

Case Study 1: An Evidence-Based Practice Review Report

Theme: School (setting) based interventions for children with special educational needs (SEN)

How effective are CBT-based interventions in reducing the frequency and severity of core ADHD symptoms in adolescents with diagnosed ADHD?

1. Summary

Attention-Deficit Hyperactivity Disorder (ADHD) is a persistent neurodevelopmental disorder characterised by symptoms of inattention, impulsivity, and hyperactivity (5th ed-*DSM-V*), and can lead to poorer academic, health and social outcomes (Dalsgaard et al., 2015, 2020). There is a significant research base for Cognitive Behavioural Therapy (CBT) interventions in children and adults (e.g., Young et al., 2020), but not during adolescence, when outcomes are more indicative of adult outcomes than in childhood (e.g. Agnew-Blais et al., 2016; Caye et al., 2016).

This systematic literature review aims to examine studies that have CBT-based interventions for secondary school-aged pupils with diagnosed ADHD. A literature search was conducted, and studies were appraised by an adapted version of Kratochwill's (2003) coding protocol and Gough's (2007) weight of evidence framework. Five studies that met the inclusion criteria focus on outcomes evaluating the frequency and severity of diagnostic ADHD symptoms, following a CBT-based intervention adapted for adolescents with ADHD. The core focus of this type of psychosocial intervention is to change maladaptive thinking (cognitions) and behaviour (behavioural) but teach skills pertinent to ADHD, e.g., planning skills, reducing distractibility etc. According to the review, CBT was effective at reducing the frequency and severity of diagnostic ADHD symptoms with effect sizes ranging from

small to large compared to wait-list controls; however, in comparison to active control groups, these effects wane to a small effect on the frequency of core symptoms and no effect on the severity. Limitations of the review are discussed in light of further research as well as providing other theoretical and practical suggestions.

2. Introduction

2.1 Attention-Deficit Hyperactivity Disorder (ADHD)

ADHD is a neurodevelopmental disorder; the identifiable features are persistent inattention, hyperactivity and impulsivity, which is not compatible with their developmental level and interferes with all domains, e.g. school, work, social activities, as defined by the Diagnostic and Statistical Manual of Mental Disorders (5th ed.; *DSM-5*; 2013; Bolea-Alamanac et al., 2014). These features map onto different presentations: ADHD-I (predominantly inattentive), ADHD-H (predominantly hyperactive-impulsive) and ADHD-C (combination). This disorder is typically child-onset; between 50%-80% of children with ADHD will experience it in adolescence and adulthood (Biederman et al., 2010).

Adolescence is characterised by “more independence, less adult supervision, less structure” (p1, Sprich et al., 2015). During school hours, adolescents are expected to concentrate for extended periods, complete multi-step tasks, keep deadlines, and take greater responsibility for belongings. Exclusion, poor school attendance and unmet academic potential are some of the potential outcomes of persistent inattention (e.g., Dalsgaard et al., 2015; Fleming et al., 2017). Impulsivity can lead to riskier decision-making and substance abuse (e.g., Thompson et al., 2007) and hyperactivity expressed cognitively, (e.g., talking excessively, interrupting and taking over activities) and physically, (e.g. restlessness and disruptive behaviour), can impact relationships (Barkley et al., 2006).

Although medication can reduce ADHD symptoms, many adolescents are medication-resistant (Park & Kim, 2015). This positions psychosocial approaches such as Cognitive Behavioural Therapy (CBT) as a potentially useful alternative or addition to medication. NICE guidelines recommend CBT for medication-treated adolescents with persistent symptoms (NICE, 2018).

2.2 Cognitive Behavioural Therapy (CBT)

CBT is an intervention predicated on an interwoven relationship between thoughts, feelings, physical symptoms and behaviours (Greenberger & Padesky, 1995); it is a well-researched and efficacious treatment for many mental disorders (e.g., Butler et al., 2006).

Traditional approaches to CBT include 'cognitive restructuring', the idea that the individual works to reframe negative cognitions and behaviours, challenge their meaning and develop more positive thoughts. Beck and colleagues (1974) conceptualised negative cognitions as negative automatic beliefs, core beliefs about the world, their future or self (e.g., 'I can't do this') and dysfunctional assumptions (e.g. 'it's better not to go at all than to be late'). CBT uses behavioural techniques such as behavioural experiments - trialling a new behaviour in other contexts and evaluating the data (Fenn & Byrne, 2013). Moreover, progressive relaxation training and breathing exercises are commonly used, especially in anxiety-based conditions (Fenn & Byrne, 2013).

Other techniques have evolved from CBT, such as Acceptance and Commitment Therapy (ACT) which concerns the acceptance of emotions and feelings (Dindo et al., 2017); and Dialectical Behavioural Therapy (DBT), which links change-oriented skills

from CBT with foundational mindfulness skills, focusing on tolerating distress and accepting emotions (Knouse et al., 2008). The shared principles are that cognition impacts behaviour and use of problem-solving skills.

2.3 Psychological underpinnings

The cognitive-behavioural model of Impairment in Adult ADHD posits that the severity of ADHD symptoms can be decreased by learning coping skills (Safren et al., 2004 – see Figure 1 below). In CBT, individuals learn about their symptoms and become aware of their thoughts and feelings about ADHD. Those with ADHD can have automatic optimistic thoughts about symptoms (e.g., ‘I do better waiting to the last minute’) or negative automatic thoughts, leading to limited awareness of the impact on themselves and others, which leads to behavioural and cognitive avoidance (e.g. Biederman et al., 2007; Knouse & Mitchell, 2015). It is theorised that those with ADHD may consciously avoid tasks based on previous repeated failure as a coping mechanism (Safren et al., 2004).

As CBT is adapted to presenting problems, strategies and psychosocial coping skills are learnt to manage symptoms (e.g., self-instructions to reduce distractibility; cognitive restructuring associated with avoidance). People can adopt these techniques into their daily lives through repeated practice and behavioral experiments, potentially reducing the severity or presentation of core symptoms. Indeed, Antshel et al. (2012) found that 68 adolescents with ADHD reported improvements on ADHD symptoms following a CBT-adapted intervention for adolescents.

Figure 1. A Cognitive-Behavioral Model of Impairment in Adult Attention-Deficit/Hyperactivity Disorder^a

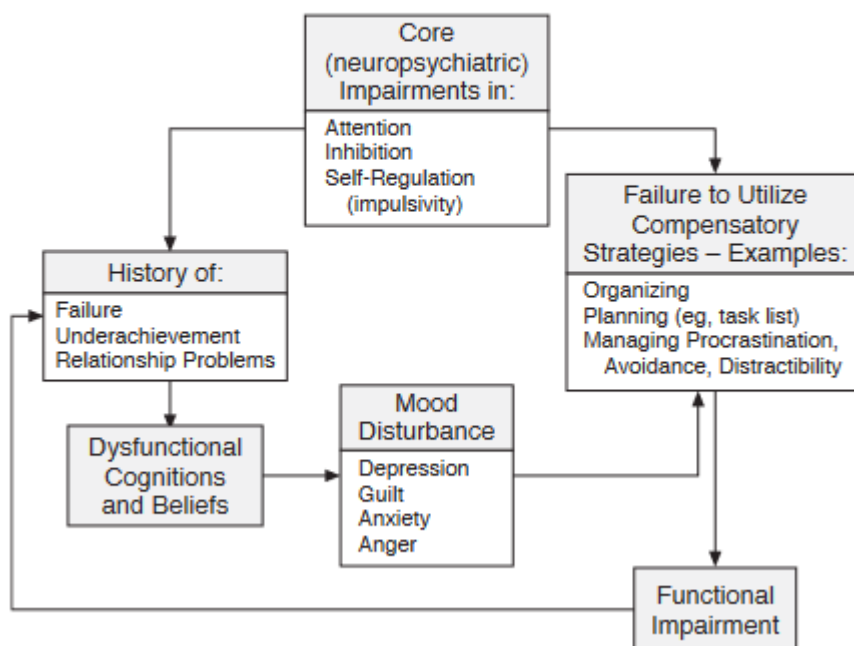


Figure 1. A Cognitive-Behavioural Model of Impairment in Adult Attention-Deficit Hyperactivity Disorder (Safren et al., 2004)

2.4 Rationale and Relevance for Educational Psychology (EP) Practice

ADHD as a condition is very costly to health care; when comorbid with other conditions e.g., anxiety, depression, ODD/CD, costs are quadrupled (e.g. Erskine et al., 2016; Fleming et al., 2017). Although, interventions may be costly to deliver, there appears to be a high cost-benefit ratio.

Educational Psychologists are requested to use their specialism with children and young people with a variety of complex needs (Kelly & Gray, 2000) and it is expected that recommendations are evidence-based interventions (HCPC, 2016) which is encouraged in schools (Kelly & Gray, 2000). Specialism is particularly pertinent in the case of ADHD, as school staff have lower knowledge about ADHD and how to treat and manage it (Toye et al., 2019).

Furthermore, more EPs are becoming trained in CBT (Squires & Dunsmuir, 2011) and provided it is an efficacious treatment for this group, they are well-placed to deliver individual or group- interventions in schools and transfer strategies to pastoral and other school staff, parents, and make a direct impact on children and young people.

The systematic review recently conducted by Riise et al. (2021) on CBT in adolescents and adults with externalising disorders examined 51 papers up to 2020, concluding that there were high within-group effects on ADHD symptoms. They looked at externalising disorders (ODD/CD/ADHD) and as such, not all participants had ADHD, whilst, this review will focus on populations with ADHD. Although ADHD is associated with these disorders, there is evidence to suggest that ADHD-only or ADHD with other comorbidities have differential presentations (e.g. Ging-Jehli et al., 2022) and potentially, treatment responses (Antshel, 2012). Additionally, in the Riise et al. (2021) review, there were only two papers that focused on adolescents. As adolescence is a distinct developmental stage, this review will investigate further the impact of CBT interventions only on adolescents. Lastly, in the Riise et al. (2021) review, they did not consider the Web of Science database in their search terms, so this review will build upon this review by including this database. Additionally, this review will focus on ACT and DBT, as they are based on CBT techniques (Hofmann et al., 2010) and they are theoretically considered as third waves of CBT (Hayes, 2016).

2.5 Review Question

It is not expected that symptoms will completely dissipate, however, the severity can be reduced, which may have a significant difference in managing symptoms, hence this review question aims to look at the effectiveness of CBT-based interventions on reducing the frequency and severity of diagnostic ADHD symptoms, as defined by

Diagnostic and Statistical Manual of Mental Disorders (*DSM-5-TR*) (hyperactivity, inattention, impulsivity) among secondary-school aged pupils with diagnosed ADHD.

‘How effective are CBT-based interventions in reducing the frequency and severity of core ADHD symptoms in adolescents with diagnosed ADHD?’

