Cognitive Behaviour Therapy for Reducing Anxiety in School-Aged Children Diagnosed with Autism Spectrum Disorders

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ABSTRACT

I conducted a systematic review to identify studies that examined the effectiveness of cognitive behavioural therapy (CBT) in reducing clinical levels of anxiety in school-age children identified with autism spectrum disorders (ASD). This is an important consideration for teachers given the prevalence of children with an ASD diagnosis and high comorbidity of ASD and clinical anxiety. Anxiety symptoms can cause distress to children, peers, parents and teachers, and be detrimental to academic and social performance. CBT is a skill building approach which aims to change maladaptive thought and behaviour patterns. Of the 16 studies reviewed, 14 indicated a reduction in parent, teacher, and clinician identified anxiety symptoms in children with ASD who participated in CBT programs. While this indicates a high level of effectiveness, caution must be applied in interpreting self-reported anxiety symptoms as 6 of the 16 studies showed no significant improvement on self-report scales. Teacher expertise is therefore paramount in understanding the complexities of ASD, in making evidence-based decisions, and in interpreting the effectiveness of interventions from the child's perspective.

Keywords
Autism, Cognitive Behaviour Therapy, Anxiety, Schools

INTRODUCTION

Research into anxiety which is comorbid with autism spectrum disorders (ASD) is relevant to teachers given the high rates of anxiety reported in children with ASD. In New Zealand, approximately 1% of the population is likely to have an ASD diagnosis (Ministries of Health and Education, 2008). Children with ASD have a range of social, linguistic, and behavioural characteristics which can be identified in early childhood and persist throughout life (Boyd, Odom, Humphreys, & Sam, 2010). These include infrequent eye contact, repetitive behaviour (such as adhering rigidly to routines), delayed language development, a limited attention span, and problems generalising skills and ideas across contexts (Matson, 2007; Tyson & Cruess, 2012). Children with

ASD may experience delay developing spoken language or may not develop language ability at all. When spoken communication develops, the level and type of impairment varies between children (The American Psychiatric Association, 2000). ASD includes the subtypes of autism disorder (AD), Asperger's syndrome (AS), and pervasive developmental disorder – not otherwise specified (PDD-NOS) (Matson, 2007). Understanding the complexity of treating anxiety disorders in children with ASD enables teachers to support children and families, especially given the potential for the characteristics of ASD to affect young people throughout their education.

The effects and prevalence of anxiety in children with ASD

Anxiety symptoms negatively impact on the child's academic potential and quality of life. Anxiety has been associated with poor school performance and difficulty in forming relationships (Wood, 2006). Students with ASD may be faced with overwhelming worry about academic performance, social interactions, or leaving their parents to attend school, and these feelings can invoke reactions such as nausea, withdrawal behaviour, crying, and disruptive behaviour (McLoone, Hudson, & Rapee, 2006). Untreated anxiety increases the risks of depression, concentration difficulties, and future drug use, along with lower self-esteem and academic achievement (Ialongo, Edelsohn, Werthamer-Larsson, Crockett, & Kellam, 1996; Langley, Bergman, McCracken, & Piacentini, 2004). Without intervention, comorbid psychiatric problems in children with ASD can persist throughout life (Davis III, et al., 2010). Identifying and treating anxiety has the potential to reduce distress from anxiety and decrease impairment caused by the overlap of ASD and anxiety symptoms.

Wide variance is reported in the rate at which anxiety occurs in children with ASD. White, Oswald, Ollendick, and Scahill's (2009) systematic review of the prevalence of anxiety in youth diagnosed with ASD placed the rate of occurrence between 11% and 84%. The difficulty identifying exact numbers resulted largely from diagnostic overshadowing. The symptoms of anxiety overlap with the characteristics of ASD and highlight the lack of standardised tools for measuring anxiety levels in this population. The underlying motivation behind the behaviour could help to differentiate between anxiety and ASD symptoms, but is complicated by impaired communication due to age and ASD (Tyson & Cruess, 2012). An example is a socially phobic child who displays social avoidance will have a desire to participate in social situations but be afraid of negative peer reactions and embarrassment, rather than a child who avoids social encounters because they have no interest in them. The anxious pattern of social avoidance can lead to further impairment of social skills, in turn increasing anxiety, and avoidance (Bellini, 2004). As well as social phobia (SoP), other frequently reported anxiety disorders in children with ASD are other specific phobias, generalised anxiety disorder, separation anxiety disorder, and obsessive-compulsive disorder (White et al., 2009). Children with ASD have an increased risk of impairment caused by the interaction of ASD and anxiety symptoms.

CBT as a treatment for reducing anxiety

The results of randomised clinical trials (RCTs) and case-based research show that cognitive behavioural therapy (CBT) may be effective in treating anxiety in individuals with ASD (Lang, Regester, Lauderdale, Ashbaugh, &

Haring, 2010). The primary goal of CBT when addressing anxiety in youth is to change maladaptive thought patterns and associated behaviour (Seligman & Ollendick, 2011). CBT is a skill-building approach, and follows a pattern starting with learning about symptoms, prevalence, and causes of anxiety (psychoeducation). Skills to recognise and manage somatic symptoms of anxiety are introduced. Cognitive restructuring involves understanding the thoughts that are associated with anxiety, which leads into building problem-solving skills to manage anxiety inducing situations. The child will set goals for situations which they find challenging and attempt to use their skills to manage them either in sessions or as homework. In hierarchical exposure, the therapist and child make a hierarchy of challenging situations and over time the child utilises skills learned earlier to work their way up hierarchy until they have successfully managed the hardest task (Rotheram-Fuller & MacMullen, 2011; Seligman & Ollendick, 2011). CBT aims to facilitate positive patterns in unobserved (cognitive) and observed (behavioural) domains.

