Cognitive Behavioral Therapy is an Effective Approach to Reduce Anxiety Symptoms and Comorbid Anxiety Disorders in Children with Autism Spectrum Disorders and Anxiety when compared to No Treatment

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CLINICAL SCENARIO

- **Client Population:** Children with comorbid Autism spectrum disorders and anxiety disorders
- **Treatment Context:** The treatment contexts varied between the studies incorporated in this Critically Appraised Topic (CAT). Chalfant, Rapee and Carroll (2007) administered the intervention in a clinical setting and Wood et al (2009b) performed the treatment in a research setting. Sofronoff, Atwood and Hinton (2005) did not specify which setting they utilized for treatment.
- **Problem/Condition:** The problems and conditions addressed by articles within this CAT include anxiety disorders and symptoms faced by children with ASD. The interventions target the symptoms of anxiety disorders most often faced by children with ASD, including poor coping strategies and somatic reactions to anxiety.
- **Intervention:** The reviewed studies utilized enhanced or modified Cognitive Behavioral Therapy (CBT) to compensate for the deficits most commonly observed in children with ASD. Although the studies used different CBT programs, all three interventions utilized similar techniques and activities to target common symptoms. Certain modifications throughout the studies included extending the treatment over a longer period of time, addressing poor social skills, attending to poor attention and motivation, as well as providing visual aids. Techniques commonly used to address anxiety included exposing the children to their feared stimuli, teaching relaxation techniques and helping the child to recognize their somatic reactions to anxiety.
- **How does the intervention work:** CBT utilizes aspects of both behavioral and cognitive theories (Cara and MacRae, 2005). According to Dobson (1988), there are three propositions that CBT follows. He states that “cognitive activity affects behavior, cognitive activity may be monitored and altered, and desired behavior change may be affected through cognitive change” (Dobson, 1988, p. 4). Thus, CBT works by helping the client change or manage their cognitions in order to produce changes in behaviors. Albano and Kendall (2002) report that not only does anxiety produce cognitive and behavioral changes, many physiological responses occur in the body in response to stress. These changes can include increases in cortisol levels, heart rate and skin conductance (Weems, Zakem, Costa, Cannon, Watts, 2002). Through CBT intervention, participants learn ways to manage their cognition, behaviors and physiologic responses. There are also many different types of CBT including coping-skills therapies, problem-solving therapies and cognitive restructuring therapies (Dobson, 1988). These therapies have slight differences in the end-goals and amounts of cognitive versus behavioral techniques utilized.
- **OT Framework:** Cognitive Behavioral Therapy fits within a few different parts of the OT framework. Certain client factors addressed by CBT include beliefs and mental functions, such as coping and behavioral regulation. The client’s beliefs include those that they hold as true. Occupational therapists may choose to use CBT in order to help them filter beliefs of themselves that are true from those that are faulty. CBT also focuses on certain performance skills of the client, such as emotional regulation and cognitive skills. Some clients participating in CBT may
have trouble regulating their emotions in which OT’s would teach them proper techniques to manage their feelings (American Occupational Therapy Association, 2008).

- **OT Theory:** The Cognitive Behavioral Therapy Frame of Reference was fathered by psychologists such as Bandura, Beck and Ellis. The theory has been adapted by Linda Duncombe and used by OT’s as well as Linda Duncombe. This theory helps individuals with anxiety perform their occupations without interference from faulty thoughts and perceptions. The Model of Human Occupation (MOHO) is an occupational therapy foundational model and can be used as a foundation when utilizing CBT. This model suggests that occupational participation stems from the interaction of the three subsystems (volitional, habituation and performance) of an individual and the environment (Cole, 2005). Individuals may have irrational thoughts about their abilities or faulty beliefs about their environment that interact with the functioning of these subsystems, thus interrupting their performance in meaningful occupations. By utilizing CBT, the CBT frame of reference, and the overarching MOHO OT model, occupational therapists are able to help clients control their thoughts and behaviors in order to better regulate themselves and participate in meaningful tasks.

**FOCUSED CLINICAL QUESTION**

Is Cognitive Behavioral Therapy an effective approach to reduce anxiety symptoms and the occurrence of anxiety disorder diagnoses in children with autism spectrum disorders when compared to a waitlist condition/no treatment?

