

Brief Report: Effects of Cognitive Behavioral Therapy on Parent-Reported Autism Symptoms in School-Age Children with High-Functioning Autism

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Abstract This pilot study tested the effect of cognitive behavioral therapy (CBT) on parent-reported autism symptoms. Nineteen children with autism spectrum disorders and an anxiety disorder (7–11 years old) were randomly assigned to 16 sessions of CBT or a waitlist condition. The CBT program emphasized in vivo exposure supported by parent training and school consultation to promote social communication and emotion regulation skills. Parents completed a standardized autism symptom checklist at baseline and post-treatment/postwaitlist and 3-month follow-up assessments. CBT outperformed the waitlist condition at posttreatment/postwaitlist on total parent-reported autism symptoms (Cohen's d effect size = .77). Treatment gains were maintained at 3-month follow-up. Further investigation of this intervention modality with larger samples and broader outcome measures appears to be indicated.

Keywords Cognitive behavioral therapy · Autism spectrum disorders · School-aged children

Introduction

Core autism symptoms such as social communication deficits have proven difficult to change through social skills training (Rao et al. 2008). Although several large-scale interventions for young children with autism such as pivotal response treatment meet American Psychological Association criteria for probable efficacy, therapeutic treatment programs for school-aged children with an autism spectrum disorder (ASD) have not achieved this level of empirical support. However, there are no known methodologically rigorous studies of cognitive behavioral therapy (CBT) for core autism symptoms in spite of the fact that CBT may well suited for this indication. This paper presents preliminary results on the impact of CBT on parental reports of core autism symptoms in 7–11-year-old children.

A common therapeutic approach that has been used to address core autism symptoms in school-aged children with ASD up to this point has been social skills training (Rao et al. 2008). This approach often involves practicing specific social skills (e.g., greetings) in regularly-meeting groups of children with ASD using hypothetical or dramatized scenarios as the principle learning mechanism. Studies of this approach have generally (a) relied on diagnostically nonspecific measures of social skills rather than measures of core autism symptoms that are typically used in the diagnosis of ASD and (b) either have found little evidence of generalization of treatment effects or have used uncontrolled designs that preclude conclusions about efficacy (Rao et al. 2008).

In comparison to social skills training, CBT relies on a cognitive science-informed model of psychological change that aims to promote retrievable memories of adaptive responses that can successfully compete with and suppress memories of previously learned maladaptive responses

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evoked under “real world” conditions outside the therapy office (e.g., Brewin 2006). In developing CBT treatment methods for children with ASD, target goals (e.g., social skill development and generalization) need to be matched with procedures for enhancing memory retrieval. We have outlined CBT procedures for addressing numerous core autism symptoms elsewhere (Sze and Wood 2007, 2008; Wood et al. 2009). Given space limitations, two examples of such procedures are given: (1) To promote reciprocal conversation skills, the encoding specificity principle from basic memory research suggests that skill learning should occur in the actual settings where social deficits are exhibited, rather than in simulated social situations such as therapy settings, as is often done in traditional social skills training. Teachers and parents can be trained on simple social coaching procedures that promote the child’s use of reciprocal conversation skills (e.g., posing questions) in real-world settings *immediately* preceding actual social interactions (i.e., moments before, rather than hours or days before, the interactions) to address this clinical need. (2) Research on levels of processing in human memory has demonstrated that deep semantic processing—rather than rote memorization—increases the chance of the retrieval of a target memory (e.g., for a social skill). To promote deep semantic processing of new concepts, Socratic questions (questions that incorporate hints of the correct answer) can be posed by the therapist to encourage children to put accurate answers in their own words (Sze and Wood 2008). The combination of repeated *in vivo* rehearsal of social skills in real-world settings coupled with Socratic discussions about the positive effects of such skills may promote deep semantic processing and increase the memory retrieval of the targeted skills in naturalistic contexts while helping to suppress memories of habitual maladaptive responses such as social avoidance.

CBT has achieved large, clinically significant outcomes in other childhood disorders (e.g., Walkup et al. 2008) and high-functioning children with ASD are considered promising candidates for this treatment approach. Studies of information processing and cognition in high-functioning children with ASD show that contrary to common speculation, their capacity for abstract reasoning is varied rather than absent (e.g., Minshew et al. 2002). It is therefore plausible that the cognitive aspects of CBT would be understandable for many high-functioning school-aged children with ASD, as long as the nature of ASD is taken into account in the presentation of skills and concepts (Anderson and Morris 2006).

