Alleviating Anxiety in Children and Adolescents with Autism Spectrum Disorders: Exploring the Effectiveness of Cognitive-Behaviour Therapy

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ABSTRACT

Children and adolescents with autism spectrum disorders (ASD) are reported to experience high rates of anxiety disorders. Cognitive-behaviour therapy has been found to be an empirically validated treatment for typically developing youth with anxiety disorders. In recent years, researchers have been investigating the use of cognitive behaviour therapy with children and adolescents with ASD. Key characteristics associated with ASD may make the application of traditional cognitive-behaviour therapy complex. In this systematic review of literature, studies that have examined the effectiveness of cognitive-behaviour therapy treatments for youth with ASD who have co-occurring anxiety disorders were reviewed and the overall findings indicate that cognitive-behaviour therapy is effective at reducing anxiety in this group of young people The modifications made to the treatment programmes to adapt them for use with children and adolescents with ASD are described and discussed. Implications for teachers and schools are discussed.

Keywords
Anxiety, Autism Spectrum Disorders, Cognitive Behaviour Therapy, Modifications, Treatment

INTRODUCTION

Children and adolescents with ASD[1] can experience comorbid psychiatric or mental health conditions. Of these conditions, anxiety disorders are one of the most common (Reaven, 2009; Russell & Sofronoff, 2005). In recent years, researchers and practitioners have been investigating the use of

[1] For the purposes of this review ASD includes autism, Asperger's syndrome, and pervasive developmental disorder, not otherwise specified; PDD-NOS

cognitive-behaviour therapy (CBT), which is an evidence-based practice for treating anxiety disorders in typically developing children, with children and adolescents with ASD (Moree & Davis, 2010). In this systematic review of literature, the effectiveness of CBT as a treatment for anxiety in children and adolescents with ASD will be explored. In addition, the ways in which CBT may need to be adapted to suit the needs and preferred approaches to learning of youth with ASD will be discussed.

Children and adolescents with ASD have been found to have higher rates of anxiety disorders than the general population (Kim, Szatmari, Bryson, Streiner, & Wilson, 2000; Mazurek & Kanne, 2010), than those with intellectual disabilities (Brereton, Tonge, & Einfield, 2006), and a different, and in some cases more extreme, profile from those without ASD who have clinical anxiety diagnoses (Russell & Sofronoff, 2005). A meta-analysis of 31 studies on youth with ASD found that 40% had at least one comorbid anxiety disorder (van Steensel, Bogels, & Perrin, 2011). Amongst the general child and adolescent population, rates of anxiety disorders have been reported to range from 2.2-27% (Costello, Egger, & Angold, 2005).

AUTISM SPECTRUM AND ANXIETY DISORDERS

A core characteristic of ASD is difficulty with social interactions, which individuals experience to varying degrees. Children with ASD typically have difficulty developing age-appropriate relationships with peers and exhibit a lack of emotional or social reciprocity. They also often display a particularly strong reliance on nonfunctional, rigid routines and rituals, and have very specific interests or hobbies, sometimes referred to as “special interests” (American Psychiatric Association, 2000; APA). Individuals identified as having a form of ASD may have a heightened risk of anxiety due to experiences of stress trying to cope with the demands of socialising, sensory experiences, and the general unpredictability of everyday life (Attwood, 2004).

For individuals who experience anxiety disorders, the central feature of their experience is an uncontrollable, excessive fear that is disproportionate to the actual source of fear and interferes with their daily functioning (APA, 2000; Wood et al., 2009). Anxiety disorders can include social anxiety, separation anxiety, obsessive-compulsive, and generalised anxiety disorders (APA, 2000; Scott, Mughelli, & Deas, 2005). Children and adolescents with anxiety disorders may exhibit the following: difficulties with separation from parents or caregivers, excessive avoidance of certain situations or stimuli (including school refusal), somatic complaints, extreme fearful responses to objects or events, sleep disturbances, the presence of distressing thoughts, physiological over-reactivity, a tendency towards perfectionism, anticipatory anxiety characterised by worrying hours, days, or weeks ahead of a certain situation or event (Reaven, 2009). In some cases, the symptoms of ASD can be hard to distinguish from anxiety disorders, for example it may be difficult to distinguish between repetitive behaviours associated with ASD and obsessive-compulsive rituals (Ozsivadjian & Knott, 2011).

