. Frequency of delivery not noted. **Format:** Group Skills training only (DT and ER only).	No intervention (no further detail provided).	Pre-treatment Post-treatment
Masson et al., (2013)	*N* = 60 DBT: (*n* = 70) 90% female Control: (*n* = 21) 86.70% female Adult sample *M* age = 42.80 years Outpatient sample of individuals with BED.	Canada	Yes	**(I)** Meet BED criteria or BED criteria with binge eating at least once per week over 6-month period; 18 +; English Language; High school level of education. **(E)** Involvement in concurrent psychological treatment for BED; active psychosis; BMI < 17.5kg/m^2; use of compensatory behaviours at least once per week over 3 months; ongoing changes to psychotropic medication over past 3 months; inability to commit to assessment and treatment.	**Delivery:** Individuals attended an initial 45-minute session in person in which they received a DBT self-help manual to be used over the course of treatment. Participants received six biweekly phone calls of 20 minutes from the research team over 13 weeks (2 hours in total). Delivered on outpatient basis. **Format:** Skills training via self-help format with additional phone coaching. (Mindfulness, ER and DT modules).	**WLC**	Pre-treatment Post-treatment 6-month F/U (DBT group only).

(*Continued*)

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Table 1. (*Continued.*)

Study	Sample	Country	Participants Randomised?	Inclusion/Exclusion Criteria	DBT Intervention	Control Condition	Assessment Points
McMain et al., (2017)	*N* = 84 DBT: (*n* = 42) 83.30% female Control: *n* = 42) 73.80% female Adult sample *M* age = 29.67 years Outpatient sample of individuals with BPD.	Canada	Yes	**(I)** Meet DSM-IV criteria for BPD; 18–60 years of age; two suicidal or NSSI episodes in past 5 years with one occurring within previous 10 weeks prior to study enrolment; English language ability. **(E)** Meet DSM-IV criteria for bipolar I disorder, psychosis or dementia; organic brain syndrome or intellectual disability based on clinical interview; participation in DBT programme within previous 12-months.	**Delivery:** 20-week DBT program delivered on outpatient basis. Group members initially met for a 90-minute orientation session and then participated in 2-hour weekly skills training sessions over the 20 weeks. **Format:** Skills training provided by the research team (all four modules); patients encouraged to have individual psychotherapy outside of the program. No phone coaching provided but encouraged. Weekly therapist consult meetings.	**WLC**	Pre-treatment Mid-treatment Post-treatment 3-month F/U
Neacsiu et al., (2014)	*N* = 48 DBT: (*n* = 24) 68.20% female Control: (*n* = 24) 63.60% female Adult sample *M* age = 35.55 years Outpatient sample of individuals experiencing ER difficulties.	USA	Yes	**(I)** 18+, score above 96 on the DERS; Meet DSM-IV criteria for at least one current depressive or anxiety disorder; agree to remain on same dosage (if any) of psychotropic medication. **(E)** Score above 2.5 on the BSL-23; at high risk of suicide; mandated to psychological treatment; homelessness; unable to attend group; previously received 5+ sessions of outpatient DBT; unable to communicate in English; meet DSM-IV criteria for psychotic or bipolar disorder; verbal IQ <70; met criteria for a life-threatening disorder (e.g. AN); participating in additional psychotherapy at time of trial.	**Delivery:** 16-week DBT intervention delivered weekly on outpatient basis. Skills training ran over 16 sessions for 2 hours (32 hours in total) with a 30-minute individual orientation session. **Format:** Group skills training only (all four modules).	**TAU** (ASG): Treatment was matched in terms of length of time. Involved client-centred discussion about group topics (e.g., anxiety, anger, communication, coping, goals, sleep, stress and depression), psychoeducation and maintaining unconditional positive regard towards clients. Similar to diary cards used in the DBT condition, participants in the ASG condition were asked to fill out diary cards, however, in this case tracking daily social support.	Pre-treatment Post-treatment 2-month F/U.

