

Cognitive behavioural therapy in children with autistic spectrum disorder

Alicia H White

Search date: September 2003

www.signpoststeer.org



What is the STEER service?

The STEER service is a rapid on-demand reviewing service, which:

- informs decisions by providing evidence-based answers to focused questions
- produces the reviews within a short period of time, usually 8-10 weeks
- is provided for policy makers by the Wessex Institute for Health Research and Development together with Bazian Ltd, an independent company that specialises in evidence-based reviews and training. Bazian Ltd has a policy of strict scientific integrity and does not accept contracts that threaten impartiality when assessing and reviewing research.

What is a STEER?

STEER stands for Succinct and Timely Evaluated Evidence Review. A STEER is:

- a short, pragmatic review of major sources of published literature to answer focused questions
- designed to further decisions by quickly surveying and reporting on a large number of sources of evidence
- descriptive in nature, rarely employing meta-analysis
- conducted by reviewers using validated search strategies, data extraction, and peer review

How is a STEER produced and quality-controlled?

A structured STEER question is developed through liaison with the commissioner and with experts in the field.

- A systematic search of the published literature is performed by an experienced information specialist, using validated search strategies (available on request for each review).
- An initial check of study abstracts is performed to exclude irrelevant studies. Identified papers are then obtained.
- An initial appraisal of each paper is then performed by two experienced appraisers, using standard, validated critical appraisal techniques. Irrelevant or poor quality studies are excluded at this stage.
- Selected papers are sent to a reviewer to produce a draft STEER report. Reviewers are supported throughout the reviewing process by an experienced in-house team, advising on methods and providing guidance as needed.
- The draft report is independently and anonymously peer-reviewed by other members of the network of reviewers.
- The manuscript is then checked and edited by in-house editors (from Bazian Ltd), who are experienced in reviewing methods.
- The final proof is re-checked by the reviewer before dissemination.

Using STEER

In the interests of rapid and timely delivery, STEER does not routinely consider unpublished research, such as submissions from the pharmaceutical industry. Where possible, we cross-check STEER reports against existing systematic reviews (which have searched unpublished sources) to ensure reliability. However, when STEERs report that no systematic reviews were identified, it should be remembered that reliable research might be available in the unpublished literature.

STEER does not make recommendations about policy. STEER reports are simply intended as an impartial summary of the best available evidence from the published literature. By explicitly describing available evidence, STEER reports can reduce the time and cost of debating research findings. However, STEER reports are at their most useful for policy making when considered alongside other policy determinants, such as cost-effectiveness and consensus opinion.

STEERs may report that insufficient evidence was found for an intervention. In such circumstances, a lack of evidence does not equate with a lack of effectiveness. We feel it important to emphasise this distinction, particularly because many STEER questions relate to novel interventions, which currently lack an evidence base, but which may yet prove effective.

How can I request a STEER?

The STEER service originated to support the decisions of health service commissioners and policy makers in the NHS.

STEER reports are available to NHS staff. Topics should be prioritised through discussion with your PCT, strategic health authority or commissioning group before a request is made.

Before requesting a STEER report please:

- Check the STEER website **www.signpoststeer.org**. The site features a system called 'SIGNPOST', which will help you to find any existing reviews on your topic. The site also provides an index and the full text of previous STEERs. You may find that your question has already been answered.
- Contact the Wessex Institute or Bazian Ltd to submit a request.

Contact details

STEER administrator
Bazian Ltd
Suites 1 and 2
138 Upper Street
London N1 1QP

tel: 020 7288 0544
fax: 020 7226 3341

email: info@bazian.com
website: www.signpoststeer.org

Cognitive behavioural therapy in children with autistic spectrum disorder

Author name and details

Alicia H White BSc PhD

Health Research Reviewer

Conflict of interest

None

Search date:

September 2003

Users of this report should check for later evidence that may alter the STEER conclusions.