**SUMMARY**

Extensive research was performed to determine if CBT is an effective approach for children with ASD and anxiety when compared to similar children not receiving treatment. It can be summarized that this is an effective treatment for this population. Seven databases were searched and eight relevant articles were found. Three articles were chosen to critique and include in this CAT based on the strength of the study, utilization of similar populations and administration of comparable treatment procedures. All studies received a PEDRO score greater than or equal to seven out of ten which deems them rigorous. The findings of these three articles suggest that enhanced versions of CBT are effective at reducing anxiety disorders and symptoms in children with ASD.

**CLINICAL BOTTOM LINE**

There is strong evidence to support the use of Cognitive Behavioral Therapy to decrease anxiety symptoms and the occurrence of anxiety disorder diagnoses in children with autism spectrum disorders and anxiety when compared to a waitlist condition/no treatment.

**Limitation of this CAT:** This critically appraised paper (or topic) has been reviewed by occupational therapy graduate students and the course instructor.
### SEARCH STRATEGY

#### Table 1: Search Strategy

<table>
<thead>
<tr>
<th>Databases Searched</th>
<th>Search Terms</th>
<th>Limits used</th>
<th>Inclusion and Exclusion Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Search Premier</td>
<td>Cognitive Behavioral Therapy, CBT, Autism, Anxiety, Aspergers</td>
<td>And</td>
<td>Inclusion: - English - Population of children with ASD younger than 18</td>
</tr>
<tr>
<td>MEDLINE with Full Text (EBSCOhost)</td>
<td></td>
<td></td>
<td>Exclusion: - Articles published before 2000</td>
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<tr>
<td>Cochrane Collection Plus (EBSCOhost)</td>
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<tr>
<td>Health Professions Databases via EBSCOhost</td>
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<tr>
<td>CINAHL Plus w/ Full Text (EBSCOhost)</td>
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<tr>
<td>Journals @ OVID</td>
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<tr>
<td>OT Search (AOTA)</td>
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</tbody>
</table>
# RESULTS OF SEARCH

## Table 2: Summary of Study Designs of Articles Retrieved

<table>
<thead>
<tr>
<th>Level</th>
<th>Study Design/ Methodology of Articles Retrieved</th>
<th>Number Located</th>
<th>Source</th>
<th>Citation (Name, Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>-SR-</strong></td>
<td>Systematic Review</td>
<td>1</td>
<td>Developmental Neurorehabilitation</td>
<td>Lang, 2010</td>
</tr>
<tr>
<td><strong>Level 2</strong></td>
<td>Non-Randomized Control Group (two groups)</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Level 3</strong></td>
<td>Non-Randomized Control Group (one group)</td>
<td>1</td>
<td>Journal of Autism and Developmental Disorders</td>
<td>White, 2009</td>
</tr>
<tr>
<td><strong>Level 4</strong></td>
<td>Single-subject/Repeated Measures Designs</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Level 5</strong></td>
<td>Qualitative, Case Study</td>
<td>2</td>
<td>Behavioural and Cognitive Psychotherapy; Journal of Contemporary Psychotherapy</td>
<td>Sze, 2008; Sze, 2007</td>
</tr>
</tbody>
</table>
### Table 3: Summary of Included Studies

