



Optimising Anxiety Treatment for Autistic Children: a Narrative Review

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Abstract

Anxiety disorders occurs at a high rate amongst autistic children. Cognitive behaviour therapy (CBT) is a reasonably well-established multi-component intervention used to reduce anxiety in this population. Whilst there are known effective intervention components in CBT for treating anxiety among autistic children, there are few guidelines for how to weight these intervention components to maximise positive outcomes. The objective of this study is to evaluate whether CBT is an effective intervention for autistic children, and if so, what the key components of effective CBT programs are for autistic children. A review of studies using manualised group-based CBT programs with family involvement was completed. The key finding was that the exposure-focused CBT (EF-CBT) studies reviewed showed a greater improvement in anxiety symptoms compared with CBT studies with fewer or no exposure-focused sessions. Compared to CBT without an exposure focus, EF-CBT may better fit the profiles of autistic children, potentially resulting in greater client and family engagement, and possibly greater intervention efficacy.

Keywords Anxiety · Autism/autism spectrum disorder · Children · Cognitive behaviour therapy (CBT) · Exposure-focused CBT (EF-CBT)

Highlights

- Co-occurring anxiety is highly prevalent amongst young autistic children.
- Cognitive behaviour therapy (CBT) is a widely used anxiety intervention for this population; however, it has been unclear what are the key components of CBT for anxious autistic children, nor how to weight key components effectively.
- Exposure-focused CBT (EF-CBT) studies appear more successful in reducing anxiety for anxious autistic children than CBT programs with minimal-to-no exposure-focused content.
- Further investigation and consultation is required to determine optimal quantity of exposure-oriented strategies, and to address barriers with implementing these procedures in clinical and community settings.
- The ideal outcome would be guidelines for practitioners to assist with tailoring CBT interventions for autistic children.

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Autism (also referred to as autism spectrum disorder) is a neurodevelopmental disorder characterised by deficits in social communication and reciprocity, restricted or repetitive interests and behaviours (Kerns et al., 2021), and sensory differences (MacLennan et al., 2020). The severity of autism can vary greatly and is determined by the degree to which communication, social behaviour, insistence of sameness of activities and surroundings, sensory sensitivities and repetitive patterns of behaviour affect the daily functioning of the individual (Lord et al., 2018).

Anxiety disorders are common comorbid mental health conditions amongst autistic children, resulting in significant impairment (Vasa et al., 2020; White et al., 2009). Meta-analyses reveal that 40% of autistic children meet criteria for at least one anxiety disorder (van Steensel et al., 2011), with a further 30–40% demonstrating

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subclinical anxiety levels that impact daily functioning (Strang et al., 2012; Vasa et al., 2013). Autistic children often experience anxiety in different ways from their neurotypical peers (i.e., children without neurodevelopmental disorders such as autism or ADHD), including anxiety around routine, novelty and restricted interests, unusual specific fears, social fearfulness, performance anxiety and compulsive/ritualistic behaviour (Kerns et al., 2014). Co-occurring anxiety can cause acute distress for autistic children, amplify the core symptoms of autism and trigger behavioural difficulties including tantrums, meltdowns, aggression and self-injury (Canitano, 2006). Given the high rates of anxiety amongst autistic children, the development and testing of effective treatments for anxious autistic children is an important public health issue.

The most frequently evaluated psychological treatment for anxiety disorders in children is cognitive behaviour therapy (CBT) (Warwick et al., 2017). CBT emphasises the interconnection of thoughts, feelings and behaviour with the basic premise that change in one dimension leads to a change in the other dimensions (Kester & Lucyshyn, 2018). Common strategies include cognitive restructuring to help children identify and challenge negative automatic thoughts, exposure activities to enable children to confront feared situations in a graded fashion, and other forms of skills training, such as relaxation, social skills, and problem-solving training (see reviews by Ale et al., 2015; Creswell et al., 2020; Rotheram-Fuller & MacMullen, 2011).