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Safer, Robinson, & Jo (2010)	*N* = 101 DBT: (*n* = 50) 86% female Control: (*n* = 51) 84% female Adult sample *M* age = 52.2 years Outpatient sample of individuals diagnosed with BED.	USA	Yes	**(I)** 18+; met DSM-IV criteria for BED; lived and worked within commuting distance of clinic. **(E)** BMI < 17.5kg/m^2; concurrent psychotherapy treatment; fluctuating dosage of psychotropic medication 3 months prior to initial assessment; regular use of purging and/or other compensatory behaviours over the past 6 months; psychosis; current alcohol or drug abuse/dependence; current use of weight-altering medications; severe depression with recent suicidality (e.g., within past month); severe medical condition affecting weight and/or appetite (e.g., diabetes, cancer); pregnant or breast feeding; imminent plan or undergoing bariatric surgery; unable to commit to group meetings for duration of study.	**Delivery:** 20-week DBT intervention delivered weekly on outpatient basis. Intervention included 20 sessions of 2 hours each + 2 orientation sessions (approx. 40 hours). **Format:** Group skills training only (Mindfulness, ER and DT).	**TAU** (ACGT): Strengths-based treatment based on Rogerian approach focusing on bolstering self-esteem. Treatment additionally delivered in group format and time matched with DBT treatment.	Pre-treatment Post-treatment 3-month F/U 6-month F/U 12-month F/U
Uliaszek, Rashid, Williams, & Gulamani (2016)	*N* = 54 DBT: (*n* = 27) *78% Female* Control: (*n* = 27) 78% female Adult sample *M* age = 22.17 years Outpatient sample of individuals presenting with ER difficulties.	Canada	Yes	**(I)** Individuals experiencing ER difficulties. No further inclusion criteria described. **(E)** Severe cognitive disturbance; psychotic disorder.	**Delivery:** 12-week DBT intervention delivered weekly on outpatient basis. Intervention consisted of group sessions of 2 hours each (approx. 24 hours). **Format:** Group skills training only (all four modules).	**TAU:** PPT. Group treatment focused on increasing pleasure, engagement and creating a valued and meaning-filled life. Activities included gratitude journals, resilience stories and creating signature strength profiles based on their values. Additional exercises included coping with negative memories and trauma, fostering positive relationships and realising meaning and purpose in one's life. PPT was time-matched to DBT and ran for 2 hours over each of the 12-weeks.	Pre-treatment Mid-treatment Post-treatment

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Table 1. (*Continued.*)

Study	Sample	Country	Participants Randomised?	Inclusion/Exclusion Criteria	DBT Intervention	Control Condition	Assessment Points
Ward-Ciesielski, Tidik, Edwards, & Linehan (2017)	*N* = 93 DBT: (*n* = 46) 39% female Control: (*n* = 47) 34% female Adult sample *M* age = 40.2 years Outpatient sample of individuals experiencing SI.	USA	Yes	**(I)** 18+; experienced SI within the past week; no MH treatment received in the month prior to assessment; able to commute to research centre; willing to consent to study procedures **(E)** Non-English speaking; significant cognitive impairments.	**Delivery:** One 45- to 60-minute session delivered on an outpatient basis. **Format:** Individual treatment during which the participant in introduced to five DBT skills (Mindfulness; mindfulness of current emotions; opposite action to emotion; distraction and changing your body chemistry. Participants provided with MH resources at the end of the session. Strategies were practiced during the session, where deemed appropriate.	**TAU:** RTC. Focus of intervention was on providing supportive therapy validating the individual's experiences. Open-ended discussion was used where the participant was encouraged to discuss their current life stressors and strategies they use to manage stress. Participants additionally engaged in sensory awareness activities lasting for approx. 10–15 minutes followed by debrief. Session time matched for 45–60 minutes. Participants provided with MH resources at the end of the session.	Pre-treatment Post-treatment 1-month F/U 3-month F/U
Wilks et al., (2018)	*N* = 60 DBT: (*n* = 31) 66.7% Female Control: (*n* = 29) 72.4% female Adult sample *M* age = 38 years Outpatient Sample of individuals experiencing SI and heavy alcohol use.	USA	Yes	**(I)** SI in the past month; 2+ episodes of heavy episodic drinking (4+ standard drinks for women and 5+ standard drinks for men over a 2-hour period) in the past month; high emotion dysregulation (score >16 on DERS-16); US resident. **(E)** Currently enrolled in psychotherapy and unwilling to discontinue treatment; diagnosed with bipolar I or psychotic disorder; unable to understand verbal or written English; no internet or computer access.	**Delivery:** Eight online modules completed over 8 weeks on an outpatient basis. Each session lasted approx. 30–50 minutes (approx 4–7 hours of treatment). Individuals completed treatment individually. **Format:** Skills training only (Mindfulness, ER and DT skills with two sessions specifically addressing strategies to reduce problematic drinking. Individuals were introduced to skills via an online video segment, then provided with an opportunity to engage in guided and interactive practice.	**WLC** — completed weekly questionnaires monitoring frequency, intensity and seriousness of SI in addition to frequency and quantity of alcohol consumption. Individuals offered treatment after initial 8-week waiting period.	Pre-treatment Mid-treatment Post-treatment 1-month F/U 2-months F/U