In a recent randomized, controlled trial, a CBT program was found to have a positive impact on parent- and diagnostician-reports of anxiety in children with ASD (Wood et al. 2009). Anxiety disorders are common among children with ASD and are associated with greater impairments in

social responsiveness and more repetitive behaviors (Sukhodolsky et al. 2008). Mundy et al. (2007) have proposed that anxiety in ASD may be an indicator of a meaningful subclass of children with a greater likelihood of benefitting from the intervention techniques used in CBT. In the present study, the effect of the Wood et al. (2009) CBT program on parent-reported core autism symptoms was evaluated. It was hypothesized that CBT would outperform a waitlist condition on these outcomes and that a reduction of anxiety symptoms during the trial would be associated with a reduction of autism symptoms.

Method

Participants

The sample included 19 children, ranging in age from 7–11 years ($M = 9.37$, $SD = 1.42$), and their primary parent(s) (defined as parent(s) who were responsible for overseeing the child’s daily activities) living in a major metropolitan area of the western United States (see Wood et al. 2009 for additional background details). The 19 children in this sample include the final 11 participants from the Wood et al. (2009) trial as well as eight additional children subsequently randomized into the same treatment protocol: (a) Beginning with the 29th child enrolled in the Wood et al. (2009) trial, the social responsiveness scale (SRS; Constantino and Gruber 2005) was added as an outcome measure. Once the 40th child completed treatment, anxiety disorder outcomes were evaluated as planned and the paper (Wood et al. 2009) was submitted for publication. Hence, of these 40 children, only the final 11 had SRS data. (b) After the Wood et al. (2009) paper was submitted, we randomized eight additional children into the same study protocol and collected SRS data from their parents. (c) Hence, the final 19 of the 48 total participants who had been randomized to condition had SRS data. The CBT intervention was identical for all 48 participants and there were no extra treatment components administered to children whose parents completed the SRS.

Children were referred by a medical center-based autism clinic, regional centers, parent support groups, and school personnel such as inclusion specialists. Children met research criteria for ASD (see below) and at least one anxiety disorder. Psychiatric medication, if used, was at a stable dose prior to intake and throughout the duration of the trial. Children with verbal IQs less than 70 or who were in concurrent psychotherapy were excluded.

Most children were boys ($n = 16$; 84%) and most primary parents had a college degree ($n = 15$; 79%). Children’s race/ethnicity varied: Caucasian ($n = 10$; 53%); Asian ($n = 4$; 21%); Native American/Caucasian ($n = 2$;

11%); Latino ($n = 1$; 5%); Latino/Asian ($n = 1$; 5%); African American/Caucasian ($n = 1$; 5%). Groups did not differ significantly on these variables.

Intervention Program

Therapists included four doctoral students in clinical or educational psychology and one postdoctoral fellow in psychology. Therapists received at least 8 h of initial training on the intervention, read the treatment manual and attended weekly hour-long supervision with the treatment developers. Sixteen weekly sessions were offered, each lasting 90 min. Therapists worked with families for 16 weekly sessions, each lasting 90 min (about 30 min with the child and 60 min with the parents/family), implementing a version of the *Building Confidence* CBT program (Wood and McLeod 2008) modified by the study authors for use with children with ASD. As with other CBT programs for child anxiety disorders, the manual includes coping skills training followed by in vivo exposure. A hierarchy is created in which feared situations are ordered from least to most distressing. Children work their way up the hierarchy and are rewarded as they attempt increasingly fearful activities. In ASD-specific treatment modules, children and parents are taught friendship skills (e.g., giving compliments, acting like a good sport, hosting peer get-togethers successfully, etc.) and children are 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 is 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. These skills are practiced in session, at school, and during play dates and are reinforced with a comprehensive reward system that relies on both daily privileges and longer-term incentives. To address the social isolation that many children with ASD experience at school, peer "buddy" and mentoring programs are set up during the school meeting. Two meetings are scheduled at the child's school to teach the social intervention techniques to relevant school providers (e.g., aides, teachers). Telephone follow-up is offered on an as-needed basis.

