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ORIGINAL PAPER

Intensive Cognitive Behavioral Therapy for Anxiety Disorders in School-aged Children with Autism: A Preliminary Comparison with Treatment-as-Usual

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Abstract Children with autism spectrum disorders (ASDs) frequently present with a comorbid anxiety disorder that can cause significant functional impairment, particularly at school. An intensive modular cognitive behavioral treatment (CBT) program was delivered to address anxiety, self-regulation, and social engagement in school and in the community. A particular emphasis was placed on increasing generalizability of coping skills and positive social behavior by involving school personnel in the treatment process. Children (7–11 years old) were randomly assigned to an immediate treatment condition (IT) that included 32 sessions of CBT ($n = 7$) or a 16-week treatment-as-usual (TAU) condition ($n = 5$). The CBT sessions emphasized behavioral experimentation and emotion regulation training as well as social coaching on increasing positive peer interactions. School observations and consultations were included in the treatment model. Independent evaluators blind to treatment condition conducted structured diagnostic interviews at baseline and post-IT/post-TAU. Post-treatment analyses showed that 71.4 % of the IT group had remitted from their primary anxiety disorder diagnosis as compared with none of the TAU group. In addition, an ANCOVA analysis conducted with baseline anxiety scores included as a covariate revealed a statistically significant difference by treatment group in anxiety severity favoring the IT group at post-treatment. The 32-session CBT program is an intensive approach for children with ASD and moderate-to-severe anxiety disorders that appears to yield a clinically significant impact on anxiety symptoms. The generalizability of coping skills may be enhanced by the inclusion of school-based treatment components due to the consistency of supports this permits across the child's daily settings.

Keywords Autism spectrum disorders · Anxiety disorders · Comorbidity · Cognitive behavioral therapy

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Introduction

Autism spectrum disorders (ASDs) are among the most common childhood neurobiological conditions (Centers for Disease Control and Prevention, 2007). Increasingly, children and adolescents with ASD are fully included, placed in regular classroom settings with their typically developing peers with varying levels of effective support for their complex learning, social-communicative, and emotional/behavioral needs (Ferraioli & Harris, 2011). Youth with ASD face considerable challenges given their social-communication difficulties, emotion regulation impairments, and limited ability to flexibly adapt to dynamic school environments that can negatively impact school adjustment (Koegel, Singh, & Koegel, 2010b). A recent epidemiological study found that 70 % of children with ASD met clinical criteria for at least one concurrent psychiatric disorder (Simonoff, Pickles, Charman, Chandler, Loucas, & Baird, 2008). Anxiety disorders that meet DSM-IV-TR diagnostic criteria (American Psychiatric Association, 2000) have been reported in about 45 % of youth with ASD (e.g., Simonoff et al., 2008), exceeding the rates observed in typically developing youth (e.g., Shaffer, Fisher, Dulcan, & Davies, 1996). Given the high prevalence rate in ASD, anxiety

disorders present an additional obstacle to successful school functioning for this population (e.g., Wood & Gadow, 2010). For example, anxiety can exacerbate the emotional distress that youth with ASD experience with unexpected changes within the classroom such as the arrival of a substitute teacher that can trigger outbursts that interfere with functioning in the classroom.

Therefore, a treatment model that specifically targets both ASD- and anxiety-related impairments specifically within the school context is warranted to improve the outcomes of these youth. The current study examined an enhanced cognitive behavioral treatment (CBT) program to treat anxiety and related ASD symptoms, with the treatment emphasizing a home–school collaboration model delivered over the course of 32 weeks, which is double the length of many standard CBT programs for children. This treatment was designed to increase supports from therapist, parents, and school personnel to provide maximal opportunities for skill building and maintenance in home and school settings.

Anxiety in Youth with ASD

Among typically developing children, those with anxiety disorders are more likely to exhibit academic underperformance, school refusal (Mychailyszyn, Mendez, & Kendall, 2010), and poorer adaptive outcomes (Langley, Bergman, McCracken, & Piacentini, 2004). Therefore, although youth with ASD face the same academic and social demands as their typically developing peers, the ability to successfully meet and cope with school-related expectations can be undermined by the combination of ASD-related deficits and anxiety (Ashburner, Ziviani, & Rodger, 2010; Ferraioli & Harris, 2011). For example, mildly anxiety provoking situations for a typically developing child such as a classroom spelling test may be experienced as highly distressing and overwhelming to a child with ASD and concurrent perfectionism worries, resulting in poor performance, emotional outbursts, and avoidance. Youth with ASD alone demonstrate greater academic and behavioral problems in the school setting than typically developing children. Comorbid anxiety further exacerbates these existing impairments, leading to increased aggression, oppositional behaviors, and poorer social relationships relative to youth with ASD without anxiety (Kim, Szatmari, Bryson, Streiner, & Wilson, 2000; Sukhodolsky et al., 2008). Unfortunately, these emotional and behavioral challenges extend into the school setting, posing a barrier to appropriate academic engagement and classroom instruction (Rispoli et al., 2011), as well as successful peer interactions at school (Kasari, Locke, Gulsrud, & Rotheram-Fuller, 2011).

Despite the potential for high-functioning youth with ASD to have intact or even higher than average intellectual functioning levels, academic achievement has been shown to be highly variable and at times discrepant from cognitive potential (Estes, Rivera, Bryan, Cali, & Dawson, 2011). Although multiple factors influence school adjustment for those with ASD (Rispoli et al., 2011), comorbid anxiety likely exacerbates these challenges for many affected children. A case study by Sze and Wood (2008) illustrated the impact of anxiety on school functioning in a 10-year-old boy with high-functioning ASD. This boy experienced severe generalized anxiety related to school performance such that catastrophic worries and perfectionism debilitated his ability to complete even simple homework assignments resulting in tantrums and avoidance of homework. Of note, the incidence of comorbid anxiety disorders reportedly increases with age (Brereton, Tonge, & Einfeld, 2006) and higher cognitive abilities (Mayes, Calhoun, Murray, & Zahid, 2011; Witwer & Lecavalier, 2010). Therefore, interventions that include strong home–school partnership seem to be especially pertinent for high-functioning school-aged youth with ASD. Comprehensive behavioral intervention programs for ASD that include a well-developed home–school collaboration component have been successful because they promote the development, maintenance, and generalization of skills in the actual settings in which youth with ASD demonstrate impairment—the school environment (Harrower & Dunlap, 2001). Treatments implemented with support from school personnel (e.g., teachers and classroom aides) are likely to be especially robust when addressing anxiety problems in youth with ASD.

