Cbt for anxiety disorders in children with and without autism spectrum disorders

van Steensel, F.J.A.; Bögels, S.M.

Link to publication

CBT for Anxiety Disorders in Children With and Without Autism Spectrum Disorders

F. J. A. van Steensel and S. M. Bögels
University of Amsterdam

Objective: The effectiveness of cognitive–behavioral therapy (CBT) for anxiety disorders in children with autism spectrum disorders (ASD) was examined, and compared with children without ASD. *Method:* Children with ASD and comorbid anxiety disorders ($n = 79$, 58 boys; $M_{age} = 11.76$) and children with anxiety disorders ($n = 95$, 46 boys; $M_{age} = 12.85$), and their parents, participated. All families were referred to 1 of 7 mental health care centers and received the same CBT. Anxiety, quality of life, ASD-like behaviors, and emotional-behavioral problems were measured at waitlist (ASD-group only, $n = 17$), pretest, posttest, and 3 months, 1 year, and 2 years after CBT. *Results:* CBT was more effective than waitlist for treating anxiety disorders ($d = -1.45$) and anxiety symptoms ($d = -0.48$) in children with ASD. At 2 years follow-up, 61% of the children with and 64% without ASD were free of their primary anxiety disorder (percentages not significantly different). The decrease in severity of anxiety disorders after CBT (d values ranging between -1.05 and -1.46) was not different for children with and without ASD. Improvements were less in children with ASD for (only) 2 out of 7 continuous outcomes measures: anxiety symptoms (d values ranging between -0.68 and -0.94 vs. d values ranging between -0.98 and -1.25) and quality of life (d values ranging between 0.39 and 0.56 vs. d values ranging between 0.77 and 0.98). *Conclusions:* CBT for anxiety disorders is effective for children with ASD, also in the long-term. Treatment gains may be somewhat less compared with children without ASD.

What is the public health significance of this article?
This study highlights the importance of treating comorbid anxiety disorders in children with autism spectrum disorder (ASD). Treatment effectiveness of cognitive–behavioral therapy (CBT) was not different for children with and without ASD on most outcome measures.

Keywords: CBT, anxiety, ASD, children

Children with autism spectrum disorders (ASD)—including children with autistic disorder, Asperger's syndrome, and pervasive developmental disorder–not otherwise specified (PDD-NOS)—are characterized by impairments in the social, communicative, and repetitive domain (American Psychiatric Association, 2013), but often endorse comorbid disorders of which anxiety disorders are frequently observed (e.g., Simonoff et al., 2008). Prevalence rates of anxiety disorders in children with ASD are found to range between 11% and 84% (White, Oswald, Ollendick, & Scahill, 2009), with a meta-analytic estimate of nearly 40% of the children with ASD endorsing clinical levels of anxiety (van Steensel, Bögels, & Perrin, 2011). Higher anxiety symptoms in ASD are found to be associated with more behavioral problems and higher life interference (Farrugia & Hudson, 2006), and seem

to negatively affect quality of life, over and above the difficulties associated with ASD (van Steensel, Bögels, & Dirksen, 2012).

Cognitive–behavioral therapy (CBT) is found to be highly effective for typically developing children with anxiety disorders (e.g., Barrett, Duffy, Dadds, & Rapee, 2001; Bodden et al., 2008; Kendall, Hudson, Gosch, Flannery-Schroeder, & Suveg, 2008), and growing evidence for its application in high-functioning ASD populations has started to emerge (e.g., Chalfant, Rapee, & Carroll, 2007; Reaven, Blakeley-Smith, Culhane-Shelburne, & Hepburn, 2012; Reaven et al., 2008; Sofronoff, Attwood, & Hinton, 2005; Wood et al., 2009). Two studies report on outcome measures based on diagnostic interviews; Chalfant et al. (2007) found 71% of the children with ASD to be free of their primary anxiety disorder at posttreatment, and Wood et al. (2009) found 53% of the children to be free of any anxiety disorder at posttreatment. Some studies also suggest that effects of CBT extend to problems beyond those targeted in CBT: an increase in the child's independence and daily living skills (Drahota, Wood, Sze, & Van Dyke, 2011), a decrease in externalizing difficulties (Chalfant et al., 2007), and a decrease in ASD symptoms (Wood et al., 2009).

The published studies examining CBT for the treatment of anxiety in ASD have used CBT programs that were modified for, or adapted to, the needs of children with ASD (e.g., Wood et al.,

2009), created a new program specifically developed for children with ASD (e.g., Reaven et al., 2008), or developed a new program combining anxiety management and social skills components (White et al., 2013). To the authors' knowledge, no study to date has evaluated the effectiveness of a standard CBT for ASD, nor has the effectiveness of CBT for anxiety disorders in children with and without ASD been compared. There may be several reasons why standard CBT is less effective for children with ASD as compared with children without ASD: The implementation of learned strategies may take longer, skills that are learned during CBT may generalize less to other settings or new (anxiety-provoking) situations, and core ASD symptoms/ASD-related difficulties may interfere with treatment effectiveness (e.g., Ozsivadjian & Knott, 2011; Reaven et al., 2008; Sofronoff et al., 2005; Wood et al., 2009). The current study aimed to examine whether standard CBT for anxiety disorders is (a) effective for children with ASD, and (b) less effective for children with ASD as compared with children without ASD. The hypothesis was that CBT would be effective for children with ASD; however, that children with ASD would show less improvement after CBT compared with children without ASD on a range of outcome variables (anxiety disorders, anxiety symptoms, quality of life, ASD-related behaviors, behavioral problems).

Method

Participants

Participants were children aged 7–18, and their parents, who received CBT for the treatment of anxiety disorders at one out of seven community mental health care centers in different cities in the Netherlands. In total, 200 children, and their parents, participated in the pretest assessment. Of the 200 children, 26 children dropped out before CBT started and were excluded from the analyses. Of the 174 children and their parents who started treatment (see Figure 1), 79 children were diagnosed with ASD and comorbid anxiety disorders (further referred to as the ASD-group), and 95 children had anxiety disorders without ASD (further referred to as the AD-group).

Inclusion criteria were: (a) children needed to have at least one anxiety disorder, which was confirmed with the Anxiety Disorder Interview Schedule-Child/Parent version (ADIS-C/P; Silverman & Albano, 1996), and (b) the child and at least one parent had to be willing to participate in research. Children were excluded for the following reasons: (a) IQ below 70, (b) untreated psychotic disorder, (c) acute suicidal risk, or (d) current physical or sexual abuse. In addition, children could not receive other treatments concurrently with CBT, except for medication of which the dosage needed to be stable for at least 1 month prior to CBT and during CBT (which was monitored by asking the parents of the children). Of the ASD-group, 25 children (32%) used medication (psychostimulants, $n = 9$; antipsychotics, $n = 8$; anxiolytics, $n = 3$; psychostimulants + antipsychotics, $n = 4$; antipsychotic + anxiolytic, $n = 1$). Of the AD-group, 8 children (8%) used medication (psychostimulants, $n = 1$; antipsychotics, $n = 2$; anxiolytics $n = 5$). None of the children who were enrolled in the study changed their medication during this period.

Of the ASD-group, 14 (18%) children were diagnosed with autistic disorder, 16 (20%) with Asperger's syndrome, and 50

(63%) children with PDD-NOS (based on the *Diagnostic and Statistical Manual of Mental Disorders–fourth edition–text revision* [*DSM–IV–TR*], see procedure). The Autism Diagnostic Interview-Revised (ADI-R; Lord, Rutter, & Le Couteur, 1994) was added as an instrument in a later phase of the research due to the instrument not being available in Dutch at the beginning of inclusion, and administrators needed to be trained first. The ADI-R was assessed for 60 children in the ASD-group (76%) by an independent administrator; 97%, 88%, and 70% met ADI-R thresholds for the social, communicative, and repetitive domain, respectively. The mean scores on the ADI-R subdomains of our ASD sample (16.33, 11.17, and 4.17 for, respectively, the social, communicative, and repetitive domain) are comparable with other ASD samples (e.g., Gray, Tonge, & Sweeney, 2008; Risi et al., 2006). Of note—and in line with the *Diagnostic and Statistical Manual of Mental Disorders–fifth edition* (*DSM-5;* American Psychiatric Association, 2013)—no group differences in scores on the ADI-R, or the Children's Social Behavior Questionnaire (CSBQ; ASD-like behaviors), between the ASD subtypes were found. In addition, children of which an ADI-R report was missing—as compared with those with an ADI-R report—had significantly higher scores, $d = 0.78$, on the CSBQ (Luteijn, Minderaa, & Jackson, 2002), which assesses ASD-related behaviors.

