

## **Cognitive-behavioural treatment of anxiety in children and adolescents with Autism-Spectrum Disorders**

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### **ABSTRACT**

This study evaluated the efficacy of a cognitive-behavioural group program Cool Kids as an anxiety treatment for children and adolescents with Autism Spectrum Disorders, with or without mild intellectual disability. Six intervention groups (total n = 15) were compared with a waitlist control group (n = 9). Pre- and post-test assessment included self-report anxiety measures, plus parent-reported mental health symptoms and anxiety disorders. Children who completed the Cool Kids program met criteria for fewer anxiety disorder diagnoses at post-test compared to the waitlist condition. No intervention effects were found for self- or parent-report anxiety or emotional and behavioural symptoms measures.

### **Keywords**

Autism Spectrum Disorder, intellectual disability, anxiety

### **INTRODUCTION**

Children and adolescents with Autism Spectrum Disorders (ASD) and developmental disabilities are at increased risk of developing anxiety disorders (Bellini, 2004; Gillot, Furniss, & Walker, 2001; Muris, Steerneman, Merckelbach, Holdrinet, & Meesters 1998; Sukhodolsky et al., 2008). Anxiety symptoms in children with ASD and developmental disabilities can interfere with functioning at home, school and in the community (Russell & Sofronoff, 2005). Children with these disabilities exhibit inappropriate fear responses, such as excessive fear of everyday objects, places or situations (Muris et al. 1998). Autism Spectrum Disorders (ASD) affects 1 in 152 children (Center for Disease Control, 2007), and children and adolescents with ASD are at increased risk of developing anxiety disorders (e.g. Bellini, 2004; Gillot, Furniss & Walker, 2001). In contrast, typical children and adolescents (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003) report three-month prevalence of any disorders as 13.3% (95% confidence interval, 11.7% - 15.0%).

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Epidemiological studies indicate that anxiety is a widespread difficulty for children and adolescents with ASD and developmental disabilities, with prevalence rates for anxiety disorders ranging from 43% to 87% (Muris et al., 1998; Kuusikko et al., 2008; Sukhodolsky et al., 2008). Compared to rates of typically developing children, 8% to 15.4% (Costello & Angold, 1995; Fergusson, Horwood, & Lynsky, 1993), anxiety disorders in children and adolescents with ASD and developmental disabilities are significant. The most common diagnoses are specific phobia (63.6%), agoraphobia (45.5%), separation anxiety disorder (27.3%), overanxious disorder (22.7%), social phobia (20.5%), and OCD (11.4%). Children with ASD have been found to experience greater levels of anxiety than other paediatric populations, such as specific language impairments (Gillot et al., 2001), epilepsy (Steffenburg, Gillberg, & Steffenburg, 1996) and children with intellectual disabilities (Bradley, Summers, Wood, & Bryson, 2004; Brereton, Tonge, & Einfeld, 2006).

Anxiety is a serious burden for children with ASD and developmental disabilities. The evidence-based treatments are limited. Techniques include social stories and DVDs (O'Connor, 2009), and laughter as an anxiety inhibitor (Jackson & King, 1982). Other research has focused on psychopharmacological treatments such as Sertraline (Steingard, Zimnitzky, DeMaso, Bauman, & Bucci, 1997) and Olanzapine (Potenza, Holmes, Kanen, & McDougle, 1999). Psychosocial treatments are limited (Chalfant, Rapee, & Carroll, 2007; Reaven et al., 2009). However, cognitive behaviour therapy is a growing area.

The efficacy of Cognitive Behavioural Therapy (CBT) based on group treatments for childhood anxiety is supported by randomised controlled studies (e.g. Barrett, Duffy, Dadds, & Rapee, 2001; Shortt, Barrett, & Fox, 2001; Silverman et al., 1999). The long-term clinical utility of CBT for anxious children is 6-year follow-up (Barrett et al., 2001). These treatments have also been found to reduce anxiety symptoms in single case studies of children with ASD (e.g. Reaven & Hepburn, 2003; Sze & Wood, 2007).