Youth with ASD and comorbid anxiety disorders are susceptible to increased functional impairment compared with those without a comorbid condition. The co-occurrence of anxiety exacerbates the symptomatology and impact of ASD impairments, and in turn, ASD-related deficits contribute further to the expression of anxiety, likely compounding challenges in the academic setting (Wood & Gadow, 2010). For example, a youth with ASD may inappropriately attempt to enter games with peers on the playground, ignoring conventions about waiting one's turn and greetings. Over time, rejection in these kinds of situations, triggered by ASD deficits, may develop into an over-generalized and erroneous belief by the child that he or she will be excluded in most or all social situations with peers, thereby overly inhibiting him/her from entering other social situations at school (e.g., exchanging ideas with peers to plan a group class project) or social performance contexts (e.g., presenting a book report in front of the class). In turn, such avoidance may further exacerbate the child's social skill challenges by reducing opportunities to learn from modeling and practice. This likely reciprocal

relationship between ASD symptomatology and anxiety complicates the overall symptom presentation and treatment needs of youth in this subgroup (Wood & Gadow, 2010). Gadow, DeVincent, and Schneider (2008) found that the severity of comorbid psychiatric disorders was associated with increased impairments in school functioning and peer interactions beyond the interference attributed by ASD symptoms alone. It is clear that effective treatments for children with ASD and comorbid anxiety need to be developed to comprehensively address the complex needs of this population.

Cognitive Behavioral Therapy

Cognitive behavioral therapy (CBT) is an evidence-based treatment for typically developing youth with childhood anxiety disorders (Silverman, Pina, & Viswesvaran, 2008). Drawing from this well-established efficacy research, CBT has become one of the primary interventions to treat comorbid anxiety in children and adolescents with ASD. Research on the efficacy of CBT for this population spans from case studies to randomized clinical trials (RCTs; e.g., Chalfant, Rapee, & Carroll, 2007; Reaven, Blakely-Smith, Culhane-Shelburne, & Hepburn, 2012; Sofronoff, Attwood, Hinton, & Levin 2007; Sung, Ooi, Goh, Pathy, Fung, Ang, Chua, & Lam, 2011; Wood, Drahota, Sze, Har, Chiu, & Langer 2009a). Treatment has been provided in various formats: group CBT that includes parent-training aspects (e.g., Chalfant et al., 2007), group CBT for children only without a parent-training component (Sung et al., 2011), and individual family-based CBT (Wood et al., 2009a). Typically, RCTs for comorbid anxiety have been targeted for youth with intact cognitive abilities. Across these studies, CBT generally has received support as a promising intervention for treating anxiety in high-functioning youth with ASD. Rates of remittance in these studies are comparable to those observed in RCTs for typically developing children with anxiety (e.g., Silverman et al., 2008).

A number of traditional and modified CBT elements for anxiety management have been applied to treat youth with ASD such as skill building to identify anxious thoughts, develop coping skills, and gradually approach anxiety provoking situations (i.e., graded exposure). In an attempt to meet the needs of children and adolescents with ASD, CBT has been adapted to better suit the learning styles of youth with ASD. The adaptations have primarily focused on facilitating the uptake of anxiety management principles and skills by altering the manner in which materials are presented, such as the use of visual aids. Generally, CBT programs for youth with ASD have been clinic based and have not specifically included a school component. Additionally, it is unclear to what extent these programs specifically target ASD-related symptoms that may compound anxiety in this subpopulation of youth (e.g., challenges with social awareness or coping with unexpected changes).

To specifically address the increased functional impairment that results from the reciprocal interplay between ASD and anxiety symptoms and the marked impact it can have on school functioning, Wood et al. (2009a) developed an enhanced CBT program by expanding the traditional aspects of existing treatments for anxiety in typically developing children by (a) including a school consultation component, (b) incorporating concurrent skill building in core ASD symptoms suspected to contribute to anxiety symptomatology (e.g., social skills or preoccupation with restricted interests), (c) providing in vivo parent training to address both the complex needs of youth with ASD and promote generalization of skills to school and community settings, and (d) targeting aspects of ASD that contribute to school adjustment—for example, providing skills and support for building friendships that can lead to inclusion in activities and games, and a more satisfying daily routine.

A strong home–school collaboration component in CBT programs for youth with ASD is likely to help youth to build and practice the necessary coping skills they need in settings where they need it most. Given the challenges these youth face at school (e.g., Koegel et al., 2010b), such collaboration seems to be a necessary aspect of treatment for youth with ASD to ensure that the skills targeted in treatment extend beyond the clinic to school (Ashburner et al., 2010; Koegel et al., 1992). Multifaceted interventions that include an active school component for typically developing youth with behavioral problems (e.g., Incredible Years Program; Webster-Stratton & Reid, 2010) and youth with ASD (e.g., Pivotal Response Treatment; Koegel, Koegel, Hurley, & Frea, 1992) have a successful history of establishing home–school collaborations and generalization of skills. These multidimensional treatments not only have provided training to youth and teachers within the school setting but have also been shown to be efficacious.