3. Critical Review of the Evidence Base

3.1. Literature Search

To answer the review question, a systematic search of the literature was conducted on February 9th 2022. Searches were conducted on Web of Science, PsychINFO, Education Resources Information Center (ERIC) using the keywords outlined in Table 1. A Google Scholar search using the same keywords generated 3 new articles for inclusion. After duplicates were removed, 404 studies were screened, first via a title screen, followed by an abstract screen. The full text of 35 studies was screened against the inclusion and exclusion criteria used for this review, outlined in Table 2; 30 of which did not meet the criteria, as detailed in Appendix A. Five studies met criteria for inclusion in this review (Table 3), with further information on each study and associated intervention in Mapping The Field (Appendix B – Table 7). A PRISMA diagram illustrates the systematic search process, shown in Figure 1.

Table 1

Search terms for Web of Science, ERIC & PsychInfo searches

Effectiveness	CBT	Intervention	Adolescents	ADHD
Efficacy OR effectiveness OR evaluation or effective*	A "Cognitive Behavioral OR "Cognitive Behavioral Therapy" OR "CBT" OR "DBT" OR "ACT" OR "Acceptance and Commitment Therapy" OR "Dialectical Behavioral Therapy"	A Intervention* OR therap* OR treatment*	A Secondary OR Teen* OR "Key Stage" OR "Pupil*" OR Student* OR "Young People" OR "Adolescent*" OR Youth	A "ADHD" OR "AD(H)D" OR "ADD" OR "Attention Deficit Hyperactivity Disorder"

Note 1. The asterisk indicates a wildcard, and the ? denotes spelling changes e.g. behaviour and behavior. DBT - Dialectical Behavioural Therapy. ACT - Acceptance and Commitment Therapy. CBT – Cognitive Behavioural Therapy.

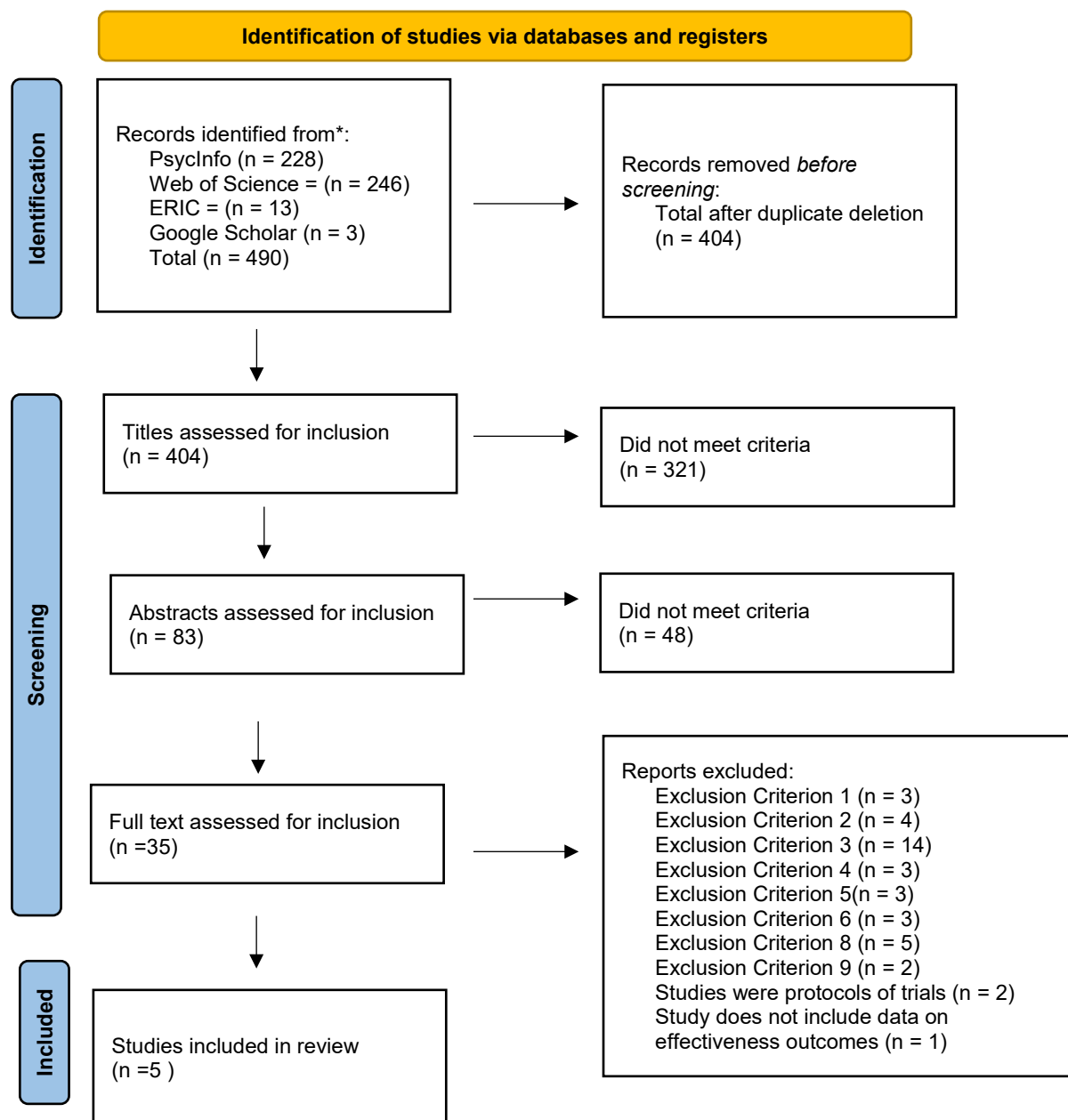


Figure 1. PRISMA flow diagram of study identification and selection from Moher et al. (2009).¹

¹ Some studies met more than one exclusion criterion and thus, were double counted. 35 were excluded overall at this stage of the process

Table 2

Inclusion and Exclusion Criteria for current review

Study Feature	Inclusion Criteria	Exclusion Criteria	Rationale
1)Types of Publications	Peer-reviewed journal articles.	Non-peer reviewed journal articles.	Peer-reviewed journal articles are of higher quality and credibility as they have gone through a process (Kelly et al., 2014)
2) Diagnosis	All study participants who met the criteria for ADHD in DSM-5 or ICD-10.	<p>a) Adolescents who did not meet the criteria for ADHD.</p> <p>b) Adolescents who have comorbidities with severe disorders and are not treated e.g., bipolar disorder, substance use disorder.</p>	<p>a) This study is looking at the target population of those with ADHD.</p> <p>b) Those with more severe disorders are not an equivalent comparison group compared with those who have ADHD and other comorbidities (e.g., Biederman et al., 1991). Untreated participants may confound the results of the intervention.</p>

3) Participants	Adolescents aged 11-17	Study includes children under the age of 11 and adolescents over the age of 17.	This review aims to focus on children who have begun secondary school, which begins at age 11. The symptom criteria in the DSM-5 for ADHD changes from age 17 (six) to 18 (five) suggesting a potential difference between the two ages; moreover, the differential number of symptoms may indicate that those 18 and older belong to a heterogeneous group (e.g. less impaired – Kooij, 2005; Vitola et al., 2016), which may affect intervention selection and response.
4) Language	Studies published in the English language.	Studies published in a language other than English.	The authors of this review do not have resources for translation.
5) Country of study	Study conducted in an Organisation for Economic Co-operation and Development (OECD) country.	Studies conducted in non-OECD countries.	Non-OECD countries may have differing educational systems and policies, as OECD countries have similar contexts, it may be more comparable to a UK context.

6) Intervention	a) Interventions must have at least two CBT principles - which can also include third wave of CBT such as ACT and DBT.	a) Interventions with one element of CBT b) Studies with an adjunct of exercise	a) This study is looking at CBT-based interventions. b) Physical activity is shown to have good evidence for reducing ADHD symptoms and may distort the 'true' effectiveness of a CBT-based intervention (Hoza et al., 2016).
7) Target of intervention	Intervention must mainly be for adolescents.	Interventions that are targeted towards parents.	This review is looking at the effectiveness of CBT for adolescents directly.
8) Study design	Studies that include randomisation of participants to treatment and control settings i.e., randomised controlled trials.	Studies that do not have a randomised controlled design.	According to the Petticrew and Roberts (2003) typology, this is the most rigorous and high-quality design for testing effectiveness research.
9) Outcome measures	Studies that include at least one measure of ADHD symptoms	Studies which do not include a measure of ADHD symptoms.	This review question is focusing on the reduction and severity of ADHD symptoms.

and/or the severity of
symptoms

Table 3

The final five studies included in the systematic literature review

Boyer, B. E., Geurts, H. M., Prins, P. J. M., & Van der Oord, S. (2015). Two novel CBTs for adolescents with ADHD: the value of planning skills. *European & Child Adolescent Psychiatry*, 24(9), 1075–1090.

<https://doi.org/10.1007/s00787-014-0661-5>

Meyer, J., Ramklint, M., Hallerbäck, M. U., Lööf, M., & Isaksson, J. (2021).

Evaluation of a structured skills training group for adolescents with attention-deficit/hyperactivity disorder: A randomised controlled trial. *European Child & Adolescent Psychiatry*. <https://doi.org/10.1007/s00787-021-01753-2>

Schramm, S. A., Hennig, T., & Linderkamp, F. (2016). Training Problem Solving and Organizational Skills in Adolescents With Attention-Deficit/Hyperactivity Disorder: A Randomized Controlled Trial. *Journal of Cognitive Education and Psychology*, 15(3), 391–411. <https://doi.org/10.1891/1945-8959.15.3.391>

Sprich, S. E., Safren, S. A., Finkelstein, D., Remmert, J. E., & Hammerness, P. (2016). A randomized controlled trial of cognitive behavioral therapy for ADHD in medication-treated adolescents. *Journal of Child Psychology and Psychiatry*, 57(11), 1218–1226. <https://doi.org/10.1111/jcpp.12549>

Vidal, R., Castells, J., Richarte, V., Palomar, G., Garcia, M., Nicolau, R., Lazaro, L., Casas, M., & Ramos-Quiroga, J. A. (2015). Group Therapy for Adolescents With Attention-Deficit/Hyperactivity Disorder: A Randomized

Controlled Trial. *Journal of the American Academy of Child and Adolescent Psychiatry*, 54(4), 275–282. <https://doi.org/10.1016/j.jaac.2014.12.016>

Vidal, R., Castells, J., Richarte, V., Palomar, G., García, M., Nicolau, R., ... & Ramos-Quiroga, J. A. (2017). " Group therapy for adolescents with attention-deficit/hyperactivity disorder: A randomized controlled trial": Correction.