The ASD-group consisted of 58 boys and 21 girls with a mean age of 11.76 years (*SD* = 2.68; *range* = 7–18 years). The AD-group consisted of 46 boys and 49 girls with a mean age of 12.85 years (*SD* = 2.81; *range* = 7–17 years). Compared with the AD-group, the ASD-group contained more boys, $\chi^2 = 11.21$, $p = .001$; were younger, $F(1, 173) = 6.80$, $p = .010$; more often attended primary education, $\chi^2 = 5.50$, $p = .019$, and special education, $\chi^2 = 8.51$, $p = .004$; but had a similar educational level, $\chi^2 = 0.46$, $p = .794$. Almost all children were Caucasian (98%). Of the parents, 168 (97%) mothers and 127 (73%) fathers participated. The mean age of the mothers and fathers who participated was 42.73 and 44.95 years, respectively, and their mean educational level (measured on a scale from 1, *no education,* to 9, *university level*) was 5.45 and 6.04, respectively. Parental participation, mean age, or educational level did not differ between groups.

Procedure

All children who participated in the study were referred to one of the seven participating mental health care centers because of anxiety/ASD-related problems. These mental health centers were regular community mental health care centers not specifically specialized in anxiety or ASD. Inclusion started in 2006 and ended in 2010. The last follow-up assessment (2 years after CBT) was conducted in the beginning of 2013. After having followed intake and assessment procedures within the mental health care centers, clinical *DSM–IV–TR* diagnoses were established by a multidisciplinary team that consisted of psychologists, therapists, social workers, and psychiatrists. No standardized protocol was used within the mental health care centers to establish *DSM–IV–TR* diagnoses; however, diagnoses were based on clinical evaluations, including interviews with the parent(s) and child, observations of child–parent interactions and/or school observations, diagnostic assessments, and psychiatric consults. IQ was estimated to be above 70 by the clinicians based on school performance. That is,
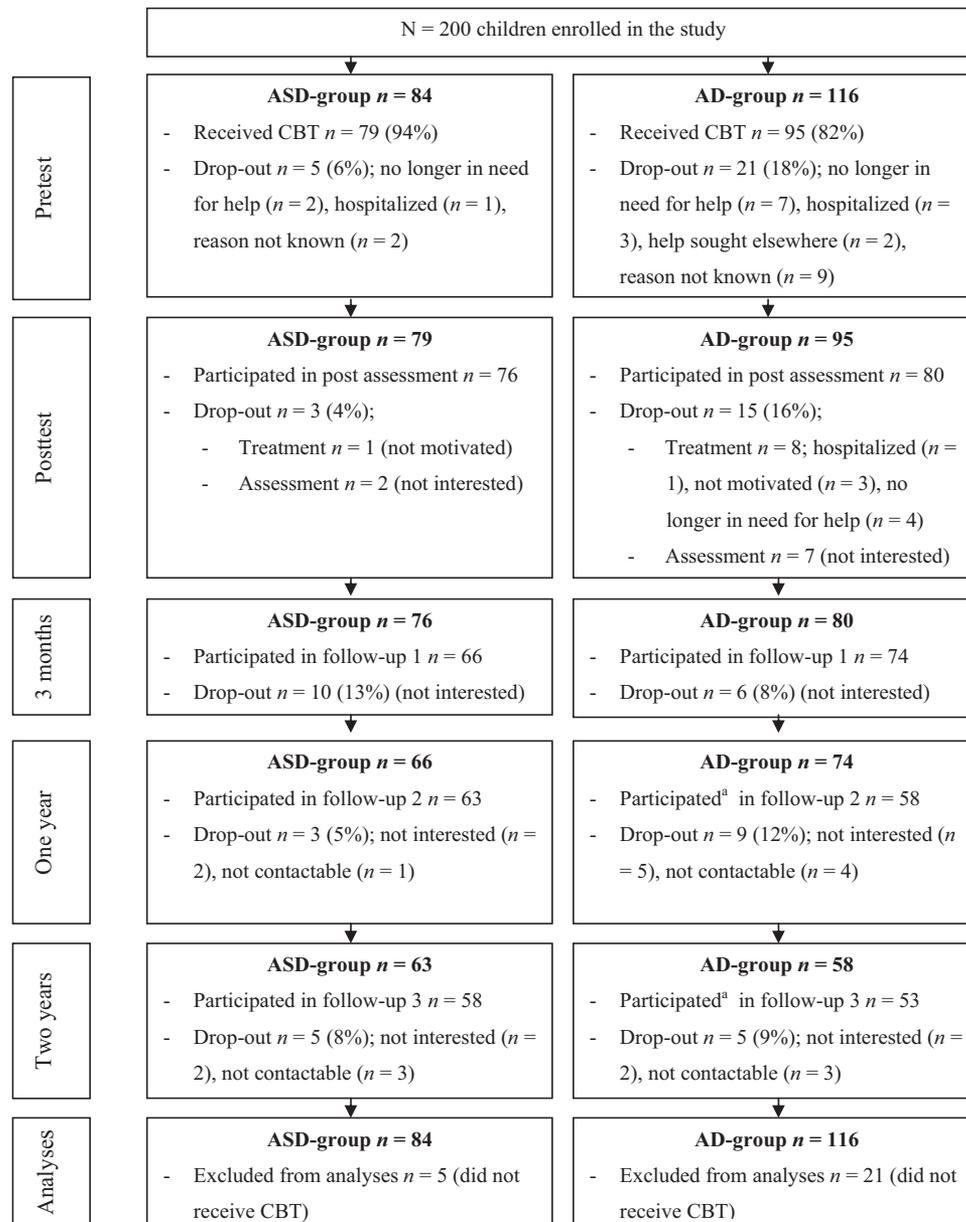
N = 200 children enrolled in the study

Pretest

ASD-group *n* = 84
- Received CBT *n* = 79 (94%)
- Drop-out *n* = 5 (6%); no longer in need for help (*n* = 2), hospitalized (*n* = 1), reason not known (*n* = 2)

AD-group *n* = 116
- Received CBT *n* = 95 (82%)
- Drop-out *n* = 21 (18%); no longer in need for help (*n* = 7), hospitalized (*n* = 3), help sought elsewhere (*n* = 2), reason not known (*n* = 9)

Posttest

ASD-group *n* = 79
- Participated in post assessment *n* = 76
- Drop-out *n* = 3 (4%);
  - Treatment *n* = 1 (not motivated)
  - Assessment *n* = 2 (not interested)

AD-group *n* = 95
- Participated in post assessment *n* = 80
- Drop-out *n* = 15 (16%);
  - Treatment *n* = 8; hospitalized (*n* = 1), not motivated (*n* = 3), no longer in need for help (*n* = 4)
  - Assessment *n* = 7 (not interested)

3 months

ASD-group *n* = 76
- Participated in follow-up 1 *n* = 66
- Drop-out *n* = 10 (13%) (not interested)

AD-group *n* = 80
- Participated in follow-up 1 *n* = 74
- Drop-out *n* = 6 (8%) (not interested)

One year

ASD-group *n* = 66
- Participated in follow-up 2 *n* = 63
- Drop-out *n* = 3 (5%); not interested (*n* = 2), not contactable (*n* = 1)

AD-group *n* = 74
- Participated[a] in follow-up 2 *n* = 58
- Drop-out *n* = 9 (12%); not interested (*n* = 5), not contactable (*n* = 4)

Two years

ASD-group *n* = 63
- Participated in follow-up 3 *n* = 58
- Drop-out *n* = 5 (8%); not interested (*n* = 2), not contactable (*n* = 3)

AD-group *n* = 58
- Participated[a] in follow-up 3 *n* = 53
- Drop-out *n* = 5 (9%); not interested (*n* = 2), not contactable (*n* = 3)

Analyses

ASD-group *n* = 84
- Excluded from analyses *n* = 5 (did not receive CBT)

AD-group *n* = 116
- Excluded from analyses *n* = 21 (did not receive CBT)

Figure 1. Flow of participants throughout the clinical trial. As the AD-group consisted of a higher number of participants than the ASD-group, and assessment resources were limited, a small number of AD families (*n* = 7) were not asked to complete follow-up 2 and 3 assessments. ASD = autism spectrum disorders; AD = anxiety disorders without ASD; CBT = cognitive–behavioral therapy.

in the Netherlands, children each year are assessed using a student follow-up system (the Centraal Instituut voor Toetsontwikkeling [CITO] monitoring and evaluation system) of which the result is compared with standardized scores. Thus, when there was evidence of poor school performance based on CITO scores, an IQ test was administered. This, however, did not occur very often, and those of who's IQs were formally assessed, verbal IQ was at least 78. In addition, in the last year of primary school, the final CITO score determines which secondary school level (low, middle, or high) a child can attend to. The mean IQs of children following a

low, middle, or high school level is 81, 98, and 111, respectively. Of our ASD sample attending secondary schools (*n* = 36), 7 (19%), 9 (25%), and 11 (31%) children followed a lower, middle, and higher school level (and 9 children followed special education, which is not associated with school level but rather with additional facilities like smaller classes).