CBT has developed over several generations or ‘waves’, with the first of these (behaviour therapy, ca. 1950–present) primarily focused on classical conditioning and operant learning (e.g., Bijou, 1957; Lindsley, 1956; Wolpe, 1968). The ‘second wave’ (cognitive behaviour therapy, ca. 1970–present) focused on the role of maladaptive thinking patterns in emotion and behaviour and the use of methods to detect and change those patterns (e.g., Beck, 1979; Ellis & Harper, 1975). The ‘third wave’ (clinical behaviour analysis, ca. 1990–present) emphasises matters such as mindfulness, emotions, acceptance, the therapeutic relationship, values, goals, and meta-cognition (Hayes, 2004).

The distinctions between the third wave and earlier models are somewhat ambiguous (Hayes & Hofmann, 2017), with some techniques developed from third-wave therapies (e.g. mindfulness, acceptance) now incorporated into mainstream CBT programs (McCracken, 2022). Technical eclecticism of both second- and third-wave techniques among clinicians appears common (Brown et al., 2011), which provides greater variety and choice in selection of therapeutic techniques, but subsequently creates a challenge in determining the most effective treatment components. The challenge of selecting the most useful effective treatment components is a dilemma that is further amplified when the target population have unique learning and behaviour profiles.

CBT has increasingly been used as an intervention approach for anxious autistic children, with modifications incorporated to address the specific needs of this population (see Table 1; Kester & Lucyshyn, 2018). Modifications have included the use of visual supports and concrete examples, including primary caregivers in the treatment process, adapting information to match the child’s cognitive abilities, incorporating special interests, and individualised reinforcement strategies (Moree & Davis, 2010). However, the multi-component nature of CBT, along with additional adaptations made for autistic children, makes it difficult to establish the components most relevant and delivered in sufficient quantity for symptom improvement. The lack of clarity on program content and weighting provides a challenge for clinicians working in this area, particularly as CBT continues to evolve, and there are few guidelines about how clinicians might prioritise CBT strategies.

The overall objective of this paper is to determine which components of CBT seem most effective for autistic children. A narrative review was completed to enable a broader lens to be applied to the current topic than is allowable through a systematic review or meta-analysis, which may identify areas where more targeted critical analysis may be warranted. There were two key research questions: (i) What evidence is there for CBT as an effective anxiety treatment for autistic children? (ii) What components of CBT may be most effective for this population? The review is divided into four sections. First, we provide an overview of empirical support for the efficacy of CBT with a focus on manualised anxiety treatment programs delivered in group format. Second, we distil the key strategies contained within efficacious interventions and look for patterns in findings that point to the most effective components. In the third section, we present recommendations for state-of-the-art CBT components. Finally, we present core conclusions and future directions for research and practice.

Is CBT Effective for Anxiety in Autistic Children?

Several meta-analyses evaluating CBT as an effective anxiety treatment for autistic children were reviewed (i.e., Hillman et al., 2020; Perihan et al., 2020; Sharma et al., 2021; Sukhodolsky et al., 2013; Ung et al., 2015). The meta-analyses shared similar inclusion criteria, in that participants included were aged 18 years or younger, had a primary diagnosis of autism, and an anxiety disorder as determined by standardised anxiety measures or clinical assessment. To ensure similarity in study designs, only reviews of group experimental designs or randomised control trials were conducted at this time, with case studies, single case designs and qualitative case reports excluded. All studies included within the meta-analyses

Table 1 Example CBT programs and components in studies with autistic children

Program name	Sample studies	Sessions	Format	Psycho-education	Somatic management	Theory of mind skills	Cognitive restructuring	In vivo/graded exposure tasks	Emotion regulation	Behavioural strategies
Facing Your Fears	Drmic et al. (2017); Hepburn et al. (2016); Reaven et al. (2015)	10–14 weekly sessions	Group	✓	✓	✓	✓	✓	✓	✓
Exploring Feelings	Luxford et al. (2017)	6 weekly sessions	Group	✓	✓	✗	✓	✗	✓	✓
BIACA	Storch et al. (2015); Wood et al. (2020)	16 weekly sessions	Group	✓	✗	✗	✓	✓	✓	✓
Discussing + Doing = Daring	van Steensel et al. (2014); van Steensel & Bögels (2015)	15 sessions	Group	✓	✓	✗	✓	✓	✓	✗
Coping Cat	McNally Keehn et al. (2013); Weiss et al. (2015)	12–16 weekly sessions	Group	✓	✓	✗	✓	✓	✓	✓
Cool Kids	Chalfant et al. (2007); Kilburn et al. (2019)	12 sessions	Group	✓	✓	✗	✓	✓	✓	✓