3.2 Weight of Evidence

To appraise the studies, Gough's Weight of Evidence (WoE) framework was used to evaluate WoE A, B, C and D. WoE A appraises the methodological quality of each study (Appendix C) using a coding protocol. Kratochwill's (2003) coding protocol was used as it appraises group experimental designs. The sections excluded and the rationale for the amendments are detailed in Appendix D. The coding protocols are in Appendix E. WoE B evaluates the methodological relevance in relation to the study question (Appendix C). WoE C evaluates the topic relevance to the question (Appendix C). WoE D averages these weightings to provide an overall score which can be seen below, in Table 4.

The total weighting (WoE D) for each study is presented below. This takes scores from WoE A, B and C and averages them to give a total score. A summary of the scores is presented below:

Table 4

Overall Weight of Evidence across all studies

Study	Methodological Quality (WoE A)	Methodological Relevance (WoE B)	Topic Relevance to the review question (WoE C)	Overall weighting of evidence (WoE D)*
Boyer et al. (2015)	2.5	1.8	2	2.1 (Low)
Meyer et al. (2021)	2.75	2.2	2.25	2.4 (High)
Schramm et al. (2016)	1.5	1.6	2.25	1.78 (Low)
Sprich et al. (2016)	2.75	2.6	2.5	2.62 (High)
Vidal et al. (2015)	1.75	2.4	2.5	2.22 (Medium)

3.3 Study Participants

Across the five studies, there were 601 participants with four studies reporting suitable demographic variables though Schramm et al. (2015) only provided age, medication, and gender which gave it a low WoE A rating.

All studies but one (Vidal et al., 2015) had inclusion/exclusion criteria similar to school practice and excluded participants with: untreated substance abuse, active suicidality and severe mood disorders as these may have interfered with the intervention.

All studies had explicit sampling and screening procedures to ensure that participants had a clinical diagnosis of ADHD by a trained professional. However, the study conducted by Boyer et al. (2015) was the only one that reported evidence of a representative sample with 73.0% being boys and 70.3% having ADHD-I, which led to a higher rating on this facet of WoE A, whilst Meyer et al. (2021) sample was unrepresentative by having 56% females which makes it less generalisable.

Both Schramm et al. (2016) and Boyer et al. (2015) included a range of 12-17 years old, which gave them a High rating on this criterion, as it consists of the target age range of this review, with the remaining studies scoring lower as they included adults, or solely older adolescents.

3.4 Study Design

All studies provided an a priori calculation of power which was used to justify the sample size. Based on an effect size of 0.2 which would be practically meaningful (Hattie, 2009), using G*Power (alpha 0.05, power 0.8, two groups, minimum of two measures, correction among repeated measures), studies would require a sample size of 110 to meet this, which was met by all studies but Sprich et al. 2016).

All studies were Randomised Controlled Trials, however all but Boyer et al. (2015) had either a wait-list control or active control group, which contributed to its low WoE B. Schramm et al. (2016) had both an active and wait-list control, however there was no follow-up phase which means we cannot infer maintenance effects; it had limited information on the randomisation sequence except participants being stratified by gender, and did not provide details on whether allocation to groups were concealed which could implicate researcher bias or therapist effects, which links to its low WoE B.

Vidal et al. (2015) and Sprich et al. (2016) both monitored patients weekly for medication adherence and gathered quantitative data on the intake; further, either they ensured that the pre-assessment was completed before their stringent randomisation process (Vidal et al., 2015) or did not share the randomisation sequence with the therapists, thus controlling for therapist effects (Sprich et al. 2016), which contributed to their high WoE B ratings.

3.5 Measures

Three studies (Schramm et al., 2015; Sprich et al., 2016; Vidal et al., 2015) used clinicians to assess symptoms pre- and post- intervention to measure behavioural change which provides a third-party view; of which two ensured that the clinician was blind to treatment allocation lowering the likelihood of bias during assessment, resulting in higher WoE B ratings. Moreover, these three studies had more informants (e.g., parent, adolescent, clinician – Sprich et al., 2016; Vidal et al., 2015) providing a holistic picture of the adolescent's behaviour change.

Meyer et al. (2021) only used parental and self-ratings on Adult ADHD-Self Report Scale for Adolescents (Cronbach's alpha = 0.89-0.91) but the authors constructed the 'Impact of ADHD Symptoms' which measured the severity of symptoms, raising their WoE C rating to Medium, however they received a lower WoE score on the Measurement as the validity was not reported.

3.6 Intervention

Even though all studies varied in terms of the format, all interventions were adapted for adolescents with ADHD by teaching relevant skills and included key components of core CBT such as: psychoeducation, cognitive skills e.g., self-instructions and problem-solving. Three studies had their interventions rooted in CBT with traditional elements such as cognitive restructuring and for two studies (Sprich et al., 2016; Vidal et al., 2015) this was reflected by a higher overall WoE C rating.

Meyer et al. (2021) received a medium WoE C rating as their intervention has a combination of cognitive-behavioural theoretical underpinnings, but specific DBT elements (e.g., mindfulness). However, the intervention used by Schramm et al. (2015) was multi-component with a few cognitive-behavioural elements, which lowered their WoE C rating; the paper was also vague on how all these components linked to outcomes, giving a Low WoE A.

It is typical in CBT to have a final session to ensure that strategies are maintained post-intervention which was demonstrated in four of the studies, but one (Vidal et al., 2021) which links to its low WoE A in the Durability/Generalisation section. The studies with follow-up demonstrated this in their follow-up assessment (Boyer et al., 2015; Meyer et al., 2021; Sprich et al., 2016) which linked to their higher WoE A in that facet.

In this same vein, CBT interventions have homework and behavioural experiments to ensure transfer in other settings which was carried out by all studies.

Meyer et al. (2019) had a high WoE A rating on implementation fidelity because they had a detailed intervention manual, ensured ongoing supervision and coding of sessions which ensured therapist adherence. Moreover, they did a sensitivity analysis on 'completers' and 'non-completers' of the intervention to highlight if there were any differences, which there were not.

3.7 Findings and Effect Sizes

Effect sizes were reported on the relevant outcomes pertinent to this review as standardised mean differences (Cohen's d) in Table 5.

Looking at the findings from Boyer et al. (2015), the considered effect sizes included their CBT-plus planning group (i.e. within-group treatment) as that intervention was similar to the other studies in this review. They reported a moderate-to-large ($d = .72$) reduction in ADHD symptoms from pre-post treatment which was maintained at 3-month follow-up, lending to stronger WoE C ratings because it demonstrates the effectiveness of the intervention. However, the overall WoE D rating is low, so one needs to be cautious with these results.

As can be seen, all studies reported decreases in the primary outcome measures, in comparison to wait-list control, ranging from small to large effects. When investigating further, when parents were asked to rate changes, parents reported larger reductions on inattention ($d = 0.5$; Schramm et al., 2016; $d = 1.25$ – Vidal et al., 2015) compared

to hyperactivity ($d = 0.27$; Schramm et al., 2016) on the two studies that separated ADHD symptoms into inattention and hyperactivity.

In all but one study (Boyer et al., 2015), adolescents reported relatively smaller reductions in ADHD symptoms; it is common to see differences between parent-adolescent ratings, with parents being more reliable reporters (e.g., Biederman et al., 2007).

Interestingly, three studies with independent evaluators all reported medium-to-large reductions in ADHD symptoms in comparison to wait-list control (Schramm et al., 2016; Sprich et al., 2016; Vidal et al., 2015). Two of these studies included CGI which measures the clinical severity of symptoms ($d = 0.9$ - Vidal et al., 2015; $d = 1.02$ – Sprich et al., 2016). Sprich et al. (2016) also highlighted this large effect size was maintained at a 4 month follow up, contributing to a higher WoE A on the Durability/Generalisation facet. Given the study's high WoE D, this lends weight to the effectiveness of a CBT-based intervention.

When considering the effect sizes in studies with an active control group (Meyer et al., 2021; Schramm et al., 2016), the effect sizes ranged from small to no effect. Similarly, the same pattern above denoting larger impacts on inattention than hyperactivity are noticed here. Given that this study used progressive muscle training (PMR) followed by playtime for the active control group, it is not surprising to see that there was no effect on hyperactivity/impulsivity as both activities are body-based activities which may work in tandem directly on calming hyperactivity.

Meyer et al. (2021) found that there were small reductions on frequency of ADHD symptoms between the DBT-based group and psychoeducational control group which were maintained at 6-month follow-up. However, there was no effect on the severity of ADHD symptoms. However, it is important to note that this sample had 65.8% females which is unrepresentative of the gender distribution of ADHD.

Table 5

Outcomes and Effect Sizes

Study	Measure	Comparison <i>(Participant numbers)</i>	Effect Size <i>(Cohen's d)</i>	Effect Descriptor	WoE D Rating
Boyer et al. (2015)		CBT Group (<i>n</i> = 83), Control Group (<i>n</i> = 76)			2.1 (Low)
	ADHD Symptoms (Parent)	CBT Group Pre vs Post	0.72	Medium	
	ADHD Symptoms (Parent)	CBT Group Post vs Follow Up	0.03	No Effect	
	ADHD Symptoms (Parent)	CBT Group vs Control Group	0.2	Small	
Meyer et al. (2021)		Intervention Group (<i>n</i> = 74), at follow-up (<i>n</i> = 71) Control Group (<i>n</i> = 61), at follow-up (<i>n</i> = 57)			2.4 (High)

ADHD symptoms (Adolescent)	Intervention Group vs Control Group (pre-post)	0.16	No Effect/Small
ADHD symptoms (Adolescent)	Intervention Group vs Control Group (pre-follow- up)	0.33	Small
ADHD symptoms (Parents)	Intervention Group vs Control Group (pre-post)	0.2	Small
ADHD symptoms (Parents)	Intervention Group vs Control Group (pre-follow- up)	0.11	No Effect
Impact of ADHD Symptoms	Intervention Group vs Control Group (pre-post)	0.03	No Effect
Impact of ADHD Symptoms	Intervention Group vs Control Group (pre-follow- up)	0.03	No Effect

Sprich et al. (2016)	CBT at 4 Month Follow up (n = 21) CBT (n = 21) vs Waiting List (n = 22)			2.62 (High)
CGI (Global Severity) (Clinician)	CBT vs Waiting List	1.02	Large	
CGI (Global Severity) (Clinician)	CBT at 4 Month Follow Up	0	No Effect	
IE-Rated Severity (Parent)	CBT vs Waiting List	0.79	Medium	
IE-Rated Severity (Parent)	CBT vs 4 Month Follow Up	0.30	Small	
IE-Rated Severity (Adolescent)	CBT vs Waiting List	0.22	Small	
IE-Rated Severity (Adolescent)	CBT vs 4 Month Follow Up	0.28	Small	
Schramm et al. (2016)	Training (n = 40)			1.78 (Low)

