CRITICALLY APPRAISED TOPIC

TITLE

Efficacy of Cognitive Behavioral Therapy (CBT) for anxiety management in children with autism spectrum disorder delivered in school settings

AUTHOR

Prepared by	Nicole Halliwell MSORT/L	**Date**	7/14/17
Email address	Nicole-halliwell@ouhsc.edu		
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CLINIAL SCENARIO

According to the Center for Disease Control and Prevention (2012) 1 in 68 children are identified as having autism spectrum disorder (ASD). Diagnostic features of ASD, according to the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (DSM-V) (5th ed.; DSM–5; American Psychiatric Association, 2013), include by restrictive and repetitive behavior patterns, interests, or activities, including a hyper-or hypo reaction to, or unusual interest in sensory input in the environment, and decreased social engagement. Children with ASD are at a high risk for mental health issues, especially developing anxiety as a concurrent disorder (Simonoff et. al., 2008). Cognitive Behavioral Therapy (CBT) interventions are a well-established approach to remediation of anxiety for children in school settings (Bernstein, Layne, Egan, & Tennison, 2005). Research efforts indicate that CBT programs are successful for children with ASD in clinical settings (Maddox, Miyazaki& White, 2016; Reaven, 2009; Wood et.al, 2009) but limited research exists exploring the potential effect of these programs within the school setting. CBT approaches are successful for both typical children as well as children with ASD. Does the research support the use of CBT approaches for children with ASD in a school setting?

FOCUSSED CLINICAL QUESTION

What is the evidence of efficacy for using group CBT to help manage anxiety for children with ASD in delivered school settings?

SUMMARY OF SEARCH

A randomized control trial utilizing the established manualized "Exploring Feelings" program (Attwood, 2004) was conducted with a sample of 35 adolescents with ASD (intervention N=18, control N=17) from a school district in England. Established valid and reliable measurement tools including the Spence Anxiety Scale, the School Anxiety Scale, the Social Worries Scale, and the Social Responsiveness Scale in combination with additional measures for attentional control and attention to threat were used to measure changes in anxiety over time and measured by teacher, parent and self at three data points: prior to intervention, post intervention, and at 6 week follow up. CBT program was delivered as described in manual to groups of between 4 and 6 participants in 90-minute sessions over 6 weeks in their school setting. Results via comparison of means using ANOVA statistical analysis revealed statistically significant reduction in anxiety over time for the intervention group with marginal improvements noted in social responsiveness and limited impact on attentional control and attention to threats. The control group maintained pretesting levels on anxiety measures. These results indicate a measured positive impact of the CBT intervention on anxiety reduction for the intervention group when compared with the control group. These improvements were found to be sustained during follow up period.

CLINICAL BOTTOM LINE

CBT interventions delivered in school settings are potentially beneficial to help adolescents with ASD manage anxiety with lasting effects after a follow up period.

Important note on the limitation of this CAT

This critically appraised paper (or topic) /has not been peer-reviewed by one other independent person/lecturer

SEARCH STRATEGY

Terms used to guide the search strategy

- **P**atient/Client Group: Children with autism spectrum disorder
- **I**ntervention (or Assessment): cognitive behavioral therapy
- **C**omparison: none/ treatment as usual
- **O**utcome(s): mediation of anxiety

Databases and Sites Searched	Search Terms	Limits Used/ Results
PubMed	**Autism, CBT, schools**	**No limits/ 832**
PubMed	**Autism, CBT, schools, anxiety**	**No limits/ 19**
Ovid MEDLINE	**Cognitive therapy and anxiety disorders or anxiety and autistic disorder**	**No limits/ 615**

INCLUSION and EXCLUSION CRITERIA

Inclusion Criteria

Inclusion criteria for narrowing the literature search included that studies need to be experimental or quasi- experimental designs and that targeted school age children with Autism Spectrum Disorder. The intervention must be identified as cognitive behavioral therapy (CBT) and was the primary experimental intervention. All article titles were screened for possible fit to inclusion criteria. Identified titles (38) were selected and abstracts were read for additional fit of inclusion criteria. If abstracts were inconclusive (8) select portions of articles were read to determine inclusion including demographics, methods, and discussion sections.

Exclusion Criteria

Exclusion criteria included the incorporation of children with other primary diagnoses than ASD (e.g. fragile x, ADHD), service delivery within a clinical or hospital setting (not a school setting) and the incorporation of other therapeutic approaches in conjunction with CBT by study design as outlined in each article's methods section. All article titles were screened for possible exclusion concurrently with screening for possible inclusion.