Autism adaptations: Multimodal stimuli (drawing, writing, pictures, acting), socratic questioning, inclusion of special interests, predictable session routines, video modelling, repetition, written worksheets

Autism adaptations: Special interest tools, visuals, reward system, structure/written schedule

Autism adaptations: Modular format guided by ADI-R algorithm, antecedent and consequence-based practices to reduce challenging behaviour; inclusion of special interests, reward system to generalise behaviour across settings

Autism adaptations: Sessions lengthened to 60-90 min, written and visual materials, concrete language, inclusion of specific interests and preoccupations, provision of sensory tools, differentiated learning, reinforcement strategies

Autism adaptations: Extended over 6 months, visual aids, structured worksheets, simplified cognitive activities

Psychoeducation = learning about anxiety and the mind-body connection; Somatic management = deep breathing, relaxation, etc.; Theory of mind skills = perspective taking, affect recognition in others; Cognitive restructuring = recognition of negative/unhelpful thoughts, developing helpful thoughts, etc.; In vivo/Grade exposure tasks = development of fear hierarchy, facing real-life fears in step-by-step format; Emotion regulation = recognition and response to feeling of anxiety; Behavioural strategies = learning through role playing, modelling, provision of reinforcement, etc

were published in English in peer reviewed journals. Participants were frequently described as ‘high functioning’, a term describing individuals who require supports at level one according to the DSM-5-TR (American Psychiatric Association; APA, 2022), have sentence-to-conversational speech skills, and of average to above average intelligence (Perihan et al., 2020). Various aspects of CBT were explored in each meta-analysis, including the general efficacy of CBT as a treatment for autistic children (e.g., Hillman et al., 2020; Sukhodolsky et al., 2013), impact of parent involvement in treatment and effect of treatment length (e.g., Perihan et al., 2020; Ung et al., 2015), differences in informant ratings (e.g., Sharma et al., 2021; Sukhodolsky et al., 2013; Ung et al., 2015), durability of treatment gains (e.g. Sharma et al., 2021), and CBT modalities (individual, group) (Ung et al., 2015).

The meta-analyses found CBT delivered with anxious autistic children yielded significant effects relative to waitlist or control conditions (Hillman et al., 2020; Sukhodolsky et al., 2013). Greater treatment effects were found in studies with parent involvement than those without (Perihan et al., 2020; Ung et al., 2015). Treatment effects associated with short-term interventions were found to be significantly weaker than those obtained in standard-term and long-term interventions (Perihan et al., 2020), suggesting that extended time (additional weeks) rather than more contact time (longer sessions) is required for autistic children to learn and administer cognitive strategies for coping with their anxieties. Effect sizes varied markedly across informants, with clinician-rated change often showing a large effect, versus a moderate-effect by parent-report and small-to-moderate effect by child report (Sharma et al., 2021; Sukhodolsky et al., 2013). The benefits of CBT was suggested to be more pronounced in younger children, indicating a need to differentiate CBT protocols by age group (Sharma et al., 2021). Sustained treatment effects were not supported for autistic children (Sharma et al., 2021), with speculation that daily life challenges associated with autism may interfere with ratings (Lecavalier et al., 2014). Individual- and group-based CBT for anxious autistic children have been found similarly efficacious (Ung et al., 2015).

Overall, there is strong existing evidence that CBT is an effective anxiety intervention relative to no or minimal intervention for autistic children. The strength of evidence for CBT in treating anxiety for autistic children is reportedly moderate (Perihan et al., 2020; Vasa et al., 2014). By comparison, the effectiveness of alternative anxiety treatments (e.g. psychopharmacological intervention) for autistic children has been found to be low (Vasa et al., 2014).

What Are the Key Components of Effective CBT for Anxiety in Autistic Children?