|------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| **Intervention Investigated** | -Modified version of the “Building Confidence” CBT program  
-16 weekly sessions, 90 minutes each  
-Total time: 24 hours | -Modified “Cool Kids” CBT program  
-12 sessions, 2 hours each session  
-Total time: 24 hours | -CBT Programme  
-6 sessions, each 2 hours long  
-Total time: 12 hours |
| **Comparison Intervention** | Waitlist | Waitlist | Waitlist and Intervention program for child and parent |
| **Dependent Variables and Outcome Measures** | DV: Anxiety Disorder Diagnosis criteria as scored by the Anxiety Disorders Interview Schedule for DSM-IV-Child and Parent Versions (ADIS-C/P)  
DV: Anxiety symptoms as measured by the Clinical Global Impression (CGI) Improvement Scale and parent and child report versions of the Multidimensional Anxiety Scale for Children (MASC) | DV: Anxiety Disorder Diagnosis criteria measured by the ADIS-C/P  
DV: Anxiety symptoms reported by child measured by the Revised Children’s Manifest Anxiety Scale (RCMAS), Spence Children’s Anxiety Scale (SCAS) child report and Children’s Automatic Thoughts Scale (CATS).  
DV: Anxiety symptoms reported by parent and teacher as measured by the SCAS parent report and Strengths and Difficulties Questionnaire (SDAQ) parent and teacher report | DV: Anxiety symptoms and feelings as measured by the SCAS parent report  
DV: Level of social worry measured by the Social Worries Questionnaire (SWQ)  
DV: Coping strategies measured by ‘James and the Math Test’ |
| **Findings** | -13 of 14 children in treatment group showed positive treatment response.  
-9 of the 14 children no longer met criteria for an anxiety disorder diagnosis.  
The scores on the ADIS-C/P were significantly lower in the IT group with a 2.46 effect size. | -20 of 28 children no longer met diagnostic criteria for anxiety disorder.  
-There were significant differences both between groups at post-test (with CBT group lower than WL) and within the CBT group from pre-test to post-test. Very strong effect sizes were noted on SCAS-C (9.37), SCAS-P (12.38), and RCMAS (12.47). | -Significant results were found on the parent-report SCAS for both intervention groups from pretest to follow-up with very strong effect sizes (Intervention 1, child only=5.09, Intervention 2, child+parent=6.27).  
-Significantly lower scores were found on the parent report SWQ for both intervention groups  
-Significantly more strategies were found using ‘James and the Math Test’ for both intervention groups. |
**IMPLICATIONS FOR PRACTICE, EDUCATION AND FUTURE RESEARCH**

*Is enhanced CBT effective in reducing anxiety in children with Autism Spectrum Disorder and anxiety when compared to no treatment?*

**Overall Conclusions:**

All three studies reviewed in this CAT were randomized controlled trials. All found statistically significant results in regards to reducing anxiety symptoms. The treatment groups improved significantly more than did the control groups. Likewise, significant improvements were found from pre-test to post-test within the treatment groups. Both Wood et al (2009b) and Chalfant et al (2007) found statistically significant decreases in occurrences of anxiety disorder diagnoses. Strong effect sizes were calculated for all three studies, showing that the use of CBT with this population has clinically relevant outcomes. Sofronoff et al (2005) studied two intervention groups, one with children only and the other with both children and their parents. The authors found many statistically significant differences for both intervention groups when compared to the waitlist condition. Significant differences were also found between the two intervention groups, with the combination group (child and parent) being superior to the child only intervention. Lastly, this study found stronger differences at follow-up testing than at post-test.

There were not any marked differences in the findings of the three studies. However, there were some differences between the studies that should be noted. Although populations were very similar, Wood et al (2009b) included children in their study with Autism Spectrum Disorders including Autistic Disorder, Aspergers Syndrome and Pervasive Development Disorder-Not Otherwise Specified (PDD-NOS). Children in the Chalfant et al (2007) study were diagnosed with either High Function Autism (HFA) or Aspergers Syndrome. Although the participants in the prior studies were similar, Sofronoff et al (2005) only included children with Aspergers Syndrome. However, it is not believed that this difference impacts any of the results since many of the characteristics of the above diagnoses are very similar and the children had comparable anxiety symptoms and diagnoses.

Also, each study implemented a variation of a different CBT programs. Wood et al (2009b) adapted the ‘Building Confidence CBT program’ and Chalfant et al (2007) enhanced the ‘Cool Kids’ program from Macquarie University in order to fit the needs specific to children with ASD. The adaptations most commonly administered included addressing poor social skills, attending to poor motivation and attention, providing visual aids, and extending treatment over a longer period of time. Sofronoff et al (2005) utilized a CBT program manual that was already reasonable to use with children with Aspergers Syndrome. Despite the use of different programs, there were marked similarities between interventions. All three programs included training to teach the children to recognize the changes that anxiety produces in their body and feelings and also focused on cognitive restructuring. Both ‘Building Confidence’ and ‘Cool Kids’ included exposure to fearful situations as part of the treatment as well as providing the parents with information and education. Lastly, ‘Cool Kids’ and the program implemented by Sofronoff et al (2005) provided the children with many relaxation techniques.

