Review

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# Dialectical Behavior Therapy for Adult Attention Deficit Hyperactivity Disorder: A Narrative Review

## *Erişkin Dikkat Eksikliği Hiperaktivite Bozukluğu İçin Diyalektik Davranış Terapisi: Bir Narativ Derleme*

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**ABSTRACT**

Due to the multifaceted psychosocial problems of adults with ADHD and the low level of functionality in different areas such as education, work and family life, the search for psychotherapeutic treatment other than pharmacological approaches has increased in the last decade. This study aims to evaluate the clinical contributions of Dialectical Behavioral Therapy (DBT)-based interventions and the controlled studies in which DBT were tested. This study is a qualitative narrative review. This review included the controlled studies reached by searching the DDT and Adult ADHD as keywords in Medline, Pubmed, Science Direct and EBSCO Psychology & Behavioral Sciences Collection databases until 2021. A total of 12 research articles and 1 short report were identified, but only 9 studies met the inclusion criteria and controlled study conditions. In all studies, it was seen that the skills training mode of DBT was used or adapted. Although the results of the studies reviewed in this review are not consistent, DBT Skills Training shows promise in controlling ADHD symptoms and increasing other psychosocial skills of adults. However, there is a need for more controlled studies on the effectiveness of DBT Skills Training in different experimental research designs.

**Keywords:** Adult attention deficit hyperactivity disorder, controlled trials, dialectical behavior therapy, dialectical behavior therapy skills training

**ÖZ**

DEHB'li yetişkinlerin çok yönlü psikososyal problemleri ve eğitim, iş, aile hayatı gibi farklı alanlarda görülen düşük işlevsellik düzeyleri nedeniyle farmakolojik yaklaşım dışında psikoterapötik tedavi arayışları son on yılda artış göstermiştir. Bu çalışmada Diyalektik Davranış Terapisi (DDT) temelli müdahalelerin sınandığı kontrollü çalışmaların ve geliştirilen DDT müdahalelerinin klinik anlamda katkılarının değerlendirilmesi amaçlanmaktadır. Bu çalışma nitel bir naratif derlemedir. Çalışmaya DDT ve Erişkin DEHB anahtar kelimelerinin İngilizce karşılıklarının Medline, Pubmed, Science Direct ve EBSCO Psychology&Behavioral Sciences Collection veritabanlarında 2021 yılına kadar taranmasıyla ulaşılan kontrollü çalışmalar dahil edilmiştir. Toplam 12 tane araştırma makalesi ve 1 kısa rapor tespit edilmiş ancak dahil etme kriterlerini ve kontrollü çalışma şartlarını yalnızca 9 çalışma karşılamıştır. Tüm çalışmalarda DDT'nin beceri eğitiminin kullanıldığı veya uyarlandığı görülmüştür. Derlemede incelenen çalışmaların sonuçları tutarlı olmamakla birlikte DDT Beceri Eğitimi'nin yetişkinlerin DEHB belirtilerini kontrol etmede ve diğer psikososyal becerilerini artırmada umut vaat ettiğini göstermektedir. Ancak çalışmaların sınırlı sayıda olması nedeniyle DDT Beceri Eğitimi'nin etkililiğine yönelik farklı deneysel araştırma desenlerinde daha fazla kontrollü çalışmaya ihtiyaç duyulmaktadır.

**Anahtar sözcükler:** Diyalektik davranış terapisi, diyalektik davraniş terapisi beceri eğitimi, erişkin dikkat eksikliği hiperaktivite bozukluğu, kontrollü çalışma

## Introduction

Attention deficit hyperactivity disorder (ADHD) is a neurodevelopmental disorder has occurred in childhood and persisted into adulthood in more than half of the cases (Biederman et al. 2006, Kessler et al. 2006). However, the diagnosis and treatment of ADHD in adults are relatively new phenomenon and has been the subject of an increased number of research for the last two decades. At first, studies have seemed to focus heavily on the clinical appearance, components, and psychosocial functionality of adult ADHD (Able et al. 2007, Ek and Isaksson 2013). ADHD symptoms grouped as inattention, hyperactivity and impulsivity have different clinical manifestations in adults than in children

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(Oerbeck et al. 2019), In adulthood, hyperactivity has manifested itself as fidgeting, inability to relax, restlessness or being unable to stay a while for reading, working on a task, or watching a movie (Canela et al. 2017). Impatience, interrupting others' conversations, changing job frequently, starting to do something with an impulse and changing sexual partners often have been common impulsivity indicators in adult ADHD (Wilens et al. 2009). Inattention, on the other hand, has clinical appearances such as forgetfulness, disorganisation, inability to follow others in a conversation, poor concentration or inability to distinguish relevant stimuli in case of monotonous situations or insufficient motivation, and being late (Hesslinger et al. 2002). Thus far, the most prominent symptoms in adults have been considered as attention deficit, emotional instability, disruptive behavior, and disinhibition (Hesslinger et al. 2002).

Confusion, slowness, fatigue, anxiety and forgetfulness, low reading skills, difficulty in completing tasks and difficulty in prioritizing have standed out as the biggest obstacles to patients to complete their work in the daily life (Bjerrum et al. 2017). Understanding the components and appearance of ADHD is important to develop a treatment model that will meet the needs of adult ADHD patients who experience daily life as a challenge (Torrente et al. 2012).

Therapeutic interventions for ADHD in children generally based on the cognitive behavioral therapy (CBT) (Torrente et al. 2012). However, the first psychosocial intervention for adults with ADHD examined in a randomised controlled trial (RCT) was based on dialectical behavior therapy (DBT) skills training (Hesslinger et al. 2002). The present review has scrutinised the efficacy and effectivity of DBT skills training in adult with ADHD within the scope of controlled trials in the literature.

## Dialectical Behavior Therapy

DBT was developed by Linehan (1993) for borderline personality disorder (BPD) and numerous studies showed its effectiveness (Turner 2000, Verheul et al. 2003, Linehan et al. 2006, Panos et al. 2014, Üstündağ Budak et al. 2020). Over time, RCT studies supported the efficacy of DBT in resistant bipolar disorder (Goldstein et al. 2015), eating disorder (Courbasson et al. 2012), treatment-resistant depression (Lynch et al. 2007), and post-traumatic stress disorder (Bohus et al. 2013) by RCT studies (Harley et al. 2008, Kaya and Alyanak 2017, Üstündağ Budak and Kocabaş 2019).

The standard DBT protocol has offered a three-stage treatment model and a hierarchical order for the targets in each stage (Linehan 1993). The first stage consisted four treatment goals: 1. to reduce suicidal behaviors; 2. to reduce behaviors preventing therapy; 3. to decrease behaviors preventing quality of life; 4. to increase behavioral skills (Linehan 1993). DBT skills training, per se, has been developed to achieve the 4th goal. Provided that the goals in the first stage are achieved, the clients can proceed to the second stage in which past and present traumas are coped. According to DBT, the client can face and cope with traumas only if s/he has developed healthy behavioral skills and actively use them rather than destructive behaviors reducing quality of life (Linehan 2015). Finally, the third stage of DBT aims to increase self-esteem and achieve individual goals. With fulfilling these goals, a "life worth living", the ultimate goal of DBT, can be built (Linehan 1993, 2015).

The standard DBT approach consists of four practice units (modes): individual therapy, skills training, telephone coaching, and team consulting (Linehan 1993). As well as modes can be used together, the individual use of DBT skills training (DBT-ST) has been examined and proved in efficacy and effectivity trials.

## DBT Skills Training

Even skills training is only one of the modes of DBT, it, later on, become a stand-alone intervention implemented in both group and individual format. Outside BPD (Linehan et al. 2015), the effectiveness of the stand-alone DBT-ST has been investigated in various psychopathologies (Safer and Joyce 2011, Valentine et al. 2015) such as binge eating disorder (Telch et al., 2001), major depression (Lynch et al. 2003), bulimia nervosa (Hill et al., 2011), anxiety (Neacsiu et al. 2014) in patient population, and in university students (Üstündağ Budak et al. 2019).