RESULTS OF SEARCH

A total of 3 relevant studies were located and categorised as shown in Table 1 (based on Levels of Evidence, Centre for Evidence Based Medicine, 2011)

Table 1: Summary of Study Designs of Articles Retrieved

Study Design/Methodology of Articles Retrieved	Level	Number Located	Author (Year)

RCT	**2**	**1**	**Luxford, Hadwin, Kovshoff (2016)**
Non- randomized control (quasi-experimental with mixed methods approach)	**3**	**1**	**Clarke, Hill, Charman (2016)**
Mechanism Based Reasoning (Feasibility/ Acceptability Studies)	**5**	**1**	**Drmic, Alljunied, Reaven (2017)**

BEST EVIDENCE

The following study/paper was identified as the 'best' evidence and selected for critical appraisal. Reasons for selecting this study were:

- **Experimental design: randomized control trial highest level of evidence available on topic**
- **Fits all inclusion criteria (measured anxiety with ASD diagnosis, age range, CBT intervention, and school setting)**
- **Multiple outcomes measures with established reliability and validity utilized**

SUMMARY OF BEST EVIDENCE

Table 2: Description and appraisal of Randomized Control Trial by (Luxford, Hadwin, and Kovshoff, 2016)

Aim/Objective of the Study/Systematic Review:
Evaluation of the effectiveness of an established CBT program within a school environment on improving measures of anxiety for children with ASD.
Study Design
Randomized controlled trial consisting of pre-intervention testing, post intervention testing, and follow up testing via eight established measures including two eligibility measures, three anxiety measures, one social measure, one attentional control measure, and one attention to threat measure. Group assignments were not blind to participants and parents and allocation to groups was not hidden from the researchers as the primary author completed service delivery of the CBT program as well as administered outcome measurements. Outcomes were measured at three intervals: prior to intervention, post intervention, and at 6 week follow up. Members of the control group were offered access to the CBT intervention program after the conclusion of the study.
Setting
Four mainstream secondary schools in England within one school district. No mention of how or why district was selected or if sampling was purposive.
Participants
Eligibility for participation required a confirmed ASD diagnosis, a total IQ score of greater than or equal to 70, and currently experiencing anxiety symptoms of clinical significance as identified by teacher, parent, or self-reporting on Spence Children's Anxiety Scale. Nine schools were approached from one school district to elicit participation resulting in four schools identifying a potential 49 adolescent students with ASD, 47 of whose parents were notified via written consent. Twelve students' diagnoses were not confirmed through educational records resulting in n=35 students completing pre-testing measures. The 35 participants (31 males and 4 females) were randomized into two groups via computerized assignment for intervention (N=18) and waitlist control (N=17) stratified into four total groups- two groups running simultaneously for 6 weeks, a 6 week follow up, and the wait-list control group which was afforded the

intervention after the study's completion by the participating schools. Participants' ages ranged 11.10-15.80, and they all had a formal diagnosis of ASD or Asperger's Syndrome. Descriptive statistics indicated there was no mean group differences for IQ or Social Communication Questionnaire (SCQ) scores but there were significant differences found in parent and teacher reported anxiety levels for the intervention group. No participants were lost to drop out but three parents failed to return information related to follow up measurements in the intervention group creating a discrepancy at the T3 measurement to n=15.

Two measures were administered individually by the researchers as premeasures to assess eligibility. The Social Communication Questionnaire (citation), a 40 item parent report measure designed for participants 4-40 years and a score range of 0-39 consists of yes-no responses to establish ASD. The Wechsler Abbreviated Scale of Intelligence 2nd Edition (WASI) citation a well-established measure for age 6-89 years to assess intelligence was also administered. In addition to the premeasures researchers administered the anxiety measures, social worry measure, and attention tasks measures in a randomized order at the three data points: prior to intervention, post intervention, and after follow up period.

Intervention Investigated

Control

The study design utilized a waitlist control group which received no instruction in the Exploring Feelings materials until after the completion of the project and follow up period. No other description of control group intervention provided.

Experimental

Researcher presented Attwood's (2004) Exploring Feelings a highly structured, manualized CBT intervention to intervention groups of 4-6 participants across four separate school settings within one school district. Exploring Feelings is a six-week program developed specifically for the ASD population consisting of six 90-minute sessions (totalling 9 hours) delivered by the researchers and supported by teaching assistants within each school to aide in concept carryover and application to day to day situations throughout the program. Each session is followed by a home project for discussion at the following meeting as well as the provision of worksheets to help students develop strategies across sessions to help manage anxiety through various learned methods.