Note: ACGT = active comparison group therapy; AN = anorexia nervosa; ASG = activities-based support group; BED = binge eating disorder; BMI = body mass index; BSL-23 = Borderline Symptoms List – 23; DSH = deliberate self-harm; DT = distress tolerance; DTS = Distress Tolerance Scale; ER = emotion regulation; F/U = follow-up; GEDM = General Emotion Dysregulation Measure; IE = interpersonal effectiveness; MH = Mental Health; NSSI = nonsuicidal self-injury; OT = Occupational Therapy; PPT = positive psychotherapy group; RTC = relaxation training control; SI = suicidal ideation; SUD = substance use disorder; TAU = treatment as usual; WLC = waitlist control.

study examined a sample seeking treatment for opioid dependence (Azizi, Borjali, & Golzari, 2010), with a final study investigating a DBT intervention in non-treatment-seeking adolescents (Burckhardt et al., 2018). Most studies examined DBT interventions delivered in an outpatient setting ($k = 12$; 85.71%). One study was delivered in an inpatient setting (Gibson, Booth Davenport Keogh, & Owens, 2014) and another in a high school setting (Burkhardt et al., 2018). Studies were primarily conducted in North America (United States and Canada; $k = 9$; 64.29%) between 2010 and 2018.

Study Designs and Treatment Conditions

Most of the studies ($k = 11$; 78.57%) were conducted using a randomised controlled trial design. Three studies were non-randomised controlled trials. Four studies (28.57%) were described as pilot or feasibility studies. Five studies (35.71%) used a waitlist control design (WLC) whereas eight studies (57.14%) used a TAU design. One study did not report on the type of comparison group and stated that no intervention was provided to this group (Jamilian et al., 2014). There was variability in the treatments delivered in TAU conditions. Of the eight studies that employed a TAU comparison condition, three studies delivered various forms of supportive psychotherapy (Neacsiu, Eberle, Kramer, Wiesmann, & Linehan, 2014; Safer, Robinson, & Jo, 2010; Ward-Ciesielski et al., 2017); one study delivered a positive psychology intervention (Uliaszek et al., 2016); one study delivered psychoeducation within a group setting in addition to medication (Dixon-Gordon, Chapman, & Turner, 2015); one study provided inpatient treatment as usual by a multidisciplinary team comprising of both pharmacological treatment in addition to psychoeducation groups in addition to individual treatment delivered by either an occupational therapist, social worker or psychologist (Gibson et al., 2014). Another study (Chugani et al., 2013) provided individual psychotherapy but did not specify what this entailed; and lastly, Azizi et al., (2010) involved two separate forms of TAU: either cognitive therapy or medication (naltrexone).

As for the specific DBT interventions, none of the included studies implemented a standard DBT treatment protocol (including ongoing individual psychotherapy, phone coaching and DBT therapist consultation in addition to the group skills-training component) as part of their treatment program. Most treatments incorporated a face-to-face group skills-training component alone ($k = 12$; 85.71%), with two studies providing individual skills training only either via a guided self-help format (DBT-gsh; Masson, von Ranson, Wallace, & Safer, 2013) or an online intervention (iDBT; Wilks et al., 2018). Only five studies (35.71%) delivered all four modules as part of the group skills training. Six studies (42.85%) delivered content from three out of the four modules; namely, the mindfulness, emotion regulation, and distress tolerance modules. One study (Jamilian, Malekirad, Farhadi, Habibi, & Zamani, 2014) only provided content from emotion regulation and distress tolerance modules, and Azizi et al. (2010) provided content from the mindfulness and emotion regulation modules. One other study provided either emotion regulation content or interpersonal effectiveness content depending on which condition participants were randomly allocated (Dixon-Gordon et al., 2015).