If a child received a clinical *DSM–IV–TR* anxiety disorder (with or without ASD) and the families agreed to participate in research, a first assessment was conducted by an administrator (psychologist/diagnostician) who worked and/or conducted research within

that center. Administrators were independent of the staff that initially assigned the *DSM–IV–TR* diagnoses and were also independent of the staff that treated the children. At the first assessment, the ADIS-C/P was administered, and questionnaires were filled in. If ADIS-C/P criteria for at least one anxiety disorder were met, children were enrolled in the study. Medical ethical approval for the study and informed consent was obtained.

Assessments were conducted before treatment (pretest), directly after CBT (posttest), and at 3 follow-ups: 3 months after treatment (follow-up 1), 1 year after treatment (follow-up 2), and 2 years after treatment (follow-up 3). Assessments took place at the mental health care center or at the families' home. No specific adaptations were necessary for the administration of the interview or the questionnaires. All children were able to read the questionnaires themselves and were able to express themselves verbally. There were only a few (younger) children who asked for the meaning of a question or sentence, or who needed an additional example. In addition, in a few cases, it was needed to simplify wording (e.g., one question at a time, questions without a denial). These adaptations were not specific for ASD and were made for all children when necessary.

Interrater reliability between the administrators for the current sample was not specifically assessed; however, interrater reliability within our research group for the ADIS-C/P diagnosis is found to be high, with kappa's ranging from .73 to 1.00. Administrators of the ADI-R were trained by the first author (who is certified for the administration of the interview and conducted the vast majority of the interviews), and had to achieve an interrater reliability of at least 80%. In addition, intercorrelation coefficients between administrators with respect to the ADI-R scores within our research group are found to be good (ranging from .73 to .94). Biannual meetings were organized to discuss coding issues, to have round table discussions, and to provide additional training to prevent rater drifts.

Intervention

The intervention consisted of a combined version of a family and individual CBT program (Bodden et al., 2008), named *Discussing + Doing = Daring,* developed to treat anxiety disorders in typically developing children (see Table 1 for the content of the program). The effectiveness of this treatment was previously examined in a large Dutch sample, and the treatment was proven highly effective to treat anxiety disorders in referred children with anxiety disorders without ASD; that is, effect sizes approached 1.4, and 73% of the children were free from their primary anxiety disorder at 3 months follow-up (Bodden et al., 2008). In addition, the treatment is highly structured and has workbooks for child and parents that provide a lot of visual examples.

Therapists providing the CBT program had to be CBT therapists or registered mental health care psychologists, and were trained by the second author who developed the program. In addition, weekly supervision group meetings were organized within the mental health care centers, and biannual meetings were organized across mental health care centers to discuss protocol adherence and to provide additional training.

Treatment sessions were audiotaped, and almost 30% was rated by independent coders to assess treatment integrity. Coders were blind to the child's diagnosis. In the manual of the CBT program, treatment goals (2 to 6 goals per session) are outlined. Each aim was rated individually as *not accomplished* = 0, *somewhat accomplished* = 1, or *totally accomplished* = 2. Over 10% of the audiotapes were double coded, and mean interrater reliability (intraclass correlation coefficient) was .67, which can be classified as good (Cicchetti, 1994). The mean rate for accomplishing treatment goals was 1.43 for the ASD-group and 1.39 for the AD-group, *p* > .10.

Table 1
Outline of the Structure and Session Content of the CBT Program Discussing + Doing = Daring

Session	Presence	Content of the session(s)
1	Child and parent(s)	Explain aims and content of the therapy, psychoeducation, introduction to how cognitions may affect feelings/behavior
2, 3a	Child	Identify negative anxious thoughts, challenge thoughts, formulate positive helping thoughts, identify behavior that might be helpful when feeling anxious (e.g., relaxation)
3b	Parent(s)	Parenting styles (autonomy granting, overprotection), effect of parental anxiety on the child's anxiety
4	Child and parent(s)	Hierarchy of fears (for step-by-step exposure)
5, 6a	Child	Exposure exercises
6b	Parent(s)	How parents may help their child overcoming their fears, identify and challenge parental dysfunctional cognitions
7, 8, 9a	Child	Exposure exercises and/or behavioral experiments, how to communicate with the parent(s) about anxiety
9b	Parent(s)	Coparenting, parenting styles (autonomy granting, overprotection), how to communicate about anxiety
10, 11	Child	Summary of what is learned, relapse prevention
12	Child and parent(s)	Summary of what is learned, relapse prevention, evaluation
Phone calls	Child and parent(s)	The therapist calls the family once a month to ask how they are doing and if they have encountered any problems
Follow-up	Child and parent(s)	After 3 months, therapy outcomes are evaluated, and it is examined if there are any problems left that require help

Note. CBT = cognitive–behavioral therapy.

Instruments

Primary outcome measures. Anxiety disorders were assessed with the ADIS-C/P (Silverman & Albano, 1996), which follows the criteria of the *DSM–IV*. The interview starts by examining symptoms of anxiety disorders, and when this symptom criterion is fulfilled, the respondent is asked to rate the impairment for daily functioning on a 0–8 point scale. When a score of 4 or higher is given, then an anxiety disorder is assigned. The clinician rating consisting of a composite score of the combined parent and child interview was used to determine the severity of the anxiety disorder(s) and the primary anxiety disorder. The ADIS-C/P has good psychometric properties (e.g., Silverman, Saavedra, & Pina, 2001), and has been used in studies evaluating treatment effectiveness for anxiety in children with ASD (e.g., Reaven et al., 2012; Wood et al., 2009). Next to establishing the presence/absence of (the primary) anxiety disorders, a total anxiety severity score was used to evaluate treatment effectiveness. A total anxiety severity score was calculated by summing the severity ratings of all anxiety disorders. This approach has the advantage that all measurement information of the anxiety disorders is used, and has been used in other treatment effectiveness studies (e.g., Hudson et al., 2009; Kendall et al., 2008; Simon, Bögels, & Voncken, 2011).

Children and parents rated the child's anxiety symptoms by completing the Screen for Child Anxiety Related Emotional Disorders-71 (SCARED-71; Bodden, Bögels, & Muris, 2009). The SCARED-71 contains 71 descriptions of anxiety, which can be summed to calculate a total score, as well as seven subscales: separation anxiety (12 items), social anxiety (9 items), generalized anxiety (9 items), specific phobia (15 items), panic disorder (13 items), obsessive–compulsive disorder (9 items), and posttraumatic stress disorder (4 items). For each item, the respondent is asked how often a particular symptom is endorsed (0 = *almost never,* 1 = *sometimes,* 2 = *often*). Psychometric properties of the SCARED-71 in typically developing children were found to be good (Bodden et al., 2009). In addition, psychometric properties of the SCARED-71 were investigated in an ASD-sample; good internal consistencies and acceptable construct and discriminant validity was found (van Steensel, Deutschman, & Bögels, 2013). Cronbach's alpha for the current sample across assessments ranged between .91 and .95 for ASD child reports, between .93 and .96 for ASD parent reports, between .93 and .95 for AD child reports, and between .92 and .95 for AD parent reports.

Secondary outcome measures. ASD-like behaviors were measured with the CSBQ (Luteijn et al., 2002). This questionnaire contains 49 items and is developed to assess a range of problems in children with ASD. For each item, the parent(s) was asked to rate how much a description applied to their child (0 = *does not apply,* 1 = *sometimes or somewhat applies,* 2 = *clearly or often applies*). Items can be summed to obtain a total score, as well as subscale scores for (a) behaviors not tuned to situation, (b) withdrawn behavior, (c) orientation problems, (c) difficulties understanding social information, (d) stereotyped behaviors, and (e) fear of and resistance to change. The CSBQ is found to be a valid and reliable instrument with good psychometric properties (Hartman, Luteijn, Serra, & Minderaa, 2006). Cronbach's alpha for the current sample across assessments ranged between .95 and .96 for the ASD-group, and between .92 and .95 for the AD-group.

