



Published in final edited form as:

Depress Anxiety. 2015 March ; 32(3): 174–181. doi:10.1002/da.22332.

A Randomized Controlled Trial of Cognitive-Behavioral Therapy versus Treatment as Usual for Adolescents with Autism Spectrum Disorders and Comorbid Anxiety

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Abstract

Objective—Examine the efficacy of a personalized, modular cognitive-behavioral therapy (CBT) protocol among early adolescents with high-functioning autism spectrum disorders (ASD) and co-occurring anxiety relative to treatment as usual (TAU).

Method—Thirty-one children (11–16 years) with ASD and clinically significant anxiety were randomly assigned to receive 16 weekly CBT sessions or an equivalent duration of TAU. Participants were assessed by blinded raters at screening, post-treatment, and 1-month follow-up.

Results—Youth randomized to CBT demonstrated superior improvement across primary outcomes relative to those receiving TAU. Eleven of 16 adolescents randomized to CBT were treatment responders, versus 4/15 in the TAU condition. Gains were maintained at 1-month follow-up for CBT responders.

Conclusions—These data extend findings of the promising effects of CBT in anxious youth with ASD to early adolescents.

Clinicaltrials.gov trial reference number—NCT01563003. Internet links: <http://clinicaltrials.gov/show/NCT01563003>

Keywords

Autism Spectrum Disorder; Anxiety; Adolescents; Cognitive-behavioral therapy; Obsessive-compulsive disorder

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Autism spectrum disorders (ASD), including Autism, Asperger's Syndrome, and Pervasive Developmental Disorder Not Otherwise Specified (PDD-NOS), are complex neurodevelopmental disorders that occur in approximately 1 in 68 North American children. 1[‡] Although the hallmark features of ASD include social, communication, and cognitive impairment,² anxiety disorders are commonly comorbid^{3, 4} and confer significant disability above and beyond the ASD diagnosis.⁵⁻⁷

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Given the frequency and deleterious consequences associated with anxiety disorder comorbidity, attention has been given to developing and evaluating effective treatments. Cognitive-behavioral therapy (CBT) adapted for the clinical characteristics of youth with ASD and anxiety has demonstrated strong efficacy relative to waitlist and treatment as usual (TAU) controls in reducing anxiety symptomology in children with ASD.⁸⁻¹¹ Relative to children with ASD and anxiety, comparatively fewer studies have examined CBT among early adolescents with ASD. Yet, adolescents present with different clinical and treatment challenges compared to children requiring the creation and evaluation of developmentally tailored interventions. For example, social functioning becomes more salient in adolescents versus children with ASD, with adolescents becoming increasingly aware of their social status and skill impairments,¹² having more academic stress, and being at risk for social avoidance and peer victimization.^{13, 14} Clinical presentation of adolescents is characterized by increased frequency of depression and anhedonia,¹⁵ externalizing behaviors,¹⁶ and the potential for limited motivation to engage in treatment.¹⁷

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Building on positive case series data,¹⁸⁻²⁰ three randomized controlled trials have been reported in adolescents with ASD and comorbid anxiety. Wood et al.²¹ randomized 33 adolescents (11-15 years) to 16 CBT sessions using a developmentally modified version of the Behavioral Interventions for Anxiety in Children with Autism (BIACA; see below for description)¹¹ manual or an equivalent waitlist period. The CBT group experienced significantly greater reductions in clinician-rated anxiety severity relative to the waitlist arm ($d=.74$); 79% of the CBT group versus 28.6% of the waitlist group were treatment responders although no differences in rates of anxiety diagnostic remission were found. White et al.²² randomized 30 adolescents (12-17 years) to Multimodal Anxiety and Social Skills Intervention (MASSI) or an equivalent duration waitlist control. MASSI is a modularized CBT intervention delivered in individual (up to 13 sessions), group (7 sessions) and parent education/coaching sessions (at the end of individual therapy sessions).^{18, 22} Modules were chosen for individual sessions based on the individual's needs and included psychoeducation, coping and problem solving skills, and exposure therapy. Group sessions focused on structured social skills training. No significant group differences were found on anxiety outcomes with generally small effect sizes. Relative to the waitlist arm, the CBT arm demonstrated large improvements in social functioning ($d=1.03$). Russell et al.²³ randomized 46 adolescents and adults (14-65 years; $M=26.9$ years) with ASD and comorbid obsessive-compulsive disorder (OCD) to CBT or Anxiety Management (AM), which