Child CBT for anxiety in children with ASD and developmental disabilities children has become an important research topic. Sofronoff, Attwood and Hinton (2005) evaluated a six-week group program focusing on emotional recognition and cognitive restructuring in children with ASD and parent-reported anxiety. The participants were clinically anxious, but did not have a diagnosed anxiety disorder at pre-treatment. The intervention group displayed significant decreases in parent-reported anxiety and social worries compared to the waitlist condition. Chalfant et al. (2007) investigated the utility of a modified family-based CBT program, 'Cool Kids' (Lyneham, Abbott, Wignall, & Rapee, 2003), for Australian children with high-functioning ASD aged 8 to 13 years. The treatment group's anxiety symptoms decreased significantly on self-, parent- and teacher-report measures compared to the waitlist control group. Results indicated that 71.4% of the treatment groups no longer met diagnostic criteria for an anxiety disorder compared to 0% of the control group. The modifications included extending the 12 session program over six months and the use of more structured worksheets and visual aids.

Wood and colleagues (2009) used a version of the CBT for children 'Building Confidence' (Wood & McLeod, 2008) which was modified for children with ASD and anxiety disorder diagnoses. Children with a verbal IQ lower than 70 were excluded from this study. Over half of the children in the intervention group no longer met criteria for an anxiety disorder following treatment and at three-month follow-up. Reaven et al. (2009) targeted social, separation, and generalised anxiety symptoms in children with ASD who had verbal fluency, an IQ above 70, and current significant anxiety symptoms. The CBT group treatment, 'Coping Group: Fighting Worry and Facing Fears' (Reaven, Hepburn, Nichols, Blakeley-Smith, & Dasari, 2005), was used with parental involvement. Significant decreases in the children's anxiety symptoms were reported by the parents compared to participants in the waitlist control condition. However, no diagnostic measures of anxiety disorders were taken.

McNally Keehn, Lincoln, Brown and Chavira (2012) used individual sessions modified from the 'Coping Cat' protocol (Kendall & Hedtke, 2006) in a small randomised control study with children with ASD, an IQ above 70, and a primary anxiety disorders of separation anxiety disorder, GAD and social phobia. Fifty-eight percent of the children who participated no longer met diagnostic criteria for their primary anxiety disorder at post-test. There was also a significant reduction in total anxiety

disorder diagnoses and in parent-reported anxiety symptoms compared to the control group. However, Wood et al. (2009) found no significant reductions in child-reported anxiety symptoms. At the two-month follow up, only 36% of the CBT group met criteria for the primary anxiety disorder diagnosis indicating booster treatment may be required.

The research into anxiety in individuals with intellectual disability (ID) is limited (Hagopian & Jennett, 2008), although it is relevant given the increased rates of anxiety in children and adolescents with ID compared to the general population (e.g. Dekker & Koot, 2003; Emerson, 2003). Research has been limited by participants' low cognitive ability (Taylor, Lindsay, & Willner, 2010). Lang, Mahoney, El Zein, Delaune, & Amidon, (2011) support the use of modified CBT to treat anxiety in higher functioning individuals with ASD. However, there is limited evidence regarding its use with individuals with ASD and ID. Lang, Regester, Lauderdale, Ashbaugh, & Haring (2010) reviewed studies into the use of CBT to treat anxiety in children and adults with ASD. They suggested that while those with Asperger's Disorder were found to benefit, those with autism and ID may not benefit to the same extent due to communication skills and intellectual functioning. However, there are indications that children with ASD and ID may benefit from psychological treatments. In particular, exposure and response prevention treatments have been found to reduce repetitive behaviours in children with autism and ID (Boyd & Woodard, 2011).

CBT treatment for anxious children with ASD and developmental disabilities is limited. Due to the high prevalence of anxiety disorders within the ASD and ID populations (e.g. Muris et al., 1998), anxiety interventions may be useful in these populations. Previous studies have often excluded participants with ID, instead focusing only on high-functioning children with ASD (Chalfant et al., 2007; Reaven et al., 2009). The current study investigates the treatment of anxiety disorders for children and adolescents with ASD with or without ID, using the Cool Kids Program (Lyneham et al., 2003). It is hypothesised that participants in the group CBT condition would have a significant reduction in anxiety compared with a waitlist control group condition.