Finally, differences in total treatment time and outcome measures used were noted between the studies. Both Wood et al (2009b) and Chalfant et al (2007) provided a total of 24 hours of treatment, whereas Sofronoff et al (2005) completed 12 hours. Also, group interventions were provided in the Chalfant et al (2007) and Sofronoff et al (2005) studies, but Wood et al (2009b) utilized individual treatment sessions. Outcome measures varied between studies, but many of the assessments measured similar variables, such as anxiety symptoms and diagnostic criteria.

In conclusion, despite the slight differences between the studies, this CAT provides strong evidence in favor of the use of CBT with children who have Autism Spectrum Disorders and concurrent anxiety when compared to a waitlist condition/no treatment. Cognitive Behavioral Therapy was shown...
to reduce both the presence of anxiety symptoms as well as comorbid anxiety disorder diagnoses. Strong evidence can be assumed since the 3 randomized controlled trials included in this CAT had positive results and a PEDRO score of 7 or higher.

**Boundaries:**

These studies were done with similar age groups of children. When the ages are combined from each study, this CAT includes children between the ages of 7 and 12 years. The effectiveness of using CBT for children with ASD and anxiety beyond this age range was not investigated for this CAT. The studies had fairly large sample sizes (at least 40 participants or more). In all studies, many children also had comorbid diagnoses along with the ASD and Anxiety, most commonly Attention Deficit Hyperactivity Disorder (ADHD). Throughout the 3 studies included in this CAT, children with ADHD were represented evenly in the control and treatment groups. It is important to note that children with ADHD were included in these studies and benefited from the treatment. Therefore, one should not shy away from using this intervention with children with comorbid ADHD.

Wood et al (2009b) also reported the different socioeconomic statuses and ethnicities of the children, which depicted a variety of children. No significant differences in these areas were found between the control and treatment group at pre-test. Thus, it can be assumed that CBT can be used effectively across ethnicities and status. Lastly, the reviewed studies administered treatment within a research or clinical setting. Thus, evidence of the effectiveness of using CBT within other settings cannot be concluded at this time.

It is also not evident exactly how much treatment time is necessary since significant results were found throughout the studies and different treatment times were utilized. Time spent administering CBT varied from a total of 12 to 24 hours. Similarly, the amount of time of each CBT session varied between the studies. Chalfant et al (2007) and Sofronoff et al (2005) provided 2 hour long sessions, whereas Wood et al (2009b) provided 60 minutes of treatment with the child and 30 minutes with the child and parent. Thus, it may be beneficial to conduct further research comparing treatment times in order to determine what is most effective.

Lastly, it is important to consider the different training given to the treatment administrators within the studies as well as the differences between the individuals administering treatment. All of treatment providers were either doctorate level psychologists or students enrolled in a doctoral psychology program at a University. Thus, none had an occupational therapy background. In two of the studies (Wood et al (2009b) and Sofronoff et al (2005)), the administrators participated in extensive treatment including a course, reading a manual and being observed. Therefore, it will be important for occupational therapists or other clinicians administering CBT to become completely familiar with the treatment before using the intervention.

**Implications for Practice:**

Although CBT is widely used among other professions, occupational therapists utilize aspects of CBT to enhance participation in occupations among individuals with depression and other psychiatric disorders as well as with children (Cara & MacRae, 2005). According to Chalfant et al (2007), “intense interventions like CBT can not only improve the main presenting difficulty, but also, can improve other aspects of the participant’s functioning such as their peer relationships (p. 1854). Thus, occupational therapists should consider using CBT for children with ASD and anxiety to help improve not only anxiety problems, but functioning in daily occupations as well. The results of the above studies help conclude that with slight adaptations to specifically fit the needs of children with ASD and anxiety, current CBT protocol and programs can be used by professionals to help alleviate anxiety symptoms and reduce the presence of anxiety disorders.
Further research should focus on the differences between specific CBT programs used in order to determine which programs are most effective. Likewise, research on the amount of treatment time necessary in order to see clinically relevant results would help guide therapists in future treatment. Lastly, since CBT is an intervention that fits within the occupational therapy framework, further research on how CBT impacts functional participation, such as ADL participation or school performance, would strengthen the OT process.
REVIEWED ARTICLES


RELATED ARTICLES


OTHER REFERENCES


APPENDIX

Article Critique

Title:

Permalink:

Purpose of the study:
• The purpose of the study was to enhance the recent research on the use of cognitive behavioral therapy (CBT) for children and adolescents with autism spectrum disorders (ASD) and concurrent anxiety. The authors aimed to study the effects of a modified CBT program with a group of children diagnosed with ASD and an anxiety disorder when compared to children on a waitlist.
• The authors hypothesized that the CBT would reduce anxiety symptoms of the children with ASD when compared to those on the waitlist.