[‡]Autism spectrum disorders as conceptualized in the Diagnostic and Statistical Manual for Mental Disorders (DSM) Fourth Edition, Text Revision included Autism, Asperger's Syndrome, and Pervasive Developmental Disorder Not Otherwise Specified. In the DSM-5, individual diagnoses were eliminated and the rubric of autism spectrum disorder was adopted to encompass individuals characterized by deficits in both social communication/interaction and restricted repetitive behaviors, interests, and activities.

consisted of psychoeducation about mood and a healthy lifestyle, diaphragmatic breathing, progressive muscle relaxation, and problem solving training. There were no statistically significant group differences although the within-group effect size for the CBT arm was large ($d=1.01$ versus $.6$ for the AM arm) and more participants responded to CBT versus AM (45% versus 20%).

In light of the mixed findings among adolescents, the need to examine the potential of CBT relative to a control condition that allows for active intervention, and the need to determine effective treatment strategies for this cohort, we examined the relative efficacy of a modular CBT approach tailored for early adolescents with ASD and anxiety relative to TAU. Relative to TAU, we expected that the CBT group would demonstrate superior reductions in clinician-rated anxiety severity, and higher response and remission rates. A secondary aim was to examine treatment effects on youth-reported anxiety, and parent-rated youth anxiety, internalizing and externalizing symptoms, and psychosocial impairment; we expected CBT to outperform TAU on each outcome. Finally, we examined the short-term maintenance of treatment gains for CBT responders.

Method

Participants

Thirty-one adolescents between the ages of 11–16 years ($M=12.74$, $SD=1.34$) participated. Youth met criteria for: 1) a diagnosis of autism, Asperger's syndrome, or PDD-NOS; 2) a co-occurring anxiety diagnosis of separation anxiety disorder (SAD), generalized anxiety disorder (GAD), OCD, or social phobia; 3) a score ≥ 13 on the Pediatric Anxiety Rating Scale (PARS);²⁴ and 4) an IQ ≥ 80 evaluated by the Wechsler Abbreviated Scale of Intelligence²⁵ or review of standardized testing occurring in the prior two years. Primary anxiety diagnoses were determined using the Anxiety Diagnostic Interview Schedule-Child and Parent versions (ADIS-IV-C/P).²⁶ At least one anxiety disorder with a Clinical Severity Rating (CSR) of ≥ 4 was required; the diagnosis with the highest CSR was deemed primary. Individuals randomized to CBT and who were on an established medication regime maintained their medication dosage for the duration of participation (youth randomized to TAU could make adjustments). Medications (if applicable) were stable at their present dose for 6 (antipsychotics, ADHD medications) or 8 weeks (e.g., antidepressants) prior to study enrollment for all participants, regardless of condition. Exclusion criteria included the following: 1) Initiation of new medications within 6 (antipsychotics, ADHD medications) or 12 weeks (antidepressants) before study enrollment; 2) Concurrent participation in psychotherapy, social skills training over 90 minutes per week, or other programmatic behavioral interventions (e.g., applied behavioral analysis); 3) Active suicidality; 4) Lifetime history of mania, psychosis, or substance abuse. Descriptive information is displayed in Table 1. Figure 1 displays the CONSORT diagram.

Procedure

This study was approved by the local institutional review board. Services were provided in a university-based, multidisciplinary behavioral health clinic specializing in the treatment of pediatric anxiety in youth with and without ASD. Interested families were phone screened

and those meeting initial criteria were scheduled for a screening assessment at which informed consent and assent were obtained from the legal guardian and youth. The screening assessment was completed over two days. The first visit focused on anxiety assessment (i.e., ADIS-IV-C/P, PARS), while the second visit approximately one week later included autism-specific assays. Subjects who were eligible were randomized at the end of the second visit using a computer-generated algorithm in a 1:1 ratio to receive either CBT or TAU. Therapists were assigned at random. The post-treatment assessment, identical to the anxiety-focused pre-treatment assessment, was completed after the 16th therapy session or 16th week in TAU. Responders to CBT completed a follow-up assessment one month following their post-treatment assessment. All participants completed their respective treatment arm.

Clinician-rated measures were administered by trained graduate-level independent evaluators that were blind to intervention condition. Training consisted of instructional meetings about study measures and multiple practice administrations with confederates and under observation. Blindness was maintained by verbal and written reminders to families at assessments, maintaining the IE in a separate wing of the clinic to minimize inadvertent contact with participants, and holding separate weekly supervision meetings regarding assessment and treatment. Twenty percent of audio-recorded assessments of the PARS were randomly selected and reviewed for integrity purposes by a second clinician. Inter-rater agreement was high for the PARS (intraclass correlation coefficient = .93).