Modifying CBT for ASD

Given the characteristics of ASD, modifications to the CBT programs are common. The child needs to recognise cognitions and understand the link between thoughts and anxiety symptoms as well as participate in repeated exposure to anxiety inducing stimuli (Seligman & Ollendick, 2011). Modifications tend toward emphasising behavioural components of treatment (Lang et al., 2010). Common modifications include using visual techniques, a focus on individual strengths, use of child specific interests, and parent involvement (Moree & Davis III, 2010). Directive language is used in psychoeducation, especially for younger children (Rotheram-Fuller & MacMullen, 2011). Modifications are designed to meet the needs of the school-aged participants with ASD.

Study protocol

The PESICO (person or problem, environment, stakeholders, intervention, comparison, and outcome) template (Schlosser, Koul, & Costello, 2007) was used to establish a rationale to support research in this area. Research has suggested treating clinical anxiety in children has potentially positive social gains and improvement in school performance (Wood, 2006). A growing evidence base suggests CBT is effective in treating clinical anxiety in children with ASD, and is a feasible option for implementation in schools (Forman & Barakat, 2011; Lang et al., 2010; Rotheram-Fuller & MacMullen, 2011). This review examined the current evidence regarding CBT treatment of anxiety in children diagnosed with ASD by conducting a systematic literature search, examining results against pre-determined inclusion criteria, and reviewing the evidence with the purpose of addressing five questions: what are the effects of CBT on levels of clinical anxiety in school-aged children diagnosed with ASD? What are the characteristics of studies that have evaluated the use of CBT in the treatment of anxiety in children with ASD? What have been the results of these studies? What is the quality of the evidence? What are the implications for teachers?

METHOD

Search procedures

Searches were conducted using seven databases: Medline, PsycINFO, ERIC, A+ Education, Index to Theses, New Zealand Educational Theses Database, and ProQuest Dissertations and Theses. The databases were selected as they cover the fields of medicine, psychology, and education, and include published and unpublished studies. Studies with different approaches and methodologies were included to align with the American Psychological Association (2006) definition of best evidence. Publication bias was addressed by searching dissertations and theses as well as published literature. The results of published research may not be representative of all studies completed (Schlosser, Wendt, & Sigafoos, 2007).

Each database was searched four times using four different combinations of search terms. These were: autism AND anxiety AND cognitive behavior therapy; autistic disorder AND anxiety AND cognitive behavior therapy; autism spectrum disorder AND anxiety AND cognitive behavior therapy; asperger syndrome AND anxiety AND cognitive behavior therapy.

To build on Lang and colleagues' (2010) study, the search for this review was limited to studies that were published between 2005 and 2013. The year was selected to include enough information for meaningful discussion of results and also to reduce overlap.

Inclusion criteria

The searches resulted in 71 articles across 7 databases. The abstracts were scanned and examined against the inclusion criteria of peer reviewed and written in English, and used CBT to reduce anxiety in at least one child or adolescent with ASD. CBT was defined for this review as an intervention which focuses on skill building and understanding and addressing maladaptive cognitions and behaviour (Rotheram-Fuller & MacMullen, 2011; Seligman & Ollendick, 2011). The participants were school aged (between 5 and 18 years old). Case-based research was included to facilitate understanding of how treatment is implemented and received (Edwards, Dattilio, & Bromley, 2004).

Fifteen studies were included from searching databases. The reference lists of these studies were scanned and resulted in one further study being included bringing the total number of studies to 16. Studies were excluded for the following reasons: 44 studies did not implement and report results of an intervention, two studies reported results of an intervention which was not CBT, three studies reported results of CBT but not in an ASD population, five studies used CBT with an ASD sample but the purpose was not to reduce anxiety, and two studies reported the results of CBT for adults with ASD. Schlosser et al. (2007) identify the importance of rejected studies in establishing whether the inclusion and exclusion criteria were properly applied. A log was kept of the citation of the study and the reason it was excluded.

Data extraction

Included studies were summarised in Table 1 in terms of (a) participants, (b) description of CBT program, (c) dependent variables, (d) results, and (e) certainty of evidence.

Experimental design was evaluated to determine certainty of evidence. Certainty of evidence was ascertained as a methodological and ethical tool. It was used to identify and rank the extent to which the outcome of the investigation can be considered to be a result of CBT treatment. As an ethical tool, certainty of evidence enables transparency in the weighing and interpretation of the studies to prevent the results of the systematic review being skewed or misleading (Suri, 2008). Certainty of evidence is ordered into three categories: suggestive, preponderant, or conclusive (Smith, 1981).

Suggestive level evidence does no more than indicate the possibility that change in anxiety levels was the result of CBT treatment. Studies with this level of certainty may be single case studies, may only utilise baseline (A) and intervention (B) phases rather than a design which reverses the treatment condition (ABAB), or may not control for alternative explanations of the change observed such as change in medication (Smith, 1981).

Preponderant level of certainty indicates the probability that change in anxiety is due to treatment. These studies use experimental design with a wait-list or control group and have randomised procedure for allocating to treatment or control group. They may not use multiple measures of anxiety, lack inter-observer agreement or have blind assessment of groups (Smith, 1981).