This STEER report should be cited as:

White AH. Cognitive behavioural therapy in children with autistic spectrum disorders. In Bazian Ltd (Ed) STEER: Succinct and Timely Evaluated Evidence Reviews 2004; 4(5). Bazian Ltd and Wessex Institute for Health Research & Development, University of Southampton. [WWW document] URL <http://www.signpoststeer.org/>

Edited by: Bazian Ltd
Information specialist: Liz Payne, Alison Price

Disclaimer

The information in this report is based on STEER search and appraisal methods as presented in this document. Great care has been taken to ensure accuracy and avoid bias in interpretation and presentation of available research. However, neither the Wessex Institute for Health Research and Development nor Bazian Ltd are responsible or liable for errors or omissions, for any consequences of applying any of the information presented herein and make no warranty, express or implied, with respect to the contents of this document. The Wessex Institute for Health Research and Development and Bazian Ltd are not responsible for policy or practice decisions made by STEER users. Any representation against such decisions should not be taken up with Bazian Ltd or the Wessex Institute for Health Research and Development.

STEER Reports Copyright © 2004 Wessex Institute for Health Research and Development and Bazian Ltd

Question

What are the effects of cognitive behavioural therapy in children with autistic spectrum disorders?

- Population:** Children up to 16 years old with autistic spectrum disorder (ASD). This may include autism, Asperger's syndrome, and pervasive developmental disorder (not otherwise specified).
- Intervention:** Cognitive behavioural therapy
- Comparators:** No treatment; sensory integration therapy; play therapy; speech and language therapy; medication; other therapies.
- Outcomes:** Behaviour (e.g. measures of rigid or inflexible behaviours or attention); communication; educational attainment; social interaction; physical coordination and clumsiness.

Summary

We were unable to draw reliable conclusions about the effectiveness or potential harms of CBT in children with autistic spectrum disorders.

We found evidence that CBT is a feasible treatment option in high-functioning children with ASD. Some children experienced improvements in coping strategies for anxiety promoting situations, behaviour, and social interaction after CBT. However, the lack of reliable controlled studies makes it impossible to attribute these effects to CBT, or to compare effects of CBT with other interventions.

Background

Children with autistic spectrum disorder have difficulty with communication and social interaction, and have restricted and repetitive stereotyped behaviours.

Cognitive behavioural therapy (CBT) is based on the theory that psychological or behavioural problems such as depression and anxiety arise as a result of cognitive deficiencies and cognitive distortions. Therefore, the aim of CBT is to identify and correct these deficiencies and distortions of thinking patterns, and thus alleviate the psychological or behavioural problem. The principles of CBT can be adapted and applied in different ways, but its typical components are¹:

- (1) Assessment of the problem
- (2) Affective education: to illustrate the connection between deficiencies and distortions of thinking, affect, and behaviour;
- (3) Cognitive restructuring: to challenge dysfunctional thinking in a logical way, and implement more healthy ways of thinking;
- (4) Stress or anxiety management
- (5) Self-reflection: to improve insight into thoughts
- (6) Practice of the principles learnt in everyday situations.

CBT has been advocated for people with some autistic spectrum disorders, particularly for people with Asperger's syndrome, who tend to be high functioning, have high verbal IQs, are receptive to factual and logical thinking,^{1,2} and are prone to mood disorders, which are known to be alleviated by CBT. CBT may not be suitable for very young children or in children at the lower functioning level of the autistic spectrum of disorders because of the minimum level of cognition required to allow appropriate interaction.

CBT methods for can be adapted to suit children, for example by having shorter sessions, using visual methods of assessment and teaching, and by theming therapy materials to suit the children's interests.^{1,3} CBT is usually performed by a trained therapist, and can take the form of individual or group sessions. In some cases parents and teachers can act as co-therapists.

Methods

Search date: September 2003. Primary sources: Medline from 1966; Embase from 1980; Cochrane Library Issue 3, 2003; Clinical Evidence Issue 9; Centre for Reviews and Dissemination Databases, University of York, (comprising Database of Abstracts of Reviews of Effectiveness; Health Technology Assessment Database; NHS Economic Evaluation Database); and PsychInfo.