Measures

Autism spectrum diagnoses were determined at screening via best estimate procedures.²⁷ This procedure involved the administration of the Autism Diagnosis Interview–Revised (ADI-R)²⁸ in all youth and either the Childhood Autism Rating Scale²⁹ (n=19) or Autism Diagnosis Observation Schedule³⁰ (n=8) by a certified doctoral-level evaluator.[§] Thereafter, complete consensus between two clinicians regarding the ASD diagnosis was required for inclusion. All parent-, child-, and clinician-rated measures were completed at the pre-, post-treatment, and follow-up assessments, unless otherwise noted.

ADIS-IV-C/P²⁶—The ADIS-IV-C/P is a psychometrically-sound semi-structured interview administered to the parent and child separately to assess the presence and severity of anxiety and comorbid disorders (e.g., attention deficit-hyperactivity disorder). The rater made the final determination regarding child diagnoses based on parent/child report and clinical judgment. The rater determines the presence of varied disorders, including a CSR, ranging from 0 to 8, for endorsed conditions.

Pediatric Anxiety Rating Scale (PARS)²⁴—The PARS is a psychometrically sound^{24, 31} clinician-administered measure that assesses anxiety symptom presence and severity over the prior week. The symptom checklist assesses the presence of a variety of anxiety symptoms. The PARS severity scale ranges from 0 to 30, with scores over 12

[§]The Autism Diagnosis Observation Schedule was initially administered. To reduce subject burden while maintaining the ability to comprehensively assess youth, we switched to the Childhood Autism Rating Scale.

consistent with moderate levels of anxiety and a diagnosis of an anxiety disorder.^{24, 32} The PARS has excellent psychometric properties in youth with ASD and anxiety.³¹

Clinical Global Impression-Severity and -Improvement (CGI-Severity, CGI-Improvement; Guy, 1976)—The CGI contains two single-item scales of severity and change in psychological symptoms. The CGI-Severity, ranging from 0 (“no symptoms/illness”) to 6 (“extremely severe symptoms”), reflects the overall severity of anxiety symptoms and associated interference. The CGI-Improvement, anchored by “very much worse” to “very much improved” ratings, captures improvement or worsening of anxiety symptoms. The CGI-Severity was rated at each assessment; CGI-Improvement was completed at the post-treatment and follow-up assessments.

Service Assessment for Children and Adolescents-Service Use Scale (SACA)³³—The SACA is a standardized, psychometrically-sound^{33, 34} measure used to assess utilization history of a broad spectrum of mental health services (e.g., inpatient, outpatient, school-based, pharmacotherapy).

Columbia Impairment Scale-Parent (CIS-P)³⁵—The CIS-P is a psychometrically-sound parent-rated questionnaire assessing parental perceptions of functional impairment experienced by the youngster across social, family, and school domains.

Child Behavior Checklist (CBCL)³⁶—The CBCL assessed parental reports of youth internalizing and externalizing symptoms.

Multidimensional Anxiety Scale for Children-Parent (MASC-P)—The MASC-P is a 39-item parent-report measure of youth anxiety with established psychometric properties³⁷ and treatment sensitivity in youth with ASD.¹¹

Social Responsiveness Scale (SRS)³⁸—The SRS is a psychometrically-sound³⁸ parent-rated measure of social functioning in children with ASD with subdomains assessing social awareness, social information processing, capacity for reciprocal social communication, social anxiety/avoidance, and autistic preoccupations and traits.

Revised Child Anxiety and Depression Scales (RCADS)—The RCADS is a psychometrically sound^{39, 40} 47-item youth-report measure of anxiety and depressive symptoms.

Treatment

Cognitive-Behavioral Therapy—Participants received 16 weekly, individual CBT sessions according to a developmentally modified version of the BIACA treatment manual¹¹ that was used in Wood et al.²¹ In that study, revisions were made to make the materials practical for early adolescents and account for issues relevant to adolescents (e.g., social issues, motivation, comorbidity). Sessions lasted between 60–90 minutes, and were provided modularly and selected by the therapist and supervisor prior to the visit based on clinical appropriateness (see Table 2 for a listing of modules). For each child, a minimum of three sessions were spent developing coping skills (e.g., behavioral activation, cognitive

restructuring) with at least eight sessions of exposure therapy. Beyond these core components (which could be used more often if appropriate), additional modules were implemented as needed to address social and adaptive skill deficits/problems, poor motivation, social/school issues, and comorbid conditions. In a slight departure from Wood et al., parents were included for the vast majority of sessions (i.e., during child and parent oriented modules) given the low treatment motivation often seen in this cohort, as well as to facilitate treatment progress and generalization (e.g., implementing exposures outside of session, scheduling peer activities, implementing reward system), promote autonomy and communication skills, and problem solve treatment barriers. For all youth, treatment was concluded with a termination module that addressed relapse prevention and continuing treatment progress.