	Active Control (<i>n</i> = 37)		
	Waitlist Control (<i>n</i> = 36)		
ASC Inattention (Parents)	Training vs Active Control	0.29	Small
	Training vs Waitlist Control	0.5	Medium
ASC Inattention (Teachers)	Training vs Active Control	0.17	No Effect
	Training vs Waitlist Control	0.22	Small
ASC Attention (Adolescent)	Training vs Active Control	0.04	No Effect
	Training vs Waitlist Control	0.13	No Effect
ASC & SDQ	Training vs Active Control	0.06	No Effect
Hyperactivity/Impulsivity (Parents)	Training vs Waitlist Control	0.27	Small
	Training vs Active Control	0.09	No Effect

ASC & SDQ	Training vs Waitlist Control	0.37	Small	
Hyperactivity/Impulsivity (Teachers)				
ASC & SDQ	Training vs Active Control	0.03	No Effect	
Hyperactivity/Impulsivity (Adolescents)	Training vs Waitlist Control	0.12	No Effect	
WRI	Training vs Active Control	0.21	Small	
	Training vs Waitlist Control	0.53	Medium	
Vidal et al. (2015)	CBT Group (<i>n</i> = 59)			
	Control Group (<i>n</i> = 60)			2.22(Medium)
ADHD-RS - Overall (Adolescent)	CBT vs Control Group	1	Large	
ADHD-RS - Inattention (Adolescent)	CBT vs Control Group	1.12	Large	
ADHD-RS - Impulsivity (Adolescent)	CBT vs Control Group	0.65	Medium	

ADHD-RS - Overall (Parent)	CBT vs Control Group	1.09	Large
ADHD-RS - Inattention (Parent)	CBT vs Control Group	1.25	Large
ADHD-RS - Impulsivity (Parent)	CBT vs Control Group	0.65	Medium
CGI (Global Severity) (Adolescent)	CBT vs Control Group	0.51	Medium
CGI (Global Severity) (Clinician)	CBT vs Control Group	0.9	Large

ASC - ADHD Symptom Checklist; CGI - Clinical Global Impression Scale; SDQ - Strengths & Difficulties Questionnaire; WRI - Wender-Reimherr Interview; ADHD-RS - ADHD Rating Scale for Adolescents; IE – Independent Evaluator

Cohen (1988) reports the following thresholds; small ($d = 0.2$), medium ($d = 0.5$) and large ($d = 0.8$).

Effect sizes are expressed as standard mean differences (Cohen's d). For studies which did not report these effect sizes, these were calculated from descriptive statistics test using the Campbell Collaboration Effect Size Calculator

(<https://campbellcollaboration.org/research-resources/effect-size-calculator.html>). For studies which used a disparate effect size e.g.

eta-squared, psychometrica.de was used to convert these values to Cohen's d for comparison across all studies, these are reported in Table 5.

4. Conclusions and Recommendations

This review aimed to evaluate the effectiveness of CBT-based interventions on reducing the frequency and severity of diagnostic ADHD symptoms among secondary-school aged adolescents and examined this through the appraisal of randomised controlled trials.

The three with wait-list controls had medium-to- large reductions in the frequency (teacher; parent; clinician Schramm et al., 2015) and medium-to-large reductions in severity (Sprich et al., 2016; Vidal et al., 2012). However, the high WoE D study was under-powered, thus future research should replicate this with a larger sample (Sprich et al., 2016). Nevertheless, given these results, there is promising evidence that CBT has a strong impact on adolescents compared to medication.

With active-control groups though, these effects attenuated (Meyer et al., 2021; Schramm et al., 2015) from small to no effects on the frequency and severity. In the multi-modal intervention, Schramm et al. (2015) found that the active-control group intervention (progressive muscle relaxation - PMR) was significantly shorter than the multi-modal intervention, though more intense in its approach. If the interventions were of comparable lengths, there may have been no effect between groups. This lack of expected effect may have been due to the intervention's practical-based approach that did not include CBT's relaxation techniques (Fenn & Byrne, 2013), hence its low WoE D rating. However, this highlights PMR as a more feasible school intervention, as it had similar impacts to that of a multi-modal intervention which may be more difficult to implement.

Similarly, Meyer et al. (2021) found small effects on the frequency of symptoms but no effects on severity between the DBT-based structured social skills group and the psychoeducational control group. However, 20% of the sample did not meet the criteria for specific ADHD diagnosis, suggesting their severity level may be already close to its basal level, especially as many of the participants were already medicated. Additionally, they had a predominantly female cohort which is dissimilar to the other studies. As there are differences in how females and males with ADHD report symptoms (Biederman et al., 2007; Millenet, 2018), it will be useful for future trials to ensure that clinicians are used as informants or use objective neuropsychological measures. One could conclude the commonality of psychoeducation in a structured format led by therapists has a strong impact on outcomes, which is a strong take-away for EP practice, as this could function as a time-light intervention to recommend in secondary schools. Following this, future trials should have active and waiting control groups to evaluate whether less time-intensive interventions have similar outcomes.

Although there were little between-group differences between intervention-control groups, it does not mean that CBT was an ineffective intervention as there were significant improvements within-group. The small effect sizes (per Cohen's *d*) on ADHD symptoms reflect teacher effects (i.e., impact of effective teachers) and zone of desired effects (meaningful educational impact) (Hattie, 2009), highlighting the usefulness of CBT-based interventions, especially as this study had a high WoE D (Meyer et al., 2021).

However, there are caveats in this review. Ethnicity was not reported in all the studies, but one (Sprich et al., 2016) sample was 91.7% white which makes it less generalisable. Future studies need to have diverse samples and report ethnicity.

Participants in Sprich et al. (2016) were self-referred with parental involvement making it less generalisable e.g. pupils whose parents are not readily available, There was no parental involvement in other studies (Meyer et al., 2021; Vidal et al., 2015) yet the results were still positive.

Additionally, in the Medium (Vidal et al., 2012) and High-rated (Sprich et al., 2016) WoE D studies, both samples were medication-treated. There are two interpretations of this, one of which is that these findings may not be generalisable to the general ADHD population. Indeed, 7.4% of adolescents received medication according to a study (McCarthy et al., 2012). However, these samples were mostly from clinical settings with severe needs which may be representative of those who get referred in secondary school to EP services who have complex needs. Moreover, medication typically works to reduce hyperactivity and impulse control, and there were further reductions in all domains of ADHD which suggests that CBT made an impact over and above that of medication.

Considering the above discussion, CBT-based interventions, when adapted for adolescents with ADHD, can be suggested as a targeted intervention for those with ADHD with varying levels of severity, delivered in either a 1:1 or group format, as a suitable adjunct to that of medication for a range of ages of adolescents.

It will be important for further research to include sub-types of ADHD and co-morbidities (e.g. Boyer et al., 2015), to gather a clearer picture on the impact of interventions as there are differential responses for sub-types (Grizenko et al., 2010), as well as co-morbidities e.g. adolescents with co-morbid anxiety and depression benefitted from CBT, and those with ODD benefitted less (Antshel, 2012).

The CBT-based interventions in this review have been delivered by mental health care workers or medical professionals e.g. therapists and psychologists which seems appropriate as ADHD is a complex condition (Di Lorenzo et al., 2021).

Considering the current UK context, it may be useful in further research to evaluate Educational Mental Health Practitioners delivering CBT to adolescents with ADHD, as part of the recent governmental initiative to bridge healthcare and education services; and doing so may engage teachers more in the data. This was seen in the appraised studies, for example Boyer et al. (2015) had so much missing data on teachers that they had to exclude them from the main analyses.

Lastly, furthering the psychological evidence-base and considering the developing nature of CBT-based interventions (e.g. Hofmann et al., 2010), future trials could evaluate ACT interventions with adolescents with ADHD: to our knowledge, there have been only two studies, one of which had significant impact on frequency and severity of ADHD symptoms, after confounding for SES, medication and comorbidities (Vanzin et al., 2020), however they did not look at adolescents.

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Hiscock, H. (2019). Does the treatment of anxiety in children with Attention-Deficit/Hyperactivity Disorder (ADHD) using cognitive behavioral therapy improve child and family outcomes? Protocol for a randomized controlled trial. *BMC Psychiatry*, 19(1). <https://doi.org/10.1186/s12888-019-2276-3>

Senior, C. J., Godovich, S. A., Habayeb, S., Alvord, M. K., & Rich, B. A. (2020). The effects of a resilience-based group intervention for youth with ADHD. *Journal of Child and Adolescent Counseling*, 6(3), 200-214. <https://doi.org/10.1080/23727810.2020.1719353>

Shecter, C. (2015). Mindfulness training for adolescents with ADHD and their families: A time-series evaluation. Dissertation Abstracts International: Section B: The Sciences and Engineering, 76(4-B(E)), No-Specified. <http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=psyc12&NEWS=N&AN=2015-99200-437>

Sprich, S. E., Burbridge, J., Lerner, J. A., & Safren, S. A. (2015). Cognitive-Behavioral Therapy for ADHD in Adolescents: Clinical Considerations and a Case Series. *Cognitive And Behavioral Practice*, 22(2), 116–126. <https://doi.org/10.1016/j.cbpra.2015.01.001>

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- Vanzin, L., Crippa, A., Mauri, V., Valli, A., Mauri, M., Molteni, M., & Nobile, M. (2020). Does ACT-Group Training Improve Cognitive Domain in Children with Attention Deficit Hyperactivity Disorder? A Single-Arm, Open-Label Study. *Behaviour Change*, 37(1), 33–44. <https://doi.org/10.1017/beh.2020.3>
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- Vidal, R., Castells, J., Richarte, V., Palomar, G., García, M., Nicolau, R., ... & Ramos-Quiroga, J. A. (2017). " Group therapy for adolescents with Attention-Deficit/Hyperactivity Disorder: A randomized controlled trial": Correction.
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Wilmshurst, L. A. (2002). Treatment programs for youth with emotional and behavioral disorders: An outcome study of two alternate approaches. *Mental Health Services Research*, 4(2), 85–96.

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Yeo, L. S., Wong, M., Gerken, K., & Ansley, T. (2005). Cognitive-Behavioural Therapy in a Hospital Setting for Children with Severe Emotional and/or Behaviour Disorders. *Child Care in Practice*, 11(1), 7–22.