There was high variability in the duration of DBT interventions provided, ranging from a single intervention session to sessions delivered over 20 weeks. The number of sessions delivered across the 14 studies ranged from 1 to 24 (median = 10), with session length ranging from 20 minutes to 2 hours. Nine studies (64.29%) included a follow-up period for evaluation of outcomes. The length of this follow-up varied across studies from 7 weeks post-intervention to 12 months post-intervention.

Synthesis of Findings on ER (see Table 2)

Pre- to post-treatment effects

Six studies (42.86%) reported significant between-group improvements in ER favouring DBT on the DERS immediately at post-treatment. Effect sizes in the 12 studies where this information was available to be calculated ranged from $d = .31–1.03$, indicating small to large between-group effects. While one study (Chugani et al., 2013) reported a significant decrease in DERS scores within the DBT condition, it is unclear as to whether there was a significantly greater change over time when compared

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Table 2. Study Outcomes at Post-Treatment and Follow-Up on Emotion Regulation as a Function of DBT Treatment

Study	Pre-post DBT treatment: Within-group effect sizes (Cohen's *d*)	F/U DBT treatment: Within-group effect sizes (Cohen's *d*)	Between-treatment group comparisons
Azizi et al., (2010)	Means and standard deviations not provided.	N/A	There was a significant decrease reported in DERS scores in the DBT condition relative to the two comparison conditions.
Burckhardt et al., (2018)	DERS (Non-accept): *d* = .26 DERS (Goals): *d* = .07 DERS (Impulse): *d* = .07 DERS (Awareness): *d* = .08 DERS (Strategies): *d* = .24 DERS (Clarity): *d* = .11 DERS (Total): *d* = .04	*6-month F/U* DERS (Nonaccept): *d* = .13 DERS (Goals): *d* = .14 DERS (Impulse): *d* = .16 DERS (Awareness): *d* = .13 DERS (Strategies): *d* = .02 DERS (Clarity): *d* = .09 DERS (Total): *d* = .10	*ns* (*d* = .01 - .27)
Cancian et al., (2017)	DERS (Total): *d* = .72	N/A	*ns* (*d* = .55)
Chugani et al., (2013)	Means and standard deviations not provided.	N/A	There was a significant decrease reported in DERS scores across treatment in the DBT condition. While there was also a significant decrease in the TAU group, it is unclear whether between group comparisons were tested statistically.
Dixon-Gordon et al., (2015)	Interpersonal effectiveness: DERS (Total): *d* = .16 Emotion regulation DERS (Total): *d* = .60	7-week F/U Interpersonal Effectiveness: DERS (Total): *d* = .12 Emotion regulation DERS (Total): *d* = 1.01	*ns* (*d* = .27 - .91)
Gibson et al., (2014)	DERS (Nonaccept): *d* = .37 DERS (Goals): *d* = .29 DERS (Impulse): *d* = .16 DERS (Awareness): *d* = .24 DERS (Strategies): *d* = .28 DERS (Clarity): *d* = .38	3-Month F/U data not provided in text.	Sig. group differences at post-treatment. Group comparisons were not made at F/U. DBT reported significantly increased ability to engage in goal-directed behaviour (*d* = .76) and increased access to emotion regulation strategies (*d* = .75) relative to TAU at post-intervention.
Jamilian et al., (2014)	DERS (Total): *d* = 1.03	N/A	Sig. group differences found at post-treatment. The improvement in DERS total score (*d* = .31) at post-intervention was significantly greater in the DBT condition relative to control.
Masson et al., (2013)	DERS (Total): *d* = .59	6-month F/U DERS (Total): *d* = .65	Sig. group differences found at post-treatment. Participants in the DBT intervention reported significantly improved DERS total score relative to the control condition (*d* = .76). Group comparisons were not made at F/U.