Therapy was delivered by post-doctoral fellows or doctoral students in clinical or school psychology with at least one year of experience in CBT for childhood anxiety. Clinical supervision with a doctoral-level psychologist was held weekly. To ensure treatment adherence, 20% of audio-recorded sessions were randomly selected for review. Good adherence to the treatment manual was noted for therapist competence (4.6/5.0), therapist flexibility (4.7/5.0), therapeutic alliance (4.9/5.0), and adherence to session components (4.1/5.0). Most participants randomized to CBT (15/16; 93.7%) received services in addition to study psychotherapy including psychiatric medication management ($n=10$; 62.5%), school counseling ($n=5$; 31.3%) or special education services ($n=8$; 50%). Regarding the number of services, 1 (6.3%) youth received no services, 9 (56.3%) youth received one service, 4 (25%) youth received two services and 2 (12.5%) youth received three services. Six out of 16 (37.5%) adolescents were not taking any psychiatric medication while 4 (25%) adolescents were taking one medication and 6 (37.5%) adolescents were taking two or more.

Treatment as Usual—If randomized to TAU, participants were able to seek any psychosocial or pharmacological treatment that they chose, or to not seek treatment, for 16 weeks. Subjects continued with preexisting medications or therapy or were able to initiate dosage changes or new medications with the prescribing provider. The research team did not influence the parents' decision in treatment choices. Using the SACA at the post-assessment, 14 out of 15 participants randomized to TAU received psychological or psychiatric services, including medication management ($n=10$; 66.7%), school counseling ($n=2$; 13.3%), special education services ($n=9$; 60.0%), social skills training ($n=1$; 6.7%) or individual psychotherapy ($n=3$; 18.8%). One participant did not receive any services, 5 (33.3%) participants received one service, 7 (46.7%) participants received two services, and 2 (13.3%) participants received three or more services. A majority of youth in this arm were prescribed psychiatric medication ($n=10$; 66.7%) with 3 (20.0%) youth taking one medication and 7 (46.7%) youth taking two or more medications. All TAU participants were offered and accepted CBT following the post-treatment assessment.

Analytic Plan

Group differences at post-treatment for continuous outcomes were analyzed via ANCOVAs, with post-treatment scores being predicted by treatment condition while covarying for baseline scores, and via Fisher's exact tests for dichotomous variables. Given the nascent

state of this literature, as well as the a priori nature of all hypotheses, no type 1 error correction was used. At 1-month follow-up, in order to evaluate changes in symptoms for participating CBT responders ($n=9$; 2 were lost to follow-up), paired t-tests were conducted for continuous outcomes, and differences in categorical treatment outcomes were evaluated using binomial proportion tests. Effect sizes for continuous variables were computed and converted to Cohen's d using formulae provided by Cooper et al.,⁴¹ where values of d of .2, .5, and .8 correspond to small, medium, and large effects respectively.⁴² Assuming an effect size of $d=0.8$ by using past CBT trials for youth with comorbid anxiety and ASD as precedent,^{8, 21} power to detect group differences was 0.87. Following precedent, treatment response was defined as a CGI-Improvement rating of "much improved" or "very much improved".⁴³ Symptom remission was classified as having a severity rating on the ADIS-IV-C/P CSR ≤ 3 for the primary anxiety diagnosis.

Missing data were addressed by PROC-MI in SAS 9.3⁴⁴ using predictive mean matching via the fully conditional specification method. Following recommendations by Graham,⁴⁵ missing data was in the acceptable range for multiply-imputed models (3.5%), and auxiliary covariates were used in imputation models (a process which can take data that is not missing at random and produce estimates that are consistent with those that meet the missing at random assumption⁴⁶), where covariates included all timepoints for the outcome under analysis question as well as treatment group (1-month follow-up scores were not used as a covariate in post-treatment comparisons, and treatment group was not used in follow-up analyses as all participants were randomized to CBT). Degrees of freedom for multiply imputed hypothesis-testing models were adjusted based on recommendations by Barnard and Rubin,⁴⁷ and 100 imputations were employed.