Study Design:
• This study is described as a Level 1: Randomized Controlled Trial according to AOTA ratings.
• Two groups were formed using block randomization. The samples were stratified based on age and gender.
• One group received immediate treatment of modified cognitive behavioral therapy and children in the other group were put on a waitlist and didn’t receive any treatment during the duration of the study.

Setting:
• Intervention was carried out in a research setting for the majority of treatment sessions. During treatment, two sessions were held at the child’s school.

Participants:
• Forty children with concurrent ASD and Anxiety Disorder were recruited for the study. Seventeen children were randomized to the immediate treatment (IT) condition and 23 to the waitlist (WL) condition group. Of the children in the IT group, two dropped out and one violated protocol during treatment. Fifteen were assessed at posttreatment. There was one drop out from the WL group and 22 were assessed at postwaitlist.
• The IT group contained 9 children with autism, six with PDD-NOS and two with Asperger Syndrome. There were 11 with autism, 11 with PDD-NOS and one with Asperger Syndrome in the WL condition.
• Anxiety disorders in the IT condition included 13 children with social phobia, eight with separation anxiety disorder, eight with obsessive compulsive disorder and 11 with generalized anxiety disorder. The WL group contained 22 individuals with social phobia, 16 with separation...
anxiety disorder, nine with obsessive compulsive disorder and eight with generalized anxiety disorder.

- Participants were referred to the study by a clinic for autism, regional centers, support groups for parents, and professionals within the schools. Thus, a convenience sample was utilized for this study.

- Inclusion Criteria:
  - Diagnosis of Autism, Asperger Syndrome or PDD-NOS
  - Anxiety Disorder (Separation Anxiety Disorder, Social Phobia or Obsessive Compulsive Disorder)
  - Not taking psychiatric medicine at initial baseline testing or were on a stable dose of psychiatric medicine
  - Maintained the same dose of psychiatric medicine (if meds were being taken prior to study)

- Exclusion Criteria:
  - Children with a verbal IQ lower than 70
  - Current psychotherapy, social skills training and/or behavioral interventions
  - Current family therapy and/or parenting classes
  - Child began or changed does of psychiatric medicine during study
  - Any reason the child and/or parent may be deemed as unable to participate

- There were 12 males in the IT group and 15 in the WL condition. The mean age of children in the IT group was 9.18(1.42) and 9.22(1.57) years in the WL group. Forty-seven percent (eight children) in the IT group and 48% (11 children) in the WL group were Caucasian.

- Chi-square tests and t-tests showed no statistically significant differences between the demographic and diagnostic conditions in the IT and WL groups prior to treatment with the exception of three appearances of comorbid dysthmia or major depression in IT and none in WL.

- Lastly, participants were not blinded to group assignment.

**Intervention Investigated:**

- The *Building Confidence* CBT program was modified by the authors in order to incorporate the typical areas of deficit seen in anxious children with ASD. Specific enhancements addressed poor social skills, adaptive skills deficits, poor attention and school-based problems, which are all common in children with ASD.

- All therapists, including 11 clinical or education psychology doctoral students and two doctoral psychologists, received extensive training on a version of the *Building Confidence* CBT protocol and administration prior to study. They received 8 hours of training, listened to recorded sessions, read the treatment manual and attended meetings with the psychologists that developed the program.

- The authors recruited subjects from September 2004 until August 2007 and performed post-treatment testing in December of 2007.

- After participants were block randomized into stratified groups, therapists were also randomized to the children they would be working with.

- Three outcome measures were performed by blind evaluators, meaning they were not aware of which group the child was assigned. These measures included the Anxiety Disorders Interview Schedule for DSM-IV-Child and Parent Versions (ADIS-C/P), the Clinical Global Impression (CGI)-Improvement Scale, and Multidimensional Anxiety Scale for Children (MASC).

- A diagnostic algorithm was used to distinguish individuals with autism, Asperger syndrome and PDD-NOS. In order to do this, the scores from the Autism Diagnosis Interview-Revised (ADI-R,
Autism Diagnostic Observation Schedule-Module 3 (ADOS) and parent-report checklists were used.