Enhanced CBT to treat comorbid anxiety has been associated with gains in social-communication (Wood et al., 2009b), adaptive living skills (Drahota, Wood, Sze, & Van Dyke, 2011), and improved school adjustment (Sze & Wood, 2008). Improvement in the core ASD symptoms of social communication, social motivation, and social awareness was achieved (Wood et al., 2009b). Also, Sze and Wood (2008) demonstrated in a case study that anxiety and problem behaviors related to completion of school assignments and difficulties with peer relations at school could be improved with enhanced CBT. Homework completion, emotion/behavior regulation skills to decrease crying outbursts at school, and improved peer interactions on the playground were achieved as skill building in these areas was started in the clinic and then transferred to the

school setting by including teacher participation, a home–school behavior chart, and active school consultation. These findings suggest treatment may need to target both anxiety management and ASD symptomatology across settings—at home, in the community, and school—to better meet the complex clinical needs of youth with ASD. As demonstrated by Sze and Wood (2008), the involvement of parents in coordinating treatment goals with the school can be effective in promoting school adjustment. Generalization of skills is often a challenge for youth with ASD (Koegel, Koegel, & McNerney, 2001); therefore, facilitating generalization in the child's daily settings (school, home) is an important treatment element that is in line with contemporary models of efficacious treatments for ASD (e.g., Koegel et al., 2010b; Lovaas & Smith, 2003).

Many CBT programs for childhood disorders in typically developing youth have been 12–16 sessions in length (e.g., Walkup et al., 2008). Most of the adapted CBT programs for comorbid ASD and anxiety have similar timeframes (e.g., Reaven et al., 2012), though some programs are much briefer (e.g., six sessions; Sofronoff et al., 2007). Yet, the intensive behavioral programs found to be most successful for young children with autism (e.g., Dawson, Rogers, Munson, Smith, Winter, Greenson, Donaldson, & Varley, 2010; Koegel, Koegel, Vernon, & Brookman-Frazee, 2010a; Lovaas & Smith, 2003) involve significantly longer durations of treatment. A somewhat longer treatment may therefore improve the efficacy of CBT and skill maintenance. The additional practice of skills associated with a longer treatment allows for extended home–school collaboration, which may help build on the promising improvements in school adjustment among youth with ASD and comorbid anxiety accomplished by shorter CBT programs (e.g., Wood et al., 2009a). Therefore, examining a longer duration of CBT for comorbid ASD and anxiety appears worthwhile.

Building upon the promising results of existing treatment studies, the current study examined the efficacy of an intensive 32-week family-based CBT to treat comorbid anxiety disorders in youth ages 7–11 years with high-functioning ASD and comorbid anxiety ($N = 12$). In this pilot study, children with clinically significant anxiety disorders in the moderate-to-severe range (anxiety severity scores ≥ 5 or higher; see "Method") were randomly assigned to either immediate treatment (IT) or a treatment-as-usual (TAU) comparison group. The treatment incorporated several typical CBT elements for comorbid anxiety but expanded the treatment focus to include explicit home–school collaboration. This included an active transfer of skills from the clinic to the home and school setting (e.g., via school consultation), as well as the delivery of therapeutic interventions such as a peer-mediated social intervention directly in the school setting. Treatment outcome measures were based on independent evaluator ratings blind to the participants' treatment condition. Supplemental qualitative descriptions of the CBT cases focusing on school-related anxiety concerns are provided to better illustrate the therapeutic interventions and positive symptom change.

Method

Participants

The sample included 12 children, ranging in age from 7 to 11 years ($M = 8.80$, SD = 1.60), and their primary parent(s) living in the greater Los Angeles area and surrounding communities. Children were referred by a medical center-based autism clinic, regional centers, parent support groups, and school personnel such as inclusion specialists and school psychologists. Children met research criteria for ASD and at least one anxiety disorder (see below). Psychiatric medication, if used, was maintained at a stable dose for at least 1 month prior to intake and throughout the duration of the trial for all children in the IT condition. Children within the IT condition did not receive any anxiety-specific services outside of our CBT program. However, two out of the seven children in IT were on stable dosages of a psychotropic medication; four received speech therapy; and six had received social skills training in the year prior to enrollment in the current study. Children in the TAU condition were allowed to alter their medication status during their 16-week waiting period as provided that their medication was maintained at a stable dose for at least 1 month prior to their post-TAU evaluation. Children with verbal IQs < 70 or a primary comorbid diagnosis other than anxiety (e.g., dysthymic disorder) were excluded.

Twenty-two children were assessed for inclusion in the study. Three families did not complete the intake assessment, two families were excluded due to the child's non-anxiety disorder primary diagnosis, and one family was excluded because the minimum verbal IQ for the child was not met. Sixteen participants completed the intake assessment and were randomized for inclusion the study. Four of those participants (three IT and one TAU) did not complete treatment or their post-assessments due to the family's inability to consistently attend treatment sessions.

Of the 16 participants who met eligibility criteria, 10 were randomized to the IT condition and six were randomized to the TAU condition. Table 1 presents descriptive information for participating families. Most children were boys, and most primary parents had a college degree. Ethnic/racial groups included: Caucasian ($n = 9$; 75 %), Asian ($n = 1$; 8 %), African American ($n = 1$; 8 %), and

Table 1 Demographics for immediate treatment (IT) and treatment-as-usual (TAU) groups

	Number of participants (%)	
	IT ($n = 7$)	TAU ($n = 5$)
Child sex (male)	5 (71)	4 (80)
Child age	8.7 (SD = 1.8)	9.0 (SD = 1.6)
Parent sex (female)	5 (71)	4 (80)
Parent graduated from college	5 (71)	3 (60)
Parent married/remarried	5 (71)	4 (80)
Child ethnic background		
Caucasian	6 (86)	3 (60)
Asian/Pacific Islander	1 (14)	0
African American	0	1 (20)
Multiracial	0	1 (20)

Mixed Race ($n = 1$; 8 %). Groups did not differ significantly on these variables. During their enrollment in the study, all of the families in the TAU condition received at least one type of service, with most (4 out of 5) receiving therapy from a psychologist, social worker, or behaviorist. In addition, all children in TAU received one or more services at school including one-on-one aides, speech therapy, or social skills groups. In addition, four of the children in TAU received medication therapy, with one increasing their dosage while in the TAU condition.