We included only studies that specifically defined their method as cognitive behavioural therapy (CBT). We excluded studies using a purely behavioural method or using CBT as part of a multifaceted intervention program. We included all controlled studies and all case series with at least 5 participants. Case series with less than 5 participants are summarized in an annex at the end of this report.

Evidence found

We found one randomised controlled trial⁴ and one case series⁵ that met the inclusion criteria and the criteria for data extraction. We found two case series^{6,7} that were below the threshold for data extraction ($n < 5$); these studies are tabulated in the annex.

The RCT included 65 children aged 10 to 12 years old with a diagnosis of Asperger's syndrome, and significant anxiety as reported by parents.⁴ Children with comorbid diagnoses such as Attention Deficit Hyperactivity Disorder were included in the trial. Children were randomised to three treatments: group CBT (n=24); group CBT involving parents as co-therapists (n=27), or waiting list control (n=14). Children received CBT in groups of three, with two therapists conducting each session. Sessions lasted for two hours and were held once weekly for six weeks. In the CBT treatment group with parents as co-therapists, therapists worked through the programme with parents while their children were receiving CBT.

Although the paper stated that many measures were used in the study, only three outcome measures were reported (see Table 1). Outcomes were assessed pre-intervention, post-intervention and at 6 week follow up. The main outcome assessed was the child's ability to offer solutions to a hypothetical anxiety provoking situation (the "James and The Maths Test" problem solving measure). The second outcome was parental self-efficacy in the management of behaviours "related to Asperger syndrome" (not further defined). Parents were asked to state which of fifteen behaviours had occurred in the last two weeks, and rate their ability to manage them on a scale of 0 (least able) to 5 (most able). Scores were averaged across the number of listed behaviours that had occurred.

The case series included 15 high-functioning children (4 girls, 11 boys) aged 8 to 17 years old diagnosed with autism.⁵ Children had to meet Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) criteria for autism, as well as the Autism Diagnostic Interview-Revised (ADI-R) criteria for autism. Children had to have

a verbal IQ of 69 or above. Children with non-specific pervasive developmental disorder (PDD-NOS) were excluded from this study. The child's main teacher in school received special training and administered the CBT. The intervention was carried out for 3 hours per week for 7 months. Children practised their newly learned social skills twice weekly with an assigned peer.

Outcomes assessed were changes in social cognition, emotional understanding, and social functioning (see Table 1). Social cognition was tested using a problem solving measure (PSM) in which the child was asked to offer solutions to a nine hypothetical social problem scenarios. Scores were calculated based on number, relevance, variety, and content of solutions, and whether the solutions involved the participant being active or passive. Higher scores indicated a better performance. Emotional understanding was assessed using an emotion inventory, in which the child was asked to define four simple emotions (happy, sad, afraid, and angry) and six complex emotions (pride, embarrassment, loneliness, guilt, affection, and jealousy) and give an example of when they had experienced each emotion. Social functioning was assessed by an independent researcher observing children's social interaction during school recess for two 15-minute periods. The scoring system used was based on Hauck's Behaviour Coding Scheme for children. Positive social interaction was defined as verbal or non-verbal behaviour that started or maintained effective social interaction with peers such as eye contact, smiling, greeting, sharing, expressing interest in or helping a peer. Negative social interaction was defined as behaviour that prevented or stopped social interaction, such as aggression, tantrums, teasing, or avoidance of

contact. Low-level interaction was defined as behaviour that may have indicated social intent but did not lead to interaction, such as staring without eye contact, standing in close proximity to peers but not approaching them, imitating peers, or typical autistic behaviours such as idiosyncratic language or repetitive behaviour. Teachers also reported on students' social skills using the Social Skills Rating Scale-Teacher Version (SSRS-T). All measures were administered before and immediately after the intervention.

Quality of evidence found

The RCT was of poor quality. Inclusion and exclusion criteria were not explicitly stated, nor was ascertainment procedure. Therefore, it is difficult to determine the extent of any selection bias, and to be sure of applicability of results to an individual or group. No description of the randomisation method was included, which is of concern since poor randomisation methods may fail to balance confounding factors among treatment groups.