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Young, Z., Moghaddam, N., & Tickle, A. (2020). The efficacy of cognitive behavioral therapy for adults with ADHD: A systematic review and meta-analysis of randomized controlled trials. *Journal of Attention Disorders*, 24(6), 875-888

Young, S., & Myanathi Amarasinghe, J. (2010). Practitioner review: Non-pharmacological treatments for ADHD: A lifespan approach. *Journal of Child Psychology and Psychiatry*, 51(2), 116-133. <https://doi.org/10.1111/j.1469-7610.2009.02191.x>

Appendix A – List of Excluded Studies

Table 6

List of excluded studies

Article	Exclusion criteria number(s)
Miranda, A., & Presentacion, M. J. (2000). Efficacy of cognitive-behavioral therapy in the treatment of children with ADHD, with and without aggressiveness. <i>Psychology in the Schools</i> , 37(2), 169–182. <a href="https://doi.org/10.1002/(SICI)1520-6807(200003)37:2<169::AID-PITS8>3.0.CO;2-8">https://doi.org/10.1002/(SICI)1520-6807(200003)37:2<169::AID-PITS8>3.0.CO;2-8	3 - There were no secondary school-aged children or data from relevant age was not disaggregated
Wilmshurst, L. A. (2002). Treatment programs for youth with emotional and behavioral disorders: An outcome study of two alternate approaches. <i>Mental Health Services Research</i> , 4(2), 85–96. https://doi.org/https://dx.doi.org/10.1023/A:1015200200316	2 The participants did not have a main diagnosis of ADHD 3 There were no secondary school-aged children or data from relevant age was not disaggregated
Riggs, P. D., Winhusen, T., Davies, R. D., Leimberger, J. D., Mikulich-Gilbertson, S., Klein, C., Macdonald, M., Lohman, M., Bailey, G. L., Haynes, L., Jaffee, W. B., Haminton, N., Hodgkins, C., Whitmore, E., Trello-Rishel, K., Tamm, L., Acosta, M. C., Royer-Malvestuto, C., Subramaniam, G., ... Liu, D. (2011). Randomized Controlled Trial of Osmotic-Release Methylphenidate With Cognitive-Behavioral Therapy in Adolescents With Attention-Deficit/Hyperactivity Disorder and Substance Use Disorders. <i>Journal of the American Academy of Child And Adolescent Psychiatry</i> , 50(9), 903–914. https://doi.org/10.1016/j.jaac.2011.06.010	2 The participants did not have a main diagnosis of ADHD 3 There were no secondary school-aged children or data from relevant age was not disaggregated
Frolich, J., Dopfner, M., Berner, W., & Lehmkuhl, G. (2002). Combined cognitive behavioral treatment with parent management training in ADHD. <i>PRAXIS Der Kinderpsychologie und Kinderpsychiatrie</i> , 51(6), 476–493.	3 There were no secondary school-aged children or data from relevant age was not disaggregated

<p>Pelham, W. E. J., Fabiano, G. A., Gnagy, E. M., Greiner, A. R., & Hoza, B. (2005). <i>The Role of Summer Treatment Programs in the Context of Comprehensive Treatment for Attention-Deficit/ Hyperactivity Disorder. Psychosocial Treatments for Child and Adolescent Disorders: Empirically Based Strategies for Clinical Practice.</i>, 2nd Ed., 377–409. http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=psyc4&NEWS=N&AN=2005-00278-016</p>	<p>3 There were no secondary school-aged children or data from relevant age was not disaggregated</p>
<p>Yeo, L. S., Wong, M., Gerken, K., & Ansley, T. (2005). Cognitive-Behavioural Therapy in a Hospital Setting for Children with Severe Emotional and/or Behaviour Disorders. <i>Child Care in Practice</i>, 11(1), 7–22. https://www.proquest.com/scholarly-journals/cognitive-behavioural-therapy-hospital-setting/docview/61928044/se-2?accountid=14511</p>	<p>2 The participants did not have a main diagnosis of ADHD 3 There were no secondary school-aged children or data from relevant age was not disaggregated</p>
<p>Dreisorner, T. (2006). The efficacy of training programs in children with attention deficit/hyperactivity disorder (ADHD). <i>Kindheit und Entwicklung</i> , 15(4), 255–266. https://doi.org/10.1026/0942-5403.15.4.255</p>	<p>4 The study was not in the English language</p>
<p>Sun, Z. Z. (2017). The Effectiveness of Verbal Self-instruction Program on the Symptoms of ADHD: Controlled Before and After Study. <i>Neuroquantology</i> , 15(4), 121–126. https://doi.org/10.14704/nq.2017.15.4.1146</p>	<p>5 The study was in a non-OECD country</p>
<p>Russell, M. A. (2017). Attention deficit hyperactivity disorder treatment impacts on academic and social performance. Dissertation Abstracts International Section A: Humanities and Social Sciences, 78(5-A(E)), No-Specified. http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=psyc14&NEWS=N&AN=2017-10859-281</p>	<p>1 The study was not peer-reviewed</p>
<p>Geissler, J., Jans, T., Banaschewski, T., Becker, K., Renner, T., Brandeis, D., Dopfner, M., Dose, C., Hautmann, C., Holtmann, M., Jenkner, C., Millenet, S., & Romanos, M. (2018). Individualised short-term therapy for adolescents impaired by attention-deficit/hyperactivity disorder despite previous routine care treatment (ESCAadol)-Study protocol of a randomised</p>	<p>Protocol - The trial has not been completed.</p>

<p>controlled trial within the consortium ESCAlife. TRIALS, 19. https://doi.org/10.1186/s13063-018-2635-2</p>	
<p>Maric, M., van Steensel, F. J. A., & Bogels, S. M. (2018). Parental Involvement in CBT for Anxiety-Disordered Youth Revisited: Family CBT Outperforms Child CBT in the Long Term for Children With Comorbid ADHD Symptoms. <i>Journal of Attention Disorders</i> , 22(5), 506–514. https://doi.org/10.1177/1087054715573991</p>	<p>2 The participants did not have a main diagnosis of ADHD</p>
<p>Kratochvil, C. J., May, D. E., Silva, S. G., Madaan, V., Puumala, S. E., Curry, J. F., Walkup, J., Kepley, H., Vitiello, B., & March, J. S. (2009). Treatment response in depressed adolescents with and without co-morbid attention-deficit/hyperactivity disorder in the Treatment for Adolescents with Depression Study. <i>Journal of Child and Adolescent Psychopharmacology</i> , 19(5), 519–527. https://doi.org/https://dx.doi.org/10.1089/cap.2008.0143</p>	<p>9 The study does not have an outcome of ADHD symptoms</p>
<p>Sprober, N., Grieb, J., Ludolph, A., Hautzinger, M., & Fegert, J. M. (2010). SAVE - A cognitive-behavioural group therapy intervention for youths with ADHD. <i>Nervenheilkunde</i> , 29(1–2), 44–51.</p>	<p>4 The study was not in the English language</p>
<p>Jarrett, M. A., & Endick, T. H. (2012). Treatment of Comorbid Attention-Deficit/Hyperactivity Disorder and Anxiety in Children: A Multiple Baseline Design Analysis. <i>Journal of Consulting and Clinical Psychology</i> , 80(2), 239–244. https://doi.org/10.1037/a0027123</p>	<p>3 There were no secondary school-aged children or data from relevant age was not disaggregated</p>
<p>Haydicky, J., Wiener, J., Badali, P., Milligan, K., & Ducharme, J. M. (2012). Evaluation of a Mindfulness-based Intervention for Adolescents with Learning Disabilities and Co-occurring ADHD and Anxiety. <i>Mindfulness</i> , 3(2), 151–164. https://doi.org/10.1007/s12671-012-0089-2</p>	<p>6 -The study includes exercise as an adjunct</p>
<p>Boucher, V., Tremblay, L., Lariviere, M., Bagaoui, R., & Guindon, B. (2012). Study on the effectiveness of an adapted cognitive-behavioural treatment: SNAPTM-In children with conduct disorders in a rural setting. <i>Adolescent Behaviour.</i>, 281–302.</p>	<p>2 The participants did not have a main diagnosis of ADHD 3 There were no secondary school-aged children or data from</p>

<p>http://ovidsp.ovid.com/ovidwb.cgi?T=JS&PAGE=reference&D=psyc9&NEWS=N&AN=2013-06326-013</p>	<p>relevant age was not disaggregated</p>
<p>van de Weijer-Bergsma, E., Formsma, A. R., De Bruin, E. I., & Bögels, S. M. (2011). The effectiveness of mindfulness training on behavioral problems and attentional functioning in adolescents with ADHD. <i>Journal of Child and Family Studies</i>, 21(5), 775-787. https://doi.org/10.1007/s10826-011-9531-7</p>	<p>6 The study includes exercise as an adjunct</p>
<p>Moreno-Garcia, I., Delgado-Pardo, G., de Rey, C. C. V, Meneres-Sancho, S., & Servera-Barcelo, M. (2015). Neurofeedback, pharmacological treatment and behavioral therapy in hyperactivity: Multilevel analysis of treatment effects on electroencephalography. <i>International Journal of Clinical and Health Psychology</i>, 15(3), 217–225. https://doi.org/10.1016/j.ijchp.2015.04.003</p>	<p>3 There were no secondary school-aged children or data from relevant age was not disaggregated</p>
<p>Fischer, L., Brettschneider, A., Kolch, M., Fegert, J. M., & Sprober, N. (2014). Individual Goal Attainment Scaling after group therapy “SAVE.” <i>Psychotherapeut</i>, 59(1), 31–37. https://doi.org/10.1007/s00278-013-1025-1</p>	<p>3 There were no secondary school-aged children or data from relevant age was not disaggregated</p>
<p>Shecter, C. (2015). Mindfulness training for adolescents with ADHD and their families: A time-series evaluation. Dissertation Abstracts International: Section B: The Sciences and Engineering, 76(4-B(E)), No-Specified. http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=psyc12&NEWS=N&AN=2015-99200-437</p>	<p>1 The study was not peer-reviewed</p>
<p>Antshel, K. M., Faraone, S. V, & Gordon, M. (2014). Cognitive Behavioral Treatment Outcomes in Adolescent ADHD. <i>Journal of Attention Disorders</i>, 18(6), 483–495. https://doi.org/10.1177/1087054712443155</p>	<p>8 The study design was not a RCT</p>