Health-related quality of life was assessed with the EuroQol 5-D (EQ-5D; EuroQol Group, 1990), which was completed by the child and parent(s). The questionnaire contains five dimensions (mobility, self-care, usual activities, pain/discomfort, anxiety/depression), which are rated by the respondent for the endorsement of problems (no/some/severe). A set of Dutch preference weights (Lamers, McDonnell, Stalmeier, Krabbe, & Busschbach, 2006) was used to obtain a health state index. The health state index can be calculated by subtracting preference weights from an optimal health state (= a score of 1), and can range from −0.024 (i.e., severe problems in all dimensions) to 1 (i.e., no problems in any dimension). Psychometric properties of the EQ-5D and the proxy (parent) report are good (Brooks, 1996; Stolk, Busschbach, & Vogels, 2000; Willems et al., 2009).

Behavior problems were measured with the Child Behavior Checklist (CBCL; Achenbach, 1991). This questionnaire contains 112 behavioral descriptions that were rated by parents on a 3-point scale (0 = *not true,* 1 = *somewhat or sometimes true,* 2 = *very true or often true*). This study used the following subscale scores of the CBCL: internalizing problems (withdrawn/depression, somatic problems, and anxiety/depression), externalizing problems (oppositional defiant behavior and aggressive behavior), and other behavior problems (social problems, attention problems, and thought problems). Psychometric properties of the CBCL are found to be good (Achenbach, 1991). Cronbach's alpha for the current sample across assessments in the ASD-group ranged between .88 and .91 for internalizing problems, between .87 and .91 for externalizing problems, and between .83 and .87 for other problems. For the AD-group, Cronbach's alpha's across assessments ranged between .88 and .92 for internalizing problems, between .88 and .92 for externalizing problems, and between .81 and .85 for other problems.

Analyses

Of the ASD-group, 17 families received a waitlist assessment because no trained therapist was available or families received psychoeducation about ASD prior to CBT. Afterward, all 17 children received CBT. We first compared the changes in anxiety between waitlist and pretest ($n = 17$) to the changes in anxiety between pre- and posttest of the children receiving CBT directly ($n = 62$) in order to examine whether CBT is more effective than waitlist. Chi-square analyses were used for dichotomous outcome measures (e.g., percentage free of primary anxiety disorder), and multilevel analyses using maximum likelihood estimation procedures were used for continuous outcome measures (e.g., total anxiety severity score). The effect size difference between the waitlist and CBT condition was calculated following White et al. (2013): change in CBT (postscore minus prescore)—change in waitlist (prescore minus waitlist-score)/pooled *SD* of the samples first assessment.

Group differences between the ASD-group (i.e., all children who received CBT irrespective of having had a waitlist assessment or not, $n = 79$) and the AD-group ($n = 95$) on pretest assessment were examined with logistic regression analyses (dichotomous variables) and analyses of covariance (ANCOVAs; continuous variables). Child gender and child age were included as covariates in all analyses. Cohen's *d* was used as an effect size for the differences between groups. With respect to the comparison of

treatment response and treatment outcomes between the ASD- and AD-group, logistic regression analyses were used for dichotomous variables (e.g., percentage free of primary anxiety disorder; the method of "last observation carried forward"—assuming no change—was used for cases that did not complete the assessment), and multilevel analyses using maximum likelihood estimation procedures were used for continuous outcome measures.

Multilevel analyses can be used when data is nested. In this study, repeated measures (pre-, post-, and the 3 follow-up assessments) were nested within respondents, and respondents (children, mothers, and fathers) were nested within families. Multilevel analyses take into account dependencies among multiple assessments within respondents, as well as dependencies among respondents of the same family. In addition, multilevel analysis uses all available data, including those from families of which one parent did not participate, or of which one or more assessments were missing. Continuous data were transformed to standard normal scores. In this way, the parameter estimate can be interpreted (while controlling for the effect of other parameter estimates) as Cohen's d (when the predictor is a dichotomous variable) or r (when the predictor is a continuous variable). If an interaction effect yielded significance, then, additional multilevel analyses were conducted to examine time/respondent/group effects for the different groups/respondents.

With respect to clinical significance change, we compared the scores of the SCARED-71 and CBCL internalizing problems to normative comparisons (Kendall, Marrs-Garcia, Nath, & Sheldrick, 1999). The SCARED-71 cutoffs established by Bodden et al. (2009) were used as estimates for clinical levels of anxiety, and the CBCL T scores were used to indicate whether subjects fall in the normal range with respect to their internalizing problems, T score < 70.

Results

ASD-Group: Waitlist Versus CBT

Changes in anxiety between waitlist and pretest ($n = 17$) were compared with changes in anxiety between pre- and posttest ($n = 62$). None of the children (0%) in the waitlist condition were free of their primary anxiety disorder against 24 children (39%) in the CBT condition, $\chi^2 = 9.45$, $p = .002$.

None of the children (0%) receiving waitlist were free of all anxiety disorders against 10 of the children (16%) having received CBT, $\chi^2 = 3.14$, $p = .076$. Children with ASD who received CBT for their anxiety problems improved significantly more compared with those in waitlist based on anxiety disorder severity scores ($d_{waitlist\ vs.\ CBT} = -1.45$), and based on anxiety symptoms ($d_{waitlist\ vs.\ CBT} = -0.48$).

ASD Versus AD: Pretest Comparisons

Table 2 displays the presence of the types of anxiety disorders and the mean number of anxiety disorders per group (means and standard deviations of the other measures are displayed in the Table A1 in the Appendix). No group differences were found for the type of anxiety disorders; however, the mean number of anxiety disorders ($d = 0.27$) and the total anxiety severity scores ($d = 0.27$) were somewhat higher in the ASD-group. Anxiety symptoms at baseline were significantly higher in the ASD-group according to parent reports ($d = 0.54$), but not child reports ($d = 0.00$). Children with ASD had a lower quality of life according to parent reports ($d = -0.27$), but not child reports ($d = 0.00$), and children with ASD had more ASD difficulties ($d = 1.23$) and behavioral problems ($d_{internalizing\ problems} = 0.47$; $d_{externalizing\ problems} = 0.75$; $d_{other\ problems} = 0.97$) compared with the AD-group.

ASD Versus AD: Primary Outcome Measures

Percentage free of (primary) anxiety disorder. No significant group differences were found for the percentage of children being free from their primary anxiety disorder (see Table 3). However, children in the ASD-group were less likely to be free from all anxiety disorders compared with those in the AD-group (see Table 3).

Severity of anxiety disorders (ADIS-C/P). The total severity of anxiety disorders was significantly reduced at posttest and follow-ups with parameter estimates (interpretable as Cohen's d) ranging between -1.05 and -1.46 (see Table 4). Children with ASD had slightly higher total anxiety severity scores across assessments compared with children in the AD-group (parameter estimate of 0.34). The decrease in the total severity of anxiety disorders (slope) did not differ between the ASD-group and AD-group (see Figure 2; for the means and standard deviations across assessments, see Table A1 in the Appendix).

Table 2

Anxiety Disorders (Pretreatment) for the Children With ASD and Children With AD According to Children and Parents (Measured With the ADIS-C/P)

Type of anxiety disorders (n, %)	ASD ($n = 79$)				AD ($n = 95$)			
	Primary		Comorbid		Primary		Comorbid	
Separation anxiety disorder	10	13%	16	20%	14	15%	18	19%
Social anxiety disorder	24	30%	25	32%	32	34%	19	20%
Specific phobia	30	38%	37	47%	22	23%	49	52%
Generalized anxiety disorder	13	16%	34	43%	22	23%	37	39%
Obsessive-compulsive disorder	0	0%	11	14%	1	1%	15	16%
Panic disorder	1	1%	5	8%	0	0%	15	16%
Agoraphobia	1	1%	6	9%	4	4%	19	20%
Post-traumatic stress disorder	0	0%	6	8%	0	0%	10	11%
Number of anxiety disorders (*M, SD*)		5.51	3.24			4.64	3.25	

Note. ASD = autism spectrum disorders; AD = anxiety disorders without ASD; ADIS-C/P = Anxiety Disorder Interview Schedule-Child/Parent version.