(*Continued*)

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Table 2. (*Continued.*)

Study	Pre-post DBT treatment: Within-group effect sizes (Cohen's *d*)	F/U DBT treatment: Within-group effect sizes (Cohen's *d*)	Between-treatment group comparisons
McMain et al., (2017)	DERS (Total): $d = 1.31$	3-month F/U DERS (Total): $d = .91$	Sig. group differences found at post-treatment. Participants in the DBT intervention reported significantly improved DERS total score relative to WLC ($d = 1.03$). Group comparisons were still significant at F/U ($d = .72$).
Neacsiu et al., (2014)	DERS (Non-accept): $d = 1.06$ DERS (Goals): $d = 1.91$ DERS (Impulse): $d = 1.18$ DERS (Awareness): $d = .53$ DERS (Strategies): $d = 2.15$ DERS (Clarity): $d = .79$ DERS (Total): $d = 1.97$	2-month F/U DERS (Non-accept): $d = .001$ DERS (Goals): $d = .21$ DERS (Impulse): $d = .29$ DERS (Awareness): $d = .34$ DERS (Strategies): $d = .15$ DERS (Clarity): $d = .09$ DERS (Total): $d = .01$	Sig. group differences found at post-treatment. Participants in the DBT intervention reported significantly improved DERS total score relative to ASG control ($d = .73$). DBT demonstrated significantly increased engagement in goal directed behaviour ($d = .23$) and adaptive emotion regulation strategy use ($d = .64$). However, no significant differences were found on the other subscales. Group differences at F/U favoured ASG control. While the DBT group still reported improved DERS scores relative to the control group ($d = .45$), participants in the DBT group trended towards losing gains at post-treatment. However, the ASG control group trended towards continuing to improve.
Safer et al., (2010)	DERS (Total): $d = 1.01$	12-month F/U DERS (Total): $d = .83$	*ns* ($d = .01$ - $.21$)
Uliaszek et al., (2016)	DERS (Total): $d = 1.16$	N/A	*ns* ($d = .08$ - $.50$)
Ward-Ciesielski et al., (2017)	DERS (Total): $d = .34$	3-month F/U DERS (Total): $d = .56$	*ns* ($d = .21$ - $.22$)
Wilks et al., (2018)	DERS-16 (Total): $d = .41$	1-month F/U DERS-16 (Total): $d = .38$ 2-month F/U DERS-16 (Total): $d = .56$	*ns* ($d = .19$ - $.45$)

with the control condition. Overall, within-group effect sizes when examining the effectiveness of the DBT intervention ranged from $d = .04$ to 1.16 (trivial to large), indicating high variability in ER outcomes.

Though the majority of studies reported on the DERS total score, three studies explored discrepancies across subscales. Two studies demonstrated significant results. Gibson et al. (2014) found that DBT skills training specifically resulted in significantly increased ability to engage in goal-directed behaviour and significantly increased access to ER strategies. Neacsiu et al. (2014) demonstrated that DBT skills training similarly improved access to a wide range of ER strategies and additionally demonstrated significantly greater emotional awareness and clarity among those participating in the DBT skills training intervention compared with TAU.

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Pretreatment to follow-up effects

Of the nine studies that included follow-up of outcomes, seven studies reported on these outcomes. Of these, only one study reported significant between-group differences at follow-up (3-months), with an effect size of $d = .91$. Overall, within-group effect sizes for DBT treatment on DERS scores ranged from $d = .02$ to 1.01 (trivial to large), again indicating high variability in outcomes. One study (Neacsiu et al., 2014), which reported significant between-group effects at post-treatment, demonstrated that although participants in the DBT condition improved at a significantly faster rate initially on the DERS total score relative to TAU at post-treatment, across follow-up the difference in this rate of improvement between conditions was no longer significant.

Active treatment versus waitlist control

Of the studies that employed a WLC design, two out of the five demonstrated significant between-group comparisons (40%). Overall, effect sizes for WLC designed studies examining DBT versus WLC on DERS outcome scores ranged from $d = .01$ to 1.03. Of the studies that employed a TAU design, three out of the eight (37.5%) demonstrated significant between-group comparisons. Effect sizes ranged from $d = .01$ to .76.