<p>Renou, S., & Doyen, C. (2019). NEAR (Neuropsychological Educational Approach to Cognitive Remediation) Cognitive Remediation Program in Adolescents with Attention Deficit/Hyperactivity Disorder and/or Autism Spectrum Disorder. <i>Annales Medico-psychologiques</i>, 177(8), 758–764. https://doi.org/10.1016/j.amp.2018.07.012</p>	<p>4 The study was not in the English language</p>
<p>Sprich, S. E., Burbridge, J., Lerner, J. A., & Safren, S. A. (2015). Cognitive-Behavioral Therapy for ADHD in Adolescents: Clinical Considerations and a Case Series. <i>Cognitive and Behavioral Practice</i>, 22(2), 116–126. https://doi.org/10.1016/j.cbpra.2015.01.001</p>	<p>8 The study design was not a RCT</p>
<p>Sciberras, E., Efron, D., Patel, P., Mulraney, M., Lee, K. J., Mihalopoulos, C., Engel, L., Rapee, R. M., Anderson, V., Nicholson, J. M., Schembri, R., & Hiscock, H. (2019). Does the treatment of anxiety in children with Attention-Deficit/Hyperactivity Disorder (ADHD) using cognitive behavioral therapy improve child and family outcomes? Protocol for a randomized controlled trial. <i>BMC Psychiatry</i>, 19(1). https://doi.org/10.1186/s12888-019-2276-3</p>	<p>Protocol - The trial has not been completed.</p>
<p>Geissler, J. M., Vloet, T. D., Strom, N., Jaite, C., Graf, E., Kappel, V., Warnke, A., Jacob, C., Hennighausen, K., Haack-Dees, B., Schneider-Momm, K., Matthies, S., Rosler, M., Retz, W., Hanig, S., von Gontard, A., Sobanski, E., Alm, B., Hohmann, S., ... Jans, T. (2020). Does helping mothers in multigenerational ADHD also help children in the long run? 2-year follow-up from baseline of the AIMAC randomized controlled multicentre trial. <i>European Child & Adolescent Psychiatry</i>, 29(10), 1425–1439. https://doi.org/10.1007/s00787-019-01451-0</p>	<p>6 The study includes exercise as an adjunct</p>
<p>Rofiah, K., Kossewska, J., & Ashar, M. N. (2021). The Implementation of CBT to Reduce Hyperactive Behaviors among Adolescents with ADHD. <i>International Journal of online and Biomedical Engineering</i>, 17(12), 165–176. https://doi.org/10.3991/ijoe.v17i12.26531</p>	<p>5 The study was in a non-OECD country</p>
<p>Senior, C. J., Godovich, S. A., Habayeb, S., Alvord, M. K., & Rich, B. A. (2020). The effects of a resilience-based group intervention for youth with ADHD. <i>Journal of Child and Adolescent Counseling</i>, 6(3), 200-214. https://doi.org/10.1080/23727810.2020.1719353</p>	<p>3 There were no secondary school-aged children or data from relevant age was not disaggregated</p>

<p>Calabria, A. M. (2021). The effectiveness of mindfulness-based interventions when treating elementary and adolescent students with attention deficit hyperactivity disorder. Dissertation Abstracts International Section A: Humanities and Social Sciences, 82(12-A), No-Specified. http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=psyc18&NEWS=N&AN=2021-65612-271</p>	<p>1 The study was not peer-reviewed</p>
<p>Andersen, A. C., Sund, A. M., Thomsen, P. H., Lydersen, S., Young, S., & Novik, T. S. (n.d.). Cognitive behavioural group therapy for adolescents with ADHD: a study of satisfaction and feasibility. <i>Nordic Journal of Psychiatry</i> . https://doi.org/10.1080/08039488.2021.1965212</p>	<p>The study does not include data on effectiveness outcomes</p>
<p>Meyer, J., Ramklint, M., Hallerback, M. U., Loof, M., & Isaksson, J. (2019). Evaluation of a structured skills training group for adolescents with attention deficit/hyperactivity disorder (ADHD) - study protocol of a randomised controlled trial. <i>BMC Psychiatry</i> , 19. https://doi.org/10.1186/s12888-019-2133-4</p>	<p>Protocol - The trial has not been completed as yet</p>
<p>Vanzin, L., Crippa, A., Mauri, V., Valli, A., Mauri, M., Molteni, M., & Nobile, M. (2020). Does ACT-Group Training Improve Cognitive Domain in Children with Attention Deficit Hyperactivity Disorder? A Single-Arm, Open-Label Study. <i>Behaviour Change</i> , 37(1), 33–44. https://doi.org/10.1017/bec.2020.3</p>	<p>3 There were no secondary school-aged children or data from relevant age was not disaggregated 8 The study design was not a RCT</p>
<p>Murrell, A. R., Steinberg, D. S., Connally, M. L., Hulse, T., & Hogan, E. (2015). Acting Out to ACTing On: A Preliminary Investigation in Youth with ADHD and Co-morbid Disorders. <i>Journal of Child and Family Studies</i> , 24(7), 2174–2181. https://doi.org/10.1007/s10826-014-0020-7</p>	<p>8 The study design was not a RCT</p>
<p>Vanzin, L., Mauri, V., Valli, A., Pozzi, M., Presti, G., Oppo, A., Ristallo, A., Molteni, M., & Nobile, M. (2020). Clinical Effects of an ACT-Group Training in Children and Adolescents with Attention-Deficit/Hyperactivity Disorder. <i>Journal of Child and Family Studies</i> , 29(4), 1070–1080. https://doi.org/10.1007/s10826-019-01546-x</p>	<p>3 There were no secondary school-aged children or data from relevant age was not disaggregated 5 The study was in a non-OECD country</p>

<p>Aghaee, M. H., & Tarkhan, M. (2017). A comparative study of effectiveness of medicinal therapy and combined therapy (cognitive-behavioral and drug) of students diagnosed with Attention Deficit Hyperactivity Disorder (ADHD). <i>Bali Medical Journal</i> 6(1), 82–89. https://doi.org/10.15562/bmj.v6i1.461</p>	<p>3 There were no secondary school-aged children or data from relevant age was not disaggregated</p>
<p>Houghton, S., Alsalmi, N., Tan, C., Taylor, M., & Durkin, K. (2017). Treating Comorbid Anxiety in Adolescents With ADHD Using a Cognitive Behavior Therapy Program Approach. <i>Journal of Attention Disorders</i> , 21(13), 1094–1104. https://doi.org/10.1177/1087054712473182</p>	<p>8 The study design was not a RCT 9 The study does not have an outcome for ADHD symptoms</p>

Appendix B – Mapping The Field

Table 7
Overview of Included Studies

Authors	Country	Age / Sample Size (N)	Intervention type	Design	Intervention (N)	Comparison Group(s) (N)	Relevant outcome variables measured	Main Findings – Primary Outcomes
Vidal et al. (2015)	Spain	15-21years (n = 119)	CBT group programme + used motivational interviewing 12 manualised sessions (group) including psychoeducation, impulsivity/motivation, planning strategies/attention	RCT with no follow-up	CBT group (n = 59)	Wait-list control group (n = 60)	ADHD Rating Scale [ADHD-RS], Clinical Global Impression Scale for Severity [CGI-S]	There were significant differences between groups with large effect sizes.

Boyer et al. (2015)	Netherlands	12-17 years (<i>n</i> = 159)	CBT with planning components Less-structured CBT - Solution Focused. Both treatments included Motivational Interviewing	RCT with no follow-up	Plan my life - CBT with focus on planning and organisational skills (<i>N</i> = 83)	CBT without planning component	Parent-rated ADHD	Multivariate tests showed significant within-group improvement over time from pre- to post-test, $F(6,23) = 2.94, p = .03, \eta^2 = 0.43$
			10 sessions (8 1:1, 2 parent) of 45-60 mins					
Schramm et al. (2016)	Germany	12-17 years (<i>n</i> = 113) 85% male	Multimodal training on problem-solving and organisational skills - Learning Skills Training for Adolescents with ADHD with CBT elements (i.e. self-monitoring and self-talk)	RCT with 3-month follow-up by blinded research assistants	Learning Skills Training for Adolescents (<i>n</i> = 40)	Wait-list control Progress muscle relaxation training (active control)	Primary outcomes: ADHD - inattention and hyperactivity-impulsivity.	Both symptom clusters showed reductions in comparison to waiting list controls resulting in highly significant large effects. Compared to active controls, these effects melted down to nonsignificant small effects.
			1:1 weekly 60min sessions. Maximum of 20 sessions. 3 behavioural therapy sessions with parents and teachers of 90 mins					

Active control - progressive muscle relaxation training. Group sessions (60 mins) twice a week for 12-15 sessions followed by play time.

Meyer et al. (2021)	Sweden	15-18 years (<i>n</i> =164)	SSTG- age-adapted version of a manualised DBT-based (combination of traditional CBT with DBT) intervention	RCT, 2 weeks before, 2 weeks after and 6 month-follow up	SSTG (<i>n</i> = 85)	Manualised psychoeducational group Control (<i>n</i> = 79)	Primary outcomes: ADHD; Impact of ADHD symptoms;	ADHD symptoms Primary outcomes. No differences were observed between the two groups regarding changes in the primary outcomes (effect sizes indicated no to small effects, <i>d</i> =0.01 to 0.33). Within-groups - SSTG - reductions of ADHD symptoms in both self-reports (<i>d</i> = 0.12) and parental reports (<i>d</i> = 0.59) which was maintained at follow-up.
			14 weekly 2-hour sessions by therapists (group)					
			Psychoeducational group (SKILLS)					
			3 2-h sessions by therapists (group)					

There also was small reductions on the impact of ADHD symptoms ($d = 0.16$) in comparison to no effect in control group ($d = .03$).

In SKILLS control group, only parental reports in control group at 6-month follow-up ($d = 0.45$), but with completers it was also at 2-weeks post-treatment ($d = 0.22$)

Sprich et al. (2016)	America	14-18 years ($n = 46$)	CBT-adapted for adolescents with ADHD 12 sessions (10 1:1 with therapist, 2 with parent)	RCT, 4/8 month, with 4-month follow up for the intervention group	CBT-adapted for adolescents with ADHD ($N = 24$)	Wait-list control ($N = 22$)	IE-rated ADHD severity ratings and CGI	Severity of ADHD symptoms reduced post-intervention. IE-rated parent assessment: 10.93 (95% CI: -12.93, -8.93; $p < .0001$) IE-rated adolescent assessment 5.24 (95% CI: -7.21, -3.28; $p < .0001$)
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Appendix C – Weight of Evidence A, B, C

Weight of Evidence A (WoE A)

These criteria were adapted from Kratochwill (2003) Group-Based Design protocol which was used to evaluate the methodological quality of the studies in this review. This protocol was deemed appropriate as the studies appraised used a group-based design and is made for school psychologists to evaluate interventions.

Appendix D highlights the amendments made to the protocol for the sections I've removed or modified and the accompanying rationale.