Conclusive evidence shows that CBT is undoubtedly the cause of results of the study. Studies with conclusive evidence will use true experimental design, have random assignment, and be blinded. They will control for extraneous variables, have sound inter-observer methodology, and use multiple measures of anxiety in order to ensure that the result is accurate (Smith, 1981).

Table 1 TABLE OF EVIDENCE

Summary of studies using cognitive-behavioral therapy to reduce anxiety in school-age children with autism spectrum disorders

CITATION	PARTICIPANTS	INTERVENTION	DEPENDENT VARIABLE	RESULTS	CERTAINTY OF EVIDENCE
Studies Capable Of Providing Suggestive Evidence					
Lehmkuhl, Storch, Bodfish, & Geffken, 2008	1 male aged 12 years old. ASD diagnosis AD Anxiety diagnosis OCD	Modified CBT program Modifications: Cognitive component focused on identifying feelings of distress and learning coping statements, earlier introduction of exposure component, parent and teacher inclusion and education, and behaviour reward system. Delivery: Individual/family	Self-report: CY-BOCS COIS	Positive: Score on CY-BOCS dropped from moderately severe to within normal range, and score on COIS dropped from being clinically significant to within normal range.	Suggestive: No use of control group or ABAB design, no attempt to control for alternative explanations, participant had previously received extensive early intervention for autism.
Ooi, et al., 2008	6 children aged 9-13 diagnosed with AD or AS and non-specified anxiety issues.	Modified CBT program Modifications: Visual cues, social stories, understanding and identifying emotions based on somatic reactions, thoughts and speech, inclusion of relaxation and problem-solving techniques. Delivery: Group	Self-report: SCAS-C Parent report: SCAS-P Teacher report: ACAS-C	Negative: SCAS-C and ACAS-C scores were lower post-treatment but not statistically significant. SCAS-P scores were slightly higher post-treatment but also not statistically significant.	Suggestive: No use of control group, no control for alternative explanations, small sample size.
Ozsivadjian & Knott, 2011	6 Children 1 female, 5 male Age 8-15 years ASD diagnoses 4 AS 2 AD Anxiety diagnoses 1 SAD/GAD, 1 Phobias, 2 GAD, 2 OCD	Modified CBT program Modifications: identifying and labelling emotions, visual techniques, structured sessions, frequent breaks, increased use of concrete thinking, special interests, parental presence. Delivery: Individual/family.	Self-report: MASC, ADIS-C. Parent report: ADIS-P, reported behaviours.	Mixed: Parent report of behaviour indicated improvement in 4 participants. MASC scores rose or stayed the same for 4 participants. Reduced in 1. 1 participant no longer met diagnostic criteria for anxiety.	Suggestive: No use of control group or ABAB design, not enough information about CBT package to replicate, no attempt to control for alternative explanations.

CITATION	PARTICIPANTS	INTERVENTION	DEPENDENT VARIABLE	RESULTS	CERTAINTY OF EVIDENCE
		Studies Capable Of Providing Suggestive Evidence			
Reaven, Blakely-Smith, Leuthe, Moody, & Hepburn, 2012	24 adolescents, aged 13-18 years old, ASD diagnoses 7 AD 13 AS 4 PDD-NOS. Anxiety diagnosis GAD SPP SoP OCD	*Facing your fears* (Reaven, Blakeley-Smith, Nichols, & Hepburn, 2011). Modifications: social skills module, parent-teen dyadic work to identify anxiety diagnosis and goals, use of a personalised digital assistant, increased number of exposure practices, exposure practices in session mostly without parent involvement, and parent education about developmental challenges of adolescence as well as anxiety. Delivery: Group	Self-report: SCARED Parent report: SCARED Clinician report: CGIS-S	Positive: Significant decrease in anxiety scores at post-test on self-report and parent reported SCARED scores. Significant difference on clinician rating of anxiety on CGIS scales.	Suggestive: No use of control group or ABAB design, small sample size, no attempt to control for alternative explanations.
Schleismann & Gillis, 2011	1 male Age 6 years ASD diagnosis AS Anxiety diagnosis SoP	Modified Coping Cat (Kendall, 1992). Modifications: personalised hierarchy of fear, psychoeducation, use of 'fear thermometer, *in vivo* exposure, reinforced practice. Delivery: Individual/family.	Parent/self-report Parent reported observed avoidance and approach behaviours. Child reported anxiety levels using fear thermometer.	Positive: Parent report indicated decrease in avoidant behaviour, increased approach behaviour, improvement in unfamiliar social situations.	Suggestive: No use of control group or ABAB design, no attempt to control for alternative explanations, no inter-observer agreement.
Sze & Wood, 2007	1 female Age 11 ASD diagnosis HFA Anxiety diagnoses GAD, SAD, OCD	Building confidence (Wood & McLeod, 2008). Modifications: Focus on symptoms of anxiety, social difficulties, and self-help skills, reduce emphasis on abstract language, use of humour and ASD related special interests. Delivery: Individual/family.	Self and parent report: ADIS–C/P, reported anxious thoughts and behaviours.	Positive: Scores on ADIS-C/P indicated improvement in separation and social worries. Parent reported gains in anxiety, social skills and adaptive functioning.	Suggestive: No use of control group or ABAB design.