All skill development and practice efforts are supported by guided conversations in which the therapist uses Socratic questioning to promote conceptual development and particularly, 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, 'Bea is...?' ...oh, a good friend? So she would like you being so friendly to her?").

Children's circumscribed interests and stereotypies are incorporated into the intervention in two ways. To enhance

rapport, therapeutic concepts (e.g., emotion recognition, cognitive restructuring) are taught using children's special interests as examples (e.g., for a child primarily interested in a particular cartoon character, the character's "feelings" and "thoughts" in socially awkward situations could serve as the basis of discussion) and as rewards (e.g., granting access to the preferred stimulus). Later in treatment, after rapport has been established (as evidenced by the therapist's and supervisor's observation of at least three consecutive sessions of high child involvement during therapy), a *suppression* approach is introduced, in which increasing amounts of time per day are devoted to consciously refraining from discussing or engaging in activities related to the circumscribed interest or engaging in stereotypies such as flapping. To help children understand the rationale for suppression, information about social expectations and acceptance is provided during these modules (e.g., that these behaviors are fine in private but tend to confuse peers and get in the way of friendship).

Measures

Assessments were conducted by independent evaluators blind to treatment condition. ASD diagnoses were assigned with an algorithm using the autism diagnosis interview-revised (ADI-R; Le Couteur et al. 2003), autism diagnostic observation schedule (ADOS; Lord et al. 2002)—Module 3, a checklist regarding circumscribed interests, and a review of previous assessment records (also see Wood et al. 2009). The ADI-R and ADOS were administered by doctoral students and doctoral-level psychologists who received standardized training and assessment certification. The SRS (Constantino and Gruber 2005) is a standardized, 65-item, 4-point Likert style parent-report form assessing children's autism-specific characteristics such as social communication deficits and repetitive behaviors. The SRS provides a total score and five subscales, and has demonstrated robust reliability and validity. The anxiety disorders interview schedule: child and parent versions (ADIS-C/P) (Silverman and Albano 1996) is a semi-structured diagnostic interview with favorable psychometric properties that generates diagnoses as well as clinician's rating scale (CRS) scores ranging from 0 to 8 (with higher scores representing more severe anxiety).

Procedure

This study was conducted in compliance with a university-based IRB. Phone contact was initiated by parents referred to the study. Parents gave written informed consent and children gave written assent to participate in the study. Children who met all inclusion/exclusion criteria were block randomized by a research assistant to either

immediate treatment (IT) or a 3-month waitlist (WL) using a computer randomization program (the randomization sequence was concealed from investigators until interventions were assigned). Block randomization procedures stratified children based on age and gender. Therapists were randomly assigned to cases. Posttreatment assessments were completed on the final day of treatment or within 1 week of termination; postwaitlist assessments were conducted 3 months after the baseline assessment but before initiating CBT. Families in IT also participated in a follow-up assessment 3 months after termination of treatment. Families received \$20 for participating in the assessments.

Results

For the participating sample ($n = 19$), recruitment began in 3/2006 and ended in 8/2007; posttreatment assessments were completed by 12/2007.

There were no statistically significant pretreatment group differences on the demographic variables or SRS scores. Evidence of intervention adherence is excellent (94% of core elements of each session detailed in the treatment manual, as rated by a blind coder listening to audiotapes of sessions, were implemented per protocol) and is described in detail elsewhere (Wood et al. 2009).

ANCOVA was used to test group differences at posttreatment/postwaitlist on SRS scores, with the children's baseline SRS scores included as a covariate. There was a statistically significant group difference, $F(1, 16) = 5.39$, $p < .05$. Posttreatment/postwaitlist total SRS scores were lower in the IT group than in the WL group ($d = .77$, approaching a large effect; Cohen 1988) (see Table 1). In additional ANCOVAs, posttreatment/postwaitlist group differences favoring CBT were found on three of five SRS subscales: Social Communication, Social Motivation, and Social Awareness ($ps < .05$); a trend favoring CBT was also found for Social Cognition ($p = .10$). No group difference was found on the Autistic Mannerisms subscale.