Core components of CBT for anxious children typically involve psychoeducation about the nature of anxiety (e.g., normalising the experience of anxiety, differentiating helpful versus unhelpful forms of anxiety, identifying cognitive behavioural and physiological components of anxiety, etc.), cognitive strategies (e.g., learning to identify and challenge unhelpful anxious thoughts or comments), and behavioural strategies (e.g., graded exposure to feared situations using a fear hierarchy, exposure and response prevention strategies, and behavioural experiments to test catastrophic and anxious predictions) (Johnco & Storch, 2015). For neurotypical children, cognitive restructuring and exposure tasks have been found to significantly accelerate the rate of progress in the treatment of anxiety on measures of symptom severity and global functioning (Piacentini et al., 2014). However, CBT adaptations for autistic children sometimes have a reduced focus on cognitively-oriented intervention components and a greater focus on teaching practical skills (Lang et al., 2010), which may be understandable given the challenge for autistic children with metacognition (Bednarz et al., 2020).

To evaluate key components of effective CBT for anxiety in autistic children, studies from existing meta-analyses (i.e., Hillman et al., 2020; Perihan et al., 2020; Sharma et al., 2021; Sukhodolsky et al., 2013; Ung et al., 2015) were reviewed, with the additional criteria that the studies (a) used a manualised anxiety treatment program, (b) were conducted as a randomised control trial, (b) provided in group-only format, and (c) specifically included parents. An additional search for studies published post-2019 using core search terms (“CBT or Cognitive Behaviour therapy”) AND (“autism” OR “ASD”) AND (“randomized control trial” OR “RCT”) AND “child” did not yield additional studies that met inclusion criteria.

A total of 11 studies were included in the present review (see Table 2). Sample sizes ranged from 11 to 71 participants, with an age range of 4–17 years and a predominance of males in all studies. Total sessions provided ranged from 7 to 14. Intervention programs used with or without adaptation included *Cool Kids* (Lyneham et al., 2003), *Fun with Feelings* (Cook et al., 2019), *Cool Kids ASD* (Chalfant et al., 2007), *Exploring Feelings* (Attwood, 2004), *Coping Group/Fighting Worry and Facing Fears* (Reaven et al., 2005), *Face Your Fears* (Reaven et al., 2011), and *MASSI* (Multimodal Anxiety and Social Skills Intervention; White et al., 2010). Parent involvement included attending the same sessions as children and/or having separate parent-only sessions either in parallel to the children’s sessions or for a short-time after the children’s

Table 2 Summary of included studies

Source	Sample size	Total sessions	Intervention	Exposure-based sessions	Amount of parent involvement	Anxiety measure used	Informant and corresponding effect size
Chalfant et al. (2007)	$N = 47$, 35 males, 8–13 years	12	<i>Cool Kids</i>	7.5	All sessions	(C) RCMAS, (P/C) SCAS	Child: $g = -2.97$ Parent: $g = -4.27$
Cook et al. (2019)	$N = 31$, 27 males, 4–6 years	10	<i>Fun with Feelings</i>	7	Parent mediated (all sessions)	(P) CBCL – Anx (P) CBCL – Int (P) CBCL – Ext	$g = -0.14$ $g = -0.30$ $g = -0.21$
Hepburn et al. (2016)	$N = 33$, 27 M	10	<i>Face Your Fears</i>	5	All sessions	(P) SCARED	$d = 0.74$
Kilburn et al. (2020)	$N = 49$, 28 males, 8–14 years	10	<i>Cool Kids ASD</i>	Included but not specified	All sessions	(P) ADIS-CRS (P) SCAS (C) SCAS	$d = 1.25$ $d = 0.67$ $d = 0.71$
McConachie et al. (2014)	$N = 32$, 28 males, 9–13 years	7	<i>Exploring Feelings</i>	0	All sessions	(P/C) SCAS (C) ADIS primary diagnosis - severity	Child: $g = -0.24$ Parent: $g = -0.20$
Ohan et al. (2016)	$N = 24$, 18 males, 8–12 years	10	<i>Cool Kids ASD</i>	Included but not specified	All sessions	(P) SCAS	Parent: $\eta^2 = 0.38$
Reaven et al. (2009)	$N = 33$, 26 males, 7–14 years	12	<i>Coping Group, Fighting Worry and Facing Fears</i>	6	All sessions	(P) ADIS CSR	Parent: $g = -0.60$
Reaven et al. (2012)	$N = 50$, 48 males, 7–14 years	12	<i>Face Your Fears</i>	Included but not specified	All sessions	(P/C) SCARED	Child: $g = -0.28$ Parent: $g = -0.86$
Scarpa and Reyes (2011)	$N = 11$, 9 males, 5–7 years	9	<i>The CBT</i>	0	All sessions	(P) ERC - Emotion Regulation Subscale (P) ERC - Negativity/Lability Subscale	$d = 0.05$ $d = 0.15$
Sofronoff et al. (2005)	$N = 71$, 65 males, 10–12 years	6	<i>Not specified</i>	0	All sessions	(P) SCAS	$g = -0.09$
White et al. (2013)	$N = 30$, 23 males, 12–17 years	14	<i>MASSI</i>	1/12 modules exposure-focused	All sessions	(P) CASI – Anxiety (CL) PARS	Parent: $g = -0.37$ Clinician: $g = -0.32$