## METHOD

### Participants

Participants consisted of 24 children and adolescents with ASD and anxiety disorders aged from 9 to 17 years ( $M = 12.42$   $SD = 1.84$ ). They were all registered with the Disability Services Commission (DSC) in Western Australia. The intervention group ( $n = 15$ ) consisted of groups of participants who completed the Cool Kids program in 2007 (2 girls and 2 boys aged 12-14 years), two groups in 2008 (6 boys aged 10-16 years), and three groups in 2009 (1 girl and 4 boys ages 9-14 years). This pre- and post-test data collected from these intervention group participants were compared to a new set of pre- and post-test data collected from a waitlist control group ( $n = 9$ , 1 girl and 8 boys aged 10 - 17 years) in 2010.

Participants met all inclusion criteria: (a) diagnostic criteria for autism; (b) diagnostic criteria for any anxiety disorder, and (c) did not display physical aggression and threat of harm to self and others. Four intervention group participants and three control group participants had mild ID. Anxiety diagnoses included GAD, social phobia, specific phobia, separation anxiety, panic disorder, agoraphobia, sleep terror, and OCD. The descriptive information of demographic and diagnoses for both conditions at pre- and post-test is represented in Table 1.

### Measures

Clinical psychologists and a clinical psychology trainee completing a Master's program administered diagnostic interviews and the same battery of assessment measures with the participants and their families at pre- and post-test for all intervention and control groups. The children's DSM-IV anxiety disorders were assessed using the structured interview Anxiety Disorders Interview Schedule for Children- Parent Report (ADIS-C/P; Silverman & Albano, 1996). The clinicians and supervisors were trained in the use of this tool as well as the Cools Kids protocol. Additional anxiety symptomology was gathered using the self- and parent-report versions of the Spence Children's

Anxiety Scale (SCAS: Spence, 1998) as well as additional emotional and behavioural symptoms using the Strengths and Difficulties Questionnaire- Parent Report (SDQ: Goodman, 1997).

**Table 1:** Frequencies of demographics and diagnoses for the intervention (CBT) and waitlist (WL)

	CBT No. (%)	WL No. (%)
	<i>n</i> = 15	<i>n</i> = 9
Child sex (male)	12 (80%)	8 (89%)
Child Age	12.3	12.7
	SD = 1.6	SD = 2.3
Parent sex (female)	15 (100%)	7 (78%)
Autism Spectrum Disorders		
High-Functioning Autism	3 (20%)	6 (67%)
Autistic Disorder	12 (80%)	3 (33%)
Mild Intellectual Disability	4 (27%)	3 (33%)
Baseline Anxiety Disorders		
Separation Anxiety Disorder	4 (27%)	0
Social Phobia	7 (47%)	4 (44%)
Specific Phobia	10 (67%)	8 (89%)
GAD	12 (80%)	5 (56%)
OCD	4 (27%)	4 (44%)
Panic Disorder Without Agoraphobia	1 (7%)	0
Panic Disorder with Agoraphobia	1 (7%)	0
Comorbid Mood Disorder		
Major Depressive Disorder	0	0
Dysthymia	2 (13%)	0

#### ***Children-Parent Report (ADIS-C/P)***

The ADIS-C/P (Silverman & Albano, 1996) is a structured parent interview schedule which contains items consistent with diagnostic criteria for childhood disorders in the DSM-IV. Of the subscales within the ADIS-C/P, measures of anxiety disorders (separation anxiety disorder, social phobia, specific phobia, panic disorder, agoraphobia, GAD and OCD) and affective disorders (dysthymia and major depressive disorder) were administered.

### ***Spence Children's Anxiety Scale (SCAS)***

The SCAS (Spence, 1998) is a 44 item self-report measure of children's anxiety containing a wide range of anxiety symptoms and diagnosis of specific childhood anxiety disorders. The scale contains subscales measuring the symptoms of panic/agoraphobia, social phobia, separation anxiety, generalized anxiety, obsessions/compulsions and fear of physical injury. The SCAS has a high internal consistency with a Cronbach alpha of .92 and a Guttman split half reliability score of .90. It also has a test-retest reliability of .60 after a six month delay. The SCAS has a convergent validity of .71 with the Revised Children's Manifest Anxiety Scale (RCMAS; Spence, 1998).