DBT skills training consists of four modules, each of which represents a separate skill group: mindfulness, emotion regulation, interpersonal effectiveness, and distress tolerance (McKay et al. 2019). These skills target to reduce lack of functionality of BPD individuals in the different areas of life, and to strengthen healthy coping behaviors that enable them to overcome multifaced psychosocial problems. Although standard protocol of DBT involves all four modules together, current review has only focused on the content, target and component of DBT-ST as in adult ADHD literature.

Skills training has aimed to teach healthy coping behaviors to reduce suicidal and self-destructive behaviors which DBT named as "life-threatening behaviors" (Gold and Yaptangco 2019). As mentioned above, very basic argument of DBT has claimed a borderline individual could only cope with the underlying trauma or attachment problems after s/he acquired the skills to overcome the daily life problems (Linehan 2015). As in the standard protocol, stand-alone DBT-ST format aims to improve quality of life in different areas by providing skills that can sustain daily life effectively (Gülgez and Gündüz 2015).

## ADHD Model of DBT

There are multiple reasons that DBT stands out as a treatment for ADHD. First, BPD and ADHD share quite number of symptoms; that is to say, they show phenomenological similarities (Philipsen 2006). The literature focuses on both the high rate of comorbidity (Davids and Gastpar 2005) and the confusion in differential diagnosis between two disorders

(Prada et al. 2014). Not only are BPD and ADHD similar in symptoms, but they also manifest similar psychosocial losses of function (Weibel et al. 2018). Therefore, consideration of DBT skills training as a suitable treatment model for adult ADHD is based on the phenomenological similarities between the two psychopathologies, the high rate of comorbidity, and expert reports on frequent confusion in the clinical evaluation (Weiner et al. 2019).

DBT explained BPD as an emotion regulation disorder within the biosocial model. According to this model, children with high emotional sensitivity and arousal level develop a borderline personality when their environment were not sufficiently validating their emotional responses (Linehan, 1993). In the review on the phenomenological similarity of BPD and ADHD, Philipsen (2006) claimed that the biosocial model seemed appropriate for ADHD as well, underlining common symptoms: difficulty regulating emotions and controlling impulses. In addition, these two disorders have manifested low self-esteem, problems in interpersonal relationships, high stress levels, lack of attention and substance abuse. Children with ADHD whose comorbidity rate of emotional irritability was up to 70%, have reported more negative environmental experiences (Asherson et al. 2012). Therefore, they cannot acquire the skills to cope with emotions, stress, and problems in interpersonal relationships (Edel et al. 2010). The multidimensionality of problem areas in which ADHD individuals have faced impairment of functionality has indicated the need for wide range of skills and corresponding professional support. As stated below, DBT skills training modules seem to be able to respond to these problems and phenomenologically overlap with the multifaced psychosocial problems experienced by those with ADHD (Hesslinger et al. 2002, Philipsen 2006).

*Mindfulness*. Inattention is the most basic symptom of ADHD (Öztürk and Uluşahin 2015) and is prominent in many areas, from interpersonal crises to career problems, from organizing daily life to completing a simple task (Brod et al. 2012). Mindfulness, on the other hand, means a constant effort to focus attention on here and now, or on a task (Lee et al. 2017). It is the introductory skill module of DBT and at the base of every subsequent module (Linehan 2015).

*Emotion Regulation*. The clinical appearances of emotion regulation difficulties in ADHD are described as rapid, sudden, or frequent fluctuations during the day; severe emotional reactions, late return to baseline after an emotional reaction, sudden outbursts of anger and hypersensitivity to emotional stimuli (Matthies et al. 2014, Hirsch et al. 2018). Lack of emotional control disrupts the interpersonal relationships of individuals with ADHD, increase their risk of comorbidity, and decrease their functionality in such areas as family, work, and social activities (Bodalski et al. 2019). Although not as common as in cases with BPD, childhood traumas or attachment problems are also encountered in adults with ADHD, and even the negative experiences of children with ADHD increase their risk of developing BPD in the future (Fossati et al. 2015). Comorbidities, especially depression and anxiety, are common in ADHD, which complicates the clinical picture and negatively affects functionality (Calvo et al. 2020).

*Distress Tolerance*. Individuals with ADHD have a higher perceived stress level (Skirrow et al., 2014), they are also more likely to use negative coping methods (Barra et al. 2021). Another symptom where distress tolerance skills can be useful in ADHD is impulsivity. Inability to control impulsivity, which can be explained as acting without thinking about the consequences, has manifested in individuals with ADHD as self-destructive behavior, aggression, risky driving, substance abuse, addiction, risky sexual relation, and excessive spending (Conejero et al. 2019).

*Interpersonal Effectiveness*. Interpersonal problems reported by individuals with ADHD have involved relations in family, work, and friendship. Lack of basic skills and several symptoms such as sudden irritability, distraction while listening to others, inattention, compulsive speaking, and forgetfulness have become prominent in the disruption of interpersonal relations (Minde et al. 2003).

The cumulative effect of failure and loss history in adults with ADHD has undermined their self-esteem and reduced their quality of life (Able et al. 2007). Past failures and losses can be seen significantly in the field of education and vocation. According to the results of cross-sectional and longitudinal studies, individuals with ADHD have a significantly lower education level and academic success, less annual income, and higher unemployment and dismissal rates than individuals with other psychopathologies or no diagnosis (Able et al. 2007, Brod et al. 2012). Since DBT skills training ultimately aims to increase individuals' self-esteem and make life worth to live, the overall purpose of entire skills training, like individual modules, also corresponds to the needs of adults with ADHD.

Although the number of the studies on the effectiveness of cognitive behavioral and third wave interventions for adults with ADHD has increased in the literature in recent years, the present review aims to evaluate only studies in which DBT interventions are tested with experimental or quasi-experimental methods, and clinical offers of DBT interventions.

## Method

The present study is a qualitative narrative review aiming to evaluate DBT interventions developed for adult ADHD (Green et al. 2006, Ferrari 2015). This review is derived from the doctoral dissertation titled "An Investigation of Dialectical Behavior Therapy Group Skills Training in Adult Attention Deficit Hyperactivity Disorder" and the literature reviews were repeated between 2019 and 2021. This review includes controlled studies accessed by searching the keywords **DBT** and **ADHD** in Medline, Pubmed, Science Direct and EBSCHO Psychology and Behavioral Sciences Collection databases. In

the last review in 2021, access to the EBSCHO Psychology and Behavioral Sciences Collection database could not be achieved due to the change in library memberships. Keywords were searched repeatedly with abbreviations, full expressions, and combinations of these two. The inclusion criteria in this review were: 1. being a controlled study; 2. being published in English; and 3. including adult participants ($X_{age}$>18). Since the authors wanted to analyse controlled studies, the results of the reviews were limited to original research articles. Although available abstracts, studies whose full text could not be reached in the above-mentioned databases were accessed either by through Google Scholar or by contacting their authors. Considering that the information obtained from different research designs provided more clinical information, random assignment was not picked up among inclusion criteria. Controlled studies were introduced by describing their samples, methods, treatment protocols, data analysis and findings, regarding PICOS (Gulpınar and Guclu, 2013), and were evaluated in terms of their research qualities and contributions to the clinicians. However, they were not compared systematically and statistically (Green et al., 2006). A three-category framework was predefined for the structure of the article: 1. the descriptive characteristics of controlled studies: design, methods, and findings; 2. DBT protocols; and 3. treatment effectiveness.

## Results

When the keywords were searched in the databases, a total of 12 research articles and 1 short report were found, but only 9 of them met the criteria for controlled study. One of these was excluded from the review as participants age range were between 15 and 18. The flow chart of the study is presented in Figure 1. The flowchart reflects the process extending from all the DBT and ADHD-related controlled studies accessed so far to the selection of the articles covered in the current review. Since the review was not carried out in a specific schedule and the articles were accessed multiple times instead of through a single search, a flow chart starting from the number of articles reviewed in each database could not be presented.