Effect sizes are reported in Hedges' g , Cohen's d , or partial eta-squared (η^2)

ADIS Anxiety Disorders Interview Schedule, *CASI* Child and Adolescent Symptom Inventory, *CBCL-Anx* Child Behaviour Checklist–Anxiety, *CBCL-Ext* Child Behaviour Checklist – Externalising, *CBCL-Int* Child Behaviour Checklist–Internalising, *CSR* Clinical Severity Rating, *ERC* Emotion Regulation Checklist, *PARS* Pediatric Anxiety Rating Scale, *RCMAS* Revised Children's Manifest Anxiety Scale, *SCARED* Screen for Child Anxiety Related Emotional Disorders, *SCAS* Spence Children's Anxiety Scale, (*P*) parent, (*C*) child, (*CL*) clinician

session was completed. In one instance (i.e., Cook et al., 2019) parents were trained as mediators of the intervention. Primary outcome measures comprised a mixture of parent, child and clinician report. Values of 0.20, 0.50, and 0.80 for Cohen's d and Hedges' g are commonly considered to be indicative of small, medium, and large effects (Cohen, 1988), however one study (i.e. Ohan et al., 2016) employed partial eta-squared which provides effect sizes of 0.01 (small), 0.06 (medium) and 0.14 or higher (large).

Commonalities and differences amongst the studies were explored based on reported effect size pre- to immediate post-treatment. Studies were predominantly found to differ on aspects of program content, in particular, the number of sessions allocated to exposure-focused activities. Studies without exposure-based sessions were noted to have small or non-significant findings (i.e., McConachie et al., 2014; Scarpa & Reyes, 2011; Sofronoff et al., 2005). By comparison, studies reporting moderate- to large effect sizes (i.e., Chalfant et al.,

2007; Hepburn et al., 2016; Kilburn et al., 2020; Reaven et al., 2009; Reaven et al., 2012) allocated up to 63% of total sessions provided to exposure-focused content.

The *Cool Kids* program appeared to provide the highest number of exposure sessions, and reported the largest effect size overall. The autism-specific adaptation of this program, *Cool Kids ASD*, may also provide a similar ratio of exposure-focused sessions. Studies using *Cool Kids ASD* (i.e., Kilburn et al., 2020; Ohan et al., 2016) were noted to have large effect sizes based on parent-report. Similarly, the *Face Your Fears* program used in two studies evaluated (i.e., Hepburn et al., 2016; Reaven et al., 2012) obtained large effect sizes by parent report, replicating an earlier study and similar program (i.e. Reaven et al., 2009) which had allocated 50% of sessions to exposure-focused activities.

The study using the *Fun with Feelings* program (i.e., Cook et al., 2019) reported a high ratio of exposure-focused sessions, but subsequent small effect size. The study differed in that sessions were provided to parents only, with the intention for the parents to implement the key strategies taught with their children. This study also involved the youngest age-group. Further investigation and replication would be required to ascertain key differences and contributions to program effectiveness.

Overall, of the studies reviewed employing manualised CBT treatment programs, exposure-focused CBT (EF-CBT) studies appear to show more consistent and significant improvement in anxiety symptoms than CBT programs with few-to-no exposure-focused sessions. Increased exposure-focused sessions could be considered a strong indicator of treatment effectiveness for anxious autistic children. However, this cannot be considered conclusive given the limited number of studies available for review. Further exploration of EF-CBT for anxious autistic children does appear warranted.