Results

Post-Treatment Comparisons

Descriptive and inferential statistics for baseline, post-treatment, and 1-month follow-up are in Table 3. Significant group differences at post-treatment were observed for all continuous clinician-rated measures, including the PARS ($d=0.79$), ADIS CSR ($d=1.30$), and CGI-Severity rating ($d=0.94$). With regard to categorical outcomes at post-treatment, 68.8% of those in the CBT group were treatment responders, compared to 26.7% of those in the TAU group ($p=0.03$). In considering post-treatment diagnostic status on the ADIS-C/P, 37.5% of those in the CBT condition no longer met diagnostic criteria for their primary diagnosis at post-treatment, whereas no participants in the TAU condition met criteria for diagnostic remission ($p=0.02$).

In considering group differences at post-treatment for parent- and child-report measures, significant improvements in overall autism functioning were observed on the SRS ($d=0.84$), with significant effects detected on the awareness ($d=0.75$), cognition ($d=0.76$), and communication ($d=1.13$) subscales, though observed differences on the motivation ($d=0.35$) and mannerisms ($d=0.52$) subscales were non-significant. In addition, significant improvements in the CBT versus TAU arm were observed with regard to overall functional impairment ($d=0.59$) and externalizing child behavior ($d=0.63$). No other significant differences were detected on parent- or child-reported anxiety symptoms.

Maintenance of Treatment Gains for Treatment Responders at 1-Month Follow Up

No significant decline in symptoms was observed on any measure (see Table 3), and significant improvements were observed for the SRS total score ($d=1.89$), as well as on the cognition ($d=1.55$), communication ($d=1.19$), motivation ($d=1.13$), and mannerisms ($d=1.39$) subscales, though no further change was seen on the awareness subscale ($d=0.60$). No changes were observed with regard to clinician-rated status of treatment response ($p=.27$) or diagnostic remission ($p=.79$).

Discussion

We report on the efficacy of a modular CBT program for early adolescents with ASD and comorbid anxiety. Consistent with Wood et al.,²¹ a personalized CBT intervention significantly reduced anxiety symptoms and impairment among this population with generally large effects observed across clinician-rated anxiety outcomes. Overall, 68.8% and 37.5% of participants were classified as treatment responders or remitters, which was superior to TAU and on par with past results among youth with ASD^{8, 21} and those who are typically developing.⁴⁸ Responders to acute treatment maintained their gains over a one-month interval. This study is the second to support the efficacy of a modularized intervention for addressing anxiety in early adolescents. Notably, treatment of adolescents with ASD and anxiety has posed a significant challenge with some CBT trials failing to demonstrate superiority relative to waitlist⁴⁹ and no established efficacious pharmacotherapy options. These data suggest that a personalized CBT protocol for early adolescents with ASD and anxiety that includes a robust dose of behavioral (i.e., exposure) and cognitive (i.e., cognitive therapy) strategies holds promise.

Improvements in social awareness, cognition and communication were found in the CBT arm relative to those randomized to TAU. Different from standard CBT approaches, modules in the present treatment approach targeted social interaction skills and taught youth how to manage ASD-related mannerisms (e.g., stereotyped interests). Group differences may reflect this specific focus. A potentially complementary interpretation is that reduction in anxiety symptoms fosters improved social functioning, which has been shown previously.^{8, 50} Beyond improvements in ASD symptoms, reductions in functional impairment were significant and suggest the value of CBT in improving functional outcomes beyond anxiety symptomology.

No differences in child- and parent-reported child anxiety were found. This is not completely surprising for child-reports given evidence that many youth with ASD have difficulty reporting on anxiety,⁵¹ thus contributing to measurement error variance. Non-significant findings with parents may reflect the challenges of existing measures to capture child anxiety,⁵² and/or difficulty in differentiating anxiety from ASD symptoms⁵³ and understanding functional determinants of anxiety. It is also possible that parents and youth across groups perceived reductions in child anxiety. Externalizing symptoms, which may be more directly observable, demonstrated improvements in the CBT arm relative to TAU. As anxiety symptoms improved, anxious triggers that evoke disruptive responses may have correspondingly improved. As well, modules in the present CBT protocol assisted parents in managing disruptive behavior, which may have translated into benefit.