### ***Spence Children's Anxiety Scale-Parent Report (SCAS-P)***

The parent-report version of the SCAS (Nauta, Scholing, Rapee, Abbott, & Spence, 2004) contains an identical set of symptoms to the child self-report version except that the symptoms are evaluated according to the parent's perspective (Nauta et al., 2004). The six subscales correlate well with the child self-report measure (and DSM-IV diagnostic criteria). The reliability of the SCAS-P has been deemed satisfactory to excellent with Cronbach's alpha coefficients calculated for each subscale ranging from .81 to .92 (Nauta et al., 2004). Convergent validity has been established as the SCAS-P correlated strongly and significantly with the internalising symptoms subscale of the Child Behaviour Checklist ( $r = .55-.59$ ). Good convergent validity was also shown with the corresponding subscales in the child-report SCAS with correlation coefficients ranging from .41 to .66 (Nauta et al., 2004).

### ***Strengths and Difficulties Questionnaire- Parent Report (SDQ)***

The SDQ (Goodman, 1997) contains 25 items, measuring five subscales with five items per subscale. The subscales comprise: Emotional Symptoms, Conduct Problems, Hyperactivity Scale, Peer Problems, and Prosocial Scales. A Total Difficulties Score can also be generated. Convergent validity has been established for the scale, with high correlation coefficients ranging from .78 to .88 between subscales with the reliable and valid Rutter questionnaires (Elander & Rutter, 1996) and equal predictive validity (Goodman, 1997). The internal consistency of the SDQ parent-report subscales has been found to be generally satisfactory, with a mean Cronbach's alpha of .70 (Muris, Meesters, & van der Berg, 2003). Its test-retest reliability over a two month period is also satisfactory with correlation coefficients for the subscales ranging from .75 to .91 and .88 for Total Difficulties (Muris et al., 2003).

## **Intervention Program**

The CBT intervention, Cool Kids program (Lyneham, Abbott, Wignall, & Rapee, 2003) was used with slight modifications for children with ASD/ID, and permission from the authors. The Cool Kids program teaches children and their parents to manage anxiety. It is delivered in a group format and is designed for primary school aged children. Cool Kids is run over 10 weeks, with weekly separate child and parent sessions. The content of the program covers recognition of signs of anxiety, simplified cognitive restructuring, self-talk, exposure, problem solving and coping strategies. The program employs a step-by-step approach that is structured and directed. Children begin by looking at their thoughts. How do thoughts and feelings affect anxiety? They learn to think realistically by facing fear to fight fear. There are realistic thinking and creative stepladders which will help children plan for the future. The children describe common anxieties and fears, such as general anxiety, social anxiety, specific phobias and panic disorders. The program describes the particular symptoms and addresses the interventions via a small step-by-step approach that is both structured and directive.

Slight adaptations were made to the original Cool Kids program to suit children and adolescents with ASD/ID. Modifications included using the child version with teenagers with high-functioning autism in the groups. Two therapists facilitated each group to manage behaviour difficulties and behaviour support plans were developed for all participants. Social workers co-facilitated the parent groups. The child and parent sessions come together at the start and finish of the sessions. The session protocol included positive self-talk and slow breathing techniques in every session.

## **Procedure**

### ***Waitlist Condition***

Families of children with ASD were contacted and invited to the Cool Kids program. They were then advised of the assessment requirements. Families were assigned to a waitlist control group condition before completing the Cool Kids program. The pre-control group data were collected in the family home. Families were visited again following the 10 week waitlist condition to collect the follow-up data. Consent and information forms were provided to the families and consent was gained retrospectively.

### ***Intervention Condition***

Pre- and post-intervention data were collected by the Disability Services Commission from families that had participated in the Cool Kids interventions at an earlier time. The same assessment measures were used as for the waitlist condition. Retrospective consent to use the parent and child questionnaire data was obtained from parents who had attended earlier groups. The participants completed a 10 session group, the Cool Kids Program, at the Disability Services Commission, with separate child and parent groups. The 10 sessions ran over 12 weeks, with two clinicians facilitating each two hour group session. Group sizes were limited to an average of three participants in order to manage behavioural difficulties. There was a high degree of consistent attendance by the participants and any missed sessions were made up through one-on-one sessions. The clinicians who administered the pre- and post-intervention assessments led the treatment groups.