Recommendations for the Delivery of CBT for Anxious Autistic Children

CBT is an effective anxiety treatment for autistic children under certain conditions, particularly when parents are involved in treatment, sessions are provided over an extended period, and content is adapted to suit the age of the child (Perihan et al., 2020; Sharma et al., 2021; Ung et al., 2015). Obtaining information on anxiety symptoms from multiple informants (i.e., clinician, parent, and child) is recommended to obtain a more accurate picture of anxiety-driven behaviours and effects (Sharma et al., 2021). Format of delivery (group versus individual) has similar efficacy, but varies with benefits (e.g., normalising anxiety symptoms in the presence of other affected children, providing socialisation and supportive peer interaction opportunities for group programs, more flexible implementation and tailoring to the

unique needs and interests of the child for individualised programs) (Ung et al., 2015).

Despite the recognition of the effectiveness of CBT for anxious autistic children, optimising anxiety treatment for this population is still needed. An evaluation of studies providing CBT via manualised anxiety treatments in group format with family involvement appeared to indicate that programs with a higher allocation of exposure-focused sessions showed greater symptom improvement with the possibility of more enduring change than CBT programs with low or no exposure-focused sessions. EF-CBT may be an approach that offers more practical application of the skills needed to directly address an autistic children's anxiety.

EF-CBT typically involves an initial session of psychoeducation on the role of avoidance in the maintenance of anxiety disorders, how the use of exposure can break this cycle, and how this is relevant to the child's particular symptoms (Whiteside et al., 2015). Fear hierarchies are created in the next session, along with completion of introductory exposure activities, and assignment of homework tasks. Remaining sessions consist of ongoing revision of homework tasks, completion of in-session exposure, and assignment of new homework tasks. Parents are often included and gradually assume responsibility for conducting in-session exposures, culminating in fully leading the exposure in final sessions (Whiteside et al., 2015). Some EF-CBT protocols have included reward systems and sessions to address problematic oppositional behaviour if behavioural challenges prevent treatment completion (e.g., Storch et al., 2020). Additional skills identified to complete exposure tasks (e.g., social skill development) can be conducted alongside the exposure tasks but may not be essential. For example, a pilot study investigating a family-based exposure-focused treatment protocol did not include any additional sessions focused on autism-related domains (e.g., functional communication, socialisation, stereotyped interest/behaviour, adaptive skills/functioning) yet significant reductions in anxiety symptoms were reported (Storch et al., 2020).

EF-CBT programs may be more effective for autistic children due to several reasons, including the reduced language component, less focus on areas that are known to be challenging for autistic children (e.g., visualising, thought recognition, body awareness), and strong dedication to sessions allocated to components that might have longer-lasting effects (e.g., direct contact and practice with feared stimuli allowing the opportunity of new learnings, providing access to social reinforcement, etc.). It is recommended that researchers and practitioners consider exposure-focused sessions a crucial component of CBT for autistic children and plan for these procedures accordingly. It appears at least half of sessions delivered under a CBT program could be allocated to exposure activities. However, more research

determining the minimum quantity of exposure-focused sessions within CBT protocols is needed.

The *format* of exposure activities must also be investigated with autistic children. In a study evaluating quantity and difficulty level of exposure tasks for neurotypical children, researchers found that greater time devoted to the practice of difficult (rather than easy or moderate) exposure tasks was associated with improved outcomes (Peris et al., 2017). For autistic children, practical skills that are practised and delivered in ‘real world’ settings have been found to significantly reduce anxiety levels, even when not the intended focus of the intervention (Rumney & MacMahon, 2017). Ensuring the intervention program to be delivered contains the requisite weighting of practical skills and is delivered with sufficient intensity to be useful in the setting and situation relevant to the child seems particularly important to obtaining clinically useful treatment outcomes. More research is required to provide direction to clinicians regarding selection of exposure tasks and whether certain levels of exposure tasks are better suited to individual characteristics (e.g., language abilities, capacity for emotional regulation, cognitive abilities, etc.) than others.