There are several study limitations. First, an active control condition (e.g., relaxation therapy, pharmacotherapy) would be preferable to TAU. Although 93% of youth received intervention in the TAU arm, treatment was not standardized and potentially not maximized for many youth. On balance, the use of TAU is an improvement relative to waitlist controls, and allowed for the possibility of patient preference in treatment selection and minimized the use of costly and non-credible control interventions. Second, although our sample was powered to detect clinically meaningful main effects, we were not powered to examine treatment mediators and moderators. Third, the sample consisted primarily of Caucasian males. Although more males than females have ASD, it would be well-advised to examine treatment efficacy and acceptability in females in a more ethno-racially diverse sample. Finally, our short follow-up interval did not allow us to evaluate long-term treatment durability.

These data add to a growing literature supporting the efficacy of CBT for anxiety in children and adolescents with ASD. At this juncture, a large scale study is needed to examine treatment outcomes relative to standard care (i.e., non-ASD specific CBT) to determine differential efficacy, as well as treatment mediators and moderators to understand the mechanisms and who benefits from which intervention. As well, dissemination of treatment protocols into real world settings is needed. Examining the effectiveness of this intervention together with varied training models will promote the use of evidence-based care, exerting a more significant impact on illness trajectory.

Acknowledgments

The authors would like to acknowledge the contributions of Erika Crawford, Anna Jones, Michael Sulkowski, Ph.D., Robert Selles, Danielle Ung, Jeffrey J. Wood, Ph.D., and Monica Wu. Mr. De Nadai is supported by the National Institutes of Health under Ruth L. Kirschstein National Research Service Award F31 MH094095 from the National Institute of Mental Health.

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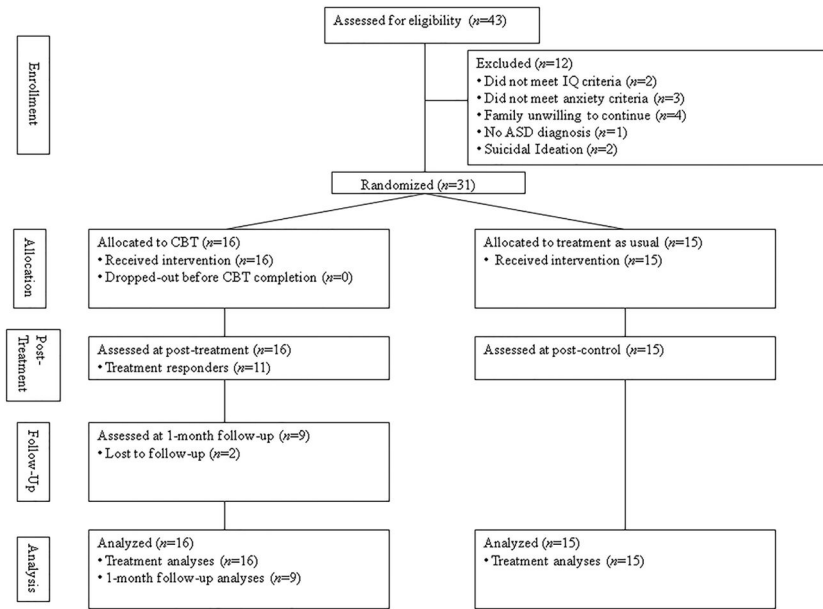


Figure 1.