CITATION	PARTICIPANTS	INTERVENTION	DEPENDENT VARIABLE	RESULTS	CERTAINTY OF EVIDENCE
		Studies Capable Of Providing Suggestive Evidence			
Sze & Wood, 2008	1 Male Age 10 ASD diagnosis AS Anxiety diagnoses GAD, SoP	Building confidence (Wood & McLeod, 2008). Modifications: Focus on friendship skills, self-awareness of own appearance and effect on others, suppressing stereotypes, and self-help skills. Use of visual aids and special interests. Delivery: Individual/family.	Self-report MASC. Parent: SSRS. Self and parent report: ADIS-C/P VABS CBCL. Clinician report: CGI – Improvement.	Positive: Scores on ADIS-C/P, SSRS, CBCL, VABS, and MASC showed significant clinical improvement post-treatment. Parent and child report decreased avoidance of social encounters. Child reported increased enjoyment of social engagements.	Suggestive: Blind post-treatment assessment, but no experimental design.
White, Ollendick, Scahill, Oswald, & Albano, 2009	4 adolescents 2 male, 2 Female Age 12-17 years ASD diagnoses 1 PDD-NOS 3 AS Anxiety diagnosis 1 SoP 1SoP, OCD, SP, PD 1 SoP, GAD 1 SP, GAD	Multi-Component Integrated Treatment Modifications: Targets anxiety and social skills, individual therapy plus group therapy delivered based on individual anxiety/social skills, parent education/involvement. Delivery: Individual/family.	Self-report: MASC. Parent report: CASI-20. SRS. Self and parent report: ADIS-C/P.	Mixed: 3 participants no longer met diagnostic criteria for ADIS CRS at endpoint. 2 remained subclinical at follow-up. 3 participants had significantly reduced CASI-20 scores at endpoint.	Suggestive: No use of control group or ABAB design, small sample size, assessment not blind.
Viecili, 2011	18 participants. 15 male, 3 female, all diagnosed with ASD, and significant symptoms of anxiety	Modified Coping Cat (Kendall, 1992). Modifications: Comic strip conversations with thought bubbles to describe emotion, more visual strategies, learning language around emotion, extended sessions on bodily awareness and self-regulation skills, buddy therapist, inclusion of children's special interests, increased parent involvement Delivery: Group.	Self-report: RCMAS Parent report CBCL SCARED	Mixed: CBCL and SCARED scores significantly lower at post-treatment. No significant change in RCMAS scores.	Suggestive: No use of control group or ABAB design, small sample size, assessment not blind, no attempt to control for alternative explanations, for example, not all participants had clinical levels of anxiety at outset which may have affected the level of change observed.

CITATION	PARTICIPANTS	INTERVENTION	DEPENDENT VARIABLE	RESULTS	CERTAINTY OF EVIDENCE
		Studies Capable Of Providing Preponderant Evidence			
Chalfant, Rapee, & Carroll, 2007	47 children 35 male, 12 female Age 8-13 years ASD diagnoses 13 HFA 34: Asperger's Anxiety diagnosis 8: SAD 14: GAD 20 SP 3: SoP 2: PD	Adaptation of "Cool Kids" (Lyneham, Abbott, Wignall, & Rapee, 2003). Modifications: Less use of communication skills, more visual aids/structured worksheets, extended programme, emphasis on relaxation and exposure, parent programme. Delivery: Not explicitly mentioned; however, "Cool Kids" is a group programme.	Self-report: RCMAS SCAS CATS. Parent report SCAS SDQ. Teacher report SDQ.	Positive: Significant difference at conclusion between waitlist and CBT group across self, parent and teacher report CATS, SCAS, SDQ, and RCMAS scores.	Preponderant: Wait-list group used as control, randomised, but no inter-observer agreement, no therapist time with waitlist group, not blind.
McNally Keehn, Lincoln, Brown, & Chavira, 2013	22 children aged 8 to 14 years. 21 males and 1 female. ASD diagnoses 22 ASD Anxiety diagnosis SAD: 8 GAD: 18 SoP: 15 SPP: 15 OCD: 2	Modified "Coping Cat" program (Kendall, 1992). Modifications: Review content, skills, and homework with parents, longer sessions to cover more content, additional visual material, concrete language used, children's special interests incorporated, use of sensory stimulating objects, proactive movement breaks, assistance with writing tasks when motor skills impaired, attention paid to individual learning preferences of children, reinforcement strategies used.	Self-report SCAS Parent report ADIS-P SCAS -P	Mixed: Significant difference for parent ADIS-P and SCAS-P scores between groups at post-treatment and non-significant difference for child report SCAS scores between groups at post-treatment	Preponderant: Wait-list group used as control, randomised, small sample size, assessment not blind.

CITATION	PARTICIPANTS	INTERVENTION	DEPENDENT VARIABLE	RESULTS	CERTAINTY OF EVIDENCE
Studies Capable Of Providing Preponderant Evidence					
Reaven et al., 2009	33 children 26 male, 7 female Age 8-14 ASD diagnoses AD: 15 PDD: 4 AS: 14 Anxiety diagnosis GAD: 22 SAD: 6 SA: 5	Modified CBT program Modifications: modifications to meet cognitive, linguistic and social needs, session pacing, reinforcement programme in group behaviour, visible structure, routine, parent participation. Delivery: Group.	Self and parent report: SCARED.	Mixed: No significant different in scores for child report. Significant different in parent report scores.	Preponderant: Wait-list group used as control, randomised, but use of single measurement tool, not blind.
Sofronoff, Attwood, & Hinton, 2005	71 children 62 male, 9 female Age 10-12 years ASD diagnoses 71 AS	Modified CBT program Modifications: highly structured, tool box concept, parent involvement in one group. Delivery: Group	Self-report: “James and the Maths Test” Parent report: SCAS-P SWQ.	Positive: Significant improvement on SCAS-P and SWQ scores in the two treatment groups, the larger improvement in the combined group. Significantly more strategies generated for “James and the Maths Test” for intervention groups.	Preponderant: Wait-list group used as control, but not blind.