Treatment effects for specific samples

Of the three studies that investigated the effectiveness of DBT on DERS in a BPD sample, two out of the three studies demonstrated significant between-group comparisons. Overall, within-group effect sizes of DBT on DERS for BPD samples ranged from $d = .16$ to 1.31. Two out of four studies demonstrated significant between-group differences when examining samples with general ER difficulties (within-group effect sizes ranging from $d = 1.03$ to 1.16 in the 12 studies where available to be calculated). One out of three studies demonstrated significant between-group differences when examining samples with obesity or binge-eating related difficulties (effect sizes $d = .59$ to 1.01).

Assessment of Risk of Bias (see Table 3)

Overall, the risk of bias across the 14 studies was high, as evidenced by the proportion of information indicating unclear or high risk of bias. Although the 11 RCTs often used a random allocation sequence generation, clear statements about whether allocation was concealed was missing in 10 studies. Furthermore, within the majority of studies ($k = 11$), participants and personnel were not blinded to treatment condition, or it was not clear whether a blinding process had been undertaken, allowing for potential biases in attributional effects of the treatment. There was varied attrition across the studies, with eight studies reporting significant attrition (20–60%), principally in the control conditions. Although most studies attempted to control for confounders and conducted appropriate analyses (e.g., intention-to-treat analyses, imputation of missing values using the expectation-maximisation [EM] method), in other studies ($k = 2$) this was unclear or inappropriate analyses were used, such as using the *last observation carried forward* method, whereby follow-up missing data is imputed using the participant's previous observed score (Lachin, 2016). Furthermore, risk of bias was increased in one study (Chugani et al., 2013), which used a comparison group comprised of people unavailable or unwilling to attend the intervention.

As for intervention integrity, the majority of the DBT interventions (92.86%) were adapted from the *DBT Skills Training Manual* (Linehan, 1993, 2015). However, there was little examination of whether DBT interventions were delivered in a consistent manner and whether facilitators adhered to the treatment manual. This was unclear across ten studies. Furthermore, four studies reported control conditions where there was risk of overlap between content taught across both DBT and control conditions. In addition, across seven studies, it was unclear as to whether the majority of participants (i.e., above 80%) completed the majority of sessions delivered (i.e., above 80%). Across studies that did report information about completions, five out of seven studies indicated that the majority of participants did not receive the full dose of treatment.

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Table 3. Risk of Bias Assessment Using Cochrane Handbook for Systematic Reviews of Interventions (Higgins & Green, 2011)

	Selection		Detection		Attrition		Intervention integrity					Other	
Type of bias	Random sequence generation	Allocation concealment	Blinding (personnel)	Blinding (participants)	Incomplete outcome data (post)	Incomplete outcome data (F/U)	Consistency of delivery/ adherence	Control contamination	Co-intervention	Participant completion	Overall judgment*	Confounders	Appropriate analysis
Azizi et al., (2010)	?	?	?	?	+	N/A	?	?	+	?	?	+	?
Burckhardt et al., (2018)	+	?	–	–	–	–	?	+	+	?	?	+	+
Cancian et al., (2017)	+	?	?	–	–	N/A	+	?	+	–	–	+	–
Chugani et al., (2013)	–	N/A	?	–	?	N/A	?	–	+	?	–	–	+
Dixon-Gordon et al., (2015)	+	?	–	–	+	+	?	–	+	?	–	?	+
Gibson et al., (2014)	–	N/A	?	–	?	–	?	?	?	?	?	+	+
Jamilian et al., (2014)	?	?	?	?	?	N/A	?	?	+	?	?	?	?
Masson et al., (2013)	+	+	–	–	–	?	+	?	+	–	–	+	–
McMain et al., (2017)	+	?	?	–	–	?	+	–	+	–	–	+	+
Neacsiu et al., (2014)	+	?	–	–	–	+	?	+	+	–	–	–	+
Safer et al., (2010)	?	?	+	–	+	+	?	+	+	+	+	–	+
Uliaszek et al., (2016)	?	+	?	+	–	–	?	+	+	?	?	+	+
Ward-Ciesielski et al., (2017)	+	+	?	–	–	–	?	–	+	+	–	+	+
Wilks et al., (2018)	+	?	?	–	?	?	+	?	+	–	–	+	+