Outcome Measures (Primary and Secondary)

A total of three primary outcome measures were used, each of which targeted measurement of student's anxiety. Measures utilized included the School Anxiety Scale (citation) which is a teacher report 16 item assessment of behaviour of children from 5 to 12 years old. A total anxiety score is created with scores ranging from 0-48 with responses measured on a 4 point scale. The Spence Anxiety Scale (citation), a measure designed with 38 items for ages 7-16 years, was used with self-report and parent report versions to measure anxiety symptoms. The tool scores on a four point Likert scale reflecting anxiety disorder subtypes as outlined in the Diagnostic Statistical Manual 4th Edition (DSM-IV) (American Psychiatric Association, 1994) with a score range of 0-114. The final anxiety measured used was the Social Worries Questionnaire which is a 13 item scale which aims to measure the worry associated with social stations on a scale of 0-26. Both the self-assessment and teacher assessment versions were utilized to better understand how social avoidance measured for participants as an additional indication of anxiety.

Specific constructs believed to impact anxiety were measured as secondary outcomes: social impairment, distractibility, attentional control and attention to threats. The Social Responsiveness Scale (SRS) - citation was used based on parent and teacher report to understand behaviours associated with social impairment. The measure consists of 65 items with a 1 to 4 point rating scale and produces scores ranging from 0-260 with higher scores reflecting greater social difficulties for children aged 4-18 years. Attentional control and attention to threat were each measured through previously established protocols found within the literature via timed tests of presented stimuli. Attention control was measured using the Erikson (year) flanker test which presents a series of arrows presented in relationship to a central image to

gauge fixation on target. Attention to threat testing uses matching between colors and emotional faces and can determine if there is attentional bias noted towards the emotional faces. Both the attentional control and attention to threat measures were calculated through reaction time differentials for correct responses on all trial types to determine distractibility. Verbiage within the article indicates that all testing measures were performed by the same single researcher but it is not specifically described.

Location for administration of outcome measures was not expressly described within the report but the additional secondary measures were reported to have been filled out by the same teacher/staff member across the three time data points to ensure rater consistency (validity?) and improve reliability. No specific mention of attempts to establish reliability outside of rater consistency were mentioned.

Main Findings

Table 1 Mean (standard deviation) [range] for self, parent teacher reported measures at each time point

	Intervention group (n = 18)[a]			Wait-list control group (n = 17)		
Variable	T1	T2	T3	T1	T2	T3
Anxiety symptoms						
Parent	47.61 (16.25) [16–78]	31.89 (14.86) [10–62]	26.67 (10.68) [13–51]	35.5 (10.82) [15–50]	40.94 (16.03) [18–74]	40.82 (19.05) [3–73]
Self	40.50 (16.87) [15–87]	27.50 (14.70) [10–57]	26.82 (15.50) [4–49]	35.12 (15.32) [10–77]	35.41 (21.35) [15–100]	30.35 (14.62) [5–66]
Teacher	28.61 (7.81) [9–39]	18.94 (8.93) [3–38]	14.39 (7.74) [2–34]	20.29 (9.23) [7–48]	20.82 (9.81) [10–48]	19.94 (11.23) [5–48]
Social worry						
Self	12.33 (4.74) [4–22]	8.83 (4.42) [3–16]	7.35 (4.82) [0–15]	12.41 (5.75) [4–26]	12.29 (6.62) [4–24]	9.76 (6.80) [1–24]
Teacher	11.28 (3.611) [5–16]	8.00 (4.42) [0–16]	6.39 (3.13) [0–14]	9.18 (4.28) [0–15]	8.41 (4.45) [1–15]	8.41 (5.01) [0–16]
Social responsiveness						
Parent	111.83 (25.24) [37–152]	98.56 (23.67) [53–138]	96.47 (21.69) [66–132]	114.06 (23.72) [69–51]	109.41 (24.68) [69–50]	103.08 (13.81) [84–26]
Teacher	96.56 (31.44) [35–152]	87.94 (29.12) [27–159]	83.11 (35.40) [18–163]	89.24 (37.79) [27–159]	92.88 (37.80) [29–159]	92.29 (35.00) [14–159]
Attentional control scores						
	194.81 (108.81) [420]	67.06 (38.62) [122]	48.10 (45.79) [169].	206.06 (137.08) [524]	151.18 (149.86) [451]	134.56 (93.76) [292]
Emotional stroop bias scores						
Happy	−27.58 (99.84) [363]	−0.29 (66.08) [295]	−19.26 (54.62) [225]	8.35 (121.01) [526]	−7.06 (77.53) [295]	−2.70 (100.98) [466]
Fear	−2.55 (155.40) [679]	21.21 (87.47) [352]	−9.64 (56.08) [210]	30.46 (97.64) [437]	−11.19 (79.76) [296]	19.25 (80.82) [287]
Angry	97.25 (127.88) [419]	13.25 (62.65) [236]	−9.24 (42.47) [141]	64.01 (69.18) [320]	23.06 (105.90) [493]	44.82 (163.19) [581]