In youth with ASD, excessive anxiety often has a negative impact on their thought patterns. Anxiety typically manifests itself as rigid thinking patterns and may result in the youth relying on controlling behaviours in an attempt to avoid anxiety-provoking situations or to control their environment (Attwood,

2004). In particular, anxiety symptoms may have a detrimental effect on the social interactions of youth with ASD (Bellini, 2004; Chang, Quan, & Wood, 2012) and increase the barrier they face in establishing functional peer relations. In some cases, anxiety may cause the youth to avoid social situations altogether (Attwood, 2004). Anxiety can also have a detrimental effect on academic performance, as it may interfere with concentration, memory, attention, the organisation of work, and test performance (Huberty, 2008). Social difficulties and anxiety symptoms can also be related to depression (Strang et al., 2012).

Treatment options for anxiety in both typically developing youth and youth with ASD include psychotherapy and pharmacological treatments (Moree & Davis, 2010; Scott et al., 2005). White, Oswald, Ollendick, and Scahill (2009) reviewed studies that looked at pharmacological treatments for youth with ASD. These studies looked at the effectiveness of medications including selective seratonin reuptake inhibitors (such as setraline), buspirone, and dextromethorphan for reducing anxiety in youth with ASD. Although the studies reported preliminary evidence demonstrating the effectiveness of these medications, the reviewers found that the studies did not employ control groups or placebo conditions and that the sample sizes were rather small, with the largest sample size being 22 participants. White, Ollendick, et al. (2009) concluded that claims of effectiveness for these treatments were tenuous. Psychotherapy methods include: CBT, eye movement desensitisation and reprocessing, and exposure and response prevention (Reynolds, Wilson, Austin, & Hooper, 2012). Currently, CBT is considered to be the most empirically validated treatment available for anxiety in typically developing youth and its potential for efficacious use with youth with ASD is being explored (Moree & Davis, 2010; Sze & Wood, 2007).

COGNITIVE BEHAVIOUR THERAPY FOR ANXIETY

The primary aim of CBT treatment is to identify and correct dysfunctional or maladaptive thought patterns and assumptions in order to improve the individual's ability to effectively manage their behaviours and emotions (Attwood, 2004; Sung et al., 2011). CBT for anxiety in children and adolescents typically involves six components. The first is psychoeducation, which involves teaching the family about the nature of anxiety, how excessive anxiety occurs, and the rationale behind various treatment techniques. The next component is somatic management, which is the teaching of deep breathing and other relaxation techniques. In this component the therapist tries to help the client develop tolerance for natural rises in anxiety and to break the association between physiological arousal and anxiety. The third component is cognitive restructuring. This involves the identification of maladaptive thoughts and beliefs, challenging those thoughts, and then learning to replace them with realistic, functional thoughts. The fourth component is problem-solving, which involves teaching the child a step-by-step process in which they learn to generate and test a variety of active methods for coping with specific problem situations. The fifth component is exposure, which is the gradated, systematic, and controlled exposure to feared situations and stimuli. And finally, the sixth component is relapse prevention. In this component, the therapist works on

consolidating the child's anxiety management skills and the promotion and generalisation of treatment gains (Velting, Setzer, & Albano, 2004).

As CBT has a substantial empirical research base attesting to its effectiveness (Davis & Ollendick, 2005; Moree & Davis, 2010; Reynolds et al., 2012) and as anxiety is a prevalent problem amongst children and adolescents with ASD, in the last decade or so researchers and practitioners have been looking at using CBT to alleviate anxiety symptoms in this population (Reaven, 2011). However, a number of the key symptoms and characteristics associated with ASD make the implementation of CBT procedures complicated. Individuals with ASD often experience a reduced ability to recognise thoughts, feelings, and emotions in themselves and in others. There are also a number of language and social deficits associated with ASD that could make the development of a functional relationship with the therapist and engagement with the material difficult (Lang, Regester, Lauderdale, Ashbaugh, & Haring, 2010; Ozsivadjian & Knott, 2011). Currently, there are limited systematic data available to indicate whether CBT is effective with individuals with ASD. In addition, there is limited information about what forms of, or modifications to, CBT might be the most useful with children and adolescents with ASD (Moree & Davis, 2010; Ozsivadjian & Knott, 2011). In recent years, researchers and practitioners have considered ways to adapt traditional CBT to increase the likelihood that it might be used effectively with youth with ASD (Attwood, 2004; White, Ollendick, et al., 2009).