Table 3

Percentage of Children Being Free From Their Primary Anxiety Disorder and Being Free From All Anxiety Disorders Across the Different Assessments

	Pre	Post	Follow-up 1 (3 months)	Follow-up 2 (1 year)	Follow-up 3 (2 years)
ASD-group					
Primary AD	0 (0)	41 **(43)**	56 (65)	54 **(65)**	61 (67)
All AD	0 (0)	**13 (14)**	**25 (27)**	**34 (39)**	**39 (43)**
AD-group					
Primary AD	0 (0)	49 **(61)**	58 (72)	66 **(87)**	64 (81)
All AD	0 (0)	**29 (36)**	**43 (56)**	**53 (73)**	**55 (74)**

Note. ASD = autism spectrum disorders; AD = anxiety disorders without ASD. Percentages displayed in bold indicate a significant difference between the ASD-group and AD-group. Percentages between brackets are based on complete case analyses.

Anxiety symptoms (SCARED-71). A reduction of anxiety symptoms was observed with a parameter estimate ranging between -0.87 and -1.24 (see Table 5). In addition, results indicated that (a) the ASD-group had higher levels of anxiety symptoms than the AD-group across assessments according to parent reports (parameter estimate of group = 0.46), but not child reports (parameter estimate of group = 0.13), (b) the ASD-group showed less improvement on anxiety symptoms at follow-ups (parameter estimates ranging between -0.68 and -0.94) compared with the AD-group (parameter estimates ranging between -0.98 and -1.25), and (c) children of the ASD-group reported less improvement at postassessment (parameter estimate of Time $1 = -0.38$) compared with the children in the AD-group (parameter estimate of Time $1 = -0.79$), and compared with their parents (parameter estimate of Time $1 = -0.85$), see Figure 3 (for the means and standard deviations across assessments, see Appendix Table A1).

ASD Versus AD: Secondary Outcome Measures

A significant increase was observed for health-related quality of life (EQ-5D) with parameter estimate ranging between 0.74 and 0.93 (see Table 5); however, health-related quality of life improved more in the AD-group (parameter estimates ranging between 0.77 and 0.98) compared with the ASD-group (parameter estimates ranging between 0.39 and 0.56).

With respect to ASD-like behaviors (CSBQ) and behavior problems (CBCL), the ASD-group had higher ASD-scores as well as higher internalizing, externalizing, and other problem behavior scores compared with the AD-group (see Table 6). ASD-related behaviors and problem behaviors were found to be decreased at posttest and follow-ups, but at follow-up 2 (1 year after CBT), ASD-related behaviors and internalizing problems were more decreased in the AD-group (parameter estimate of -0.50 and -0.92,

Table 4

Results of the Multilevel Model Concerning the Effects of Time (Post and Follow-Up Assessments vs. Pretest), Group (ASD vs. AD), and Interactions Between Time and Group, While Controlling for Child Gender and Age, on the Total Anxiety Severity Score (ADIS-C/P)

	Estimate[a]	SE	t	p
Child gender[b]	-0.09	0.08	-1.13	.263
Child age	-0.02	0.04	-0.41	.685
Group[c]	0.34	0.18	1.87	.063
Time 1 (Post)	-1.05	0.11	-9.87	<.001
Time 2 (Follow-up 1)	-1.21	0.10	-11.70	<.001
Time 3 (Follow-up 2)	-1.42	0.11	-12.83	<.001
Time 4 (Follow-up 3)	-1.46	0.12	-12.53	<.001
Time 1 × Group	-0.02	0.16	-0.13	.900
Time 2 × Group	-0.10	0.15	-0.64	.525
Time 3 × Group	-0.05	0.16	-0.33	.739
Time 4 × Group	-0.11	0.17	-0.66	.511

Note. ASD = autism spectrum disorders; AD = anxiety disorders without ASD; ADIS-C/P = Anxiety Disorder Interview Schedule-Child/Parent version.
[a] Parameter estimates (while controlling for the effects of other parameters) can be interpreted as effect sizes (Cohen's *d* for dichotomous variables and *r* for continuous variables). [b] Girl = 0; boy = 1. [c] AD = 0; ASD = 1.
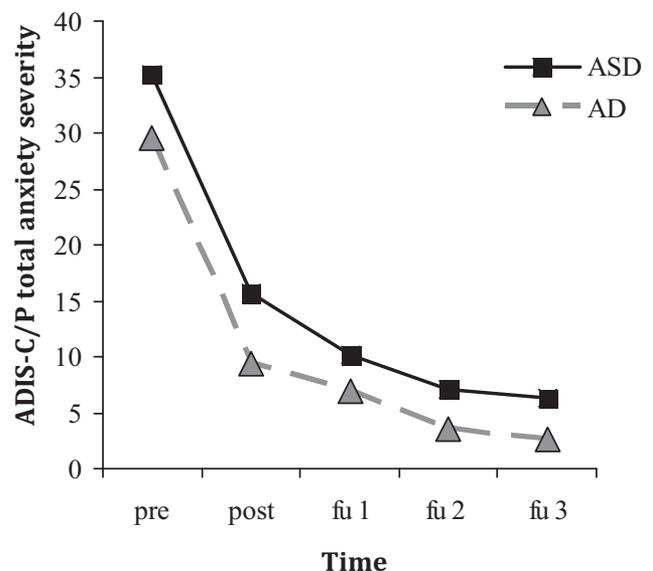

Figure 2. Total anxiety severity score (ADIS-C/P) for preassessment, postassessment, 3 months after CBT (follow-up 1), 1 year after CBT (follow-up 2), and 2 years after CBT (follow-up 3) for the children with ASD and the children with AD.

Table 5

Results of the Models Concerning the Effects of Time (Post and Follow-Up Assessments vs. Pretest), Group (ASD vs. AD), Respondent (Children vs. Parents), and Their Interactions on Anxiety Symptoms (SCARED-71) and Quality of Life (EQ-5D)

	Anxiety symptoms		Quality of life	
	Estimate[a]	SE	Estimate[a]	SE
Child gender[b]	−0.18*	0.08	−0.09	0.08
Child age	0.03	0.04	−0.10*	0.04
Group[c]	0.53***	0.14	−0.30	0.16
Respondent[d]	0.15	0.10	−0.06	0.12
Time 1 (Post)	−0.87***	0.09	0.74***	0.09
Time 2 (Follow-up 1)	−0.98***	0.12	0.78***	0.10
Time 3 (Follow-up 2)	−1.01***	0.13	0.93***	0.12
Time 4 (Follow-up 3)	−1.24***	0.14	0.93***	0.11
Respondent × Group	−0.47**	0.15	0.27	0.18
Time 1 × Group	0.00	0.09	−0.32*	0.13
Time 2 × Group	0.23*	0.12	−0.41**	0.15
Time 3 × Group	0.37**	0.13	−0.52**	0.17
Time 4 × Group	0.28*	0.14	−0.32*	0.16
Time 1 × Respondent	0.00	0.10	0.16	0.14
Time 2 × Respondent	0.05	0.11	0.10	0.14
Time 3 × Respondent	−0.04	0.11	0.02	0.15
Time 4 × Respondent	−0.07	0.11	0.08	0.12
Time 1 × Group × Respondent	0.39**	0.14	−0.03	0.20
Time 2 × Group × Respondent	0.03	0.16	0.15	0.20
Time 3 × Group × Respondent	0.09	0.15	0.26	0.21
Time 4 × Group × Respondent	0.09	0.15	0.22	0.17

Note. ASD = autism spectrum disorders; AD = anxiety disorders without ASD; SCARED-71 = Screen for Child Anxiety Related Emotional Disorders-71; EQ-5D = EuroQol 5-D.
[a] Parameter estimates (while controlling for the effects of other parameters) can be interpreted as effect sizes (Cohen's *d* for dichotomous variables and *r* for continuous variables). [b] Girl = 0; boy = 1. [c] AD = 0; ASD = 1. [d] Parents = 0; child = 1.
* *p* < .05. ** *p* < .01. *** *p* < .001.

respectively) compared with the ASD-group (parameter estimate of −0.18 and −0.62, respectively).

Normative Comparisons

Parents reported that anxiety scores (SCARED-71) and internalizing problems (CBCL) in the ASD-group were less likely to be changed from clinical to nonclinical scores compared with the AD-group (Table 7). For child-reported anxiety symptoms, this was only found for posttest, but not for the follow-up assessments (Table 7).