### Descriptive Characteristics of Studies: Design, Method and Findings

The first controlled trial on a non-pharmacologic intervention for adults with ADHD was the pilot study of Hesslinger et al. (2002), applying an adapted DBT skills training. Participants were selected from the patient population and not randomly assigned to the treatment (n=8) and control group (n=7). The eligibility, inclusion and exclusion criteria for the patients were explained in detail. In control group, four participants dropped out of the study and other three participants changed their medication status. Although the missing data were imputed with the last observation carried forward (LOCF) method, researchers pointed out the limitation (drop-out rate) and cautiously interpreted the results in discussion. In the intervention group, one person had predominantly inattentive type, one person had predominantly hyperactive type, and six people had the combined type of ADHD.

Regarding comorbidity, three depression, two social phobia and two insomnia were found in treatment group. It is stated that same criteria for the experimental group were used for the control group, but subtypes and comorbidities of controls were not shared. Since the design of the study was defined as naturalistic, researchers were not determined the drug treatment. Pre- and post-intervention measures were

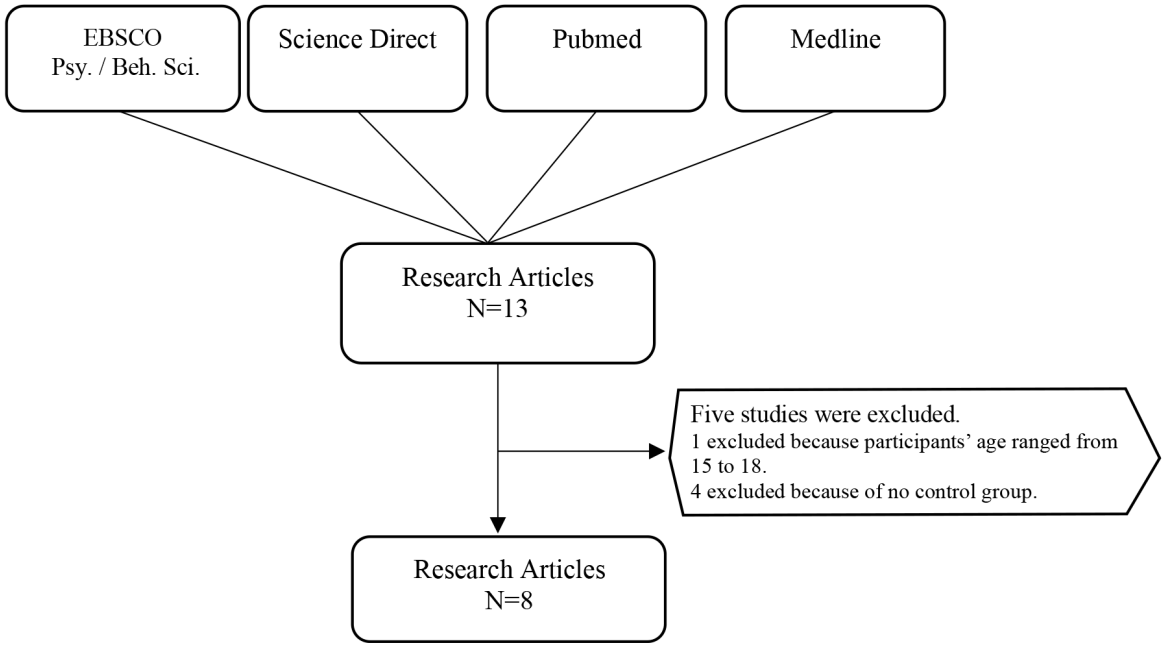


**Figure 1.** Flow chart

ADHD Checklist (ADHD-CL), an adapted version of the Brief Symptom Inventory **(SCL-90-R)** with 16 items selected for ADHD, Beck Depression Inventory (BDI), a visual analogue scale to assess general health status and a neuropsychological battery. Finally, a 5-item questionnaire was applied to the participants to evaluate the adapted DBT-based skills training (DBT-ST). The questionnaire inquired about the specificity of the group work for ADHD, its impact, and suggestions for further studies. The measurements of the control group were analysed with the paired-Wilcoxon test. According to the findings, the treatment group showed improvement in all psychological tests. No change was observed in the control group. According to the results of neuropsychological tests, while there was improvement in selective (d-2 test) and split attention (WAIS-R Digit Symbol subtest and Stroop test), and psychomotor speed (d-2 test). No change was observed in the number of omission and commission (d-2 test), working memory (Number Sequence, Visual Memory Sequence), fluency, and executive functions. The intervention received high scores from the treatment group in the evaluation questionnaire in terms of responding ADHD-related symptoms, allowing to learn and control ADHD better, and being effective.

The next study was a randomised controlled study of the patient population conducted by Hirvikoski et al. (2011). First of all, power analysis was performed, and the number of people expected to leave the study was added to the number of patients required to conduct the study to achieve a power of 80% (n=60), and a sample size of 70 people was determined. In the study, random assignment was applied at a ratio of 1:1 with block size of 10-24, and no strata was determined. The eligibility, inclusion and exclusion criteria, and how the random assignment was made were explained in detail and the flow chart was shared. 144 people were screened for ADHD criteria and 51 people were included in the study and assigned to the experimental (n=26) and control (n=25) groups. The experimental group received Hesslinger et al.'s (2002) DBT-ST protocol, while the control group was involved in an unstructured group therapy. The only difference from the first version of DBT-ST in Hesslinger et al. (2004) was an additional session to the end of the protocol, making a 14-week therapy course. Main analyses were conducted with total 37 subjects, excluding those who started taking medications during the application, did not attend the sessions, and dropped out of the study. For intent to treat (ITT) analysis, last observation carried forward (LOCF) method was used. For feasibility, three criteria were determined: at least 75% of participants should represent ADHD, drop-out rate were less than %25 and participants should attend at least 75% of the sessions. Treatment acceptability was evaluated by the questionnaire published in the study protocol of Hesslinger et al. (2004). Efficacy-related measures were Current ADHD Symptom Scale Self Report Form[1], BDI, Beck Anxiety Inventory (BAI), Karolinska Sleep Questionnaire, Perceived Stress Scale (PSS) and Sheehan Disability Scale (SDS), and a visual analogue scale was used to evaluate general health status. Inappropriate life events reported by the patient during the treatment were evaluated as "negative events" and events requiring hospitalization were evaluated as "seriously negative events". Efficacy-related analysis were examined with mixed design repeated measures ANOVA (rmANOVA). Further analyses were performed by classifying the participants as responders and non-responders to the treatment, using the 30% and 21% reductions in symptoms as a cut-off point. For those who consider visual analogue scale and evaluation questionnaire as ordinal scale data, these measurements were also examined with non-parametric analyses. According to the findings, treatment feasibility in the control group was found to be as good as that in the skills training group; that is, special rules for attendance/exclusion and skills training did not improve feasibility more in DBT-ST. Regarding acceptance, the control group reported that they had a better opportunity to influence the content of the sessions (it was an unstructured discussion group which was mostly up to the clients themselves), while the skills training group reported that they coped with their ADHD-related problems better after the treatment. In the treatment reliability evaluation, the skills training group had significantly higher scores in both the pre-test and post-test stages. According to the efficacy analyses, while ADHD symptoms decreased in the DBT skills group, they remained the same in the unstructured group and the group×time effect was found significant. In other words, the improvement of the participants in the skills group over time was significantly higher than the improvement of those in the control group. Analysis of the categories of responders and non-responders showed that no matter which cut-off point was used, participants in DBT-ST were more often categorised as responders than controls. The effect size of the reduction in ADHD symptoms was found to be moderate. In other psychiatric measurements, no significant findings were obtained in terms of between-group, within-group, or group×time effetcs. Both groups reported that their general health status improved significantly, and no significant difference between groups or group×time interaction was found. In ITT analysis, in which participants whose medication status changed and who dropped out were also included, rmANOVA did not show significance result for any measure. Therefore, it is appropriate to say that DBT-ST significantly improved participants who wanted to stay in the treatment and used their medication regularly. Superiority of DBT-ST in general health status stayed significant in ITT analysis. Although it was mentioned in the study that ITT analysis were performed for comorbidity, no detailed information was shared on how this was done. Thus, it is not clear whether comorbidity were entered as covariates, or a separate classification was made. Perceived stress level was significantly higher in general, regardless of the group, when those who started the medication during the treatment were included in the analysis, but no other significant results were obtained. To summarize, in this study, the participants in the DBT-ST group reported higher evaluation scores than