OBJECTIVES

This primary aim of this systematic review is to address the question: Is CBT effective for reducing anxiety in children and adolescents with autism spectrum disorders? A secondary question to be addressed is: What specific modifications are more likely to enhance the effectiveness of CBT for individuals with ASD?

METHODOLOGY

This review involved a systematic search for, and analysis of, studies that examined the use of CBT with children and adolescents with ASD.

Search procedures

Systematic searches were conducted in five electronic databases: PsycInfo, Education+, ProQuest Education, ProQuest, and Scopus. Publication year was restricted to studies conducted in 2005 or later. Search terms used included: "anxiety", "autism", "autism spectrum disorders", "cognitive-behaviour therapy", "cognitive-behavior therapy", "treatment", "psychotherapy", "children" "adolescents". The search was conducted in September 2012.

Inclusion and exclusion criteria

To be included in this review, each article had to describe an empirical study that looked at the effects of CBT on the anxiety levels or symptoms of youth with ASD aged 5-18. The CBT intervention had to be the focus of the study, as comparison with other types of treatments was not the aim of this

review. Also, the sample size had to be at least four participants, with an emphasis on finding studies with 20 or more participants. Studies that looked at other behavioural or mental health or associated disorders, such as attention-deficit hyperactivity disorder, conduct disorder or aggression, schizophrenia, or eating disorders, were not included. Also, as much as possible, studies that looked at depression were not included. Depression is often comorbid with anxiety and some studies addressed both areas, but as the focus of this review was specifically around anxiety, any studies that looked at depression separately from anxiety were not included. Only articles published in peer-reviewed, scholarly journals were included. Qualitative research was not excluded intentionally; however, the only qualitative research available on CBT and anxiety in individuals with ASD was in case studies. A total of 10 studies were identified as being suitable for inclusion in this review.

Data extraction

First, each study was assessed for inclusion/exclusion criteria. Then, each selected study was summarised in terms of the following elements: a) participants (in terms of sample size, age, and characteristics), b) use of standardised assessments to determine ASD and anxiety diagnoses, c) use of a control group and study design, d) CBT intervention procedures and modifications employed, and e) findings. A range of procedural aspects was noted, such as treatment delivery methods (group or individual settings), duration of treatment, incorporation of modifications to address ASD symptoms, and experimental designs. Outcomes were discussed mainly in terms of increases or decreases in anxiety symptoms on either standardised measures or parental and self-reports.

RESULTS

The features and findings from each study have been summarised in Table 1.

Table 1 TABLE OF EVIDENCE

Use of Cognitive-Behaviour Therapy with children and adolescents with autism spectrum disorders

CITATION	SAMPLE CHARACTERISTICS	STANDARDISED ASD MEASURE USED?	STANDARDISED ANXIETY MEASURE USED?	CONTROL GROUP/DESIGN	CBT PROCEDURES	RESULTS
Chalfant, Rapee, and Carroll (2007)	47 children (ages 8-13; 35 boys, 12 girls), diagnosed with High Functioning Autistic Disorder, Asperger's Disorder and met criteria for one to three anxiety disorders.	Diagnosis made by paediatrician, psychiatrist, or clinical psychologist	Yes	Wait list/Randomised, controlled	*Cool Kids* programme. Family sessions held concurrently with child sessions. Modifications included: Extending treatment over a longer period of time, using more visual aids and structured worksheets, greater emphasis on relaxation and exposure activities, and simplified information in cognitive activities.	At post-treatment 20 out of 28 children (71.4%) no longer met DSM-IV criteria for a current primary anxiety disorder compared to 0 out of 19 children in waitlist condition. Majority of self, parent, and teacher report measures also showed a reduction of anxiety symptoms.
Drahota, Wood, Sze, and Van Dyke (2011)	44 children (ages 7-11; no gender breakdown), diagnosed with autism, Asperger's Syndrome, or PDD-NOS; at least one anxiety disorder, and not taking psychiatric medication or taking a stable dose at time of study.	Researcher criteria	Yes	Waitlist/Randomised, controlled	*Building Confidence* CBT programme. Child/parent/family sessions. Modifications designed to address poor adaptive skill deficits, social skills deficits, special interests, poor attention/motivation, and school-based problems.	*Building Confidence* CBT programme. Child/parent/family sessions. Modifications designed to address poor adaptive skill deficits, social skills deficits, special interests, poor attention/motivation, and school-based problems.
Reaven, Blakely-Smith, Culhane-Shelburne, and Hepburn (2012)	50 youth (ages 7-14; no gender breakdown), confirmed diagnosis of an ASD, average verbal ability, clinically significant symptoms of anxiety.	Yes	Yes	Treatment as usual group/Randomised, controlled	*Facing Your Fears* programme. Multi-family group sessions. Modifications included: careful pacing of sessions, token reinforcement, visual structure/schedule provided, focus on special interests, and video modelling.	Treatment group demonstrated significant reductions across all four principal anxiety diagnoses. Reduction in anxiety symptoms maintained at 3 and 6 month follow-ups.