Discussion

The present study is the first to examine the effectiveness of a standard CBT for anxiety disorders in children with ASD, and to compare this effectiveness with children without ASD. The first key finding is that standard CBT for anxiety disorders is effective for children with ASD, and that treatment gains were maintained up to 2 years. CBT was found to be superior compared with waitlist, which is in line with other studies (see meta-analysis of Sukhodolsky, Bloch, Panza, & Reichow, 2013). However, as compared with other studies, the outcomes based on dichotomous measures were somewhat less favorable. For example, 71% of the children were free of their primary anxiety disorder at posttest in the study of Chalfant et al. (2007), against 43% in our study. In addition, 53% of the children were free of all anxiety disorders at

posttest in the study conducted by Wood et al. (2009), against 25% in our study. This could suggest that standard CBT for children with ASD is less effective for treating anxiety disorders compared with an adapted version; however, some other aspects also need to be considered. First, in the current study, all participants were referred to a community mental health care center and were then asked to participate. In contrast, participants were recruited via advertisements or an Asperger's support network in the study of Chalfant et al. (2007), and treatment was provided in a research setting in the study of Wood et al. (2009). This may also explain the rather large mean number of anxiety disorders in the present study, seen in both the ASD-group and AD-group. Second, this study included a more heterogeneous group of children with ASD (including children with autistic disorder, Asperger's syndrome, and PDD-NOS), a broader age range (7–18 years) and a broader IQ range (IQ > 70) than previous studies. Third, our study included children with *all* anxiety disorders and reported about being free of *all* anxiety disorders (e.g., Wood et al., 2009; it did not include specific phobias in their percentage free of all anxiety disorders and excluded the participants with a sole diagnosis of generalized anxiety disorder because these children responded less well). Finally, it is important to note that our effect size of anxiety symptom reduction (ranging between −0.68 and −0.98 across assessments) is comparable with other studies (*d* = 0.46 to 3.69 based on the means and standard deviations of questionnaires reported in other studies; Chalfant
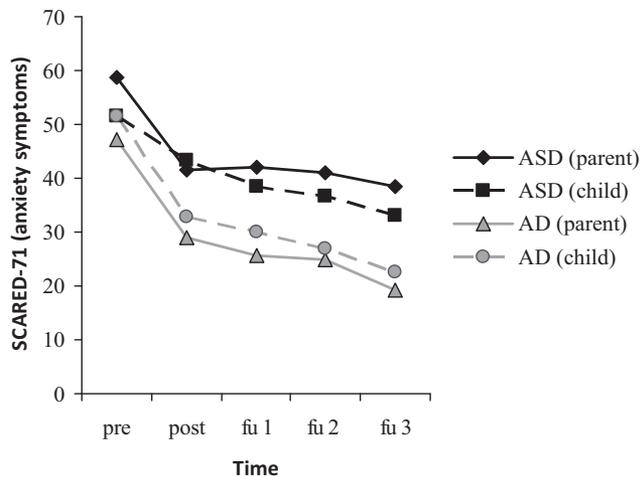
Figure 3. Anxiety symptoms (SCARED-71) for preassessment, postassessment, 3 months after CBT (follow-up 1), 1 year after CBT (follow-up 2), and 2 years after CBT (follow-up 3) for the children with ASD and the children with AD, according to parent and child reports. SCARED-71 = Screen for Child Anxiety Related Emotional Disorders-71; CBT = cognitive–behavioral therapy; ASD = autism spectrum disorders; AD = anxiety disorders without ASD.

et al., 2007; Reaven et al., 2012; Reaven et al., 2008; Sofronoff et al., 2005; Wood et al., 2009).

A second key finding of the current study is that CBT was found less effective for children with ASD for (only) two of the seven continuous outcome measures. That is, at posttest and follow-ups, children with ASD showed less improvement over time with respect to their anxiety symptoms and quality of life. Differences in treatment response between the ASD-group and AD-group may be explained by children with ASD having more trouble to implement and generalize learned skills and/or ASD symptoms interfering with treatment effectiveness (e.g., Ozsivadjian & Knott, 2011; Reaven et al., 2008; Sofronoff et al., 2005; Wood et al., 2009).

Another important issue might be that instruments developed for typically developing populations were used, and these instruments may not be able to differentiate reliably between symptoms of anxiety and ASD. In addition, it is likely that for the AD-group, most problems that interfere with daily functioning are solved when anxiety disorders are no longer present, whereas for children with ASD, other problems might still be present (problems with self-care, difficulties with peers or at school, etc.), resulting in a smaller increase in quality of life.

Finally, different end states were found for the ASD-group and AD-group. That is, children with ASD were less likely to be free from *all* anxiety disorders and were less likely to move from a clinical to a normal score. However, as (borderline) significant pretest differences were found between the ASD-group and AD-group for anxiety problems as well as other problems (indicating that children with ASD have higher baseline levels to begin with), we cannot expect similar end states. In addition, the cutoffs for the interpretation of a clinical versus a normal score are based on typically developing samples, and as children with ASD frequently do not fall into this normal range, these cutoffs may be less representative for the ASD population.

Strengths of this study were the clinical nature of the sample, the multisite approach, the inclusion of long-term follow-up assessments, and the inclusion of a control group consisting of children with only anxiety disorders. Limitations of the study also need to be addressed. First, although administrators were appropriately trained (and interrater agreement is found to be high within our research group) and we provided additional training and round table discussion to prevent rater drifts, we did not have interrater reliability data of the ADIS-C/P interviews for this sample specifically. In addition, administrators were not blind for condition or assessment. Second, although treatment integrity was checked and therapists were instructed to inform the researcher if they deviated from the protocol guidelines, it was not systematically recorded after each session how treatment delivery took place. However, (a) all therapists treated children with and without ASD, (b) the treatment itself is highly structured, and (c) therapists worked together with the children to complete the exercises in the workbook—which were the same for all participants and

Table 6
Results of the Models Concerning the Effects of Time (Post and Follow-Up Assessments vs. Pretest), Group (ASD vs. AD), and Their Interactions on ASD-Related Behaviors, Internalizing, Externalizing, and Other Problem Behaviors

	ASD		Internalizing		Externalizing		Other	
	Estimate[a]	SE	Estimate[a]	SE	Estimate[a]	SE	Estimate[a]	SE
Child gender[b]	0.20	0.11	−0.10	0.12	0.15	0.13	0.13	0.12
Child age	−0.02	0.06	0.14[*]	0.06	0.01	0.06	−0.01	0.06
Group[c]	0.99[***]	0.13	0.54[***]	0.14	0.70[***]	0.15	0.86[***]	0.14
Time 1 (Post)	−0.30[***]	0.06	−0.62[***]	0.07	−0.18[**]	0.06	−0.44[***]	0.06
Time 2 (Follow-up 1)	−0.42[***]	0.06	−0.81[***]	0.08	−0.25[***]	0.06	−0.57[***]	0.07
Time 3 (Follow-up 2)	−0.49[***]	0.08	−0.97[***]	0.09	−0.32[***]	0.08	−0.81[***]	0.07
Time 4 (Follow-up 3)	−0.52[***]	0.09	−0.98[***]	0.08	−0.44[***]	0.09	−0.83[***]	0.09
Time 1 × Group	−0.04	0.09	0.06	0.11	−0.05	0.09	−0.02	0.09
Time 2 × Group	0.12	0.09	0.20	0.11	−0.03	0.10	0.09	0.10
Time 3 × Group	0.25[*]	0.11	0.36[**]	0.13	−0.05	0.11	0.20	0.10
Time 4 × Group	0.03	0.13	0.18	0.12	0.00	0.13	0.05	0.12

Note. ASD = autism spectrum disorders; AD = anxiety disorders without ASD.
[a] Parameter estimates (while controlling for the effects of other parameters) can be interpreted as effect sizes (Cohen's *d* for dichotomous variables and *r* for continuous variables). [b] Girl = 0; boy = 1. [c] AD = 0; ASD = 1.
[*] $p < .05$. [**] $p < .01$. [***] $p < .001$.