**Table 1. Basic features of controlled studies.**

| | Study Groups | Measurement Tools | Comorbidity | Results |
|---|---|---|---|---|
| Hesslinger et al.<br>Germany<br>2002<br><br>N=17 | 1.DBT-ST<br><br>2. Control group*<br>(waiting list) | ADHD Checklist<br>BDI II<br>SCL-90-R (selected items)<br>Visual analogue test<br>Verbal and letter fluency test<br>Stroop Test (for mental speed, inhibitory executive functions)<br>WAIS-R digit symbol subtest (for split attention)<br>KLT (for continous attention)<br>D2-Test (for selective attention)<br>Mental control, digit span, visual memory span in WMS-R (for short-term memory and working memory, general attentional capasities) | Depression<br>Social phobia<br>Insomnia | In DBT-ST group:<br>1. Significant decrease in all scales<br>2. In neuropsychological tests, selective (d2) and differential attention (DSS, Stroop) increased<br>3. Psychomotor speed (d2) increased<br>4. Fluency in primary and working memory (digit span, visual memory span), no effect on executive functions |
| Hirvikoski et al.<br>Sweden<br>2011<br><br>N=51 | 1-DBT-ST<br>2. Poorly structured discussion group | Current ADHD Symptom Scale-Self Report Form<br>BDI II<br>BAI<br>Karolinska Sleep Questionnaire<br>Perceived Stress Scale<br>Sheehan Disability Scale Visual Analogue Test (overall health/ general well-being) | | 1. ADHD symptoms decreased significantly only in the DBT group<br>2. No significant time-based or inter-group difference in other measures<br>3. Well-being increased in both groups; no inter-group effect and no group X time effect<br>4. Scores did not reach significance when people who discontinued medication were included in the analysis<br>5. Perceived stress decreased with no difference between the groups |
| Edel et al.<br><br>Germany<br>2014<br><br>N= 91 | 1.DBT-ST<br>2.Mindfulness-based group* | WRI (ADHD symptoms)<br>4 Likert Scales for ADHD Symptoms<br>(generated for the study)<br>Mindful Attention Awareness Scale<br>Generalised Self-Efficacy Scale | BPD<br>Axis II (other)<br>Social Anxiety<br>Depression<br>Substance addiction (no substance use) | 1. ADHD symptoms improved for all patients<br>2. As per clinical observation and self-report scores, there was a significantly higher decrease in ADHD general symptoms in the mindfulness group than the DBT group<br>3. As per the clinician's assessment, there was greater impulsivity improvement in the DBT group<br>4.There was a greater increase in awareness scores in the mindfulness group<br>5. hTe clinical evaluation scores of BPD patients were significantly higher than others both in general ADHD symptoms and emotional instability sub-dimension of ADHD (this may have led to results favoring the mindfulness group) |
| Fleming et al.<br>Pacific Northwest<br>2015<br><br>N=33 | 1.DBT group<br>2. Self-help group | BAARS-IV<br>BADDS<br>AAQoL<br>BAI<br>BDI-2<br>FFMQ<br>CPT-2<br>Quality of Life<br>College GPA | Depression<br>Anxiety | 1. ADHD symptoms: DBT group decrease>self-help decreaase<br>2. Executive functions: DBT posttest and follow-ups>self-help<br>3. Quality of life: DBT posttest>self-help, DBT follow-up=self-help<br>4.Mindfulness: DBT posttest>self-help, DBT follow-up>self-help<br>5. Improvement in omission errors: DBT posttest>self-help, DBT follow-up>self-help<br>6. Improvement in commission errors, response time and standard errors: DBT follow-up=self-help |

**Table 1. Continued**

| | Study Groups | Measurement Tools | Comorbidity | Results |
|---|---|---|---|---|
| Philipsen et al.<br>Germany<br>2015<br><br>N=448 | 1.DBT-ST+MPH<br>2.DBT-ST+placebo<br>3.Clinical Interview+ MPH<br>4.Clinical Interview+ placebo | CAARS-O:L<br>CAARS-S:L<br>Adult Attention Deficit Hyperactivity Scale<br>SCL-90-R<br>BDI-II<br>Clinical Global Impression Scale<br>SF-36 (Quality of life)<br>Satisfaction with Life Scale – Short Form<br>EQ-5D (Quality of life) | 66% of Axis 1<br>17.9% of Axis 2 | ADHD symptoms (including T2, T3, T4):<br>1.DBT-ST+MPH=clin. int..+ meth<br>2.DBT-ST+MPH>group + placebo<br>3.clin. int.+ MPH>clin. int.+ placebo<br>4. DBT-ST=clinical interview<br>5. methylphenidate >placebo<br>ADHD symptoms according to observer scoring (T2, T3, T4):<br>1.DBT-ST>clin. int.<br>(High in all measurements but significant in T4)<br>2.MPH>placebo<br>(High in all measurements but significant in T3)<br>Depression<br>(including T2, T3, T4):<br>1. There is no difference between the groups. |
| Prada et al.<br>Sweden<br>2014<br><br>N=123 | 1-BPD<br>2-BPD-ADHD+MPH*<br>3-BPD-ADHD (No MPH)* | ASRS<br>SCID-II<br>BDI<br>STAXI<br>BIS<br>BHS | BPD<br>Anxiety | BKB-ADHD+MPH > BKB-ADHD<br><br>motor impulsivity, total impulsivity score, state-trait anger, severity of depression, severity of ADHD (in that order) |
| Cole et al.<br>Switzerland<br>2016<br><br>N=62 | 1-DBT+ CBT Group (49)<br><br>2. Waiting List (13) | ASRS<br>BDI-II<br>BHS<br>KIMS (Mindfulness)<br>STAXI | Not specified | In DBT-ST group:<br>1. depression symptoms decrease.<br>2. ADHD total score, ADHD attention and ADHD hyperactivity/impulsivity symptoms decreased<br>3. Acting with awareness increased<br>4. Hopelessness decreased |
| Moritz et al.<br><br>Brazil<br>2020<br><br>N=31 | 1.DBT+ST<br>2.Routine Treatment | ASRS | Not reported | No group X time effect |

*No random assignments
AAQoL:ADHD Quality of Life Questionnaire; ASRS: Adult ADHD Self-Report Scale; BAARS-IV: Barkley Adult ADHD Rating Scale; BADDS: Brown ADD Rating Scales; BAI: Beck Anxiety Inventory; BDI: Beck Depression Inventory; BIS: Barratt Impulsivity Scale; FFMQ: Five Facet Mindfulness Questionnaire; BHS: Beck Hopelessness Scale; CAARS-O:L: Conners Adult ADHD Rating Scale, Observer rated, Long version;
CAARS-S:L:Conners Adult ADHD Rating Scale, Self-rated, Long version; KIMS:Kentucky Inventory of Mindfullness Skills; KLT:Konzentrations-Leistungs-Test; MPH: Metilfenidat; BPD: Borderline personality disorder; CPT: Continuous Performance Test-2; STAXI: State-Trait Anger Expression Inventory; WRI: Wender-Reimherr Interview; WMS-R: Weschler-Memory Scale Revised

unstructured discussion group, and it was seen that they coped better with ADHD after the treatment. DBT-ST significantly reduced the symptoms of ADHD in participants who stayed in the treatment and used their medication regularly. On the other hand, neither in terms of feasibility nor non-ADHD measurements, no results in favor of DBT-ST were obtained.