Note: + = low risk of bias; - = high risk of bias; ? = unclear risk of bias (i.e., insufficient information available to determine risk of bias) ; N/A = not applicable. *For intervention integrity, an overall rating of high was given if at least one high rating (-) was recorded for the four components. A lower risk of bias was given if a study was deemed to have met at least three of the intervention integrity criteria (+). An overall rating of unclear (?) was given if at least two components were rated as unclear.

Discussion

The last 30 years have seen increasing interest in the implementation of DBT interventions in research and community settings to treat pervasive emotion dysregulation (Feigenbaum et al., 2012; Prendergast & McCausland, 2007; Zalewski, Lewis, & Martin, 2018). While there has been increasing cause for optimism with the treatment of suicidal behaviours and self-harm, there has been little exploration in the literature of further outcomes, such as reduced difficulties in ER. The current review systematically reviewed the current literature to address this empirical gap. The review identified 14 studies that provided inconclusive evidence regarding the effectiveness of DBT in treating ER difficulties, relative to treatment as usual or waitlist control designs.

Additionally, the literature examining this research question is hampered by several methodological limitations that hinder the reliability of studies and their outcomes; namely, underpowered studies with significant attrition rates (up to 60%), lack of blinding, and limited ability to replicate studies with high variability regarding comparison group and the nature of the DBT intervention delivered.

Interpretation of Outcomes

The large variability in treatment effects of DBT in improving ER is indicative of the high variability in study design and methodologies analysed in this review. These ranged from examining the effectiveness of treatment in inpatient settings with individuals diagnosed with BPD to non-treatment-seeking individuals attending high school. Indeed, when DBT was examined in treatment-seeking populations, effect sizes ranged from small to large; however, when examined in a non-treatment-seeking high school group, effect sizes were trivial. Thus, there appears to be disparity across treatment contexts. Furthermore, many studies were underpowered to detect effects given the significant attrition rates, with four studies listed as pilot or feasibility studies.

In addition, it is difficult to make any firm conclusions about the effectiveness of DBT in reducing ER difficulties, as there was high variability in the interventions delivered. No study in this review delivered the full standard protocol as specified by Linehan (1993, 2015), with most studies solely delivering the skills training component. Furthermore, the content of skills training varied across studies. Currently, there is no 'best practice' protocol for delivering DBT treatment to address emotional regulation, with limited replication across interventions. The lack of a 'best practice' protocol hinders the conclusions that can be made about DBT skills-training interventions, as it remains unclear what the necessary and sufficient components are that can effectively improve ER abilities. Future research should focus on attempting to understand the critical components of DBT skills training through the conduct of studies with replicable interventions. This will assist to develop consensus in the literature as to the optimal and critical components of DBT skills training to target ER ability.

In the current systematic review, many comparison groups consisted of waitlist designs that may overinflate the relative efficacy of DBT intervention. One study reported that the control group was simply provided with no intervention and no further detail was specified. Where other studies used TAU designs, the comparison group was often not described in detail, and across three studies, it was not explicit as to whether the comparison treatment was delivered in a manualised format. Furthermore, across some studies it is likely that the content was not distinct enough from that offered as part of the DBT intervention, potentially resulting in contamination across conditions. For example, one study (Dixon-Gordon et al., 2015) used a psychoeducation group as a comparison, where the content involved understanding the link between nutrition and exercise and the impact of mood, a skill that is covered throughout DBT in the Emotion Regulation module. Another study (Ward-Ciesielski et al., 2017) used a relaxation training control where participants were encouraged to engage in a sensory awareness exercise, which may overlap with the content of the DBT Distress Tolerance and Mindfulness modules.