Although it was clear that independent raters were blinded to intervention during inter-rater reliability testing, it was not clear whether assessors were routinely blinded during assessment. Due to the nature of the intervention, the participants and their parents could not be blinded to treatment allocation. The lack of blinding could lead to bias, especially in subjective outcome measures such as the parental self-efficacy in behaviour management outcome.

The study stated that many outcome measures were used but only three reported, all of which were unvalidated, so it is not clear whether results reflect

clinically important changes in aspects of function. It was not clear on what basis outcomes were selected for presentation, and it may be that only the most favourable outcomes were presented. It was not stated whether significance levels had been adjusted to allow for multiple testing. The lack of such adjustment increases the likelihood that any significant difference found between groups could be due to chance. Pre-treatment assessment scores were not significantly different between groups at baseline (scores depicted graphically; no P value given), but there was no further comparison of the characteristics of the groups at baseline.

There was no description of dropouts, and it was not clear whether the analysis was by intention to treat. The follow up period was short and therefore no conclusions about the long-term effects of CBT could be drawn.

The second study⁵ was a small case series: an intrinsically weak design for examining effectiveness because it lacks a control group. Changes observed cannot be conclusively attributed to the intervention, rather than to natural development, learning, or the extra attention received during the intervention. Also, because the intervention included both CBT and organised peer interaction, the contribution of each of these components to the outcomes cannot be determined. The study was small, and therefore was at risk of finding positive results by chance, or of finding no effect by chance.

Inclusion and exclusion criteria were clearly stated, and these allowed us to conclude that results are generalisable only to autistic children with a high level of function. Reasonable steps had been taken to ensure accurate assessment of changes from baseline following treatment. The outcome measures used

had been validated, suggesting that they did reflect clinically important outcomes. Most outcome measures consisted of several components, each of which was tested individually, and the level for significance was adjusted to $P \leq 0.01$. It was not stated whether there was any loss to follow up. It is possible that the teacher-assessed outcome may have been biased towards a favourable result because they had provided the therapy. The independent assessors of the children's social interaction were not blinded to the fact that children were receiving social skills training, and this could also have introduced a bias towards a positive outcome. The study did not provide any parent-assessed outcomes, and therefore we cannot assess the effects on a child's behaviour outside the school setting. Because outcomes were measured immediately after the completion of the intervention, the duration of the effects seen is not known.

Study results

The RCT found that CBT, both with and without parents as co-therapists, significantly increased the number of positive solutions the child was able to provide to the "James and the Maths Test" assessment post-intervention and at 6 week follow up (scores depicted graphically; $P < 0.0001$). CBT, both with and without parents as co-therapists, significantly improved parents' self reported efficacy in managing behaviour compared with the waiting list control (scores depicted graphically; no P value stated). As neither of these outcomes had been validated, the clinical importance of these results is unclear.

The case series found that children's performance on the Problem Solving Measure significantly improved after CBT (overall pre- and post-intervention

scores not given; $P < 0.01$). In the emotional inventory measure, children significantly improved in their ability to describe complex emotions and give specific examples of when they had experienced these emotions (AR for providing examples of five or more complex emotions: 27% before treatment v 53% after treatment; $P < 0.001$). Children also improved on their knowledge of basic emotions (AR for providing examples of four basic emotions: 60% before treatment v 100% after treatment; $P = 0.02$).

Children showed significantly more instances of positive social interaction with their peers after CBT (mean number of positive interactions in 15 minute period: 6.09 at baseline v 12.0 after CBT; $P < 0.001$). There was no significant change in the children's low-level social interaction or negative interaction with their peers after CBT (mean number of negative interactions: 0.50 at baseline v 0.86 after CBT; P value not stated; mean number of low-level interactions: 3.33 at baseline v 4.46 after CBT; P value not stated). Children's behaviour improved significantly after CBT as assessed by teachers (overall SSRS-T scores not given; $P < 0.001$).