Edel et al. (2014) conducted a controlled study with 91 adults with ADHD who were assigned to mindfulness-based group or DBT-ST group over their own wishes, the therapists' approval, or the availability of their time. The groups were balanced for age, ADHD subtype and severity, comorbidity, gender, education, and medication. In DBT-ST group, the protocol of Hesslinger et al. (2004) was applied while in mindfulness group, a 13-week intervention adapted by the researchers based on MBSR, Kabat-Zin's publications and the mindfulness module of DBT was applied. The pre- and post-test mesaures were Wender-Reimherr Interview (WRI) that has measured ADHD symptoms and a four-point Likert-type scale developed in accordance with the DSM criteria, Mindful Attention Awareness Scale (MAAS) and Generalized Self-Efficacy Scale (GSES). An important aspect of this study is that the change in ADHD symptoms (using WRI) was measured not only by self-report but also by clinician and patient relatives. Data were analysed using mixed design rmANOVA. Medication status was accepted as covariant by two categorizations as methylphenidate and catecholaminergic group. The baseline values were shared in a table. Considering the baseline values, the diagnosis of BPD was also accepted as covariant, since comorbidity of BPD were twice as common in the

mindfulness-based group. According to the results showing no dropout in either group and similar number of attended sessions in both groups, the feasibility did not differ between the two interventions. Researchers also reported similar acceptance in both group over participants' feedbacks. There was no group×time effect for both ADHD-related and non-ADHD measures, that is, there was no significant difference between groups regarding the improvement in any outcome measure. However, a difference was found in recovery rates by cut-off scores, implying there were more participants whose symptoms decreased in the mindfulness group than in the DBT-ST group. For adjustment of covariates, ANCOVA was not used, but rmANOVA was repeated for both covariates which were medication type and BPD comorbidity. Regardless of the treatments, separated analyses were conducted for medication groups and BPD groups. According to results, in the affective lability subscale of the WRI, borderline individuals in both groups showed more improvement than participants without BPD comorbidity. Small to moderate effect sizes were found for all outcomes in the study. To summarize, the two treatments were found to be similar in terms of feasibility, and of improvement in all outcome measures. However, the mindfulness group contained the higher number of people whose symptoms decreased. Considering that participants with PBD showed better outcomes in WRI measurements by clinicians, the higher number of participants in mindfulness group may have led to the results favoring the mindfulness group. Therefore, it can be said that a mindfulness-based intervention may be more promising in those with a diagnosis of BPD+ADHD, but other than that, it showed similar results to DBT-ST intervention.

Philipsen et al. (2010, 2015) examined a structured group intervention versus individual clinical interview and methylphenidate versus placebo with a multicenter, factorial, and randomised controlled design (COMPASS). To the best of our knowledge, this is the first COMPASS study in the ADHD literature. In the study, 1480 patients were contacted, 518 were found eligible, and following the exclusion criteria, 433 individuals were randomly assigned to DBT-ST+methylphenidate, DBT-ST+placebo, clinical interview+methylphenidate, and clinical interview+placebo groups. Detailed information about the random assignment was presented in the appendix of the COMPASS. The intervention of Hesslinger et al. (2002) was applied in the DBT skills group. The strengthening session at the end of the skills training was repeated monthly for 10 times in the study. The protocols followed to ensure the integrity of the group sessions (configuration of each session, taking video and audio recordings and scoring them with the help of an expert, etc.) are explained in detail. In 15–20-minute clinical interviews with individual setting, the control group received a non-directive supportive counseling in which negative events were evaluated, and necessary medication was arranged. While DBT-based skills were deliberately excluded from the clinical interviews, patients seeking support and advice were encouraged to develop and implement individual solutions. After the pretest (T1), measures were repeated four times at the end of the 12-week first intervention (T2), after 24 weeks (T3), after 52 weeks (T4), and after 2.5 years (T5). Sample size, missing data methods, determination and control of covariances, the flow chart, the hypotheses, analyses and how the effect sizes were calculated were presented in detail in the articles and appendices. The study used Conners Adult ADHD Rating Scale, Observer rated, Long version, (CAARS-O:L); Conners Adult ADHD Rating Scale, Self-rated, Long version (CAARS-S:L); ADHD-Checklist (ADHD-DC) (Adult Attention Deficit Hyperactivity Scale); SCL-90-R, BDI-II, Quality of Life Enjoyment and Satisfaction Questionnaire-Short Form (Q-LES-QSF); Clinical Global Impression Scale (CGI); SF-36; EuroQol-5D (EQ-5D); and the socioeconomic status questionnaire prepared for the study. The results were examined within a two-armed model including methylphenidate vs placebo and DBT-ST vs individual clinical interview. Moreover, a four-arm model examined the differences in therapy groups among medication users and the differences in medication groups among therapy receivers. Regarding ADHD-related symptoms, participants in both DBT-ST and individual clinical interview, showed improvement with no significant group difference in terms of clinician-scored measures in T2. In both groups, those taking methylphenidate had significantly more reduced symptoms than those taking placebo. No significant difference was found between the effects of DBT-ST or individual clinical interviews on ADHD symptoms in those taking methylphenidate. Results in skills training-individual clinical interview and methylphenidate-placebo comparisons remained at T3 and T4. According to the results obtained from the self-report scales, the symptoms of the DBT-ST group increased in T2 and T3 but did not reach significance. In T4, it decreased but still did not reach significance. However, superiority of methylphenidate over placebo was found to be significant in all time points. Regarding the rates of responders, the number of responders in the clinical interview+methylphenidate group in T2 was found higher than the others. However, there was no difference between the groups in terms of those responders at T4. Regarding depression symptoms, no significant difference was found between the groups at any time point. Regarding CGI, that is, the general clinical appearance, DBT-ST had relatively better results than the clinical interview group in each time point, but the difference reached significance at T4. Those taking methylphenidate had relatively better CGI scores than those taking placebo at all three follow-ups, but the difference was only significant at T3. To summarize, in this study, DBT-ST yielded similar results to individual clinical improvement in terms of reduction in symptom severity. Those in the DBT-ST group reported lower levels of symptoms in the last measurements, but this difference was not significant. Considering the recovery rate, a significant difference in favor of clinical interview+methylphenidate was found only at T2. Only in clinician evaluations, participants in DBT-ST had better clinical appearences than those in clinical interviews at

all follow-ups, but the difference became significant only at the last follow-up. However, in the comparison of the medication groups within themselves, methylphenidate gave significantly better results than placebo did at each time point.

Fleming et al. (2015) randomly assigned 35 college students, seeking for treatment and meeting ADHD criteria, to the DBT-ST group or the self-help group, stratifying them by the median split of the inattention score. However, random assignment procedure was not explained in detail. The flowchart was presented, and the baseline values were shared in a table without reporting between-group comparisons. Barkley Adult ADHD Rating Scale-IV (BAARS-IV), Brown ADD Rating Scales, ADHD Quality of Life Questionnaire, BAI, BDI-2, Five Facets Mindfulness Questionnaire, Conners' Continuous Performance Test-2 (CPT-2) and the student's general grade point average were measured at pre-test, post-test and at 3-month follow-up. Showing positive response were determined by symptom reduction greater than Reliable Change Index, and recovery were determined by being below the 93rd percentile in BAARS-IV and by being below the 96th percentile in BADDS. Participants in experimental group received a 9-week re-adaptation of DBT-ST. An additional strengthening session was held in the first week of next semester after the end of the therapy. The participants in the control group were given 34 handouts containing the skills selected from the guide developed by Tuckman for adults with ADHD. Data were analysed using rmANOVA. Rates of positive response and recovery were examined with chi-square analysis. There was one participant in each group showing subthreshold inattention symptoms (four criteria were met). A major change in medication status (more than 25% change in drug dose and change in drug type) was seen in two participants in skillls training and one participant in self-help group. The analyses were repeated including and excluding those who had a medication change and those who showed sub-threshold inattention. However, only the results of the intent-to-treat (N=33) analyses were reported due to no difference in the results from included or excluded data. Regarding inattention symptoms, the DBT-ST group showed lower inattention than self-help group regardless of time (group main effect), and group×time interaction reached significance at only follow-up. At posttest, rate of positive responders and participants recovered in DBT-ST group was nearly twice as high as in self-help group in terms of BAARS-IV inattention symptoms, showing a trend at significance level of .10. At follow-up, only rate of positive response reached significance in favor of DBT-ST. Analysis for executive functions showed significantly higher improvement in DBT-ST group than self-help group at both posttest and follow-up. Rate of positive response and recovery was significantly higher in the DBT-ST at both, posttest and follow-up. A significant difference between two groups was found for life satisfaction at posttest but it turned insignificant at follow-up. Mindfulness level showed a difference in favor of the DBT group both in the posttest and in the follow-up. Omission errors significantly decreased in neuropsychological tests measuring level of attentional impulsivity, in DBT group, but a similar result was not obtained in commission errors and reaction times. There was no significant difference between the groups in terms of depression and anxiety symptoms and GPA. Moderate to large effect sizes were found for the results summed above. The acceptance of treatment in the DBT group was found to be significantly higher than the control group. Covariates were determined by a linear regression analysis with demographic variables as predictors and posttest measurements as dependent variables by controlling baseline values and treatment group. Only age predicted the BADDS, measuring executive functions, it was therefore defined as a covariant in rmANOVA. Still, the results did not change and neither age×time nor age×group×time effect was found significant. Thus, no covariant effect of age for the relevant scale was reported.