Table 7

Percentage of Children of Which the Scores Changed From Clinical to Nonclinical for the ASD-Group and AD-Group Based on Normative Cutoffs of the SCARED-71 (Anxiety Symptoms) Child and Parent Report and the CBCL Internalizing Problems

	SCARED-71 child		SCARED-71 parent		CBCL internalizing	
	ASD	AD	ASD	AD	ASD	AD
Post	**10**	**32**	12	21	**17**	**40**
Follow-up 1	25	35	**14**	**29**	23	43
Follow-up 2	22	36	13	35	16	47
Follow-up 3	32	44	**12**	**36**	26	54

Note. ASD = autism spectrum disorders; AD = anxiety disorders without ASD; SCARED-71 = Screen for Child Anxiety Related Emotional Disorders-71; CBCL = Child Behavior Checklist. Percentages displayed in bold indicate a significant difference between the ASD-group and AD-group.

contain a lot of visual examples. Thus, although we do not have objective data to support to what extent treatment delivery was fully equivalent in the ASD-group and AD-group, it is unlikely that treatments were more different across groups than within groups. Third, improvements were found for quality of life, behavioral problems, and ASD-like behaviors. While such findings are in line with previous studies (Chalfant et al., 2007; Drahota et al., 2011; Wood et al., 2009), it is unclear whether these effects stem from (a) the CBT-intervention directly, (b) a more indirect effect of a decrease in anxiety, and/or (c) a more positive responding of the participants (e.g., it may be that participants are in a more positive mood state at post- and follow-up assessments and therefore report less problems in general). Fourth, IQ was not formally assessed, and thus it is unknown exactly how high-functioning our ASD sample is. Finally, this study included all ASD subtypes, and all participants were recruited via community mental health care centers not specifically specialized in ASD or anxiety disorders, which benefits the generalizability of the findings. However, findings may be less generalizable to inpatient settings where an important proportion of children with severe ASD and comorbid (anxiety) disorders may be admitted. In addition, a downside of including a broader group of children with ASD (broad age- and IQ range as well as severity of ASD) is that it might be more difficult to conclude for which child with ASD standard CBT is effective. That is, treatment effectiveness may be moderated by ASD characteristics, or other child and/or family characteristics. More research is needed to identify which characteristics of the child (e.g., ASD severity, cognitive abilities, age) and/or family (e.g., parental psychopathology) may predict treatment response. In addition, future research should focus on what treatment components (e.g., cognitive vs. behavioral, a child or family approach) are most effective for children with ASD, how these might be related to child characteristics (age, IQ, ASD severity), and whether adding social skills components (e.g., White et al., 2013) or contingency management components lead to better treatment outcomes.

In conclusion, the current findings suggest that standard CBT for anxiety disorders is effective for treating anxiety disorders in children with high-functioning ASD; however, with regards to two of the seven continuous outcome measures, CBT was found to be somewhat less effective for children with ASD compared with children without

ASD. A longer time needed to implement learned skills, less generalization of learned skills, different baseline levels, and measurement issues may (partly) account for these differences. In addition, it is worth examining in what way treatment responses for children with ASD can be improved, for example by (a) extending the treatment duration, (b) adding booster sessions, and/or (c) using an adapted CBT.

References

Achenbach, T. M. (1991). *Manual for the child behavioral checklist/4–18 and 1991 profile*. Burlington, VT: University of Vermont.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: Author.

Barrett, P. M., Duffy, A. L., Dadds, M. R., & Rapee, R. M. (2001). Cognitive-behavioral treatment of anxiety disorders in children: Long-term (6-year) follow-up. *Journal of Consulting and Clinical Psychology, 69,* 135–141. http://dx.doi.org/10.1037/0022-006X.69.1.135

Bodden, D. H. M., Bögels, S. M., & Muris, P. (2009). The diagnostic utility of the Screen for Child Anxiety Related Emotional Disorders-71 (SCARED-71). *Behaviour Research and Therapy, 47,* 418–425. http://dx.doi.org/10.1016/j.brat.2009.01.015

Bodden, D. H. M., Bögels, S. M., Nauta, M. H., De Haan, E., Ringrose, J., Appelboom, C., . . . Appelboom-Geerts, K. C. (2008). Child versus family cognitive-behavioral therapy in clinically anxious youth: An efficacy and partial effectiveness study. *Journal of the American Academy of Child & Adolescent Psychiatry, 47,* 1384–1394. http://dx.doi.org/10.1097/CHI.0b013e318189148e

Brooks, R. (1996). EuroQol: The current state of play. *Health Policy, 37,* 53–72. http://dx.doi.org/10.1016/0168-8510(96)00822-6

Chalfant, A. M., Rapee, R., & Carroll, L. (2007). Treating anxiety disorders in children with high functioning autism spectrum disorders: A controlled trial. *Journal of Autism and Developmental Disorders, 37,* 1842–1857. http://dx.doi.org/10.1007/s10803-006-0318-4

Cicchetti, D. V. (1994). Guidelines, criteria, and rules of thumb for evaluating normed and standardized assessment instruments in psychology. *Psychological Assessment, 6,* 284–290. http://dx.doi.org/10.1037/1040-3590.6.4.284

Drahota, A., Wood, J. J., Sze, K. M., & Van Dyke, M. (2011). Effects of cognitive behavioral therapy on daily living skills in children with high-functioning autism and concurrent anxiety disorders. *Journal of Autism and Developmental Disorders, 41,* 257–265. http://dx.doi.org/10.1007/s10803-010-1037-4

EuroQol Group. (1990). EuroQol—A new facility for the measurement of health-related quality of life. *Health Policy, 16,* 199–208. http://dx.doi.org/10.1016/0168-8510(90)90421-9

Farrugia, S., & Hudson, J. (2006). Anxiety in adolescents with Asperger syndrome: Negative thoughts, behavioral problems, and life interference. *Focus on Autism and Other Developmental Disabilities, 21,* 25–35. http://dx.doi.org/10.1177/10883576060210010401

Gray, K. M., Tonge, B. J., & Sweeney, D. J. (2008). Using the Autism Diagnostic Interview-Revised and the Autism Diagnostic Observation Schedule with young children with developmental delay: Evaluating diagnostic validity. *Journal of Autism and Developmental Disorders, 38,* 657–667. http://dx.doi.org/10.1007/s10803-007-0432-y

Hartman, C. A., Luteijn, E., Serra, M., & Minderaa, R. (2006). Refinement of the Children's Social Behavior Questionnaire (CSBQ): An instrument that describes the diverse problems seen in milder forms of PDD. *Journal of Autism and Developmental Disorders, 36,* 325–342. http://dx.doi.org/10.1007/s10803-005-0072-z

Hudson, J. L., Rapee, R. M., Deveney, C., Schniering, C. A., Lyneham, H. J., & Bovopoulos, N. (2009). Cognitive-behavioral treatment versus an active control for children and adolescents with anxiety disorders: A randomized trial. *Journal of the American Academy of Child & Adoles-*

cent Psychiatry, 48, 533–544. http://dx.doi.org/10.1097/CHI
.0b013e31819c2401

Kendall, P. C., Hudson, J. L., Gosch, E., Flannery-Schroeder, E., & Suveg, C. (2008). Cognitive-behavioral therapy for anxiety disordered youth: A randomized clinical trial evaluating child and family modalities. *Journal of Consulting and Clinical Psychology, 76,* 282–297. http://dx.doi.org/10.1037/0022-006X.76.2.282

Kendall, P. C., Marrs-Garcia, A., Nath, S. R., & Sheldrick, R. C. (1999). Normative comparisons for the evaluation of clinical significance. *Journal of Consulting and Clinical Psychology, 67,* 285–299. http://dx.doi.org/10.1037/0022-006X.67.3.285

Lamers, L. M., McDonnell, J., Stalmeier, P. F., Krabbe, P. F., & Busschbach, J. J. V. (2006). The Dutch tariff: Results and arguments for an effective design for national EQ-5D valuation studies. *Health Economics, 15,* 1121–1132. http://dx.doi.org/10.1002/hec.1124

Lord, C., Rutter, M., & Le Couteur, A. (1994). Autism Diagnostic Interview-Revised: A revised version of a diagnostic interview for caregivers of individuals with possible pervasive developmental disorders. *Journal of Autism and Developmental Disorders, 24,* 659–685. http://dx.doi.org/10.1007/BF02172145

Luteijn, E., Minderaa, R., & Jackson, S. (2002). *Vragenlijst voor Inventarisatie van Sociaal gedrag bij Kinderen, Handleiding* [Children's Social Behavior Questionnaire manual]. Lisse, The Netherlands: Swets & Zeitlinger.