Based on ADOS and ADI-R scores of the 12 participants included in the analyses, 11 were diagnosed with Autism and one was diagnosed with PDD-NOS. Combined *Communication* and *Social Interaction* severity scores from the ADOS as well as ASD diagnosis are presented in Table 2.

Table 2 Primary diagnoses at intake and post by group

Primary diagnosis	Intake		Post	
	IT	TAU	IT	TAU
Anxiety diagnosis				
Separation anxiety disorder	3	2	0	2
Social phobia disorder	2	3	1	3
Obsessive compulsive disorder	1	0	0	0
Generalized anxiety disorder	1	0	1	0
Autism diagnosis				
Autism	7	4		
PDD-NOS	0	1		

Number of participants with specific diagnosis by group at intake and post-IT or post-TAU

PDD-NOS pervasive developmental disorder not otherwise specified

CBT Program

Therapists included five graduate students in clinical or educational psychology and four postdoctoral students in psychology or psychiatry. Therapists received at least 8 h of initial training, read the treatment manual, and attended weekly hour-long supervision with the treatment developer.

Thirty-two weekly sessions were offered to all families with sessions taking place at a university clinic or an associated autism community clinic. Therapists worked with individual families, with each session lasting approximately 90 min [about 30 min separately with the child and parent(s), and 30 min conjointly with the child and parent(s)] and delivered a version of the *Building Confidence* CBT program (Wood & McLeod, 2008) modified for use with children with ASD (Wood et al., 2009a). Building upon the success of this CBT program, novel modifications were made to the intervention to more thoroughly address each child's school functioning. Similar to other CBT programs for children with anxiety disorders, the manual included coping skills training followed by in vivo exposure. A hierarchy of feared situations was created and ordered from least to most distressing to ensure gradual exposure to increasingly feared situations. As children worked their way up the hierarchy, they were rewarded for attempting increasingly fearful situations. In addition to the traditional CBT training, other ASD-specific treatment modules were included to teach friendship skills to children and their parents (e.g., giving compliments, hosting peer get-togethers successfully, etc.).

Throughout CBT, therapists employed a method of guided conversations through the use of Socratic questioning to support conceptual development and perspective taking (e.g., immediately before entering a playground interaction: "If you offered her a turn, can you think of a nice thought she would have about you…? …Like, 'Lisa is…?' …oh, a good friend? So she would like you being friendly to her?"). This cognitive element of CBT was among one of the key clinical methods intended to promote general verbally mediated principles that children may apply to multiple similar situations, enhancing generalization of effect.

The focus of the first 16 sessions was primarily on remittance of general anxiety symptoms, whereas the second 16 weeks of treatment focused on the child's relationships and interactions with peers at school and in the community. Children were given social coaching by the therapist, parents, and available school providers on appropriate ways to enter interactions and (later in treatment) maintain conversations with peers. Unlike traditional social skills training, social coaching was provided on-site immediately before attempting to join a social activity at

school or home or in public and discussed in terms of others' thoughts and feelings. To increase generalizability of the skills learned from social coaching, sessions took place in playgrounds, shopping centers, parks, and other areas where a large number of similarly aged children were available. Parents were taught to practice these skills at home and during play dates. The children were reinforced with a comprehensive reward system that relied on both daily privileges and longer-term incentives. Particular emphasis was placed on enhancing the home–school relationship to address school anxiety. Collaboration between parents and teachers (in the form of daily home–school notes, emails and phone calls) was established with the guidance of the therapist to maintain consistency with programs and practices at school and at home.

Teachers and other school personnel (e.g., one-on-one aide) involved with each child were included in the intervention to facilitate the transition of skills learned during treatment session to the school environment. A minimum of two teacher–therapist conferences and playground observations by the therapist were included in the treatment with additional meetings and consultations offered on an as-needed basis upon teacher request. On average, teachers received five additional consultations via phone and/or email from the child's therapist. Initially, teachers were educated about anxiety disorders in children with autism and the concepts behind CBT. Specific goals for the child were established (e.g., spending at least 10 min playing in a group game with peers during recess), and social coaching and reinforcement procedures were established with the CBT guidelines. In addition, goals set in therapy sessions were shared with teachers and intervention-related homework given to parents often had a school-based component wherein parents partnered with teachers to discuss how to best implement the intervention-related homework at school. Parents were encouraged by the therapist to involve the teacher in all aspects of the treatment program with the therapist serving as an intermediary, thus laying the groundwork for future interactions once therapy sessions ceased.

To address the social isolation that many children with ASD experience at school, therapists utilized a peer "buddy" program with the help of the child's teacher. When delivering the peer buddy intervention, teachers were asked to identify similar-aged children who were accepting and caring and might have been able to participate in activities with the target child. The teacher was taught to facilitate positive interactions between the target child and the buddies, encouraging the target child to engage in and maintain interactions by using social coaching techniques.

If a family missed a session, it was made up within a week or two so that 32 sessions were completed by all families. The average number of rescheduled treatment sessions was approximately 10 for the IT families (out of 32 treatment sessions). Treatment sessions were randomly spread across the calendar year, with start dates varying due to the rolling nature of enrollment in the study. There was no pattern of differing start dates between the IT and TAU groups. Therapists' adherence to the intervention protocol was monitored through audio recordings of each therapy session. Three sessions for each participant were randomly selected and coded by trained graduate and undergraduate students with substantial experience working with the current treatment manual. Coders listened to each tape and noted the presence of required topics for each module. Sample items from the checklist were as follows: "Conduct an in vivo exposure" (yes/no) and "Build hierarchy of child fears" (yes/no). Results showed that study therapists adhered to the required topics for each module at a rate of 92 %.