Follow-up data was collected on four of the nine children in the IT group (the remaining five children were lost to follow-up). All four children had lower SRS total scores at follow-up than they had at posttreatment, suggesting treatment gains had been maintained or augmented.

SRS T -scores were also examined. A T -score of 70 or greater is considered a clinically significant level of autism symptoms. At baseline all but one child in the sample had a total SRS T -score above 70 (the exception was in WL, $T = 63$). Of the nine WL children who began the trial with a T -score in the clinical range, all remained at or above a T -score of 70 at postwaitlist. At immediate posttreatment, two of nine children in IT had T -scores below 70. At 3-month follow-up, three of four IT children had T -scores

Table 1 Total social responsiveness scale scores for the IT and WL groups

	Baseline		Posttreatment/postwaitlist	
	IT	WL	IT	WL
<i>M</i>	113	116.40	89	110.30
<i>SD</i>	18.27	30.19	26.39	29.22
Range	87–145	61–151	53–140	53–146

For IT, $n = 9$; for WL, $n = 10$. Raw scores are reported

below 70 (as noted above, the remaining five IT children were lost to follow-up). Hence, using a last-observation-carried-forward (LOCF) approach, five of nine IT children (56%) were below a T -score of 70 at their last available assessment (i.e., posttreatment or follow-up).

Two OLS linear regression models were fitted to evaluate the correspondence of anxiety reduction and autism symptom improvement. In the first model, the DV was posttreatment/postwaitlist SRS scores. Predictors included ADIS-C/P CRS change scores and baseline SRS total scores. In the second model, SRS change-scores and baseline ADIS-C/P scores were used to predict posttreatment/postwaitlist ADIS-C/P scores. Both models had significant effects (Model 1 $\beta_{\text{ADIS-C/P change score}} = .53$, and Model 2 $\beta_{\text{SRS change score}} = .63$, $ps < .01$, respectively), suggesting that when anxiety decreased over time, so did autism symptoms (and vice versa).

Discussion

These results suggest that autism symptoms such as social communication deficits may be positively influenced by CBT. If this finding proves to be robust in larger-scale trials, it would represent a major advance in the treatment of core autism symptoms in high-functioning school-aged children.

A key finding was that parent-reported autism symptoms were lower in the CBT group than the waitlist group at the post assessment, with a medium to large effect size. A particular improvement made by the CBT group was in social communication skills. Although reliance on parent report is in some ways a limitation, parent report does have the potential advantage of capitalizing on a parent's extensive observations of child behavior at home and in the community. Generalization and maintenance of treatment effects in these settings has generally not been attained in social skills training (Rao et al. 2008). Furthermore, few if any clinical trials of non-pharmacological behavioral treatments for school-aged children with ASD have used diagnostic measures of autism symptoms as an outcome measure; social skill training studies have tended to use diagnostically nonspecific measures of social skill mastery,

which may not be capable of documenting improvement in autism-specific social communication deficits. A second major finding in this study was that improvement in anxiety was associated with improvement in autism symptoms and vice versa, suggesting that for children with comorbid ASD and anxiety disorders, the two symptom domains could be interconnected. The potential role of anxiety in exacerbating ASD symptoms for some children has been documented in various descriptive studies (e.g., Sukhodolsky et al. 2008). Hypothetically, after experiencing a reduction of the aversive affective experience of anxiety, children with ASD may feel less need to engage in maladaptive coping behaviors such as social avoidance and repetitive behaviors to regulate their mood state, permitting interventions in the core autism symptom domain (e.g., social reciprocity) to be more effective.

This study was limited by a small sample and reliance on parent reports of symptomatology, which are vulnerable to bias. Future research could expand upon these initial findings by using a larger sample of participants and by including objective measures of outcome based on independent evaluators' ratings and direct observations of children's behavior. Given the limited number of empirical studies on effective intervention modalities for core autism symptoms in this population, further investigation of CBT for the treatment of core autism symptoms appears indicated.

This study was strengthened by its use of methods that are consistent with contemporary guidelines for clinical trials research (Chambless and Hollon 1998). If the present findings are representative of the effects of CBT on autism symptoms in high-functioning school-aged children, this intervention modality could represent an important step towards developing more efficacious practices for the treatment of ASD.

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