CITATION	SAMPLE CHARACTERISTICS	STANDARDISED ASD MEASURE USED?	STANDARDISED ANXIETY MEASURE USED?	CONTROL GROUP/DESIGN	CBT PROCEDURES	RESULTS
Reaven et al. (2009)	33 children (aged 8-14; no gender breakdown) with ASD diagnoses and significant anxiety symptoms.	Yes	Yes	Wait list/Randomised, controlled	*Coping Group: Fighting Worry and Facing Fears*. Sessions consisted of large group time, separate parent and child group meetings and parent-child dyads. Modifications included: token reinforcement, written worksheets, focus on creative activities, and video modelling.	Parents reported significant decreases in severity of anxiety symptoms; children reported no significant effects, in fact 25% reported an increase in symptoms.
Scarpa and Reyes (2011)	11 children (aged 5-7; two girls, nine boys).	Yes	Parental and self-report on an emotional regulation scale, parental observations	Delayed treatment group/Randomised, controlled	Treatment focused on skill-building via effective communication, stress management, and understanding and expressing of emotions.	Parents reported significantly higher levels of confidence in their child's ability to deal with anger and anxiety than the delayed treatment group.
Sofronoff, Attwood, and Hinton (2005)	71 children (aged 10-12; no gender breakdown). All diagnosed with Asperger's Syndrome and had parent reported anxiety symptoms.	Yes	Parent report via phone interview	Waitlist, intervention with child only, intervention with child and parent/Randomised, controlled	Sessions included information on being happy, relaxed, and anxious. Parents were involved in separate sessions and trained to work as "co-therapists" during all aspects of the intervention for the child/parent group.	Results from parent reports demonstrated that CBT was effective at reducing anxiety symptoms to a significant degree in both groups, with the child/parent group showing greater improvement.
Sung et al. (2011)	70 children (aged 9-16; 66 boys, 4 girls), diagnosed with autism, Asperger's Syndrome, PDD-NOS or ASD and average intelligence. For those on medication, no change in dosage 1 month prior to study.	Yes	Yes	Social Recreation Program/Randomised, controlled	Modified versions of the *Coping Cat Program*, *Exploring Feelings*, and unpublished anxiety management programs from the Child Guidance Clinic and Autism Resource Centre. Sessions delivered to small groups of 3-4 participants. Modifications were made to suit the cultural and developmental profiles of children from the Asian population.	Both groups reported significantly fewer generalised and total anxiety symptoms post-treatment and at 6 month follow-up. The SR group also showed a significant reduction in panic attack symptoms at 6-month follow-up.