CITATION	PARTICIPANTS	INTERVENTION	DEPENDENT VARIABLE	RESULTS	CERTAINTY OF EVIDENCE
Studies Capable Of Providing Conclusive Evidence					
Sung, et al., 2011	70 children 66 male, 4 female Age: 9-16 years ASD diagnoses AD/PDD-NOS: 58 AS: 12	Modified CBT program Modifications: Structured sessions, visual strategies, role-plays, social stories. Delivery: Group.	Self-report: SCAS-C. Clinician report: CGIS-Severity.	Negative: A significant reduction in overall anxiety across time for both groups, but no significant difference between groups.	Conclusive: Social recreation group used to compare results with CBT, double blind, randomised.
Reaven J., Blakeley-Smith, Culhane-Shelburne, & Hepburn, 2012	50 children 48 male, 2 female Age 7-14 years ASD diagnoses AD: 31 PDD-NOS 3 AS: 16	Facing Your Fears (Reaven, Blakeley-Smith, Nichols, & Hepburn, 2011). Modifications: pacing of session, token reinforcement, visual structure, predictable routine, use worksheets, written examples of core concepts, hands-on activities, emphasis on creative expression, strengths and special interests, provision for practice, videos used in modelling and activities, parent curriculum. Delivery: Group.	Parent report: ADIS-P. Clinician report: CSR, CGIS-Improvement.	Positive: Medium to large effect sizes in reduction of clinician severity ratings in intervention group. Statistically significant reduction in GAD in intervention group, with a large effect size. Other principal diagnoses did not show any difference. CGIS-improvement showed scores of 1 or 2, ‘a clinically meaningful improvement for anxiety severity”.	Conclusive: Wait-list group used as control, randomised, blinded, treatment fidelity, inter-observer agreement but no therapist time with control group.
Wood, et al., 2009	40 children Age: 7-11 years 27 male, 13 female ASD diagnoses AD: 20 PDD-NOS: 17 AS: 3 Anxiety diagnosis SoP: 35 SAD: 24 OCD: 17 GAD: 19	Building Confidence (Wood & McLeod, 2008). Modifications: Friendship skills, social coaching, peer buddy/mentoring programme, self-help skills, use of special interests, rewards system. Delivery: Individual/family.	Self-report: MASC. Parent report: MASC. Clinician report: CGI-Improvement.	Mixed: 13 of 14 showed positive response to treatment in intervention group and no longer fit diagnostic criteria for any four anxiety disorders. Significant reduction for intervention group in parent report MASC scores post treatment, but no significant difference in self-report scores.	Conclusive: Wait-list group used as control, blind, randomised, treatment fidelity, inter-observer agreement.

Abbreviations: ASD Diagnosis: AS, Asperger’s syndrome; AD, autism disorder; PDD-NOS, pervasive developmental disorder – not otherwise specified; HFA, high functioning autism. *Anxiety diagnosis:* SAD, separation anxiety disorder; GAD, generalised anxiety disorder; OCD, obsessive-compulsive disorder; SoP, social phobia; SP, specific phobia; PD, panic disorder; SA, social anxiety. *Dependent variables:* MASC, Multidimensional Anxiety Scale for Children; ADIS-C, anxiety disorders interview schedule for children – child version; ADIS-P, anxiety disorders interview schedule for children – parent version; SSRS, Social Skills Rating System; VABS, Vineland Adaptive Behaviour Scales; CBCL, Child Behaviour Checklist; CGI, Clinical Global Impression, CASI-20, Child and adolescent symptom inventory-20; SRS, Social responsiveness scale; RCMAS, The Revised Children’s Manifest Anxiety Scale; SCAS, Spence Children’s Anxiety Scale; CATS, Children’s Automatic Thoughts Scale; SDQ, Strengths and Difficulties Questionnaire; SCARED, Screen for Child Anxiety and Related Emotional Disorders; SWQ, Social Worries Questionnaire; CSR, Clinician Severity Ratings; MCIT, Multi-Component Integrated Treatment.

RESULTS

Table 1 above summarises the participants, intervention characteristics, dependent variables, and certainty of evidence. It is ordered by certainty of evidence and then by name of first author.

Participants

Across the 16 studies, 395 participants received some form of CBT intervention. Of these participants, 172 (44%) were classified as having AS, 134 (34%) with AD, 40 (10%) with ASD, 29 (7%) with PDD-NOS, and 20 (5%) with HFA.

Anxiety disorders reported by participants in the studies included GAD, SoP, SAD, SPP, PD, and OCD. Five studies did not include numbers of participants with specific anxiety disorders but instead reported the presence of anxiety at a clinical level (Reaven, Blakeley-Smith, Culhane-Shelburne, et al., 2012; Reaven, Blakely-Smith, Leuthe, et al., 2012; Sofronoff et al., 2005; Sung et al., 2011; Wood et al., 2009). Viecili (2011) recruited participants with "significant symptoms of anxiety" (p. 21) and examined changes in diagnostic categories rather than requiring clinical levels of anxiety. Additionally, some studies reported anxiety disorders based on the primary diagnosis for the participants, while others reported on all the disorders for which the participants met the diagnostic criteria. Without comparable numbers it would be misleading to indicate the prevalence of anxiety disorders in this group.