## **RESULTS**

### **Pre-Intervention Comparability**

Pre-treatment group differences were assessed using paired samples t-tests and chi-square tests. There were no statistically significant differences between the waitlist control and intervention groups on the variables age, gender and pre-test scores on all measures (SCAS, SCAS-P, SDQ and ADIC-C/P).

### **Descriptive Statistics**

The control and intervention group pre- and post-test means, standard deviations and ranges of the total scores for each variable, are presented in Table 2. The mean SCAS and SCAS-P scores were in the normal range for both the intervention and waitlist control groups at pre- and post-test. Only seven control group participants and 12 intervention group participants completed both the pre- and post-test SCAS, hence only their scores were used in the analysis. One participant did not complete a post-intervention ADIS-C/P.

### **Hypothesis Testing**

Because all tests were hypothesis-driven, they were evaluated at the conventional alpha-level of .05 with no Bonferroni correction required. Multiple hierarchical regression analyses were used to test all hypotheses with pre-test scores entered as the covariate on Step 1 and the binary predictor (intervention versus control) entered on Step 2.

### ***Anxiety Measures***

It was hypothesised that children in the intervention group would report lower levels of anxiety at post-test compared to children in the waitlist group (CBT  $n = 12$ , WL  $n = 7$ ). After controlling for the pre-test SCAS scores, the intervention effect was non-significant accounting for none of the variance in post-test SCAS scores ( $sr^2 = .000$ ,  $p = .99$ ). One child in the intervention group reported a significant increase in anxiety symptoms on the SCAS according to the RCI. After controlling for pre-

test SCAS-P scores, parents of children in the intervention group did not report lower levels of anxiety as hypothesised (CBT  $n = 15$ , WL  $n = 9$ ). The intervention effect was non-significant, accounting for 1.96% of the variance in parent-reported anxiety symptoms ( $sr^2 = .0196$ ,  $p = .150$ ).

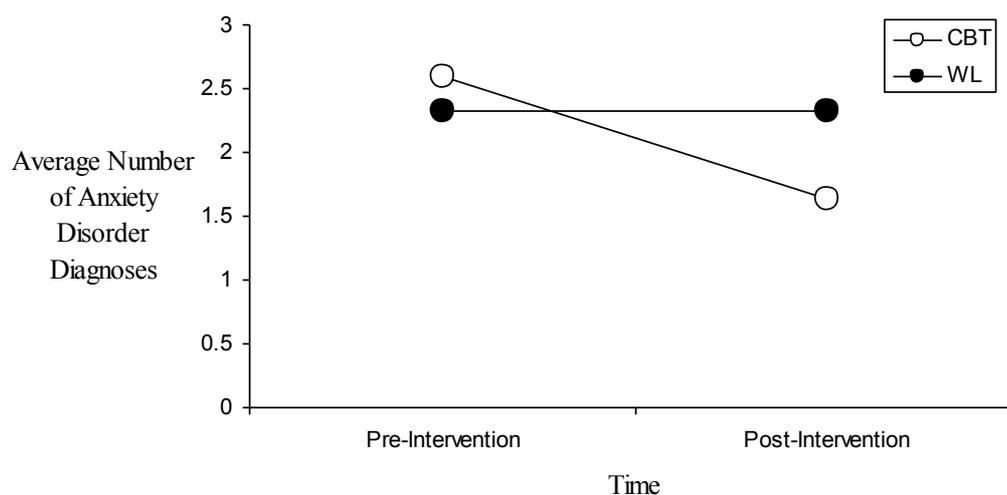
**Table 2:** Descriptive statistics of the anxiety scores for the intervention (CBT) and waitlist (WL) groups