Prada et al. (2014) used a naturalistic study design to investigate the efficacy of intensified DBT program in patients with both BPD and ADHD diagnoses. In conformity with naturalistic design, participants were assigned to three groups by clinical decision, not randomly. A-month intensified DBT, included daily individual and group sessions, was applied to three groups as BPD only, BPD+ADHD and BPD+ADHD+methylphenidate which were already included in an ongoing standard DBT protocol (all four modes together). Of 166 candidates, 159 met the inclusion criteria. Research flow chart was shared. The base values of the three groups were given in tables. ASRS, Barratt Impulsivity Scale (BIS-10), State-Trait Anger Expression Inventory (STAXI), BDI-II and Beck Hopelessness Scale (BHS) were administered before and after the intensified program. Data were analysed with linear mixed model. Participants were included in the model as hierarchical random effects; predictors of treatment were included as fixed effects; and random interaction effect (slope) of participants was added to the model. Baseline values seemed to be predictors of the treatment in the model. Treatment response rates were compared with ANOVA by determining the percent change score for each variable. Medications for comorbid deficits other than ADHD were determined as covariant. In the overall sample, there was a significant decrease, namely, improvement in symptoms in all variables, during 4 weeks of intensified DBT, except motor impulsivity measured via BIS-10. There was a significant increase in anger control of STAXI, impyling clinical improvement. The BPD+ADHD+methylphenidate group showed greater improvement in motor impulsivity and impulsiveness total score than BPD only group. Similar results were seen in the state-trait anger levels, depression symptoms and ADHD severity. Effect sizes ranged from moderate to large.

Cole et al. (2016) applied DBT+CBT protocol to 49 patients resistant to medication treatment. Patients with residual symptoms despite continued appropriate doses of medication or who discontinued medication due to side effects were defined as treatment-resistant for the study. Neither random

assignment nor a control technique such as balancing was used for waiting-list control group (n=13). The baseline values and comparisons of groups were presented in a table. Baseline differences were controlled in analyses. The skills training group received a combined intervention of two CBT modules (hyperactivity/impulsivity and inattention) in addition to traditional DBT modules for a year, but control group continued only monthly individual clinical interviews. The goal of therapeutic strategies in DBT-based intervention, whether in individual or group sessions, has been to balance acceptance and change. Individual settings in DBT-based intervention have aimed to generalize acquired skills. In the monthly routine clinical interviews with the control group, a psychoeducation about ADHD was given when it seemed necessary. The experimental group participated in the measurements before the treatment, 3 months and 6 months after the treatment and at the end of the treatment, while the control group participated in the measurements before and after the treatment. The measurement tools were: ASRS, BDI-II, BP, mindfulness skills (KIMS[4]) and STAXI. Analyses were made with a linear mixed model. Treatment group and time were included in the model as fixed effects, and observations as random effects. The model was also refitted for the fixed effect of gender, age, and baseline values of the measuring instruments. The 14% dropout rate in the treatment group was examined in terms of baseline characteristics and no correlation was found between them. That is, certain baseline characteristics did not predict dropping out. According to the results, the treatment model predicted the change in all variables except the observing subscale of mindfulness and the anger expression subscale of STAXI. According to the effect sizes, time-related changes were found in the following order: depression, ADHD symptoms, acting with awareness, hopelessness, ASRS inattention symptoms, and ASRS hyperactivity/impulsivity symptoms. Significant improvement was observed in the experimental group, and increased symptoms were observed in the control group. The control group showed improvement only in the level of acting with awareness. Effect sizes ranged from large to moderate in all results. The researchers stated there was no difference between the groups in the follow-up measurements. However, it is not clear whether this statement, which also left out statistical reporting, refered to the group×time effect or just an intergroup comparison at the last follow-up. In addition, absence of a table for the results of linear mixed model analysis made the results difficult to understand. The important contribution of this study is that it could present the baseline variables that predict treatment. High level of depression, ADHD symptoms, hopelessness, STAXI total score and two subscales, high level of education and low level of nonjudgmental acceptance in the first step predicted good response to the treatment. In the study, first model and fitted models were not compared, and no information was given about model fitting itself. Also, the statistical package program for lmm was not stated. Therefore, it was difficult to interpret model estimates and results for the review.

Moritz et al. (2020) randomly assigned 31 adult ADHD patients using methylphenidate group drugs to DBT-ST or treatment as usual (TAU) groups. Participants' ADHD symptoms were measured with ASRS alone before treatment, at mid-treatment, and 16 weeks after treatment ended. The protocol published by Philipsen et al. (2015), which was actually developed by Hesslinger et al. (2002), was followed in the DBT-ST group. Participants in the control group received monthly clinical interviews with a psychologist and the content of these interviews was limited to psychoeducation only. Details of random assignment, flow chart, baseline values of demographic variables were not shared. Changes in the groups over time were analysed by comparing generalised estimating equations, and the results of only the intent-to-treat data were shared. No covariates were investigated. Since there was only output data, only feasibility results and group differences in ASRS total scores and its subscales were presented. According to the results, the feasibility was high. However, there was no group×time effect on ADHD symptoms. Insufficient information was provided about the method of the study and ADHD symptoms were measured with a single measurement tool. This may be due to the fact that the findings were only published as brief reports. However, in the discussion part of the study, the researchers stated that they found it unnecessary to continue the study because they did not find a group effect on the change in ADHD symptoms. Although this decision may seem surprising considering their use of a single measurement tool, the logistical constraints they describe make it unnecessary to continue the study, which may be a serious reason for termination.

## DBT Protocols Applied

The overall goal of the German protocol used by Hesslinger et al. (2002) was expressed as "control your ADHD, rather than to be controlled by ADHD" and it has spread as the name DBT-ST (Hesslinger et al. 2002, Hirvikoski et al. 2011, Edel et al. 2014, Philipsen et al. 2015, Morgensterns et al. 2016). Table 2. displayed the session contents of the protocol. The same protocol was used in three subsequent controlled studies, in which only the number of strengthening sessions was increased. For example, in the study of Philipsen et al. (2015), the structure of the strengthening sessions was added to the DBT skills group as follows: Although the agenda was decided together with the participants in the first nine strengthening sessions, the repetition of modules including awareness, chaos and control, functional analysis, emotion regulation and stress management skills was required. In the last session, the achieved individual goals and auxiliary strategies were discussed, strategies were planned to achieve the remaining goals, and a discussion was held concerning how to communicate with other group members.