CITATION	SAMPLE CHARACTERISTICS	STANDARDISED ASD MEASURE USED?		STANDARDISED ANXIETY MEASURE USED?	CONTROL GROUP/DESIGN	CBT PROCEDURES	RESULTS
White, Ollendick, et al. (2009)	Four participants (aged 12-17; two males, two females). Diagnosed with Autism, Asperger's Syndrome or PDD-NOS and met criteria for an anxiety disorder.	Yes	Yes	None	*Multi-Component Integrated Treatment* Parents were involved as "coaches." Integrated social skill development techniques with evidence-based approaches for the treatment of childhood anxiety.	Three out of four participants no longer met criteria for an anxiety disorder at the time of treatment and the fourth showed some improvement. All four showed improvement in social skills.	
Wood et al. (2009)	40 children (age 7-11; no gender breakdown) diagnosed with autism, Asperger's Syndrome, or PDD-NOS and met criteria for an anxiety disorder.	Yes	Yes	Waitlist/Randomised, controlled	*Building Confidence* CBT Program. Child/parent/family sessions. Modifications included: social skills development, adaptive skill deficits, incorporation of special interests, ways to address poor attention and motivation.	9 out of 14 (64.3%) of CBT group no longer met criteria for an anxiety disorder post-treatment compared with only 2 out of 22 (9.1%) of waitlist group.	
Wood, et al. (2009)	19 children (aged 7-11; 16 boys, 3 girls), diagnosed with ASD and anxiety disorders.	Yes	Yes	Waitlist/Randomised, controlled	*Building Confidence* CBT Program (see description above).	Parents reported reduced autism and anxiety symptoms in the CBT group (medium to large effect size). Also a significant increase in social communication skills in the CBT group was noted.	

Participants

Sample sizes in the studies ranged from 4 to 71. Only three studies had a sample size of fewer than 20. Of these studies, the samples were 4, 11, and 19 participants. The collective sample size of the 10 studies reviewed was 389 participants. Some studies did not include information on the gender breakdown of the sample; therefore this information could not be included in the table. Ages of participants ranged from 5 to 17.

ASD and anxiety diagnoses

All of the participants in the studies were diagnosed with ASD using standardized measures or clinical assessments by a paediatrician, psychiatrist, or clinical psychologist. The standardised measures used included the *Autism Diagnostic Observation Schedule* (Lord, Rutter, DiLavore, & Risi, 2002)*,* the *Social Communication Questionnaire* (Berument, Rutter, Lord, Pickles, & Bailey, 1999)*, the Autism Diagnostic Interview-Revised* (LeCouteur, Lord, & Rutter, 2003), and the *Social Responsiveness Scale* (Constantino & Gruber, 2005)*.*

In all but two of the studies, participants were diagnosed with anxiety disorders using standardised measures. These scales included the *Anxiety Disorders Interview Schedule (ADIS*; Silverman & Albano, 1996), the *Spence Children's Anxiety Scale and Parent Report* (Spence, 1998), *Vineland Adaptive Behavior Scale* (Sparrow, Balla, & Cichetti, 1984), and the *Screen for Child Anxiety and Related Emotional Disorder (SCARED*; Birmaher et al., 1999). Of the two studies that did not use standarised assessment, one (Scarpa & Reyes, 2011) used parental and self-reports on an emotional regulation scale and parental observations and one (Sofronoff et al., 2005) used parental report via phone interviews.

Study design/Use of control group

The majority of studies (9 out of 10) used a randomised, controlled design to assess the effects of the CBT treatment on the anxiety symptoms of the participants. The one study (White, Ollendick, et al., 2009) that did not use a randomised, controlled design had only four participants. This was a pilot study that focused on adolescents. Of the 9 studies that used randomised, controlled designs, all but two used a waitlist control group. One study used a "treatment as usual" group, in which the group continued with their current treatment and were also free to explore other treatment options (Reaven et al., 2012). The other used a social recreation programme group (Sung et al., 2011).

CBT procedures and modifications employed

The studies used a wide range of CBT programmes, procedures, and modifications. Some of the commercial programmes used were the *Cool Kids Anxiety Program* (Lyneham, Abbott, Wignall, & Rapee, 2003), the *Coping Cat Program* (Kendall, 2000), *Exploring Feelings* (Attwood, 2004), *Facing Your Fears* (Reaven, Blakely-Smith, Nichols, & Hepburn, 2011), *Building Confidence* (Wood & McLeod, 2008), the *Coping Group: Fighting Worry and Facing Fears* (Reaven, Hepburn, Nichols, Blakely-Smith, & Dasari, 2005), and *Multi-Component Integrated Treatment* (*MCIT*) (White et al., 2010). The sessions and programmes varied in length and duration. Some studies used separate child

and parent sessions, some used family sessions, some used only child sessions, and some used small or large group sessions.