[a] For parent reported measures at T3 N = 15 for the intervention group and N = 11 for the control group

Analysis was conducted via repeated measures ANOVA with two group and three time data points (T1, T2, and T3) for the raw scores on anxiety and social responsiveness measures and conflict scores for attention control/attention to threat measures. Authors report no significant differences for self-reported anxiety, social responsiveness, attention to threat, attentional control, or social worry measures but significant differences are noted on parent and teacher reported anxiety which increased baseline for the intervention group (T1). In the analysis, the initial difference in anxiety scores was address through use of repeated analysis with T1 as a covariate entry. Correlations between measures were also assessed and can be found in the table below. The authors utilized both the 95% and 98% confidence levels throughout the analysis as indicated by the p-values.

Table 2 Summary of correlations at Time 1 between parent, pupil and teacher-reported measures

	1	2	3	4	5	6	7	8	9	10	11	12
Anxiety												
1. Parent	–	0.49**	0.24	0.32	0.11	0.39*	0.14	−0.22	−0.14	0.44**	−0.19	0.27
2 Self		–	0.14	0.48**	0.11	0.30	0.25	0.20	−0.09	0.26	−0.08	−0.26
3 Teacher			–	0.17	0.73**	−0.07	0.45**	−0.13	−0.13	−0.08	−0.20	−0.12
Social worry												
4 Self				–	0.12	0.25	0.24	−0.06	0.04	0.18	0.21	0.08
5 Teacher					–	0.19	0.39*	−0.08	−0.18	−0.10	−0.09	−0.13
Social responsiveness												
6 Parent						–	0.12	−0.28	−0.08	0.32	0.01	0.37*
7 Teacher							–	−0.21	0.03	−0.21	−0.17	0.04
Attentional control												
8. AC								–	−0.15	0.12	0.05	−0.40*
Emotional stroop bias												
9 Happy									–	0.14	0.69**	0.12
10 Angry										–	0.25	0.38*
11 Fear											–	0.13
12 IQ												–

* $p < 0.05$; ** $p < 0.001$

Summary of Primary and Secondary Outcomes:

Parent Reported Anxiety- within groups anxiety symptoms were significantly different for intervention group over time with no change in the control group; main effect of time F(2, 24) = 5.08, p = 0.01

Self-Reported Anxiety- significant reduction in anxiety over time for intervention group with no significant change found in control group over time; main effect of time F (2,64) = 9.71, p<0.001; significant interaction between group and time F(2,64) = 4.45, p = 0.015

Teacher- Reported School Anxiety- significant differences noted over time for intervention group with no differences noted in control group, main effect of time F(2,33) = 10.27, p<0.01; significant interaction between group and time F (2,33) = 5.23, p<0.01

Social Worry- significant improvements in anxiety symptoms over time for the intervention group measured through teacher report with no significant differences for control group; significant main effect for time on self-report noted F(2,33) = 10.43, p<0.001; significant interaction between time and group for intervention group F (2,32) = 5.23, p<0.01,

Social responsiveness scale- increased social responsiveness over time for parent and teacher reports; significant main effect of time for parent report F (2, 25) = 15.69, p<0.001 but no significant association for teacher reported measure based on group or time

Attentional Control- conflict scores indicate overall means for intervention group significantly slower and with greater errors than control group compared with congruent and neutral trials; demonstrated a significant effect of condition F(1.36, 46.12) = 74.23, p =<0.01; ANCOVA analysis with covarying IQ scores indicate a significantly lower conflict score for the intervention group F(1, 31) = 6.92, p = 0.013 but no main effect of time or interaction between time and group

Attention to threat- main effect noted of emotion showed bias scores for angry trials higher than with fear and happy trials indicating less interference with task from angry faces presented; significant interactions are noted between emotion and orientation of the image F(3, 34) = 4.72, p<0.01 with strongest responses to upright angry faces being the only significant comparison emotion