Table 9

Summary of WoE A Criteria

Measurement	Strong evidence (3)	Promising evidence (2)	Weak evidence (1)
	A reliability coefficient of at least 0.85 for all outcome measures	Reliability should be at least 0.70 for most of the outcome measures	Reliability should be at least 0.50 for most of the outcome measures
	Clear links between the intervention and key outcome indicators	Some, but not all, key outcomes are linked to intervention	Vague references to links between key outcomes and intervention
	Validity of measures reported	Used a norm-referenced, standardised assessment	Did not use norm-referenced standardised assessment
	Have to meet 3 out of 3 criteria	Have to meet 3 out of 3 criteria	Have to meet 3 out of 3 criteria

External Validity Indicators

Strong evidence (3)	Promising evidence (2)	Weak evidence (1)
Detailed level of description regarding demographic variables, beyond age and gender and bears relevance to inclusion/exclusion criteria	Detailed level of description regarding demographic variables beyond age, gender	Limited description about demographic variables
Rationale for sample size specified	Rationale for sample size specified	Rationale for sample size specified
Sampling procedures described in detail	Sampling procedures described in detail	Sampling procedures described in detail
Measures variables that have relevance for intended outcomes	Measures variables that have relevance for intended outcomes	Measures variables that have relevance for intended outcomes
Inclusion/exclusion criteria similar to school practice	Inclusion/exclusion criteria similar to school practice	Inclusion/exclusion criteria specified
Evidence provided that sample represents target population		
Complete and detailed description of the context within which the intervention occurs	Detailed description of some but not all contextual components	Provides overview of contextual components but lack details

Provided evidence of perceived benefits from the intervention for all participant groups

Have to meet 6 out of 8 criteria

Provided evidence of perceived benefits from the intervention for some participant groups

Have to meet 6 out of 7 criteria

Provided evidence that participants did not perceive benefits from the intervention

Have to meet 6 out of 7 criteria

Durability/Generalisation

Strong evidence (3)

Promising evidence (2)

Weak evidence (1)

Longer-term follow up (6 month +)

Mid-term follow up (3 month +)

No follow up

Evidence is provided regarding sustainability of outcomes after intervention is terminated and in other settings

Evidence is provided regarding sustainability of outcomes after intervention is terminated or documentation of efforts

No evidence is provided regarding sustainability of outcomes after intervention is terminated or documentation of efforts

Documentation of efforts to ensure maintenance effects and application in other settings

Documentation of efforts to ensure maintenance effects OR application in other settings

No documentation of efforts to ensure maintenance effects or application in other settings

Have to meet 2 out of 3 criteria

Have to meet 2 out of 3 criteria

Have to meet 2 out of 3 criteria

Implementation Fidelity

Strong evidence (3)	Promising evidence (2)	Weak evidence (1)
Information provided to interventionists involves written material involving a detailed account of the exact procedures and the sequence in which they are to be used	Information provided to interventionists involves written materials providing broad overview and description of intervention	No mention of manual or training
Information provided and analysis carried out on participants who completed more of the intervention (i.e. higher "dosage" of intervention)	Information provided about participants who completed more of the intervention (i.e. higher "dosage" of intervention)	No information provided about completion rates
Facilitators had ongoing supervision to adhere to intervention, as well as had intervention sessions coded for the intervention	Facilitators had intervention sessions coded to adhere to the intervention or had ongoing supervision	Nothing was recorded about treatment adherence
Have to meet 3 out of 3 criteria	Have to meet 3 out of 3 criteria	Have to meet 3 out of 3 criteria

WoE A Methodological Quality Scores

Table 10

Overall WoE A scores for studies in this review

Study	Measurement	External Validity Indicators	Durability/Generalisation	Implementation Fidelity	Overall WoE A (1)	
Boyer et al. (2015)		2	3	3	2	2.5 (Medium)
Meyer et al. (2021)		2	3	3	3	2.75 (High)
Schramm et al. (2016)		2	1	2	1	1.5 (Low)
Sprich et al. (2016)		3	2	3	3	2.75 (High)
Vidal et al. (2015)		2	2	1	2	1.75 (Low)

The overall weighting of evidence A is the average of four categories (Measurement, External Validity Indicators, Durability/Generalisation and Implementation Fidelity) - the scores were added up and the total was divided by four. Studies were rated in a tercile fashion:

Note 1: WoE A ratings receive a rating of low <1.99, medium if between 2 and 2.5, and high if >2.5

Weight of Evidence B (WoE B)

This section assesses how appropriate each study research design is for answering the current review question. The criteria and rationale are presented below in tables. Following this, a summary of the WoE B scores is presented.

Table 11
Summary of WoE B Criteria

WoE B Criteria	Low (1)	Medium (2)	High (3)	Rationale
Control group	No wait-list control	Wait-list control	Active control	Controlling for time and maturation effects and attention effects with active control, and it can be highlighted whether intervention. Active control where CBT is not dependent variable does not give specific information; waitlist control.
Follow-up phase	No follow-up	Pre- post and follow up scores are reported for one group	Pre- post and follow up scores are reported for both treatment and control for primary outcome measures	Follow-up would show whether the effectiveness of the intervention is maintained. If information is not gathered from both groups in a follow-up, then cannot safely assume that maintenance effects are due to the intervention, it could be to another factor.
Randomisation used for assignment of participants to treatment groups, allocation to groups concealed	Limited information about randomisation process e.g. unsure if researcher was blind to allocation groups	Appropriate information about randomisation process e.g. using a random number generator	Detailed information about randomisation process, stratified on more than one criteria and interventionists were unaware of the process	As all trials are RCTs, it is fundamental that all participants are randomised and a process is used where the allocation to groups are concealed to the researchers otherwise there could be researcher bias (i.e. assigning participants based on a criteria). Further to this, there can be therapist effects e.g. if aware of the randomisation sequence, they may treat participants differently (provide more

attention etc if randomisation is based on severity).

Methodical monitoring around medication	Information collected at beginning of study, but limited information otherwise	Information collected at categorical timepoints, but not throughout the study	Information around frequency of dose and data monitoring protocol throughout the study	Methodical collection of ADHD medication intake (e.g. dose, medication and intake) throughout the study will control for external variables interacting with study findings.
Independent clinician to assess symptom severity	No independent clinician was used to assess symptom severity	Independent-clinician is not blind	Independent-clinician is blind to treatment group	The raters being blind to treatment would reduce bias, as it may influence how they assess symptom criteria e.g. may give a lower scoring to a participant in the CBT group. Using an independent clinician adds greater validity than using a parent and teacher who may be biased based on their initial relationship with the adolescent.

Table 12

Summary of WoE B Ratings

Study	Control Group	Follow-up Phase	Randomisation	Monitoring around medication	Independent clinician	Overall WoE B Rating
Boyer et al. (2015)	1	3	2	2	1	1.8 (Low)
Meyer et al. (2021)	3	3	2	2	1	2.2 (Medium)
Schramm et al. (2016)	3	1	1	1	2	1.6 (Low)
Sprich et al. (2016)	2	2	3	3	3	2.6 (High)
Vidal et al. (2015)	2	1	3	3	3	2.4 (High)

The overall weighting of evidence B is the average of the below four criteria - the scores were added up and the total was divided by four. Studies were rated in a tercile fashion:

Note 1: WoE B ratings receive a rating of low <1.93, medium if between 1.93 and 2.33, and high if >2.33

Weight of Evidence C (WoE C)

This section assesses how relevant the focus of the included studies are to the current review question. Four criteria were developed. It was decided that the extent to which all participants in the study have been diagnosed with an anxiety disorder, the experience of the intervention facilitators, the detail and reporting of outcome measures and the inclusion of a follow up phase were significant indicators of relevance to this review question

Table 13

Summary of Criteria of Weight of Evidence C

Criteria	Low (1)	Medium (2)	High (3)	Rationale
Amount of informants for rating measures	Study has reported 1 informant who has rated changes	Study has reported 2 informants who have rated changes (e.g. parent and adolescent)	Study has reported 3 or more informants who have rated changes - (e.g. clinician, parent, teacher and adolescent)	More sources will lead to a more holistic picture. Parents and teachers are reliable informants as they are in direct contact with participant, so they can observe behaviour change post-intervention (Kratochwill, 2003). Furthermore, having a clinician is beneficial in terms of reducing the likelihood of parent bias and the impact of parent-adolescent relationship on parent assessment.
CBT-based Intervention	Intervention is loosely informed by CBT (i.e. had at least two or three elements of CBT), and adapted for adolescents of ADHD	Intervention is partially-informed by CBT, and adapted for adolescents with ADHD.	Intervention is fully informed by CBT, and adapted for adolescents with ADHD	This review is looking at the effectiveness of CBT-based interventions and as such, an intervention that is more informed by CBT within the intervention will better suit the aims of the review question.

Age of participants	Sample includes adults	Sample includes only older adolescents	Sample includes a range of adolescents	It is suggested that treatment for ADHD needs to change according to the developmental stage (e.g. children, adolescence and adults; Young & Myanathi Amarasinghe, 2010) and thus this review aims to solely include adolescents (including older adolescents) as other reviews tend to review children and early adolescents (e.g. Chronis et al., 2006) and adults (e.g. Young et al., 2020). It is also likely that adolescents are better equipped to cope with CBT intervention than children, due to their developing maturity (e.g. Antshel et al., 2012). However, young adolescents were also included since at this age, they begin secondary school which can be challenging for pupils with ADHD (Thompson et al., 2003). As a result, evaluating the impact on this age group may have beneficial implications for transition support.
Outcome Measures	Measured ADHD symptoms solely, not according to clinical criteria	Measured ADHD symptoms according to clinical criteria or measured the severity of symptoms	Measured ADHD symptoms according to clinical criterion and has a measure of measuring the severity of symptoms	This review question is looking at the reduction of severity in symptoms and frequency of symptoms, as defined by the DSM-5, being hyperactivity, inattention and impulsivity, thus having two measures to evaluate both will give a clearer picture

Table 14

Summary of WoE C Ratings

Study	Amount of informants for rating measures	CBT-based	Age of Participants	Outcome Measures	Overall WoE C Rating
Boyer et al. (2015)	1	3	3	3	1 2 (Low)
Meyer et al. (2021)	2	2	2	2	3 2.25 (Medium)
Schramm et al. (2016)	3	1	3	3	2 2.25 (Medium)
Sprich et al. (2016)	3	3	2	2	2 2.5 (High)
Vidal et al. (2015)	3	3	1	3	3 2.5 (High)

The overall weighting of evidence C is the average of the above four criteria - the scores were added up and the total was divided by four. Studies were rated in a tercile fashion:

Note 1: WoE C ratings receive a rating of low <2.25, medium if between 2.25 and 2.41, and high if >2.4

Appendix D - Coding Amendments

Sections of Kratochwill (2003) that were excluded

Section heading	Section removed/modified	Rationale
I. General Study Characteristics	Section A: General Study Characteristics	The study characteristics are discussed within the review, besides A5. which is not relevant to the review question.
Section B: General Design Characteristics	Section B: General Design Characteristics	Studies are discussed further in WoE B. All studies are randomised controlled trials. Further evaluation of randomisation is included elsewhere in this review
	Section C4- C6: Data Analysis	This will be covered in mapping the field. Familywise error rate controlled – Type 1 error. MANOVA will be in mapping the field
	Section C7. Coding, C8. Interactive Process	The studies included do not report on qualitative data.
	Section C9. Rival Interpretations	This is not relevant to the aims of the study.
	Section D: Type of Program	This was excluded as all studies within this review are 'intervention' programs.
	Section D4: Social comparison	This has been removed as the research question is about the effectiveness of ADHD symptoms and not how it would compare to their non-ADHD counterparts.
	Section E: Stage of Program	This was excluded as it is not relevant for the review.
II. Key Features of Coding for studies and Rating Level of Evidence/Support	Section A1	Not relevant for this review (A1 & A2) or no differences between studies (A3-A5).