There were a large number of modifications employed in the studies. Modifications to CBT included using visual aids/schedules, structured worksheets, incorporation of individuals' special interests, video modelling to teach complex concepts, social skills instruction, token reinforcement, ways to address poor attention and motivation, simplifying the cognitive information, stress management, and using parents as coaches or co-therapists.

Findings

The findings from all of the studies indicate that CBT was effective at reducing anxiety in the majority of the participants. While all of the studies had positive results in favour of CBT treatment, there was moderate variation in the findings overall. There was a wide range of methods used to determine these findings. Half of the studies used standarized anxiety measures to determine the effectiveness and the other half used primarily parent and self-report measures. Some studies that used standarized measures also used parent and self-report measures.

Ethical issues

The researchers involved in the studies in this review would have needed to consider a number of ethical issues in regards to the purpose of their investigation and the way they conducted the studies. A primary ethical issue that underlies the use of any intervention is to consider the purpose of implementing that intervention with a particular individual, group, or population. The purpose should be to provide a beneficial treatment for a problem that affects the participant. In other words, in all but exceptional circumstances, the treatment should be for the primary benefit of the participants and not the people that support the participants. The treatment should also be one that will promote the participants' ability to make effective decisions for themselves (Raines, 2008). Trialling the use of CBT with youth with co-morbid anxiety and ASD appears to be an ethical approach because it is a treatment that is provided for the primary benefit of the client (Sofronoff, et al., 2005) and its aim is to instruct the participant in how to manage their own emotions and increase their coping skills in stressful situations (Kazantis, 2006).

DISCUSSION

While the overall findings from the 10 studies included in this review indicate that CBT is effective for reducing anxiety symptoms in children and adolescents with ASD, the variation in the findings deserves consideration. Some studies demonstrated more positive findings than others, and not all studies used standarized assessments to evaluate the effectiveness of the CBT treatment. Several studies found that anxiety symptoms were alleviated significantly in more than half of the participants, and in some cases two-thirds of the participants. Several participants no longer met the criteria for an anxiety disorder post-treatment. One study found that while the parents indicated that there were significant decreases in their children's anxiety symptoms, a good portion of the children reported an increase in symptoms. The researchers in this study, Reaven et al. (2009), surmised that this finding could be the result of

the children being educated about anxiety and therefore becoming hyper-aware of anxiety symptoms. They also felt that this finding implied that the children were not accurate reporters of their own emotional experiences, as is a general concern with children with ASD (Russell & Sofronoff, 2005). The Sung et al. (2011) study used a social recreation programme as a control for the CBT treatment and found that the social recreation was as effective in reducing anxiety in the participants and even more effective at reducing panic attack symptoms at a six-month follow-up.

Programme used

The variation in the findings of this review could be in part due to the fact that apart from three studies that used *Building Confidence* (Wood & McLeod, 2008), each study used a different version of CBT. Not only were there different commercial programmes used but also the way the researchers chose to implement the various commercial programmes varied widely. There was also a huge range in the sample sizes of participants, the treatment session and course durations, and treatment delivery formats (e.g., individual, family, or group). Also, as was noted in the results section, the variation in the results could be due to the different outcome measures used. Some studies used standardised measures to determine effectiveness and others used parental and self-reports. Some studies used all three types of outcomes measures.

Although the variations in the findings make it difficult to conclude that CBT should be endorsed unreservedly as the treatment of choice for treating anxiety in youth with ASD, this review provides reasonable evidence to indicate that CBT may be very useful for alleviating anxiety symptoms and to recommend its use with these young people. To address the secondary aim of this review, some important themes emerged in the studies that may inform best practice techniques when using CBT with youth who have ASD and anxiety disorders.

Social difficulties

One of the primary themes that emerged in both the studies and the literature on anxiety disorders amongst youth with ASD was that difficulties with social interactions may contribute to anxiety or that social skills may be adversely affected by anxiety. While it is often assumed that individuals with ASD prefer to be isolated or to have low social contact, Attwood (2004) reports that many people with ASD do not like being socially disconnected and would like to improve their social situations. Although anxiety in individuals is typically characterised as unrealistic fears, Wood et al. (2009) posit that in the case of individuals with ASD, their fears may be quite realistic. As individuals with ASD often lack the ability to understand or assume the intentions of others accurately, they may behave in ways that garner unwanted attention and cause them to become the victims of stigmatisation, ridicule, and bullying (Lang et al., 2010).