Measures

All assessments were conducted by independent evaluators blind to treatment condition. ASD diagnoses were assigned using the Autism Diagnosis Interview-Revised (ADI-R; Le Couteur et al. 2003) and Module 3 of the Autism Diagnostic Observation Schedule (ADOS; Lord et al. 2002). The ADI-R and ADOS were administered by doctoral and post-doctoral students who received standardized training in the assessment and coding procedures. Anxiety disorder type and severity was assessed using the Anxiety Disorders Interview Schedule: Child and Parent versions (ADIS-C/P; Silverman and Albano 1996), a semi-structured diagnostic interview shown to have favorable psychometric properties in this population and generates diagnoses as well as clinical severity rating (CSR) scores ranging from 0 to 8 (with higher scores representing more severe anxiety). Children with a CSR anxiety rating of five or higher were considered to have a clinical diagnosis of that particular disorder with a moderate-to-severe presentation. In comparison, most other studies have set a lower severity threshold of four for their entry criteria (cf. Silverman et al., 2008), permitting milder cases of anxiety in the trial. This intervention was aimed at children with at least moderately severe anxiety.

Procedure

The current study was approved by a university-based IRB and conducted as approved. Phone contact was initiated by parents referred to the study, and initial screening and information about the study was provided during this phone call. Parents who remained interested in the study and who appeared to meet basic eligibility criteria (e.g., child was in the accepted age range; previous clinical diagnosis of ASD;

reported anxiety problems) gave written informed consent, and children gave written assent to participate in the study. Children who completed the intake assessment and met all inclusion/exclusion criteria were block-randomized by sex and age to the IT or a 16-week TAU condition. Individuals in the IT condition received 32 weekly sessions while individuals in the TAU condition were offered 16 weeks of CBT after a 16-week waiting period. The majority of treatment was conducted in a clinic setting, though, due to the nature of CBT, some of it was performed in community settings (e.g., the park; shopping areas) and, as described above, several consultations were conducted at the child's school. During the 16-week waiting period, families in the TAU condition were free to seek any kind of treatment they chose to pursue in the community; this was considered more ethical than a no-treatment waitlist condition. Therapists were randomly assigned to cases. Post-IT assessments were completed on the final 2 days of treatment or within 1 week of termination. Post-TAU assessments were conducted 16 weeks after the baseline assessment, but before initiating CBT. Families received $15 for participating in the assessments.

Results

A summary of each participant's primary anxiety diagnosis at baseline is presented in Table 2. Three of seven children randomized to IT had a primary diagnosis of separation anxiety disorder with CSR scores of 5 (two children) and 6 (one child). Two of five children randomized to TAU had a primary diagnosis of separation anxiety disorder, with CSR scores of 6. Two children randomized to IT had a primary diagnosis of social phobia, with CSR scores of 5 and 6, respectively. Three children randomly assigned to TAU had a primary diagnosis of social phobia; of these, two had CSR scores of 5 and one had a CSR of 6. One child assigned to IT had a primary diagnosis of obsessive compulsive disorder with a CSR score of 6, and, lastly, one child in the IT group had a primary diagnosis of generalized anxiety disorder with a CSR score of 6.

A χ^2 analysis was conducted to examine diagnostic status at post-IT and post-TAU. Positive diagnostic status at post-IT/post-TAU was defined as child meeting diagnostic criteria (CSR $\geq$4) for their primary anxiety disorder. As shown in Table 2, five of seven children (71.4 %) in the IT condition no longer met diagnostic criteria for their primary anxiety disorder at post-IT, whereas all five children in the TAU condition still met diagnostic criteria for their primary anxiety disorder at post-TAU (χ^2 [1] = 6.12, p = .013). Figure 1 displays a summary of primary anxiety disorder remission by group.

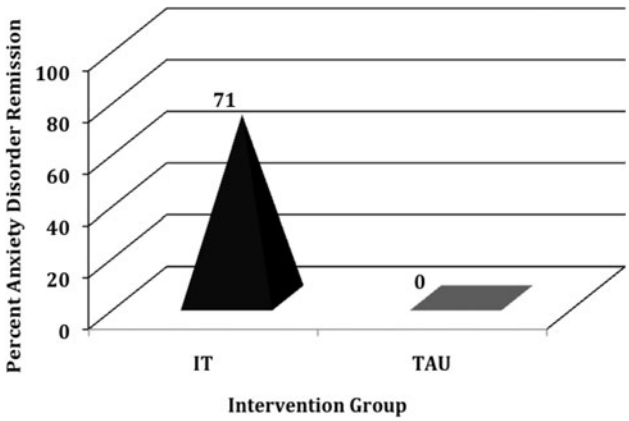

Fig. 1 Percent remission of primary anxiety diagnosis from the ADIS-C/P at post-IT/post-TAU

ANCOVA was used to test group differences on children's highest anxiety severity (CSR) scores at post-IT/post-TAU, with the children's baseline CSR scores included as a covariate. The means (with standard deviations in parentheses) of the highest anxiety disorder CSR scores at baseline for the IT and TAU conditions were 5.57 (0.54) and 5.60 (0.55), respectively. At post-IT and post-TAU, the means of the highest anxiety disorder CSR ratings were 3.86 (0.90) and 5.60 (0.55). The CSR ratings significantly differed by treatment group at post-IT/post-TAU, F (2, 12) = 6.62, p = .017. On average, children assigned to IT had lower anxiety severity scores after 32 weeks of CBT when compared to children assigned to TAU for 16 weeks.