- Intervention took place during 16 weekly sessions which lasted 90 minutes each. The therapist spent approximately 60 minutes with the child and 30 minutes with the family. Thus, 24 hours of treatment was provided to the IT group. Sessions were carried out in a research setting and twice within the child’s school throughout the intervention.
- Post-treatment measures were conducted on the last day of intervention or within a week of completion for those in the IT group. Posttest measures of the WL group were given 3 months after pre-test measures.
- Families received $20 for their participation in the study.

### Dependent variables and Outcome Measures:

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Outcome Measure</th>
<th>Data Type</th>
<th>Scoring</th>
<th>ICF Level</th>
<th>OT Framework Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety Disorder Diagnostic Criteria</td>
<td>Anxiety Disorders Interview Schedule for DSM-IV-Child and Parent Versions ADIS-C/P</td>
<td>Ordinal</td>
<td>Lower score reports fewer anxiety disorder diagnoses</td>
<td>Impairment Level</td>
<td>Mental Functions</td>
</tr>
<tr>
<td>Anxiety Symptoms</td>
<td>Clinical Global Impression (CGI)-Improvement Scale</td>
<td>Ordinal</td>
<td>Lower score means fewer symptoms (1-Completely Recovered, 8-very much worse)</td>
<td>Impairment Level</td>
<td>Mental Functions</td>
</tr>
<tr>
<td>Anxiety Symptoms</td>
<td>Multi-Dimensional Anxiety Scale for Children (MASC)</td>
<td>Ordinal</td>
<td>Lower score describes fewer anxiety symptoms</td>
<td>Impairment Level</td>
<td>Mental Functions</td>
</tr>
</tbody>
</table>

*There were not any secondary variables or outcome measures utilized in this study.

### Main Findings:

- The main outcome measure utilized in the study was the CGI to measure anxiety symptoms of the children.
- 13 out of 14 children (92.9%) in the IT group received a score of 1, 2 or 3 on the CGI at posttreatment, thus meeting the criteria for a positive treatment response. Only 2 out of 22 children in the WL condition met these criteria.
- The ADIS-C/P revealed that 9 out of 14 children in the treatment group no longer met criteria (ADIS-C/P score of ≥4) for a diagnosis of an anxiety disorder. The mean score of this group at posttest was 2.36. The WL group only had 2 individuals who did not meet diagnostic criteria at posttest with a mean score of 4.77.
- Thus, ADIS-C/P scores were lower in the IT group after treatment when compared to the WL group with a large effect size of 2.46.
- There was also a large effect (1.23) reported for parent-reported MASC scores. Scores were significantly lower for children in IT at posttest, F(1,32)=19.5, p <.0001. Mean score of IT group was 58.48(14.72) compared to a mean score of 76.57(14.65) in the WL group.
- However, there was not a significant difference in scores on the child-reported MASC, F(1,33)=.3, p=.87. Both groups improved similarly but with a small effect size of .03. Mean score of IT group was 46.93(14.76) and mean score in WL group was 46.5(15.83).
• Intent-to-treat analysis revealed that statistically significant group differences remained even when the baseline scores of the 4 individuals who dropped out of the study were included in posttest analyses. 13 of 14 children in IT met CGI criteria for response to treatment compared to only 2 of 23 in WL. As for ADIS-C/P scores, 9 of 17 children in IT were free of an anxiety disorder diagnosis whereas only 2 of 23 WL children met this criteria.

Original Authors’ Conclusions:
The authors concluded that this study provides support for the use of a modified CBT program when treating children with ASD and anxiety. CBT is also effective when children have multiple comorbid disorders. Outcomes of this study are comparable to those in which CBT is administered to children with anxiety but without ASD, both of which have large effect sizes and positive treatment responses on items such as the CGI. The authors also concluded that parent and teacher involvement is very important and there is a need to move from the conventional model of treating just the child.

Validity:
• Extensive training on treatment protocol was given to therapists before therapy began and all outcome measures were obtained by blinded graduate level experimenters.
• Authors also described the enhancements made to the CBT program in detail.
• This study received a PEDro score of 8/10 and was deemed rigorous.
• The study met all criteria on the PEDro scale except for blinding of all participants and therapists. It was not possible to blind participants and therapists since one group received the treatment and the others were placed on a wait-list. It was well-known who was receiving treatment.