Ozsivadjian, A., & Knott, F. (2011). Anxiety problems in young people with autism spectrum disorder: A case series. *Clinical Child Psychology and Psychiatry, 16,* 203–214. http://dx.doi.org/10.1177/1359104511404749

Reaven, J., Blakeley-Smith, A., Culhane-Shelburne, K., & Hepburn, S. (2012). Group cognitive behavior therapy for children with high-functioning autism spectrum disorders and anxiety: A randomized trial. *Journal of Child Psychology and Psychiatry, 53,* 410–419. http://dx.doi.org/10.1111/j.1469-7610.2011.02486.x

Reaven, J. A., Blakeley-Smith, A., Nichols, S., Dasari, M., Flanigan, E., & Hepburn, S. (2008). Cognitive-behavioral group treatment for anxiety symptoms in children with high-functioning autism spectrum disorders: A pilot study. *Focus on Autism and Other Developmental Disabilities, 24,* 27–37. http://dx.doi.org/10.1177/1088357608327666

Risi, S., Lord, C., Gotham, K., Corsello, C., Chrysler, C., Szatmari, P., . . . Pickles, A. (2006). Combining information from multiple sources in the diagnosis of autism spectrum disorders. *Journal of the American Academy of Child & Adolescent Psychiatry, 45,* 1094–1103. http://dx.doi.org/10.1097/01.chi.0000227880.42780.0e

Silverman, W. K., & Albano, A. M. (1996). *Anxiety Disorders Interview Schedule for DSM–IV Child Version, Child Interview Schedule.* San Antonio, TX: The Psychological Corporation.

Silverman, W. K., Saavedra, L. M., & Pina, A. A. (2001). Test–retest reliability of anxiety symptoms and diagnoses with the Anxiety Disorders Interview Schedule for *DSM–IV*: Child and parent versions. *Journal of the American Academy of Child & Adolescent Psychiatry, 40,* 937–944. http://dx.doi.org/10.1097/00004583-200108000-00016

Simon, E., Bögels, S. M., & Voncken, J. M. (2011). Efficacy of child-focused and parent-focused interventions in a child anxiety prevention study. *Journal of Clinical Child and Adolescent Psychology, 40,* 204–219. http://dx.doi.org/10.1080/15374416.2011.546039

Simonoff, E., Pickles, A., Charman, T., Chandler, S., Loucas, T., & Baird, G. (2008). Psychiatric disorders in children with autism spectrum disorders: Prevalence, comorbidity, and associated factors in a population-derived sample. *Journal of the American Academy of Child & Adolescent Psychiatry, 47,* 921–929. http://dx.doi.org/10.1097/CHI.0b013e318179964f

Sofronoff, K., Attwood, T., & Hinton, S. (2005). A randomised controlled trial of a CBT intervention for anxiety in children with Asperger syndrome. *Journal of Child Psychology and Psychiatry, 46,* 1152–1160. http://dx.doi.org/10.1111/j.1469-7610.2005.00411.x

Stolk, E. A., Busschbach, J. J. V., & Vogels, T. (2000). Performance of the EuroQol in children with imperforate anus. *Quality of Life Research: An International Journal of Quality of Life Aspects of Treatment, Care & Rehabilitation, 9,* 29–38. http://dx.doi.org/10.1023/A:1008923029886

Sukhodolsky, D. G., Bloch, M. H., Panza, K. E., & Reichow, B. (2013). Cognitive-behavioral therapy for anxiety in children with high-functioning autism: A meta-analysis. *Pediatrics, 132,* e1341–e1350. http://dx.doi.org/10.1542/peds.2013-1193

van Steensel, F. J. A., Bögels, S. M., & Dirksen, C. D. (2012). Anxiety and quality of life: Clinically anxious children with and without autism spectrum disorders compared. *Journal of Clinical Child and Adolescent Psychology, 41,* 731–738. http://dx.doi.org/10.1080/15374416.2012.698725

van Steensel, F. J. A., Bögels, S. M., & Perrin, S. (2011). Anxiety disorders in children and adolescents with autistic spectrum disorders: A meta-analysis. *Clinical Child and Family Psychology Review, 14,* 302–317. http://dx.doi.org/10.1007/s10567-011-0097-0

van Steensel, F. J. A., Deutschman, A. A. C. G., & Bögels, S. M. (2013). Examining the Screen for Child Anxiety-Related Emotional Disorder-71 as an assessment tool for anxiety in children with high-functioning autism spectrum disorders. *Autism, 17,* 681–692. http://dx.doi.org/10.1177/1362361312455875

White, S. W., Ollendick, T., Albano, A. M., Oswald, D., Johnson, C., Southam-Gerow, M. A., . . . Scahill, L. (2013). Randomized controlled trial: Multimodal anxiety and social skill intervention for adolescents with autism spectrum disorder. *Journal of Autism and Developmental Disorders, 43,* 382–394. http://dx.doi.org/10.1007/s10803-012-1577-x

White, S. W., Oswald, D., Ollendick, T., & Scahill, L. (2009). Anxiety in children and adolescents with autism spectrum disorders. *Clinical Psychology Review, 29,* 216–229. http://dx.doi.org/10.1016/j.cpr.2009.01.003

Willems, D. C. M., Joore, M. A., Nieman, F. H. M., Severens, J. L., Wouters, E. F. M., & Hendriks, J. J. E. (2009). Using EQ-5D in children with asthma, rheumatic disorders, diabetes, and speech/language and/or hearing disorders. *International Journal of Technology Assessment in Health Care, 25,* 391–399. http://dx.doi.org/10.1017/S0266462309990171

Wood, J. J., Drahota, A., Sze, K., Har, K., Chiu, A., & Langer, D. A. (2009). Cognitive behavioral therapy for anxiety in children with autism spectrum disorders: A randomized, controlled trial. *Journal of Child Psychology and Psychiatry, 50,* 224–234. http://dx.doi.org/10.1111/j.1469-7610.2008.01948.x

Wood, J. J., Drahota, A., Sze, K., Van Dyke, M., Decker, K., Fujii, C., . . . Spiker, M. (2009). Brief report: Effects of cognitive behavioral therapy on parent-reported autism symptoms in school-age children with high-functioning autism. *Journal of Autism and Developmental Disorders, 39,* 1608–1612.

Appendix

Observed Means and *SD*s for Pre-, Post-, and Follow-Up Assessments of Severity of Anxiety Disorders (ADIS-C/P), Anxiety Symptoms (SCARED-71), Quality of Life (EQ-5D), ASD-Related Behaviors (CSBQ), Internalizing, Externalizing, and Other Problem Behaviors (CBCL) for Children With ASD and Children With AD

	Pre		Post		Follow-up 1 (3 months)		Follow-up 2 (1 year)		Follow-up 3 (2 years)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
ADIS-C/P										
ASD	35.25	21.77	15.66	17.03	10.10	11.42	7.09	7.89	6.36	7.46
AD	29.47	20.68	9.43	11.17	6.85	10.64	3.49	8.53	2.66	7.31
SCARED-71										
ASD child report	51.53	18.75	43.43	18.50	38.34	20.95	36.77	16.89	33.15	20.00
ASD parent report	58.77	21.11	41.57	19.53	42.00	23.63	41.04	19.95	38.43	20.73
AD child report	51.53	23.92	32.77	18.82	29.94	21.05	27.00	17.38	22.45	16.01
AD parent report	47.13	21.78	29.00	17.28	25.52	16.59	24.97	16.32	19.20	14.40
EQ-5D										
ASD child report	0.75	0.22	0.86	0.17	0.88	0.16	0.90	0.13	0.92	0.12
ASD parent report	0.71	0.22	0.79	0.18	0.80	0.17	0.81	0.18	0.83	0.15
AD child report	0.75	0.24	0.93	0.13	0.93	0.10	0.94	0.13	0.95	0.12
AD parent report	0.77	0.22	0.91	0.14	0.93	0.15	0.95	0.11	0.95	0.11
CSBQ										
ASD parent report	41.05	18.25	34.63	19.19	33.55	19.54	34.57	18.88	30.43	18.61
AD parent report	19.91	16.27	14.53	13.80	11.53	11.24	10.33	9.93	9.09	10.06
Internalizing										
ASD parent report	22.34	10.09	16.23	9.83	14.75	9.85	14.13	8.92	14.83	10.21
AD parent report	17.32	11.11	10.68	9.59	7.97	7.02	7.26	7.82	6.01	7.11
Externalizing										
ASD parent report	13.87	8.21	11.33	8.36	10.46	7.37	10.22	8.54	10.54	7.87
AD parent report	7.70	8.17	6.39	7.35	5.54	6.92	4.65	5.71	3.58	5.67
Other										
ASD parent report	17.30	7.56	13.51	7.57	12.76	7.75	11.68	6.99	10.95	6.69
AD parent report	10.31	6.84	7.02	5.67	5.50	5.36	3.73	3.91	3.47	4.41

Note. ADIS-C/P = Anxiety Disorder Interview Schedule-Child/Parent version; SCARED-71 = Screen for Child Anxiety Related Emotional Disorders-71; EQ-5D = EuroQol 5-D; ASD = autism spectrum disorders; CSBQ = Children's Social Behavior Questionnaire; CBCL = Child Behavior Checklist; AD = anxiety disorders without ASD.