Case Examples of CBT for Anxiety in Children with ASD

We present case material from four of the seven IT cases to illustrate the nature of the anxiety symptoms experienced by the participants, as well as elements of the clinical technique used to treat the anxiety. Each case was selected to highlight one or more unique challenges and corresponding techniques for addressing anxiety in children with autism. Particular emphasis is placed on the way the intervention was adapted to address each individual child's needs as well as the unique school intervention elements of each case. Names and identifying information have been altered to preserve confidentiality.

Case 1

Michael presented as a bright, slightly quiet 10-year-old boy with a diagnosis of autism, social phobia, and generalized anxiety disorder concurrent with prominent ADHD. School intervention was necessitated early in Michael's course of treatment, due to increasing emotional and behavioral regulation difficulties at recess. Per school

consultation and behavioral school observation, Michael frequently argued with peers and aides at recess over losing at handball and/or perceiving that other players had cheated. Michael would storm off the court in a rage and would often be suspended from recess for his tantrums. In addition, Michael would manufacture exceptions to the rules of the game when he was losing which would aggravate the others players and increase his social isolation. As CBT progressed, it became clear that underlying performance-related anxiety and a narrowly defined cognitive belief system (related to his ASD diagnosis) were contributing to these emotional and behavioral regulation problems, and consequently impacting his social functioning at school.

A hierarchy was developed to target both the anxiety- and ASD-related symptoms that were interfering with his ability to play appropriately with his peers at school. A cognitive coping skills schema (i.e., *Being a Good Sport*) was created conjointly with Michael to provide him with a framework for "keeping his cool" by learning how to regulate his emotions, thoughts, and behaviors associated with playing games/sports, and developing a concept for why such regulation would help him (i.e., "I'll be more one of the guys if I act like I don't care so much"). Within each in vivo exposure session with Michael's therapist and adult confederates from the clinic, Michael's anxiety was gradually activated by manipulating several mitigating factors including who participated in each exposure and the outcome of each exposure. With repeated practice, Michael learned to tolerate tying, losing, and eventually losing on purpose to multiple competitors while simultaneously "keeping his cool" and remaining emotionally and behaviorally regulated. These skills were then practiced at home and at school for generalization purposes.

A follow-up behavioral school observation revealed social interaction deficits with peers that had previously been overshadowed by Michael's emotional and behavioral regulation difficulties. Michael was usually social isolated when he was not engaged in an activity in which he felt confident (e.g., handball). A socially focused hierarchy was developed to target anxiety producing social situations at school together with on-site social coaching by both therapist and teacher. A cognitive coping plan was incorporated to increase Michael's ability to challenge his fears of social rejection by utilizing confidence building self-talk statements (e.g., "Well, those guys aren't exactly Shaq, either."). Initial social exposures at recess required Michael to practice approaching a familiar peer who was by himself on the playground, asking what they are up to, and either offering to join in the peer's activity, or, if the peer was looking for something to do, suggesting something that the peer might enjoy based on Michael's past knowledge of the peer. Michael was engaged in ongoing conversations with the therapist to build up his understanding of the rationale for each aspect of these skills (e.g., approaching a familiar peer who is alone increases the chance of a positive response, which in turn will decrease Michael's anxiety and help him find someone to hang out with who might end up being fun). At treatment follow-up, parents reported that Michael had developed a cadre of "buddies" at school that he socialized with regularity outside of school and that he had decided to form of band with three of them.

Case 2

David was 11 years old at intake and met criteria for ASD, as well separation anxiety disorder, obsessive compulsive disorder, and social phobia. David was easily overwhelmed and displayed high stress reactivity, resulting in avoidant behaviors. For example, when David was behind on homework assignments, instead of making up the missed work, he discontinued completing all past and current assignments, lied to his parents about his homework, and began failing classes. To target the decrease in homework completion, David developed a more rational way of thinking about the relative stress of homework ("at least I'm not a prisoner!"), helping him to de-catastrophize about the level of challenge presented by the work, and a concurrent behavior modification plan was delivered (a good example of the behavioral component of the CBT intervention model). David was able to earn stickers for completed assignments and could use these stickers to obtain a reward of choice. David initially presented with school avoidance and would frequently miss school which added to his falling behind academically. While staying home from school, David had previously been permitted to play on the computer, watch television, and play video games. During CBT, a behavioral extinction plan was put into place to target the avoidance by removing all desired activities (computer, television, telephone, and video games) when home from school. However, when David chose to attend school, privileges were returned. David developed self-statements that appealed to his sense of humor, such as, "I don't want to be the kind of weirdo who never leaves his house when I grow up, so I guess I'll just go to school," to help decrease his sense of cognitive dissonance about "forcing" himself to go to school.

As school avoidance decreased and homework completion increased, the focus of treatment shifted to social anxiety at school. In one exercise, David learned to coach himself past reluctance to initiate a conversation and developed an understanding of the rationale that questions are an easy conversation-starter that turns the focus on the conversation on the partner, rather than on oneself. He learned to ask three related questions on a particular topic of interest to a conversational partner as a strategy to

reduce his social performance anxiety and increase positive social reception. David initially practiced this exercise with adults, such as parents, and then as anxiety decreased, he began to generalize the skills to peers at school. As a component of the CBT program, he discussed successes at school with the therapist and developed a more self-confident assessment of his social performance when he began to realize that his overtures were being well-received by peers and leading to pleasant conversations. As his social phobia decreased, David also began to study with peers as a means of expanding his range of social interactions in a low-demand, but sociable group activity. This facilitated academic improvement along with social skill practice and taught David how to appropriately utilize social supports in an academic environment. Lastly, in collaborating with David's teacher, a goal of participating in class was added. David was rewarded for asking at least one question and answering at least one question in each class throughout the school day. David's teacher monitored his progress on these goals (questions; peer studying; class participation) using a behavioral chart and provided weekly feedback to the therapist before each session. Daily school goals successfully completed on the school chart led David to access rewards such as home-based electronics. This daily home–school collaboration was effective in helping David overcome his social anxieties, establish new social routines at school (he was part of a regular study/hang-out group), and become an active participant in class.