Intervention characteristics

All the CBT interventions were implemented using treatment manuals and by doctoral psychology students or trained therapists. Five interventions in this study were implemented on an individual level with the inclusion of the parents, and the remaining six used group therapy, also supported by parental involvement.

Modifications

Increasing accessibility

Modifications improved accessibility to CBT by accommodating impaired expressive communication ability, comprehension of abstract language, and attention span. These changes were made to remove barriers to treatment caused by characteristics of ASD and the age of the participants.

Visual techniques were used across studies but for different purposes. These included worksheets to help participants supporting discussions about identifying helpful and unhelpful thoughts (Chalfant et al., 2007; McNally Keehn et al., 2013; Reaven, Blakeley-Smith, Culhane-Shelburne, et al., 2012), body drawings and thought bubbles to facilitate discussion of somatic symptoms (Ozsivadjian & Knott, 2011; Viecili, 2011), and video modelling and role play to enhance generalisation of skills (Reaven, Blakeley-Smith, Culhane-Shelburne, et al., 2012; Sung et al. 2011). Visually presented, highly structured sessions provided a predictable routine (Ooi et al., 2008; Ozsivadjian & Knott, 2011; Reaven et al., 2009; Reaven, Blakeley-Smith, Culhane-Shelburne, et al., 2012; Viecili, 2011).

Maintaining attention span

Sessions were paced with frequent breaks (Reaven et al., 2009; Reaven, Blakeley-Smith, Culhane-Shelburne, et al., 2012) and sensory stimulation (McNally Keehn et al., 2013) to maintain concentration of participants. Special interests of the child were used to illustrate explanation of key ideas, hold attention, and encourage problem solving (McNally Keehn et al., 2013; Ozsivadjian & Knott, 2011; Sze & Wood, 2007; Viecili, 2011; Wood et al., 2009).

There was an increased focus on discussing what somatic symptoms are, how they relate to anxiety, and learning relaxation techniques to manage them (Chalfant et al., 2007; Lehmkuhl et al., 2008; Ooi et al., 2008; Ozsivadjian & Knott, 2011; Reaven et al., 2009; Schleismann & Gillis, 2011; Sze & Wood, 2007; Viecili, 2011). Modifications facilitated discussion of abstract concepts, and improved understanding of core treatment ideas as well as presenting the session in a format which was predictable and achievable for the child.

Enhancing CBT

Modifications made to enhance CBT for ASD either extended standard CBT principles or added components designed to make CBT more effective. These changes took components of CBT and emphasised them over other components to make treatment more effective for children with ASD.

Reinforcement schemes, such as token reinforcement programs, provided reinforcement for in-group behaviour and in exposure exercises (Lehmkuhl et al., 2008; McNally Keehn et al., 2013; Reaven, Blakeley-Smith, Culhane-Shelburne, et al., 2012; Schleismann & Gillis, 2011; Wood et al., 2009).

Social and self-help skills were included as part of the intervention with the rationale that improved social and self-help skills would reduce anxiety stemming from impairment (Reaven et al., 2009; Reaven, Blakeley-Smith, Leuthe, et al., 2012; Sze & Wood, 2007; White et al., 2009; Wood et al., 2009). Social coaching from therapist or trained parent, peer buddying and social stories increased skills which were later reinforced through exposure either at school or on play-dates (Ooi et al., 2008; Wood et al., 2009). Self-help skills broke tasks into manageable steps and aimed to foster independence in children. CBT was modified to include behavioural methods and focus on specific areas in which the child suffered impairment, such as social skills.

Parental involvement was included in all studies as participation during therapy and in a coaching role between sessions. Education was specially targetted for parents to assist them in supporting the children in preparation and through exposure exercises and other homework assignments. Inclusion of parents also intended to promote generalisation of skills learned in therapy. Parent education explained the rationale underpinning the program so that parents understood why exposure exercises were important and had skills to support the children as they completed homework tasks. Parent modules included discussion of the effect of parental anxiety and parenting style in the maintenance of anxiety. The effect of an excessively protective parenting style arising from the challenges of having a child with ASD was discussed (Reaven, Blakeley-Smith, Culhane-Shelburne, et al., 2012). As well as being coaches, parents were actively involved in CBT sessions. This was to provide support for the participants and to further train parents to be able to give reliable feedback

at post-treatment assessment. Reaven, Blakeley-Smith, Culhane-Shelburne, et al., 2012 and Reaven, Blakeley-Smith, Leuthe, et al., 2012 differed from this pattern. While parent education was an important factor, parent involvement in the sessions was decreased in order for the therapists to develop a rapport with the adolescent, and allow participants space from parents as typically desired by adolescents. The parent module was designed to enable an individual with limited training to deliver, reinforce, and report on treatment.

Dependent variables

None of the studies employed measures specifically for children with ASD; all measures used have been shown to be reliable in measuring anxiety in typically developing children.

Most studies utilised a range of measures; however, to be considered the dependent variable the tool needed to have the purpose of specifically measuring the effect of treatment on anxiety levels. Tests administered solely to confirm diagnosis of either ASD or anxiety, and tests to examine other aspects of the intervention were excluded, such as the Social Validity Questionnaire which was used to measure understanding and agreement with treatment goals (Schleismann & Gillis, 2011), and the Children's Perception of Therapeutic Relationship (Viecili, 2011).