From the studies reviewed, it is additionally unclear the extent to which individuals are engaging in the interventions themselves. No studies reviewed included diary card entries or homework practice in

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their analyses to understand a possible moderating effect on improvement of ER difficulties. Given the importance of mastery in skill development, studies will need to incorporate this data into their research designs to further understand the effectiveness of such intervention practices on enhancing ER abilities. The effectiveness of DBT may be underrated in the current review simply because individuals are not attending sessions and engaging in skills practice outside of session. Aside from Ward-Ciesielski et al., (2017), who administered one session, across the remaining interventions either the majority of participants did not receive the full dose of treatment or this information was not reported. Future research needs to focus on how to maximise engagement in treatment to ensure that the efficacy of DBT is not being underrepresented. This is especially important, as within research settings, individuals are often self-selected into research trials and may have more motivation to seek treatment than is seen in the general population. Indeed, Little, Tickle, and das Nair (2018) report that increasing self-efficacy in skills use is a key component identified qualitatively by DBT participants as a determiner of change. Further research needs to investigate this more systematically to understand if increasing self- efficacy and mastery of skills use occurs over time in DBT which promotes increased ER ability.

The development of ER is a dynamic process that continuously develops across one's lifespan (Cole, 2014). In order to examine the effect of DBT on improving ER ability, the short-term nature of the programs included in the current review (up to 24 sessions) may hinder our ability to understand the nature of this effect. It may be that the driving force of such programs is to initially increase knowledge of alternative ER strategies. Indeed, two studies that explored findings on this subscale on the DERS produced significant effects. However, improving non-acceptance of emotional responses, improving emotional awareness and clarity, and reducing impulse control difficulties in the face of intense emotions to engage in goal-directed behaviour may require mastery of skills use developed over the long term.

More research is thus needed with longer follow-up of outcomes. Only half of the studies in the current review reported follow-up of outcomes. Given the dynamic and complex nature of ER development, more research is needed to look at how this develops over time following DBT treatment. Indeed, Neacsiu et al. (2014) found that while improvements in DERS occurred at a significantly faster rate throughout and immediately post-treatment in the DBT group relative to TAU, at follow-up, the rate of change in the TAU group continued to increase, whereas changes in DERS outcomes across the DBT group appeared to stabilise. The authors note that this may relate to the significant level of coaching, monitoring and validation provided within the DBT intervention. However, once individuals complete their training, there may be a perceived lack of accountability for skills use. Further research is thus needed to understand trajectories of skills use over time.

Limitations

A meta-analysis was not considered appropriate for this review given the limited number of studies and heterogeneity observed in the DBT interventions delivered. The current systematic review is limited to published literature, and thus there may have been further studies eligible for inclusion that have not been considered. Nevertheless, this was done to increase quality of the studies included in the review. Furthermore, given the lack of consistency in operationalisation of ER as a construct, the studies included were limited to those examining difficulties in ER ability as operationalised by the DERS (Gratz & Roemer, 2004).The DERS was chosen as it purports to map onto key processes involved in ER such as emotional awareness and clarity, emotional acceptance, and the ability to engage in goal-directed and avoid impulsive behaviour in the face of aversive emotional state via access to ER strategies perceived as being adaptive within the specified context, as opposed to mood regulation or coping with stress. The DERS is additionally one of the most common measures used within the DBT literature to examine efficacy of outcomes on difficulties regulating emotions. Indeed, the lack of a unified construct and measure is a further limitation within this field to assist in understanding of the effects of DBT on ER abilities (Koechlin, Coakley, Schechter, Werner, & Kossowsky, 2018). This

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may limit the conclusions made. Finally, the current review was limited to a self-report measure that may carry inherent biases, as participants report on their perceived ability to regulate emotions that may not accurately reflect their ability or may carry an expectancy effect following participation in treatment to help improve ER ability. As a consequence, it may be that such measures are capturing perceived self-efficacy as opposed to ER ability itself.

Conclusion

The current systematic review evaluated the empirical literature concerning the effectiveness of DBT interventions in reducing difficulties in ER ability, relative to existing psychological treatments. While there is some promise, at present, the literature is inconclusive as to the effectiveness of DBT in improving ER difficulties relative to existing psychological treatments. DBT appears to be a viable treatment option targeting emotion dysregulation; however, caution must be taken not to overstate claims at present regarding its effectiveness in targeting ER difficulties. Further studies are needed addressing the methodological limitations outlined in this review before such conclusions can be made.

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