Both anxiety and ASD present significant challenges for the social profile of an individual, and the relationship between the social difficulties of individuals with ASD and anxiety may have bi-directional effects (White, Ollendick, et al., 2009). As mentioned previously, anxiety has a detrimental effect on an individual's social ability (Bellini, 2004; Chang et al., 2012). A child who suffers from the social difficulties associated with ASD may develop social anxiety as a

result of experiencing the negative effects of these difficulties, or their anxiety may further compound their social difficulties and lead to fewer opportunities to practise and develop social skills (White, Ollendick, et al., 2009).

Social skills instruction

In this review, four studies, Drahota et al. (2011), White, Ollendick, et al. (2009), Wood, Drahota, Sze, Har et al. (2009), and Wood, Drahota, Sze, Van Dyke et al. (2009) used programmes that incorporated social skills instruction. Three of these studies used *Building Confidence* (Wood & McLeod, 2008), and one used *MCIT* (White et al., 2010). In *Building Confidence*, children are taught friendship skills in an ASD specific module. They learn about how to host a play date, be a good sport, and give compliments. They are also provided with social coaching by therapists, parents, and available school personnel to learn appropriate ways to enter social interactions or activities, and to maintain conversations with peers. This coaching happens during actual social situations at home or at school; therefore children are provided with immediate prompts and reinforcement. Children are also provided with peer buddies or mentors to alleviate their social isolation. In the Wood**,** Drahota, Sze, Har et al. (2009) study, a key finding was that social communication skills were greatly improved in the CBT group post-treatment. In *MCIT*, anxiety and social skills deficits are conceptualised as having reciprocal influences on each other. Both are targeted in treatment in a series of individual therapy modules. These four studies that included social skills instruction reported moderate to large effect sizes in the reduction of anxiety symptoms, indicating that social skills instruction is most likely a useful addition to CBT for children and adolescents with ASD.

Parental involvement

Another prominent theme in the reviewed studies was the inclusion of parents either in therapy sessions or as co-therapists. In fact, 8 of the 10 studies included parents and families in some capacity. There were a number of different approaches to the inclusion of parents and families. In the Reaven et al. (2012) study, participants' families met together in groups. In the Drahota et al. (2011), Reaven et al. (2009), Wood, Drahota, Sze, Har et al. (2009), and Wood, Drahota, Sze, Van Dyke et al. (2009) studies, parents participated in therapy sessions either with or separate from their children.

In the Sofronoff et al. (2005) and the White, Ollendick, et al. (2009) studies, parents were trained as "co-therapists" or "coaches." In both of these studies, the authors highlighted the use of parental involvement as a way to promote skill generalisation and enhance the usefulness of the CBT programmes. Parental involvement was also useful for receiving feedback about how the participants were responding to the programme. Sofronoff et al. (2005) reported several indicators that parent involvement added significant benefits for both the parents and children participating in the programme. The parents reported feeling competent to assist their child, and empowered by meeting other parents who shared similar experiences and supported each other. They also found that the group that had parent involvement showed a greater reduction in parent reported symptoms in the anxiety levels of the participants on two of the scales used to measure the effectiveness of the treatment.

The Chalfant et al. (2007) study, which had the strongest outcome of all the studies included in this review with 71.4 % of participants no longer meeting anxiety disorder criteria at the conclusion of the intervention, included a parent training programme adapted from the *Cool Kids* manual (Lyneham et al., 2003). The parent programme provided information and training on relaxation strategies, cognitive restructuring exercises, graded exposure, and relapse prevention. The researchers noted that the treatment manuals were implemented with flexibility to allow for the individuality of each child and family. Some of the other modifications used addressed the concrete and visual learning style of children with ASD. The programme was extended over a longer period of time (6 months), and used more visual aids and structured worksheets than would usually be employed. The largest components of the programmes concentrated on relaxation and exposure. During the exposure session, families planned out weekly exposure tasks to do at home, rather than during the session. Families were asked to complete a daily diary as a record of the practice and outcomes of their exposure activities.