Self-report

Nine different self-report assessment tools were used. All measures required linguistic competence. The COIS, CY-BOCS, SCARED, MASC, RCMAS, SCAS, and CATS were written and required reading ability and ability to reflect on the personal meaning of the questions posed and formulate a response. The MASC, SCARED, COIS, and CY-BOCS use rating scales while the other three require 'yes' and 'no' answers.

The ADIS-C was a semi-structured interview delivered and recorded by the clinician. "James and the Maths test" required children to generate coping strategies in response to an anxiety inducing scenario (Sofronoff et al., 2005). The scenario was read by the clinician who recorded the number of strategies generated in response to the scenario. The result was based on the difference between the number of strategies at pre-testing and post-testing.

Parent report

With the exception of the ADIS-P, which like the ADIS-C is a semi-structured interview, all parent report measures were written rating scales. The purpose was to measure the severity of anxiety, social skills, or externalising and internalising behaviour associated with anxiety.

Clinician or teacher report

The CSR and CGI scales are questionnaires using a rating scale and reported by observed improvement and severity of anxiety symptoms by a clinician. The ACAS-C is a written rating scale which was reported by the teachers at schools the participants attended.

Findings in the studies

Of the 16 included studies, 8 indicated positive results (50%), 6 mixed (38%) and 2 reported negative results (12%). Results were considered to be positive if there was a significant statistical difference on all the scales used to measure anxiety and in reported behaviour.

The six studies with mixed results showed no significant difference on at least one scale. All of the scales which did not show significant change were self-reported - the self-report MASC (Ozsivadjian & Knott, 2011; Wood et al., 2009), ADIS-C (White et al., 2009), SCARED (Reaven et al., 2009), SCAS (McNally Keehn et al., 2013), and RCMAS (Viecili, 2011).

Ooi et al. (2008) indicated no significant change on any dependent variable. Sung et al. (2011) utilised an alternative treatment rather than a wait-list control. At post-treatment, there was overall reduction in anxiety across both groups, but no significant difference between groups. The result was recorded as negative as the study could not show that CBT elicited more change in anxiety levels than an alternative treatment.

Certainty of evidence

Nine studies were accorded a suggestive level of evidence (Lehmkuhl et al., 2008; Ooi et al., 2008; Ozsivadjian & Knott, 2011; Reaven, Blakeley-Smith, Leuthe, et al., 2012; Schleismann & Gillis, 2011; Sze & Wood, 2007, 2008; Viecili, 2011; White et al., 2009). These were either single case studies, or a series of case studies, which used AB design, did not control for alternative explanation of results, and lacked interobserver agreement. One study indicated negative results, three mixed results, and five had positive results.

Four studies were at the preponderant level (Chalfant et al., 2007; McNally Keehn et al., 2013; Reaven et al., 2009; Sofronoff et al., 2005). These studies utilised experimental design with a wait-list group as a control and were randomised but were not blind. One lacked inter-observer agreement (Chalfant et al., 2007) and one only used a single scale to measure change in anxiety (Reaven et al., 2009). Of the four studies, two had positive and two had mixed results.

Three studies had a conclusive level of evidence (Reaven, Blakeley-Smith, Culhane-Shelburne, et al., 2012; Sung et al., 2011; Wood et al., 2009). They were blind, randomised, controlled for alternative explanations, ensured treatment fidelity and inter-observer agreement. Of the three studies at this level, one was negative, one positive, and one mixed.

DISCUSSION

This review summarised 16 studies that implemented CBT to reduce anxiety in children and adolescents with ASD. The results across studies indicate that CBT could be an effective intervention to reduce anxiety. However, there are some interesting points for discussion regarding characteristics of the CBT programs and considerations for implementation in a school setting.

Characteristics of studies

Modifications

All the treatment programs were modified by adding features to improve access to CBT, such as worksheets, visual aids, and structured sessions. Other modifications enhanced treatment by emphasising behavioural components, such as teaching understanding of somatic symptoms of anxiety and relaxation techniques to manage them. The modification trends identified in the results reflect the findings of Lang et al. (2010) and Moree and Davis (2010). Currently, there is limited understanding of the mechanism of action in CBT (Hudson, 2005). Understanding the balance of cognitions and behavioural elements in CBT and how they elicit change will ensure future modifications maximise benefit to the child and enable accessibility.

Tools used to assess anxiety

The lack of assessment tools to measure anxiety specifically in children with ASD is well documented (Davis et al., 2010; Lang et al., 2010; White et al., 2009). Suri (2008) urges synthesists to consider it an ethical obligation to identify stakeholders who are not being represented. The voice of the child was included through self-report measures, but the prevalence of mixed results suggests either the measures or the treatment were not meaningful for the child. All mixed results were a consequence of self-report scores showing no significant improvement between pre and post-treatment when parent and clinical reports showed significant improvement. Mixed results occurred on five different self-report measures. Two measures used rating scales (MASC & SCARED), two used yes or no answers (SCAS & RCMAS), and one was delivered in an interview (ADIS-C). This presents an ethical dilemma in making a decision as to which scores have greatest significance. There is the risk of taking a paternal approach in assuming anxiety scores reported by a third party carry more weight than those reported by the child.