Scale	CBT		WL	
	Pre-intervention	Post-intervention	Pre-waitlist	Post-waitlist
<b>ADIS-C/P</b>				
<i>M</i>	2.60	1.64	2.33	2.33
<i>SD</i>	1.30	1.34	1.00	.87
Range	1-5	0-4	1-4	1-4
<b>SCAS</b>				
<i>M</i>	27.12	22.33	27.16	24.29
<i>SD</i>	16.60	14.85	19.30	13.60
Range	5-65	4-50	6-67	8-46
<b>SCAS-P</b>				
<i>M</i>	34.51	30.16	23.77	17.82
<i>SD</i>	22.16	17.71	10.14	8.53
Range	12-88	11-68	13-41.91	11-33
<b>SDQ-Total Difficulties</b>				
<i>M</i>	18.55	17.47	19.78	17.44
<i>SD</i>	3.79	4.63	3.15	3.00
Range	13-25	11-26	13-23	13-22
<b>SDQ-Prosocial Scale</b>				
<i>M</i>	5.53	4.67	5.56	5.00
<i>SD</i>	4.67	1.34	2.24	2.59
Range	1-8	2-6	3-10	1-10

Children who participated in the Cool Kids program met criteria for fewer anxiety disorder diagnoses according to the ADIS-C/P at post-test as hypothesised (CBT  $n = 14$ , WL  $n = 9$ ). After controlling for the pre-test anxiety diagnoses, there was a significant intervention effect accounting for a 13.76% variance in anxiety disorder diagnoses ( $sr^2 = .1376$ ,  $p = .025$ ). After completing the

intervention, two participants no longer met diagnostic criteria for an anxiety disorder, compared to none of the waitlist control group. At post-test, nine of the intervention group participants no longer met criteria for one or more previous anxiety disorders, including one participant with ID. Six with ASD met criteria for the same number of anxiety diagnoses as at pre-test. No intervention group participants gained an anxiety disorder diagnosis. Within the waitlist control group, two participants dropped an anxiety disorder diagnosis, two participants met criteria for additional anxiety disorders and five met criteria for the same number of anxiety disorders as at pre-test. See Figure 1 for the graph depicting changes in average number of anxiety disorder diagnoses for which criteria were met for the waitlist and intervention group participants.

**Figure 1:** Changes in average number of anxiety disorder diagnoses for CBT and WL participants



### *Secondary Outcome Measures*

Contrary to the hypothesis, the intervention group did not display lower levels of parent reported total difficulties at post-intervention compared to the waitlist control group (CBT  $n = 15$ , WL  $n = 9$ ). After controlling for the pre-test SDQ Total Difficulties scores, the intervention effect was non-significant, accounting for none of the variance in emotional and behavioral difficulties ( $sr^2 = .001$ ,  $p = .83$ ). One participant in the intervention group reported a significant improvement on the SDQ Total Difficulties scale according the RCI. In addition, the intervention effect for the SDQ Pro-social subscale was also non-significant, accounting for 0.7% of the variance in pro-social behaviors ( $sr^2 = .007$ ,  $p = .58$ ).

## **DISCUSSION**

The current study adds to the research supporting the use of CBT interventions for the treatment of anxiety in children and adolescents with ASD. The results indicated children diagnosed with ASD and ID met criteria for fewer anxiety disorder diagnoses according to the ADIS-C/P at post-test. However, no significant changes were found in self- and parent-reported anxiety symptoms or parent-reported emotional and behavioural symptoms. Despite these findings, a significant intervention effect was still found in reducing anxiety symptoms so that the participants met criteria for fewer anxiety disorder diagnoses in the intervention condition. Nine of the 15 Cool Kids participants no longer met criteria for more than one anxiety disorder compared to their pre-test assessments, with two participants no longer meeting criteria for any anxiety disorder on the ADIS. Two of the waitlist participants recovered from one of their anxiety diagnosis at post-test; however two other participants met criteria for one or more additional anxiety diagnosis.

The children and adolescents who participated in the program reported significant changes in their lives following the conclusion of the group. Examples included being able to eat in crowded restaurants, entering crowded places such as shopping centres, increased socialisation with peers, returning to school full-time, being able to use lifts and coping better in unfamiliar situations and changes in routine.