Interpretation of Results:
• The above results show the effectiveness of CBT in treating children with ASD and anxiety.
• When compared to their typically developing peers from a previous study, the children with autism that participated in the current study had more comorbid anxiety disorders. However, concluding results of the studies were similar, which shows that the enhancements made to the CBT protocol in order to target the common deficits of children with autism were effective.
• Treatment effect sizes were large on many of the outcome measures including ADIS-C/P and parent-reported MASC.
• There was only a small effect size of treatment on child-reported MASC. Thus, children did not perceive a drastic decrease of anxiety symptoms after the CBT treatment. However, MASC scores were low when tested at baseline as well. Authors reported that children with ASD may report their anxiety in an exclusive way. Children may also not have been aware of or able to describe their anxiety symptoms until after treatment.

Summary/Conclusion:
This article provides support for the use of enhanced CBT for children with ASD and comorbid anxiety disorders. The large effect sizes and statistically significant differences reported in the study show that clinically significant differences may be obtained when using a modified version of CBT for this population. If thoughtful actions are taken before administering CBT to children with ASD and certain characteristics and symptoms of the child are taken into consideration when planning treatment, this intervention shows effectiveness in reducing the presence of anxiety disorders and/or alleviating anxious symptoms.
However, practitioners should keep in mind that the children participating in the study were only between the ages of 7 and 11. Thus, more research should be studied and conducted on the use of CBT for younger and older children with ASD and anxiety. Also, there were many different anxiety disorders present in the participants, some of which have symptoms not measured by the MASC. Further studies should include more complete self-report measures.
**Pedro Scale and Score**


<table>
<thead>
<tr>
<th>Criteria</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Subjects were randomly allocated to groups (in a crossover study, subjects were randomly allocated an order in which treatments were received).</td>
<td>Yes: A research assistant block randomized each child to immediate treatment or waitlist using a computer randomization program. The children were then stratified based on age and gender.</td>
</tr>
<tr>
<td>2. Allocation was concealed.</td>
<td>Yes: Since a computer randomization program was used, the investigators were unaware of the randomization sequence until the individuals were assigned to groups.</td>
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<tr>
<td>3. The groups were similar at baseline regarding the most important prognostic indicators.</td>
<td>Yes: Chi-square tests and t-tests were performed to test group differences before treatment. These tests determined no statistically significant differences between the groups.</td>
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<tr>
<td>4. There was blinding of all subjects.</td>
<td>No: Since the treatment group was compared to a waitlist group, clients and families were aware if they were receiving treatment or still on the waitlist.</td>
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<tr>
<td>5. There was blinding of all therapists who administered the therapy.</td>
<td>No: Again, it wasn’t possible to blind therapists of which group they were treating since only one group was receiving treatment.</td>
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<tr>
<td>6. There was blinding of all assessors who measured at least one key outcome.</td>
<td>Yes: All of the outcome measures used, both pretest and posttest, were administered by graduate students blind to which group the child had been randomized.</td>
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<tr>
<td>7. Measures of at least one key outcome were obtained from more than 85% of the subjects initially allocated to groups.</td>
<td>Yes: Fourteen of the seventeen individuals in the treatment group completed treatment and had outcomes measured. Similarly, 22 of 23 in waitlist condition were assessed at posttest. Thus, 90% of subjects initially allocated to groups had outcome measures tested.</td>
</tr>
</tbody>
</table>
8. All subjects for whom outcome measures were available received the treatment or control condition as allocated or, where this was not the case, data for at least one key outcome was analysed by ‘intention to treat’.  
**Yes:** There were two protocol violations during the study. However, intention to treat analyses were performed for all 40 participants originally allocated to groups.

9. The results of **between-group statistical comparisons** are reported for at least one key outcome.  
**Yes:** Between group comparisons were carried out for all three outcome measure utilized in the study (ADIS-C/P, CGI and MASC).

10. The study provides both **point measures** and **measures of variability** for at least one key outcome.  
**Yes:** Means, standard deviations and effect sizes, as well as the range of scores, were provided for the ADIS-CSR, parent MASC and child MASC.

11. **Eligibility criteria** were specified (not included in score)  
**Yes:** Inclusion and exclusion criteria were clearly stated.

**Total Score: 8/10**