Case 3

Jewel was a 7-year-old girl diagnosed with autistic disorder as well as generalized anxiety disorder, social phobia, and separation anxiety disorder. She also met clinical criteria for attention-deficit/hyperactivity disorder, combined subtype. A primary area of concern for Jewel and her family was her heightened anxiety regarding her academic performance. She worried excessively about academic failure and engaged in catastrophic thinking about people's negative evaluation of her should she incorrectly answer items on school assignments. These concerns resulted in tearful outbursts both in class and at home when Jewel answered items incorrectly on assignments or received constructive feedback about her performance. As a result, she spent a significant portion of her evenings completing homework and became fearful of timed tests. Moreover, tearful outbursts in class were frequent, interfering with Jewel's participation in classroom activities. Consequently, such behaviors began to have negative social repercussions for Jewel as her peers began to find the outbursts off-putting. Another source of concern was Jewel's anxiety in social situations with peers and unfamiliar adults. She was concerned about being negatively judged by other people. She worried about joining conversations with peers, anticipating that peers would ignore her or she would embarrass herself. She tended to avoid interacting with peers and directed most of her social overtures to one close friend at school, resulting in isolation from other peers.

The first target of treatment was to address "perfectionism" worries about timed tests and increasing Jewel's independence with homework completion. In a playful manner, Jewel was presented with easy math problems and asked to complete a few items by writing a letter from the alphabet rather solving the problem. Gradually, she was asked to write letters or draw pictures for a few of math problems before she was finally asked to write the wrong numerical value for some of the math items. Jewel found the assignment funny and gradually became less upset when she accidentally incorrectly answered math problems. A second target for treatment that was addressed in tandem throughout the 32-week intervention was to decrease tearful outbursts in class. A replacement behavior plan was initially developed as well as a reward for using these more adaptive coping behaviors. The immediate plan was for Jewel to excuse herself to use the restroom when she became tearful. Her teacher was informed of this plan and asked to encourage Jewel to excuse herself during these instances. Each day, Jewel earned a point on her school behavior chart if she was able to "keep it in" at school. She was motivated to earn points toward a weekly prize of a stuffed animal from one of her preferred interests. Eventually, the number of tearful outbursts decreased and Jewel only rarely had to excuse herself from class as treatment progressed.

A third goal for treatment was to address Jewel's social phobia and concurrently enhance social-communication skills. Jewel had only one close friend with whom she played with at school. However, their relationship was conflicted, and they isolated themselves from other peers. Concepts about friendship such as the meaning of being a good friend and the qualities Jewel preferred in friends were discussed. Additionally, play dates with other peers in her class were set up to expand Jewel's friendships. Jewel was taught and practiced play date hosting skills to promote successful get-togethers. As play dates with a variety of girls from her class occurred, Jewel became increasingly aware of the poor quality of her friendship with her "close" friend. Eventually, she used this realization and her success in the play dates to develop closer friendships with other girls in her class, increasing her network of friends to play with at school.

Case 4

Max was a 9-years-old who met criteria for autism as well as social phobia, obsessive compulsive disorder,

generalized anxiety, and concurrent ADHD-combined type at intake. Max presented as very shy and would often fail to speak with or speak in a strange accent (not his real voice) to unknown individuals until he became comfortable with them. Max was often preoccupied with "looking cool" at school and would frequently avoid going to birthday parties or get-togethers with peers from school because he was afraid the other children would not like him and would think he was stupid or dumb. Max spent half of his school day in a special day class and was worried that other kids would find out that he was in that class and would think he was "retarded." Therefore, Max would often isolate himself during periods of free play, choosing to sit alone in the library or wander. While in the special day class Max would often participate, in his mainstream classes Max would never participate unless compelled to and even then would hesitate to join in thus isolating himself more in the eyes of his peers. Two main goals for Max were to increase his participation in his mainstream class as well as to increase his peer interactions during unstructured free time. While a number of the intervention practices seen in Cases 1, 2, and 3 were delivered in school (i.e., school–home note promoting increased social and class participation linked with home-based rewards; concept building about the nature of friendships and friends' positive perceptions of Max), some challenge was experienced in breaking Max away from dependence on his older (by 1 year) brother, who attended the same school. Max increased his time socializing with peers at school but tended to spend most of his free time with his older brother's group of friends, in spite of some efforts to encourage Max to seek out additional peers from his own class. While Max did so with reluctance, he ultimately ended treatment with a strong preference for going along with his brother's group of friends, who certainly accepted Max but whose strength of reciprocal friendship was not entirely clear. Nonetheless, by the end of treatment, he was able to approach and interact with unknown peers and sustain interactions with even small groups of children, which he had typically avoided at all costs at the beginning of treatment.

Discussion

The current study evaluated the efficacy of a 32-week family-based CBT program designed to treat comorbid anxiety disorders in youth with high-functioning ASD. Findings from this preliminary evaluation support the efficacy of the intensive 32-session CBT program. At post-treatment, five out of the seven participants (71.4 %) in the IT group no longer met diagnostic criteria for their primary anxiety diagnosis whereas all five participants in the TAU control group met diagnostic criteria for their primary anxiety diagnosis. These findings are promising and suggest that this CBT program achieved remission rates comparable to CBT programs for typically developing youth diagnosed with anxiety disorders (Silverman et al., 2008). Moreover, our findings suggest that this new, more intensive multicomponent CBT program may confer a number of benefits compared with shorter CBT programs. In all, our findings have important implications for the treatment of comorbid anxiety in high-functioning ASD youth as well as transporting and implementing CBT programs for youth with ASD in school settings.

As noted above, other CBT programs for children with ASD and anxiety have been successful as well, with previous trials publishing anxiety disorder remission rates for between 52.9 to 71.4 % of school-aged children with ASD treated (e.g., Chalfant et al., 2007; Wood et al., 2009a). The current trial shows a similar success rate, albeit with a significant minority of treatment-refractory youth as seen in all of these trials, suggesting that even with high intensity, CBT may be better suited to some children than others.