Table 1

Demographic and clinical information as a function of treatment condition

Measure	CBT ^a n=16	TAU ^a n=15	p ^b
Child sex (male)	12 (75.0%)	13 (86.7%)	.65
Child age	12.75 (1.24)	12.73 (1.49)	.97
Parent sex (female)	15 (93.8%)	15 (100.0%)	1.00
Parent graduated from college	8 (50.0%)	6 (40.0%)	.72
Parent married	12 (75.0%)	12 (80.0%)	1.00
Child ethnicity/race			
Caucasian	12 (75.0%)	14 (93.3%)	.33
Asian/Pacific islander	1 (6.3%)	0 (0%)	1.00
Latino/a	3 (18.8%)	1 (6.7%)	
Autism spectrum disorders			
Autistic disorder	4 (25.0%)	5 (33.3%)	.70
PDD-NOS	6 (37.5%)	2 (13.3%)	.22
Asperger's syndrome	6 (37.5%)	8 (53.3%)	.48
Primary anxiety disorder			
Social phobia	7 (43.8%)	8 (53.3%)	.72
SAD	0 (0.0%)	2 (13.3%)	.23
OCD	3 (18.8%)	2 (13.3%)	1.00
GAD	6 (37.5%)	3 (20.0%)	.43
Number of anxiety diagnoses	2.75 (1.29)	2.80 (0.77)	.90
Other comorbid diagnoses			
Social phobia	6 (37.5%)	6 (40.0%)	1.00
SAD	3 (18.8%)	3 (20.0%)	1.00
OCD	3 (18.8%)	1 (6.7%)	.60
GAD	9 (56.3%)	9 (60.0%)	1.00
ADHD	9 (56.3%)	8 (53.3%)	1.00
Dysthymia/MDD	3 (18.8%)	4 (26.7%)	.69
ODD/CD	3 (18.8%)	4 (26.7%)	.69
Specific phobia	6 (37.5%)	8 (53.3%)	.48
Selective mutism	3 (18.8%)	0 (0%)	.23
Panic disorder	1 (6.3%)	0 (0%)	1.00
PTSD	1 (6.3%)	2 (13.3%)	.60
Sleep terror disorder	0 (0%)	1 (6.7%)	.48
Psychiatric medication use			
SSRI	7 (43.8%)	6 (40.0%)	1.00
Stimulant, atomoxetine, or guanfacine	8 (50.0%)	9 (60.0%)	.72
Atypical antipsychotic	2 (12.5%)	3 (20.0%)	.65
Anticonvulsant	0 (0%)	1 (6.7%)	.48
Trazodone	0 (0%)	1 (6.7%)	.48

Measure	CBT ^a n=16	TAU ^a n=15	p ^b
Benzodiazepine	0 (0%)	1 (6.7%)	.48
Family financial status^c			
Under \$40,000	4 (25.0%)	1 (7.7%)	.34
Between \$40,001-\$90,000	6 (37.5%)	6 (46.2%)	.72
Over \$90,000	6 (37.5%)	6 (46.2%)	.72

Note. CBT=Cognitive-behavioral therapy; TAU=treatment as usual; PDD-NOS=pervasive developmental disorder not otherwise specified; SAD=separation anxiety disorder; OCD=obsessive-compulsive disorder; GAD=generalized anxiety disorder; ADHD=attention deficit hyperactivity disorder; MDD=major depressive disorder; ODD=oppositional defiant disorder; CD=conduct disorder; PTSD=posttraumatic stress disorder; SSRI=selective serotonin reuptake inhibitor.

^aColumn values represent N (%) for categorical values and Mean (SD) for continuous variables

^bp-value based on independent t-test for continuous variables and Fisher's exact test for categorical variables

^cTwo parents in the TAU condition provided only personal financial status and did not report family financial status; the missing data rate between groups was non-significant at the $p < .05$ level, and only complete data were used in financial status comparisons

Table 2

Behavioral Interventions for Anxiety in Children with Autism Session Modules

Individual Therapy Modules	
Parent	Youth
<p><u>Core Modules</u></p> <ul style="list-style-type: none"> • <i>Module 1</i>: Introduction and Psychoeducation about ASD/anxiety • <i>Module IND</i>: Encouraging Independence • <i>Module REW</i>: Rewards System • <i>Module EXP</i>: Negotiating and Planning Exposures • <i>Module H</i>: Fear Hierarchy Development • <i>Module T</i>: Termination <p><u>Social Intervention Modules</u></p> <ul style="list-style-type: none"> • <i>PLAY</i>: Facilitating Play Dates • <i>MENTOR</i>: Facilitating Mentoring Activities • <i>SOC-C</i>: Social Coaching • <i>APPROP</i>: Socially Appropriate Activities and Appearance <p><u>School Module</u></p> <ul style="list-style-type: none"> • <i>IEP</i>: Principals of Parent Advocacy in the IEP process <p><u>Support Module</u></p> <ul style="list-style-type: none"> • Support Session for Unexpected Events 	<p><u>Core Modules</u></p> <ul style="list-style-type: none"> • <i>Module 1</i>: Introduction and Psychoeducation • <i>Module 2</i>: Emotion Recognition • <i>Module 3</i>: Cognitive Restructuring • <i>Module 4</i>: Review of Psychoeducation and CBT Skills • <i>Module H</i>: Fear Hierarchy Development • <i>Module R</i>: Relaxation • <i>Module KICK</i>: Review of Cognitive Skills and “Homework” Out-of-Session Exposures • <i>Module IV</i>: In-Vivo Exposures • <i>Module T</i>: Termination <p><u>Social Intervention Modules</u></p> <ul style="list-style-type: none"> • <i>FRND</i>: Making Friends • <i>MENTOR</i>: Mentoring • <i>SOC-C</i>: Social Coaching <p><u>OCD Focused Module</u></p> <ul style="list-style-type: none"> • <i>E/RP</i>: Exposure and Response Prevention <p><u>Support Module</u></p> <ul style="list-style-type: none"> • Support Session for Unexpected Events

Table 3

Descriptive and Inferential statistics for the CBT and TAU Conditions.