B2. Multi-method	This was excluded as it is discussed in other parts of the review.
B3. Multi-source	This was excluded as it is discussed in other parts of the review.
B4. Extent of Engagement Section B.6: Cultural appropriateness of the Measures	Not relevant for this review.
Section C: Comparison group	This is excluded as it will be further evaluated and discussed in WoE B.
Section D: Primary/Secondary outcomes are statistically significant	This is excluded as it will be discussed in detail within the study, and secondary outcomes are not discussed.
Section E: Cultural significance	This is excluded as it is not relevant to the purpose of this review question.
Section F: Educational/clinical significance.	This is excluded as it is discussed in detail within this review.
Section H4: Durability/generalisation of intervention and outcomes	This is excluded as this review question looks at the impact on those with ADHD, so it is not relevant to the review question.
Section I: Intervention Components	One of the studies had identifiable components, but this was excluded, as mentioned in other parts of the review.
Section G1.3 Rationale for sample size specified.	All studies chose participants with adolescents with ADHD, so this was excluded.
Section G2. Participant characteristics specified for treatment and control group	This is excluded as it is not relevant to the purpose of this review question.

H1.4 Follow-up addresses institutionalisation and/or sustainability of intervention efforts	It was changed to 'follow-up addresses both treatment and control conditions' as suits the methodological design of the review question.
Section J4.1: Characteristics of the Implementer J4.2	This is excluded as it is not relevant to the purpose of this review question. All interventions are adapted for adolescents with ADHD.
J4.4 Documents the relationship between the implementers and participants	This is excluded as it is not relevant to the purpose of this review question.
J4.5 Length of intervention J4.6 Intensity of Intervention	These are excluded as they are discussed elsewhere in the review.
J4.8 Program Implementer	This is excluded as it is discussed elsewhere in this review.
J4.9 Intervention Style	This is excluded as this will be discussed elsewhere in the review.
J4.10 Cost analysis data	None of the studies included information on cost analysis.
J4.11 Training and Support Materials	This is excluded as this will be discussed elsewhere in the review.
J4.12.2 Cost to train intervention agents if known and potentially J14.2.3 Rating of cost to train intervention agents	This is excluded as it is not relevant to the purpose of this review question.
Section K: Replication	This was not relevant to the aims of the review.
Section L: Site of Implementation	This was not relevant to the aims of the review.

Appendix E – Coding Protocols

Adapted from the Procedural Manual of the Task Force on Evidence-Based Interventions in School Psychology, American Psychology Association, Kratochwill, T.R. (2003)]

Coding Protocol: Group-Based Design

Domain:

- School- and community-based intervention programs for social and behavioural problems
- Academic intervention programs
- Family and parent intervention programs
- School-wide and classroom-based programs
- Comprehensive and coordinated school health services

Full Study Reference in APA format:

Meyer, J., Ramklint, M., Hallerback, M. U., Loof, M., & Isaksson, J. (n.d.). (2021) Evaluation of a structured skills training group for adolescents with attention-deficit/hyperactivity disorder: a randomised controlled trial. *European Child & Adolescent Psychiatry*. <https://doi.org/10.1007/s00787-021-01753-2>

Intervention Name (description from study):

Age-adapted version of a manualised DBT-based group programme originally developed for adults with ADHD

Type of Publication: (Check one)

- Book/Monograph
- Journal article
- Book chapter
- Other (specify):

A. Data Analysis (answer B1 through B6)

- C1. Appropriate unit of analysis YES NO N/A
- C2. Familywise error rate controlled YES NO N/A

C3. Sufficiently large N YES NO N/A

Statistical Test: two tailed t-test
 α level: 0.05

ES: 0.50

N required: 100

F. Concurrent or Historical Intervention Exposure (select one)

F1. Current exposure

F2. Prior exposure

F3. Unknown

II. Key Features for Coding Studies and Rating Level of Evidence/ Support

(3=Strong Evidence 2=Promising Evidence 1=Weak Evidence 0=No Evidence)

A. Measurement*(answer B1 through B6)

B1. Use of outcome measures that produce reliable scores for the majority of primary outcomes. The table for Primary/Secondary Outcomes Statistically Significant allows for listing separate outcomes and will facilitate decision making regarding measurement) 0.91, 0.89 (select one of the following

B1.1 Yes

B1.2 No

B1.3 Unknown/unable to code

B5. Validity of measures reported (select one of the following)

B5.1 Yes, the questionnaires had good internal consistency of the questionnaires within the study.

B5.2 In part, validated for general population only

B5.3 No

B5.4 Unknown/unable to code

B7. Measures of key outcomes are linked to intervention

B7.1 3 Clear links established between the intervention and key outcome

B7.2 2 Some, but not all, key outcomes are clearly linked to the intervention

B7.3 1 Vague reference to links between key outcomes and intervention

B7.4 0 No evidence that key outcomes are linked to the intervention

B. Overall Rating for Measurement (select 0, 1, 2, or 3): 3 2 1 0

G. External Validity Indicators

G1. Sampling Procedures (Answer G1.1 through G1.4)

G1.1 Sampling procedures described in detail

G1.1.1. 1 YES

G1.1.2. 0 NO (incomplete or no evidence)

G1.2. Rationale for sample selection specified [integrate current A1.1-A1.3, & A.3]

G1.2.1 1 Yes

Specify: _____

G1.2.2 0 No (incomplete or no evidence)

G1.3. Rationale for sample size specified

G1.3.1. 1 Yes

Specify: G*Power, power of 0.80, effect size of 0.5 participants per group 7 and sample size of approx 50

G1.3.2 0 No (incomplete or no evidence)

G1.4. Evidence provided that sample represents target population

G1.4.1. 1 Yes

G1.4.2. 0 No (incomplete or no evidence)

G1.6. Inclusion/exclusion criteria specified Yes No

G1.7. Inclusion/exclusion criteria similar to school practice Yes No

G1.8. Specified criteria related to concern Yes No

G1. Rating for Sampling (select 0, 1, 2, or 3): 3 2 1 0

G3. Adequately reported characteristics of participants/sample. Adequate level of detail in description of participants.

G3.1. 1 Yes

G3.2. 0 No (Incomplete or no evidence)

G4. Details are provided regarding variables that:

G4.1 Have differential relevance for intended outcomes Yes No

Specify: measured medication

G4.2 Have relevance to inclusion criteria Yes No

Specify: They listed the ADHD diagnosis, age of participants as well as other relevant inclusion/exclusion criteria

G5. Transferability of the intervention.

G5.1. 3 Complete and detailed description of the context within which the intervention occurs.

G5.2. 2 Detailed description of some but not all contextual components

G5.3. 1 Provides overview of contextual components but lack details

G5.4. 0 No description of context

G6. Participant perceptions of benefits of intervention (treatment group)

G6.1. 3 Provided evidence of perceived benefits from the intervention for all participant groups.

G6.2. 2 Provided evidence of perceived benefits from the intervention for some participant groups.

G.6.3. 1 Provided evidence that participants did not perceive benefits from the intervention.

G.6.4. 0 Did not investigate participants' perceptions of benefits.

G. OVERALL Rating for External Validity (select 0, 1, 2, or 3): 3 2 1 0

Score range: Score of 3 (7-9), Score of 2 (4-6), Score of 1 (1-3)., with G3 and G4.1 and G4.2 constituting 1 point each.

H. Durability/Generalization of Intervention and Outcomes

H1. Follow-up assessment

H1.1 Timing of follow up assessment: Yes No

Specify 6 months

H1.2. Number of participants included in the follow up assessment: Yes No

Specify n = 57 for control and n = 71 for intervention

H1.3, Consistency of assessment method used: Yes No

Specify: same measures were used

Overall Rating for Follow-up Assessment (select 0, 1, 2, or 3): 3 2 1 0

H2. Durability/Generalization over time

H2.1.1 Evidence is provided regarding the sustainability of outcomes after intervention is terminated

Yes No

Specify: follow-up measures

H2.1.2 Procedures for maintaining outcomes are specified Yes No

Specify: last session is on maintaining progress and manage future problems.

H3. Durability/Generalization across settings

H3.1 Evidence is provided regarding the extent to which outcomes are manifested in contexts that are different from the intervention context Yes No

H3.2 Documentation of efforts to ensure application of intervention to other settings
 Yes No

Specify: home assignments to complete

OVERALL Rating Durability/Generalization (select 0, 1, 2, or 3): 3 2 1
 0

J. Implementation Fidelity

J1. Evidence of Acceptable Adherence (answer J1.1 through J1.3)

J1.1 Ongoing supervision/consultation

J1.2 Coding intervention sessions/lessons or procedures

J1.3 Audio/video tape implementation (select J1.3.1 or J1.3.2):

J1.3.1 Entire intervention

J1.3.2 Part of intervention

J2. Manualization (select all that apply)

J2.1 Written material involving a detailed account of the exact procedures and the sequence in which they are to be used

J2.2 Formal training session that includes a detailed account of the exact procedures and the sequence in which they are to be used

J2.3 Written material involving an overview of broad principles and a description of the intervention phases

J2.4 Formal or informal training session involving an overview of broad principles and a description of the intervention phases

J3. Adaptation procedures are specified (select one) Yes No Unknown

Rating for Implementation Fidelity (select 0, 1, 2, or 3): **3** 2 1 0

J4. Implementation Context (Conditions of Implementation)

J4.7 Dosage Response (select J4.7.1 or J.7.2)

J4.7.1. Unknown/insufficient information provided

J4.7.2. Information provided (if information is provided, answer J4.7.2.1)

J4.7.2.1 Describe positive outcomes associated with higher dosage:

Summary of Evidence for Group-Based Design Studies

Indicator	Overall Evidence Rating NNR = No numerical rating or 0 - 3	Description of Evidence Strong Promising Weak No/limited evidence or Descriptive ratings
General Characteristics		
Data Analysis		Sufficiently large N
Concurrent/Historical Intervention Exposure		Current exposure - requested participants not to take part in any other psycho-social treatment
Key Features		
Measurement	2	Promising
External Validity Indicators	3	Strong
Durability/Generalization	3	Strong
Implementation Fidelity	3	Strong