In general, parental involvement seems to be associated with better outcomes and generalisation of effects for participants (Moree & Davis, 2010). The findings of each of these studies indicate that including parents in an active role in CBT treatment may greatly enhance the effectiveness of the treatment for youth with ASD. These studies employed parents in active roles with both children and adolescents, further indicating that parental involvement may be useful with a wide range of ages.

Incorporation of special interests

A third theme in the studies reviewed was that some programmes, for example *Building Confidence* (Wood & McLeod, 2008) and *Facing Your Fears* (Reaven et al., 2011), incorporated the participants' special interests as part of the CBT treatment. There are numerous ways to incorporate special interests according to the type of interest. For example, in the Sofronoff et al. (2005) study, therapists used a science or a science fiction theme and created the metaphor that the participating children were "scientists" or "astronauts" exploring a new planet while exploring their emotions. Unfortunately, the other studies did not explain how they used special interests in their interventions. However, it is worth considering how some other studies, not included in this review, utilised special interests as part of treatment. In the Sze and Wood (2008) case study, the participant had a special interest in Harrison Ford. To help the child engage in the sessions, the therapists allowed the child to use stories of Harrison Ford and to consider how Harrison Ford would handle certain scenarios as a way to facilitate the child verbalising her emotions. In the Reaven and Hepburn (2003) study, therapists chose to use the preferred language of the child being treated when addressing obsessive-compulsive disorder symptoms and ratings instead of traditional CBT wording.

Another theme that came through in the literature and the studies was that individuals who were higher functioning on the autism spectrum tended to be more adversely affected by anxiety symptoms. Mazurek and Kanne (2010) looked at friendship and internalising symptoms of children and adolescents with ASD and found that individuals with more severe ASD symptoms and lower IQ scores had fewer symptoms of anxiety. They posited that individuals who

have fewer ASD symptoms may also have less core social and self-awareness impairments, which would predispose them to more anxiety symptoms.

The final theme that came through in the reviewed studies was that adolescence, in general, was a time in which anxiety increased for youth and this was also true for adolescents with ASD (McPheeters, Davis, Navarre, & Scott, 2011). Mazurek and Kanne (2010) suggested that anxiety emerges later in preadolescence because that is when cognitive mechanisms underlying the constructs of self-awareness and the perception of how one is viewed by others begin to develop. While adolescents are developing their sense of self-awareness, their social world is becoming increasingly complex and their desire to form peer relationships is also increasing. If, as mentioned earlier, they are impeded by social skills deficits, they may be more likely to experience anxiety as well as depression (White et al., 2010). These findings suggest that pre-adolescence and early adolescence may be particularly crucial times to address anxiety.

IMPLICATIONS FOR TEACHERS

Teachers play an important role in the recognition and management of anxiety in children and adolescents (LaBillois & Lagacé-Séguin, 2009). While teachers are not expected to provide therapy for students with anxiety, knowledge of what treatments help to alleviate anxiety may help teachers to identify effective programmes for their students. This article has explored and highlighted aspects of a number of commercially available programmes for treating anxiety. Teachers may find this information helpful in informing their discussions with parents and professionals about addressing anxiety in children and adolescents with ASD.

CONCLUSION

While more still needs to be learned about the best way to provide CBT treatment to alleviate anxiety in children and adolescents with ASD, the findings of this review overall favour the use of it. It also appears that recreation programmes may provide an effective form of treatment for reducing anxiety in students. Anxiety presents a significant barrier to the social and academic profiles of young people with ASD, and CBT appears to be an efficacious treatment option. Care should be taken when adapting CBT for use with youth with ASD. It appears that parental involvement and social skills instruction are particularly important modifications that should be incorporated when implementing CBT interventions with children and adolescents on the autism spectrum. Finding a way to utilise the special interests of the participants may also lead to enhanced effectiveness of treatment. Individuals on the spectrum who are high functioning or just entering adolescence may be more susceptible to anxiety and this may be a crucial time to apply CBT interventions. While no one evidence-based treatment will necessarily work for every participant and in every situation (Cook, Tankersley, Cook, & Landrum, 2008), CBT appears to be a promising treatment option for the alleviation of anxiety in children and adolescents with ASD.

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