Measure	Baseline			Post-treatment			Follow-up			d ^z	
	CBT M (SD)	TAU M (SD)	TAU M (SD)	CBT M (SD)	TAU M (SD)	TAU M (SD)	CBT M (SD)	d ^y	r ^y		r ^z
PARS	15.81 (1.64)	15.67 (2.50)	13.93 (3.56)	10.94 (3.91)	10.94 (3.91)	13.93 (3.56)	9.78 (3.38)	-0.38	-0.13	6.15**	2.05
ADIS CSR ^a	5.50 (1.03)	5.73 (0.80)	5.33 (0.90)	3.69 (1.35)	3.69 (1.35)	5.33 (0.90)	2.47 (2.31)	1.08	0.39	4.01**	1.44
CGI-Severity	3.69 (0.60)	3.93 (0.80)	3.67 (0.82)	2.88 (0.72)	2.88 (0.72)	3.67 (0.82)	2.67 (0.50)	0.00	0.00	5.55**	1.85
SRS											
Awareness	12.50 (3.60)	14.47 (3.14)	13.27 (3.06)	10.00 (3.29)	10.00 (3.29)	13.27 (3.06)	8.11 (2.09)	1.81	0.60	3.90**	1.30
Cognition	19.06 (5.87)	20.67 (5.64)	19.80 (5.35)	14.69 (5.40)	14.69 (5.40)	19.80 (5.35)	10.89 (4.43)	4.66**	1.55	8.40**	2.80
Communication	38.06 (8.57)	38.13 (9.44)	36.67 (9.20)	27.13 (8.52)	27.13 (8.52)	36.67 (9.20)	19.78 (5.04)	3.57**	1.19	6.49**	2.16
Motivation	18.19 (5.90)	18.33 (5.59)	17.53 (6.60)	15.13 (6.62)	15.13 (6.62)	17.53 (6.60)	10.11 (3.37)	3.38**	1.13	3.63**	1.21
Mannerisms	18.13 (5.98)	21.33 (6.07)	20.13 (5.99)	14.00 (8.22)	14.00 (8.22)	20.13 (5.99)	7.78 (3.93)	4.18**	1.39	8.37**	2.79
Total	105.94 (22.64)	112.93 (24.77)	107.40 (24.53)	80.94 (26.83)	80.94 (26.83)	107.40 (24.53)	56.67 (12.95)	5.68**	1.89	9.36**	3.12
RCADS	27.94 (15.42)	27.05 (20.86)	21.88 (17.19)	23.86 (15.24)	23.86 (15.24)	21.88 (17.19)	-0.09	-0.83	-0.30	1.54	0.52
MASC-P	62.33 (19.99)	64.37 (11.56)	58.62 (17.56)	56.94 (17.52)	56.94 (17.52)	58.62 (17.56)	45.89 (19.69)	1.12	0.44	1.23	0.44
CIS-P	23.52 (7.51)	25.67 (7.45)	24.96 (8.91)	17.24 (9.75)	17.24 (9.75)	24.96 (8.91)	18.00 (7.31)	-0.97	-0.32	2.46*	0.86
CBCL											
Internalizing	28.12 (11.27)	23.55 (8.16)	20.07 (6.89)	18.79 (8.73)	18.79 (8.73)	20.07 (6.89)	17.33 (10.78)	-0.71	-0.24	3.11*	1.11
Externalizing	15.63 (10.03)	15.70 (11.09)	15.92 (10.88)	10.79 (8.48)	10.79 (8.48)	15.92 (10.88)	8.98 (6.77)	-0.98	-0.40	1.48	0.56

Note.

** p<.01;

* p<.05

^a Clinical severity rating associated with principal diagnosis

^x Post-treatment analyses evaluated the effect of treatment condition while accounting for baseline group differences

^y Analyses compare 1-month follow-up to post-treatment status for treatment responders who returned for a follow-up assessment

^zAnalyses compare 1-month follow-up to baseline status for treatment responders who returned for a follow-up assessment.

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