Several components of the family-focused CBT program evaluated in this study likely contributed to the positive outcomes. First, the treatment was modular which allowed the therapist to individualize the intervention to the child's specific needs (Chorpita, Taylor, Francis, Moffitt, & Austin 2004). Second, the length of the treatment helped to ensure that the youths had sufficient time to master the CBT skills. Finally, collaboration between school, parents, and therapist allowed the youth to practice skills in vivo. Altogether, these components contributed to the success of the program as well as suggest that it may be possible to transport this program to school settings.

Key to the success of this CBT program was the collaboration of the therapists with school personnel. The opportunity to have the youth practice skills and conduct exposures in school settings was critical to promoting lasting anxiety reduction in the ASD youth. After focusing on skill development in the clinic setting, the skills were then practiced in school settings through collaboration between the therapist and teacher. For example, Michael had performance anxiety related to games, particularly with peers on the playground. He initially lost games of low salience in the clinic and eventually practiced tolerating losing games on the playground at school. The collaboration between the therapist and school personnel to facilitate this practice was critical to the success of the program. Michael's active role in constructing a rationale for developing better emotion regulation at school (being "one of the guys") was also a critical element, exemplifying the cognitive treatment elements that can be critical in promoting children's buy-in and motivation to develop and try out new skills.

The opportunity to address social problems in a school setting may be particularly important for youth with ASD. Addressing social deficits by providing opportunities for youth to engage in social interactions with same-aged peers is an important component of treating ASD. The school setting is the ideal environment for this work due to the number of opportunities for social interactions. For example, Jewel desired social interaction but was unsure of how to initiate. Providing her with opportunities to practice skills on the school playground was instrumental to treatment success and allowed her to eventually engage in recess activities with her peers. Nonetheless, the synergy of these developments with the implementation of a proactive play date program, with the help of Jewel's parents, and Jewel's emerging ability to reflect on and articulate what friendship really means as a result of these experiences, was critical to the degree of success she was ultimately able to achieve on the playground. Our success in delivering the CBT program in school settings is notable and consistent with the current American School Counselor Association's National Model that emphasizes integrating families and teachers into children's mental health interventions (Walsh, Barrett, & DePaul, 2007).

Though schools provide ideal conditions for the treatment of youth with ASD, few or no CBT programs for children with ASD have been delivered and studied in school settings. An important direction for future research is to evaluate CBT programs for individuals with ASD in school settings. Transportability studies that focus on the processes involved in moving a treatment from a research setting into school settings represent an important next step for the field. In such studies, there are a number of factors to consider, such as what therapist, setting, or client factors may influence the delivery and outcome of a treatment in a school setting. For example, the time of the school year in which a treatment is initiated could theoretically impact the effectiveness of the program. Children were enrolled in the present study throughout the school year; with our small sample, it is impossible to rule out the possibility that the timing of the onset of CBT may have influenced how a teacher would work with a child and/or how other children would respond to that child (e.g., some children may experience greater peer rejection as the year progresses).

We achieved substantial remissions rates using a hybrid study design that blended elements of efficacy and effectiveness research (Weisz, Sandler, Durlak, & Anton, 2005). Similar to previous efficacy studies, we employed highly trained therapists with a background in CBT and provided some of the treatment in a research setting. However, we employed design features typically seen in effectiveness research such as a TAU control group, clients referred through typical channels, and collaborating with school personnel to deliver critical elements of the program in school settings. The fact that the study produced significant results with a hybrid design suggests that the CBT program may be successfully transported to school settings. A critical next step will be to demonstrate that school personnel can deliver the treatment on site and maintain treatment integrity. It is possible that the treatment itself may need to be adapted to ease its eventual dissemination. Indeed, the implementation phase is sometimes conceived as a "fitting" stage, in which the fit of the treatment is examined in situ, with close attention paid to what specific tailoring is necessary to help the treatment produce the desired outcomes.

It is important to consider how the phenotypic overlap between anxiety and ASD symptoms may influence interpretation of the study findings. Research has yet to determine the extent to which anxiety disorders and ASD represent distinct disorders (Wood & Gadow, 2010). For example, youth with ASD have a prevalence rate of around 45 % for anxiety (Simonoff et al., 2008). However, ASD is characterized by deficits in social communication, which raises the question of whether some or most of a given child's social avoidance is due to social difficulty and low social motivation (and not social anxiety). As a result, it is difficult to determine whether the symptom reduction in this trial is primarily due to changes in core ASD symptoms or anxiety symptoms. More research is needed to determine the etiology of the symptoms that map onto anxiety disorders and ASD. Such research would directly inform treatment research by providing guidance on whether treatment should target anxiety, ASD symptoms, or both.

The study had some limitations that are worth noting. Most notably, the sample size was small ($N = 12$ IT/TAU completers). Nonetheless, significant group differences were found for both diagnostic remission and reduction of anxiety severity at post-treatment. Larger sample sizes provide more reliable statistical estimates and allow for subgroup analysis, tests of predictors of treatment outcome, and mediators. Additionally, the fact that the duration of the wait list control condition was not identical to the treatment condition (16 vs. 32 weeks) introduces a limitation. Though ethical reasons dictated that the wait list control condition should be shorter than the treatment condition, the shorter duration does not fully control for the passage of time or client knowledge that the clinical problems would be treated.

This study was intended as an initial trial of a more intensive, integrated CBT format for children with particularly challenging anxiety symptoms in the context of ASD. Future trials will be needed to confirm the treatment's efficacy in comparison with an active comparison group (e.g., group CBT or social skills) and explore a broader range of outcomes as well as treatment process

variables. Ultimately, the litmus test will be the independent implementation of the program by school practitioners.

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