Fleming et al. (2015) adapted and applied a different DBT-ST group protocol which mentioned above. It seemed reasonable for researchers to develop a different protocol, as they worked with people in the student population who complained about

| **Table 2. Session plan and contents of DBT-ST by Hesslinger et al. (2002)** | |
|---|---|
| **Sessions:** | **Contents** |
| 1-Clarification: | After written information is shared about ADHD diagnosis and symptoms, the therapy goals and parts are introduced to the patients. The overall goal of the therapy is defined as "the ability to control ADHD rather than be controlled by ADHD". |
| 2- Neurobiology/ Mindfulness 1: | Attention deficit skills are targeted. Scientific information and neurobiological foundations of attention and concentration are shared. Linehan's definition of awareness (what and how skills, etc.) is introduced and explained. |
| 3-Mindfulness 2: | Attention deficit is targeted. Experiences of which participants are unaware are shared and scrutinised. Mindfulness skills are given as daily homework to be shared in each session. |
| 4-Chaos and Control: | Disorganised behaviors are targeted. Being controlled by ADHD is chaos. Hallowell and Ratey's concrete recommendations for controlling ADHD are shared; how daily life can be organised is discussed. |
| 5- Dysfunctional Behavior / Behavior Analysis I: | Behavior analysis is introduced and practiced. |
| 6- Behavior Analysis II: | More participants' behavior analyses are confronted and the ability to do so at an individual level is reinforced. |
| 7-Emotion Regulation: | Emotion regulation skills are targeted. Modern theories of emotion are explained. Emotion analysis (emotion logs and emotion diaries) and Linehan's emotion regulation strategies are introduced and practiced. |
| 8- Depression during ADHD and Depression Medication: | Depression symptoms and drug treatment in the presence of ADHD are introduced, allowing patients to open up about their moods and review their symptoms. |
| 9- Impulse Control: | Impulse control is targeted. Behavior analysis examines problematic behaviors caused by capitulation to impulses. Linehan's goal-directed acting skills, and long and short-term pros and cons of impulsive behavior are discussed. |
| 10- Stress Management: | Disorganised behavior is targeted. Problems planning and regulating sequential behavior often result in situations where ADHD patients do several different things at once, feel pressured and fail to finish any of their projects; to address this, the stress-performance relationship is explained and distress tolerance skills of DBT are taught. |
| 11-Substance Abuse: | Since it is a very common comorbidity, substance abuse and its symptoms are explained, and information is given about the effects and side effects of ADHD drugs. |
| 12- ADHD/Self-Esteem in Relationships: | Because of ADHD's symptoms, the relationship between home life and work life for patients often results in criticism and rejection. As a result patients' self-esteem often drops drastically. Participants are encouraged to share both their negative memories of their past experiences of ADHD and the possible advantages of ADHD. |
| 13- Looking Backward and Forward: | Past sessions are reviewed. Creating individual plans for the future is discussed. A kind of self-help plan is prepared. |
| Session with family members: | Written descriptions of ADHD-related symptoms and goals in group therapy are shared with family members. A one-time meeting is arranged with each participant's family, and all attending are allowed to discuss their problems together. |
| Additional interventions or other DBT modes | Additional individual interview or telephone support is provided to the participants if they need it. |

ADHD symptoms and (mostly) met the diagnosis but were able to remain functional enough to continue their education. In the study, some data allowing the evaluation of DBT sessions and their content were shared. The duration of sessions, 90 minutes, was found appropriate by the participants, 9 sessions in total were found to be too short. The participants scored the DBT skills discussed in the sessions according to the benefits they saw, and the following sequence emerged: Awareness, non-judgment, restructuring the environment, planning, emotion regulation, managing the rhythm of daily life, pros and cons, and psychoeducation about ADHD. The content of the adaptation developed by Fleming et al. (2015) has been presented in Table 3.

Morgernstern et al. conducted a multicenter open feasibility study with the patient population in 2016. Inclusion and exclusion criteria were clearly stated, and it was stated that those who made a medication change in accordance with an open design study were not excluded from the study. Since the study did not have a control group, detailed information was not included in this review, but it seemed informative in terms of developing a DBT. In addition to Hesslinger's protocol, a strengthening session, approximately 10-30 minutes of homework coaching (on the phone or in the clinic) was given to 98 people who participated in the study, and the clients were allowed to continue interacting among themselves in an unstructured way for 45-60 minutes after each session.

**Table 3. DBT group skills training adaptation of Fleming et al. (2015).**

| **Sessions:** | **Session Plan:** |
|---|---|
| Pre-Intervention: | 15–20-minute individual interviews to provide motivation |
| 1st session: | Group orientation, goal setting, psychoeducation, mindfulness |
| 2nd session: | Use of daily planning, partitioning tasks and prioritizing |
| 3rd session: | Environmental regulation, use of social support |
| 4th session: | Regulating sleep, eating and exercise |
| 5th session: | Generalization and troubleshooting skills |
| 6th session: | Regulating emotions (For example: Reverse action) |
| 7th session: | Generalization and troubleshooting skills |
| 8th session: | Reviewing skills, planning for the demanding periods |
| 9th session: | A plan to review the skills and to use the sustainability skills<br>(this is a boosting session held in the first week of the next academic year) |
| Additional interventions or other DBT modes | Weekly homework and coaching on the phone for 15-20 minutes |

Moreover, various protocols for ADHD were examined by combination DBT-ST with cognitive behavioral therapy (Cole et al. 2016) or a third wave therapy (Nasri et al. 2017). The variety of DBT-based protocols used so far has been displayed in Table 4.

Although the contents of DBT protocols for adults with ADHD have differed, the feasibility level was generally found to be high in the efficacy studies. However, when an intervention which was either individual or group, structured or unstructured was apllied to the control group, there was no significant difference in favor of DBT-ST in the clinical applicability. These results may be by reason of the fact that the adults with ADHD had intense need for an intervention in which they would share their problems and feel understood (Brod et al. 2012). Therefore, they may find any group (or individual) therapy, even if unstructured, beneficial. On the other hand, Hesslinger et al. (2002) prepared an evaluation questionnaire for DBT-ST and reported high results in favor of the intervention. Participants reported that DBT-ST shed light on their problems and provided benefits. Similar results were obtained in the evaluation questionnaire of Hirvikoski et al. (2011), and participants in DBT-ST reported higher scores in coping with ADHD symptoms than control group. However, when compared with the awareness skill group, it was stated that the participants in both groups gave positive feedback (Edel et al. 2014). To sum, in the light of current studies, it seemed appropriate to conclude that DDT-ST was a viable and sustainable treatment for the participants. As comparisons with other therapy methods, it will be possible to see its usefulness in meeting the needs of the clients or whether it is the most ideal method. Clearly there is also a need for more reporting of participant feedback.

## Effectiveness of the Treatment

All but one of the studies summarised above were conducted with the patient population under methylphenidate medication. In most studies, participants was requested that medication use for ADHD be stabilised, and also, if there were another medication for any comorbid disorder, it should have been stabilised too. Therefore, the findings showed the effectiveness of medication+DBT. Efficacy-related results in studies with patient population were inconsistent. Three studies supported superiority of DBT-ST over a waiting list (Hesslinger et al. 2002), a weakly structured discussion group (Hirvikoski et al. 2011) and TAU (Cole et al. 2016). However, two studies did not support its superiority over individual clinical interview (Philipsen et al. 2015, Moritz et al. 2020). Also, a study showed similar results between DBT-ST and minfulness-based intervention (Edel et al. 2014), indicating that both interventions were effective. In another study, a-month intensified DBT program with individual and group settings were applied to all participants with BPD and BPD+ADHD who have already engaged in a-year standard DDT protocol (Prada et al. 2014). Pariticipants with BPD+ADHD were put into DBT+methylphenidate group or DBT only group. Results were found in favor of DBT+methylphenidate treatment. In the study of Felming et al. (2015), which was the only research with college students who were seeking help for ADHD symptoms medication status were not restricted and results supported efficacy and superiority of DBT-ST over self-help. In brief, five studies supported superiority of DBT-ST over active control groups, but three studies did not. However, one of three was carried out for equality of treatments not superiority, and supported efficacy of both, DBT-ST and mindfulness-based intervention (Edel et al. 2014). The other two investigated the superiority of DBT-BE over individual clinical interview but showed similar

**Table 4. Commonalities and differences in the dbt applications of the studies.**

| Studies | Additional Interventions | Other DBT Modes | Duration |
|---|---|---|---|
| Hirvikoski et al. (2011) | In addition to the sessions by Hesslinger et al., an assignment session was held for mindfulness. | | 14 sessions, weekly |
| Philipsen et al. (2015) | The 13th session of Hesslinger et al. was repeated monthly for 10 months | Individual sessions 3 times | Weekly for 3 months + 9-month session |
| Prada et al. (2014) | A-year standard DBT therapy | Intensive group and individual sessions | Daily sessions for 1 month |
| Morgensterns et al. (2015) | Unstructured, optional group discussion without therapist for 45-60 min after each session | 10-30-min homework coaching provided weekly (on the phone or in the clinic) | 14 sessions, weekly |
| Cole et al. (2016) | CBT hyperactivity and 2 attention modules of CBT | Weekly individual and group modes. Individual interviews include skill generalization. | Weekly sessions for one year |
| Fleming et al. (2015) | 90-minute sessions | Seven sessions of weekly phone coaching for 10-15 minutes | 9 sessions, weekly |

effectiveness results between interventions (Philipsen et al. 2015, Moritz et al. 2020).