The current findings are comparable to previous studies which have investigated the efficacy of group based CBT in reducing symptoms of an anxiety disorder with children and adolescents with ASD (e.g. Chalfant et al., 2007; Wood et al., 2009). Chalfant and colleagues, also evaluated the Cool Kids program and found 71.4% of participants did not meet the criteria for an anxiety diagnosis at post-test. They found a large effect size for the reduced number of anxiety disorders met between pre- and post-test for the children in the CBT condition compared to waitlist. A significant reduction in anxiety diagnoses at post-treatment compared to a waitlist condition was also found by Wood et al. (2009). In this study one child with ASD and mild ID benefited from the CBT treatment. Previous research in this area has focused on only high-functioning children with ASD (e.g. Chalfant et al., 2007; Reaven et al., 2009; Sofronoff et al., 2005) or excluded those with ID (Wood et al., 2009). The children and adolescents with ASD and ID who completed the Cool Kids program appeared to benefit from linking thoughts and feelings, and cognitive restructuring.

Cognitive treatments have often been thought to be ineffective in assisting individuals with ID (Dagnan & Jahoba, 2006) and the current literature in this area is limited, particularly research involving children and adolescents. However, other studies have indicated that CBT may be an effective treatment for adults with ID. For example, CBT treatment has been found to be effective in reducing symptoms of depression, negative automatic thoughts and increasing self-concept in adults with mild to moderate ID (McCabe, McGillivray, & Newton, 2006) and anger in adults with mild/borderline ID (Taylor, Novaco, Gillmer, Robertson, & Thorne, 2005). The results of the current study suggests that CBT may also benefit children and adolescents with ID and ASD.

In the current study, children who completed the intervention did not report lower levels of anxiety on the SCAS following treatment, nor did they have lower scores compared to the waitlist. This finding is somewhat consistent with previous findings in the literature. While Chalfant et al. (2007) did find a reduction in child-reported anxiety following intervention, others have not (Reaven et al., 2009; Wood et al., 2009). Chalfant and colleagues found that the intervention group participants reported significantly lower levels of anxiety following the intervention. Wood et al. (2009) suggested that it is possible that traditional anxiety self-report measures may not function well with this population, particularly as a measure of change. This was observed in the current study, with the average SCAS total scores being in the normal range, despite all participants meeting diagnostic criteria for an anxiety disorder. Reaven et al. (2009) also questioned the use of traditional self-report measures with ASD populations, and specifically whether they under-report anxiety. Other findings have indicated that children with ASD may have restricted insight into their anxiety difficulties and may under-report anxiety symptoms (Russell & Sofronoff, 2005). Measuring self-reported anxiety in children with ASD is further impeded by most existing anxiety measures being designed for typically developing children (Reaven, 2009).

The existing literature indicates lower levels of parent-reported anxiety following treatment (Chalfant et al., 2007; Reaven et al., 2009; Sofronoff et al., 2005; Wood et al., 2009). In addition, Chalfant et al. found significant intervention effects for emotional and behavioural symptoms using the SDQ. In this study, parent-reported anxiety and overall emotional and behavioural symptoms were not decreased at post-test for the intervention group. This finding may have resulted from a lack of statistical power in this exploratory study due to the small sample size. The lack of significant findings using the SCAS-P could also be explained by parents' limited knowledge of their child's anxiety symptoms. It has been suggested that children with ASD with greater impairment in communication may be less able to verbalise their anxiety to their parents (Sukhodolsky et al., 2008). Research in typically developing samples has also suggested that parents are not always aware of their children's anxiety symptoms and may not be accurate in identifying all symptoms (e.g. Birmaher et al., 1997; Wachtel, Rodrigue, Geffken, Graham-Pole, & Turner, 1994).

The current study had a number of methodological limitations, and findings must be viewed with caution. The small sample size and lack of random group allocation limit the generalisability of the findings. The collection of data from the intervention and waitlist control groups was completed at different times, which may mean extraneous variables could have affected the findings of the study. The study did not involve a follow-up, and hence the long-term effects of the treatment program could not be assessed.

The current study adds to the mounting literature supporting the use of cognitive-behavioural group treatment for children and adolescents with ASD and comorbid anxiety disorders. Future research should adopt larger, randomised, and controlled studies to improve generalisation of the findings. Future research could investigate the utility of CBT treatment at six, 12 and 24 months post-intervention to investigate whether treatment gains are maintained. Future trials could focus on individuals with ASD and ID to explore the effectiveness of CBT for anxiety symptoms within this population. Particular components of the group CBT could then be identified to determine what is effective, allowing for modifications to be made to the existing CBT protocols.

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