Conclusions

We found only two studies that met our inclusion criteria. Neither was reliable enough to decide whether or not CBT has any clinically important effects in children with autistic spectrum disorder.

One poor quality RCT in children with Asperger's syndrome found that CBT improved the children's ability to provide hypothetical solutions to an anxiety-promoting situation, and increased parents' confidence in their ability to manage their children's problem

behaviours. However, the direct effect of the CBT on the children's behaviour was not assessed, and the relevance and reliability of the outcomes used is questionable.

One small case series of moderate quality in high functioning children with autism found that after CBT, children showed improvements in their ability to provide hypothetical solutions to social dilemmas, their understanding of emotions, and their social skills from baseline. However, due to the lack of a control group it is impossible to determine whether these improvements were due to the CBT.

6. Vickers B. Cognitive behaviour therapy for adolescents with psychological disorders: A group treatment programme. *Clinical Child Psychology and Psychiatry* 2002; 7: 249-262
7. Reaven J and Hepburn S. Cognitive-behavioural treatment of obsessive compulsive disorder in a child with Asperger syndrome. *Autism* 2003; 7: 145-164

References

1. Attwood T. Frameworks for behavioural interventions. *Child and Adolescent Psychiatric Clinics N. Am.* 2003; 12: 65-86
2. Hare DJ, Paine C. Developing cognitive behavioural treatments for people with Asperger's syndrome. *Clinical Psychology Forum* 1997; 110: 5-8
3. Drinkwater J, Stewart A. Cognitive behaviour therapy for young people. *Current Opinion in Psychiatry* 2002; 15: 377-381
4. Sofronoff K and Attwood T. A cognitive behaviour therapy intervention for anxiety in children with Asperger's syndrome. *GAP* 2003; 4: 2-8
5. Bauminger N. The facilitation of social-emotional understanding and social interaction in high-functioning children with autism: Intervention outcomes. *Journal of Autism & Developmental Disorders* 2002; 32: 283-298

Table 1: Outcome measures used in included studies

Measures used	Inter-rater reliability	Measure validated?
Sofronoff & Attwood ⁴		
"James and the Maths Test" problem solving measure	99%	No
Parental efficacy in behaviour management	Not stated	No
Bauminger ⁵		
Modified Lochman and Lampron problem solving measure	95%-100%	Yes
Emotion inventory	66%-100%	Yes
Social Skills Rating Scale-Teacher Version	Not stated	Yes
Modified Hauck Behaviour Coding Scheme of social interaction	85%	Yes

Annex: Summary of case series (n<5)

Reference	Study design	Participants	Interventions	Outcomes	Comments
Vickers ⁶	Two case reports	Two males aged 15 and 16 years, one with Asperger's syndrome and one with autism	Twelve weekly 1.5 hour group CBT sessions in a mixed diagnosis group of adolescents. Sessions aimed at improving social skills deficits.	"Major clinical improvement" in both boys. The boy with Asperger's syndrome showed improved mood, improved social competency. The boy with autism showed decreased anxiety and improved eye-contact.	Both participants were also undergoing family therapy at the time of intervention. No control group. Clinical improvement was quantified by researchers on an unvalidated scale. Other improvements were reported by teachers and parents and were presented narratively.
Reaven & Hepburn ⁷	Case report	One female aged 7 years with high functioning ASD/Asperger's syndrome (Autism Diagnostic Interview-Revised) and obsessive compulsive disorder (OCD; DSM-IV criteria).	Individual CBT sessions based on the children's CBT protocol of March and Mulle aimed at reducing OCD symptoms. Fourteen sessions were given over a 5.5 month period.	Improvement in symptoms on the Children's Yale-Brown Obsessive Compulsive Scale (score decreased from 23 (moderate) at baseline to 8 near the end of treatment). Self reported improvement of symptoms using a visual scale and a visual mapping tool.	Participant was prescribed sertraline for OCD symptoms and anxiety 3 months into the intervention, therefore it is not possible to determine whether improvements were due to CBT or pharmacotherapy.

STEER



B A Z I A N