Original Authors' Conclusions

Results indicate that the CBT intervention Exploring Feelings delivered in a school setting proved

beneficial with maintenance of 6 week follow up period when compared with a waitlist control group. Findings that students experienced reduction in anxiety as measured through parent, self, and teacher reporting measures as well as some increased social responsiveness as reported by teachers. Measures aiming to assess the impact on attentional control and attention to threat were unclear in if and how the CBT intervention impacted these skills. The results of this study support previous studies conducted in clinical settings replicating results within a school setting utilizing the Exploring Feelings manualized intervention. This study strengthens and adds to the growing body of research to support CBT interventions with the ASD population previously conducted in clinical settings as well as the general research for the usefulness of CBT in helping children with anxiety (Maddox et. al., 2016; Reaven, 2009; Wood et.al, 2009).

Critical Appraisal

Validity

The methodology of the study was clearly outlined within the article including mention of study design, sampling, data collection methods, and analysis and can be easily replicated in future research studies. The researchers designed an RCT utilizing an established manualized CBT program for students with ASD selecting a school district to sample and utilizing suggested participants from school staff and administration. Since the sample pool was not selected at random and utilized purposive suggestions from staff there was a potential for bias in the suggestion of participants as well as the researchers selection of school district. District selection was likely a result of access convenience but the reasoning for this decision is not addressed by the researchers. The study's participant pool was adequately randomized into intervention and control groups allowing for some level of randomized control but the parents of participants and researchers were not blind to the randomization process. The researchers also completed both the intervention and the assessments themselves with the article's wording indicating that a single researcher provided the intervention and completed the measurements. This lack of blinding further increases the potential for bias. Utilizing the PEDro scale the article scored a 6/10 since subject allocation was not concealed, there was no blinding of subjects, therapists, or assessors and there was noted dissimilarity at baseline between the intervention and control groups in level of reported anxiety.

Interpretation of Results

The primary outcome of interest within the study, anxiety for adolescents with ASD, was favourably supported by the ANOVA analysis of primary outcome measurements. The results of the study's measurements over time indicated improvements across anxiety measures with CBT intervention as demonstrated by the strong effect of time with high statistical significance. Secondary outcomes were mixed in their strength of analysis with social responsiveness being only marginally improved and conflict analysis results related to attention to threat and attentional control were inconclusive to determine potential effect.

Summary/Conclusion

Using an established CBT program delivered within the school setting and designed specifically for students with ASD can potentially remediate the effects of anxiety and improve outcomes.

IMPLICATIONS FOR PRACTICE, EDUCATION and FUTURE RESEARCH

CBT interventions are commonly used in educational settings for typically developing children as supported by established research (Bernstein et. al., 2005). Information related to use of CBT interventions with the ASD population is limited and research primarily takes place in clinic settings rather than school settings (Maddox et al., 2016; Reaven, 2009; Wood et.al, 2009). Difficulties with managing anxiety can further complicate many features of the ASD diagnosis, particularly limited social participation as well as be compounded by sensory processing difficulties. If CBT programs which improve student's self-management of anxiety are introduced there is likely to be a profound effect on student's school function especially related to social demands like making and maintaining friendships,

interaction with peers (both academically and socially) and interacting appropriately with staff and community adults. Future research should address attempts to replicate these results while revising the design to further limit potential bias and introducing additional socialization measures. Researchers can do this by blinding assessment and assignment practices and increasing the sample size for future RCTs while adding established measures of social engagement such Teacher Perception of Social Skills (TPSS) (Kasari, 2012). Studies not selected for review in this CAT due to lower levels of evidence represent recent further attempts to expand the research related to using CBT for students with ASD in school settings. Drmic, Aljunied, and Reaven (2017) conducted a feasibility and acceptability study to investigate treatment outcomes of a school based CBT program, conceptually building on the work of Luxford et al. (2016) appraised above. The authors explore adapting the program to be culturally sensitive as well as identify supports and barriers related to its implementation in a school based setting. Drmic et. al. endeavour to implement a CBT protocol called Facing Your Fears via 3-4 day staff training and have it implemented strictly by school staff rather than by the researchers themselves and base their assessment of program strengths and barriers on online surveys for staff as well as on semi-structured interviews with parents regarding the impact the program had on their child's life (2017). The inclusion of qualitative data within the research design allowed the authors to explore the effect of the program with richer detail but the focus on qualitative information combined with the lack of randomization, lack of control group, and purposive sampling resulted in a lower level of evidence to support the intervention. Future research should aim to explore these topics in well developed, blinded, structured RCTs to create the highest level of evidence possible to support CBT interventions with the ASD population in school settings.

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