Discrepancies in child report scores highlight the complexity arising from lack of tools for assessing anxiety specifically within the ASD population. White and colleagues (2009) reported variance in expression and perception of anxiety symptoms among youth with ASD. Variation between individuals in external manifestations, levels of self awareness, and interpretations of anxiety are difficulties in creating a standardised measure. Diagnostic overshadowing and varying communication abilities in the population with ASD further complicate reliability of assessment of anxiety.

Accessing cognitive information is complicated in children with ASD. The limitations of age and expressive and receptive communication in ASD make it difficult to ascertain the child's interpretation of the question and how accurately the response reflects their cognitions (White et al., 2009). One suggestion was that participants under-reported in pre-treatment and post-treatment self-report scores and these reflected increased insight and awareness of emotion gained through participating in the program (Reaven et al., 2009; Ozsivadjian & Knott, 2011; Wood et al., 2009). Parent, teacher, and clinician scores risk reporting observed behavioural changes, along with associated bias, rather than actual levels of anxiety experienced.

Limitations

This review has limitations. The process had only limited measures to enhance a reliable selection of studies (Schlosser et al., 2007). A more objective synthesis of the results may better describe the outcomes of the studies. In addition, the participants in this study were a homogenous population which may not be representative of the population of children with ASD who could benefit from CBT for anxiety. All studies which gathered detailed demographic information reported participants were predominately Caucasian, with married or remarried parents, and with at least one parent having graduated from university. The parent demographics are important as the modified programs involved a significant amount of parent involvement and education.

IMPLICATIONS FOR TEACHERS

Implications for teachers from this review focus on affirming the valuable expertise teachers bring to collaborative consultation, particularly given the complexity determining appropriate interventions for children with ASD, and benefits and considerations for providing services at schools.

The value of teacher expertise

Given the difficulties assessing anxiety in children with ASD, teacher expertise provides a valuable perspective on the severity of distress or impairment resulting from anxiety symptoms. Additionally, teachers are an integral part of children's everyday environments and are in a position to provide ongoing support enhanced by their knowledge of the school system, their own personal experiences, and their relationship with the child (Sheridan & Gutkin, 2000). Whether CBT is implemented directly through the school or through a separate service, teachers have an important role in supporting students and families by facilitating effective interactions between multiple systems influential to the child (Miller & Leyden, 1999). Children function across systems including schools and the family, and their wellbeing and development are influenced by interactions in and between systems (Sheridan, Magee, Blevins, & Swanger-Gagne, 2010). As part of the school system, teachers can identify where there is disparity between demands of the system and the abilities of the individual (Sheridan & Gutkin, 2000). In the consultation process, teachers have valuable information to contribute about the suitability of CBT for children, such as communication ability and family situation. CBT might be indicated primarily for individuals with sufficient language capability to understand and respond to the cognitive requirements of CBT, such as the ability to express and understand abstract concepts. Additionally, parents need to be able to commit to adhering to the parent education aspects, as well as completing homework and exposure tasks between sessions with their child.

Benefits of CBT at school

Children with ASD are more likely than typically developing peers to be diagnosed with anxiety disorders during the years they are at school (Reaven et al., 2011; Rotheram-Fuller & MacMullen, 2011). Implementing CBT at the school the child normally attends and during school hours, rather than at a

separate clinic, has the potential to make CBT available to children with ASD. School-based treatment removes barriers such as the need to travel to a mental health clinic and, depending on whether the cost is supported by the school, makes treatment affordable to families (McLoone et al., 2006). Given the skill-building approach taken in CBT, and difficulty of children with ASD in generalising skills across contexts, school is a relevant context for children to build and practise their skills (Rotheram-Fuller & MacMullen, 2011). Despite potential benefits to school-based implementation of CBT for anxiety reduction, implementation in schools remains low (Forman & Barakat, 2011).

Considerations for schools implementing CBT

School-based interventions require clear implementation procedures, financial feasibility, and implementation by individuals with relevant training to be successful (Foreman & Barakat, 2011). Standardised materials such as treatment manuals do not replace clinical expertise or knowledge. Without a theoretical understanding by the implementer of the treatment, a treatment manual can be rigidly or inappropriately used to implement procedures within the program (Forman & Barakat, 2011; Gosch, Flannery-Schroeder, Mauro, & Compton, 2006). However, with training and support, teachers have the potential to implement and support CBT programmes through behaviour management strategies and providing cues for social and adaptive behaviour (Wood et al., 2009).

Financial restraints for schools include budget concerns over the cost of implementation, as well as the provision of trained staff, either by releasing existing staff members for further training or hiring specialists (McLoone et al., 2006). Group therapy could be a cost-effective mode of delivery as it enables greater numbers of children to have access to treatment at one time. Among typically developing children, group format CBT has been implemented with equal success to individual treatment in schools (Rotheram-Fuller & MacMullen, 2011). The results of the studies in this review did not indicate difference in outcome between CBT which was delivered using group methods, or those in which the therapist worked directly with the child and their family. Delivery method has the potential to improve access to treatment by making treatment available at school.

CONCLUSION

CBT reduced anxiety symptoms in 14 of the 16 studies reviewed. Mixed results occurred in six of these studies when self-report anxiety tools did not indicate significant improvement despite improvement on other scales. Enhanced understanding of anxiety as experienced by the child would provide further evidence to support CBT as an effective intervention in anxiety reduction. Teachers have expertise in the school system and experience with individual children. Their knowledge provides context for the results of standardised tests, and is critical in ensuring that interventions are suitable for the child and their family.

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