Research on barriers to the use of exposure therapy with neurotypical children has found session length, lack of training, and concern about parent reaction to be key factors in avoiding exposure-focused sessions in clinical practice (Reid et al., 2017). Therapists holding negative beliefs about the safety, tolerability, and ethicality of exposure therapy has also been strongly associated with less frequent use of exposure and greater use of non-exposure-based techniques (Whiteside et al., 2016). For autistic children, barriers include therapists with limited or no knowledge or experience of autism, or therapists and services refusing to make adjustments to treatments to support the autistic individual (Adams & Young, 2021). In addition, autistic individuals have difficulties with generalisation (i.e., the ability to apply learned behaviour from the context it was acquired to new people, places or times; Stokes & Baer, 1977), as different perceptual and/or cognitive processes for autistic individuals may also mean that the features considered shared across two contexts (e.g., clinical versus ‘real life’) by non-autistic individuals may not consistently align with what autistic individuals perceive to be common elements (Carruthers et al., 2020). Learning in the environment in which the behaviour is to be maintained may be more beneficial for autistic individuals and is aligned with EF-CBT but points to administrative challenges for the therapist. The practicality of EF-CBT could be difficult in certain settings, where access to feared stimuli are not easily accessible, are unique or uncommon, or may involve numerous variables that are difficult to manage and contain (e.g. walking into a classroom of peers, going to a shopping centre, playing in a team sport, etc.). Barriers to completing EF-CBT programs

specifically for anxious autistic children needs to be explored further, to determine if both characteristics unique to autistic children *and* the logistics and practical nature of the intervention is a difficulty that can be addressed to ensure that therapists and parents can comfortably and effectively implement evidence-based strategies. Qualitative methods to obtain input from autistic individuals and their family members on barriers towards treatment generalisation would be invaluable to guide clinical research and practical applications (see Bearss et al., 2016 for example methodology).

Finally, most CBT trials have been conducted with moderate- to high-functioning autistic (i.e., level 1 or 2) children, who have adequate verbal skills. While results have been positive in this population, it is unclear whether CBT is appropriate for lower-functioning children, those with moderate- to low-intellectual functioning, children with minimal verbal skills and those with aggressive and/or self-injurious behaviours (Johnco & Storch, 2015). EF-CBT may be more inclusive of autistic children with lower communicative abilities and/or cognitive delays. Graduated exposure and reinforcement has been effective in several studies for autistic children with delayed language and cognitive abilities for approach responses to specific phobias (e.g., animated toys, needles; Ricciardi et al., 2006; Shabani & Fisher, 2006), and could be extrapolated to other forms of anxiety. To do so successfully with this population, incorporating special interests and/or visual prompts could be helpful to explain therapeutic concepts in engaging and accessible ways. Parent involvement may need to be higher and the use of more parent management strategies (vs. self-regulation and self-directed coping strategies) required (Johnco & Storch, 2015).

Conclusions and Future Directions for Research and Practice

The present paper explored the effectiveness of CBT as a treatment for anxious autistic children and evaluated key components of CBT for this population. Overall, CBT shows good effect in the reduction of anxiety for autistic children, compared with minimal-to-no treatment or pharmacological treatments on their own. However, expanding on this further, EF-CBT studies appear more successful in reducing anxiety for anxious autistic children. The benefit of in-session exposure is consistent with expert consensus and a growing body of empirical work suggesting that exposure is the active treatment ingredient of CBT for childhood anxiety disorders (Peris et al., 2017; Stewart et al., 2016). However, more investigation is needed to determine the optimal number of exposure-focused sessions and which level of exposure tasks (i.e., mild, moderate, high) achieves the greatest benefit. Barriers to the administration of exposure-focused CBT with anxious autistic children must be explored to

better understand why this important component of treatment is at times neglected.

The ideal outcome of these investigations would be guidelines to assist with tailoring CBT interventions for anxious autistic children. Broad recommendations on adapting CBT to make the treatment more accessible to autistic children exists (e.g. National Institute for Health and Care Excellence; NICE, 2011) (e.g., changing the number and duration of sessions, using simple concrete methods of conveying information, incorporating ‘special interests’ into treatment); however, there are currently no empirically derived guidelines about how best to adapt the weighting, frequency or intensity of CBT content. Without widely disseminated guidelines giving clear direction to mental health organisations and clinicians, it may be difficult for practitioners to optimally adjust treatment programs and be supported to maintain the focus on behavioural components that could be considered fundamental to treatment success for anxious autistic children.

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Declarations

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