## Discussion

The recent review scrutinised the controlled trials examining efficacy and affectivity of DBT-ST in adult ADHD. Randomised or not, only nine controlled studies were reached in the literature. Eight of nine were conducted with patient population, and one of those included BPD+ADHD patients into the sample (Prada et al., 2014). In most of the studies with patients, effectiveness of DBT-ST and methylphenidate together were investigated. Only two studies also examined the effect of DBT without medication and failed to show significant results behalf of DBT-only. Two studies yielded similar results for DBT-ST and individual clinical interview. Philipsen et al. (2015) reported for all participants, whether they took DBT-ST or an individual clinical interview methylphenidate treatment gave significantly better results than placebo; and in fact, the effectiveness of the methylphenidate in the treatment of ADHD has been already known (Faraone et al. 2014).

In the only study among student population (Fleming et al. 2015), medication use were not inspected and DBT-ST showed better results than self-help. It could be phenomenologically reasonable to generalize the results obtained with college students to people with high functionality who did not take the drug due to the side effects or their own preferences. However, more efficacy studies are needed for normal population suffering from ADHD symptoms without fully meeting the diagnostic criteria.

Inconsistent results of studies were likely to be caused by confounding factors such as number of comorbidity or stressful life events as weel as by the experimental designs. It is thought-provoking that the research with the largest sample did not yield results in favor of DBT-ST. The findings of Philipsen et al. (2015) (n=448) indicated that participants who received DBT-ST showed an improvement trend only in terms of overall ADHD symptoms in the first follow-up but this effect did not reach significance. DBT-ST showed a significant improvement in the participants' affective lability and impulsivity only at the end of the 12-week intervention (T2). Otherwise, as was said above, only regarding long-term effect there was a significant improvement. The significant difference obtained in terms of emotional dysregulation and impulsivity has overlapped with the DBT model. DBT was developed specifically for a population (BPD) with serious difficulties in emotion regulation and impulse control, that complicated life (Valentine et al. 2015). In addition, the long-term trend in favor of DBT-ST, albeit not statistically significant, has indicated the need for studies examining the long-term effect. Moritz et al. (2021) suggested that the insignificant results of their study in which ADHD symptoms were measured by a single self-report scale supported the findings of Philipsen et al. (2015). Although this interpretation may seem acceptable for their samples in such clinical conditions, it could be required to be cautious about the generalizability of results. In this context, it could be partially appropriate for researchers to direct future studies, saying that DB-ST can improve non-ADHD psychosocial skills as well as ADHD symptoms. Evaluating the findings of all studies in the literature together suggested that there was a need

for more studies on both ADHD symptoms and non-ADHD psychosocial skills. On the other hand, it has been important that the studies should not be only randomised controlled trials, naturalistic or open designs were also required. Because, the generalizability of a study on pure ADHD would be questionable. Because the clinical presentation of ADHD in adults has varied considerably in terms of comorbidities, subtypes, severity of symptoms and level of functionality, an effective intervention needs to address to this complicated clinical picture. In addition, not only designs based on repeated measures, but also mixed designs that enable qualitative evaluations had the potential to provide more information about efficacy of the treatment (Creswell, 2021). For example, even if there was no qualitative feedback, post-intervention evaluation questionnaires or verbal feedback can shed light on the benefits that the participants saw (Hesslinger et al., 2002; Hirvikovski et al., 2011). Because participants can reflect on the general and specific benefits they see by answering open-ended questions. Whereas, it has been expected that positive verbal statements cannot be determined statistically, particularly in studies conducted with small samples.

Another important factor for inconsistent results could be the differences in the treatment protocols such as duration, session structure and contents. Different protocols can be expected to produce different results and it could be found negative for the effectiveness studies. Indeed, for clinicians, such differences could provide a diversity. Clinicians working with clients with different clinical appearances can need an adapted DBT-based intervention meeting clients' need. In this case, such differences in the protocols in the literature can enrich treatment.

The different designs of control groups in studies could also affect the consistency of the findings. DBT-ST did not differ when compared to another therapeutic group intervention as in Edel et al. (2014) or individual session as in Philipsen et al. (2015). In the former one, a mindfulness-based group therapy was applied to the control group. However, DBT has been also an approach that based on mindfulness (Jennings and Apsche, 2014; Baer, 2015). Poissant et al. (2020) included DBT also in their meta-analysis of mindfulness-based interventions in ADHD. Moreover, Edel et al. (2014) reported that the mindfulness module of DBT was added in the treatment in mindfulness group. Thus, it has to be said that not two different but two similar interventions were compared in the study, which may explain the insignificant difference between them. On the other hand, the control group in the latter study, by Philipsen et al. (2015) was applied individual interviews as control. Ultimately, although a person has the opportunity to discuss only his/her own problems in an individual interview, a skills training is given in a way that connects everyone in a group therapy. In the meta-analyses of Lopez-Pinar et al. (2018), group interventions were found to have smaller effect size than individual interventions in both between-group and within-group results. The authors of the study also suggested that the individual interviews could be interpreted as being more responsive to the client's needs. Therefore, it seemed understandable for an adult with ADHD to report positive results after individual interviews.

Although the intense need for psychotherapeutic interventions in adult ADHD has been emphasised (Weiss et al. 2008), the studies do not seem to be sufficient. For example, Lopez-Pinar et al. (2018) included only 9 RCTs and 3 studies without a control group into their meta-analysis. Half of these studies had a CBT-oriented intervention, and only a few had a DBT-based intervention. Regarding larger effect sizes in favor of CBT in the meta-analysis, the researchers warned that using CBT in half of the studies could bias the results. There have still been very few studies on the effectiveness of DBT in adult ADHD.

*Limitations*. The most important limitation of this study is lack of a systematic review method. In addition, only controlled studies published in English were reviewed, which may cause bias in the study. However, it can be said that this study can provide clinicians with sufficient information about how DBT-ST protocols were applied and adapted in ADHD and what kind of results are obtained from the applications. It also brought together all protocols useful in the clinic, allowing an overall assessment.

## Conclusion

DBT-ST has been a candidate for useful, feasible and effective clinical intervention for adult ADHD, but more research is needed on the subject. It seems necessary to conduct research with different designs, especially with mixed designs, in order to provide broader and generalizable information. It may be beneficial to increase the number of studies with naturalistic designs in order to cover the clinical presentation of ADHD patients, and to increase the number of randomised controlled studies for the effectiveness of pure ADHD symptoms or certain sub-symptom groups. Comparison of DBT-ST with other promising interventions (Langer et al., 2013) has seemed also important to determine the most applicable and effective method. The number of meta-analyses involving various therapeutic interventions as weel as the number of research articles covered by the meta-analyses has been low. Also the number of research using the DBT orientation among the articles reviewed has been very few. Therefore, further studies to make the above-mentioned comparisons seem necessary to obtain sufficient data.

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