Peninsula Cerebra Research Unit
PenCRU Childhood Disability Research

What's the Evidence?

Applied behaviour analysis for autistic spectrum disorders

- Applied behaviour analysis (ABA) is an approach to understanding and modifying behaviours.
- Early intensive behavioural intervention (EIBI) is an individualised treatment programme based on ABA delivered by professionals or parents.
- Research evidence suggests EIBI can have positive effects on adaptive behaviour, language skills, and IQ for many, but not all, children with ASD.
- More high-quality research is needed: to establish the characteristics of children most likely to respond to EIBI, to evaluate the long-term effectiveness, and to compare this approach to other available therapies.

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What were we asked?

A parent asked us about Applied Behaviour Analysis (ABA) for children with Autistic Spectrum Disorders (ASD), and whether it is effective.

What did we do?

In 2012 we searched a range of academic databases including NHS Evidence, the Cochrane Library, TRIP database, NICE guidelines and Pubmed for evidence and articles on this topic. This search was updated in January 2015.

In addition we sought advice from families and colleagues with expertise in ASD and consulted the Research Autism website.

For more information about research terms and what they mean, please see our website.

What did we find?

What is ABA?

Definitions vary, but Applied Behaviour Analysis (ABA) is an approach to 1) analyse behaviour and factors that might be influencing behaviour, and 2) identify ways to establish and encourage new behaviours to improve quality of life for the individual, such as participation and learning skills.

ABA involves the analysis of:

- The behaviour of interest (with whom/where/when/how often it occurs),
- Factors that may be triggering, maintaining or limiting the behaviour,
- Potential reinforcers; items or activities that are likely to increase desired behaviours or environmental variables that may be modified to decrease problem behaviours,
- Strategies such as prompting, modelling, shaping, discrete trial training (teaching in

simple structured steps), extinction (stopping behaviour by removing the reason for the behaviour), time outs etc. that can be used to promote positive and/or decrease "negative" behaviours.

ABA is an approach, and not a discrete therapy for children with ASD. Many different programmes and interventions for children with ASD are based on methods derived from ABA. For this reason, the Research Autism website suggests that it is not possible to judge the effectiveness of Applied Behaviour Analysis for children with ASD as a whole.

There are studies about some particular interventions based on ABA, such as Early Intensive Behavioural Intervention (EIBI).

What is Early Intensive Behavioural Intervention (EIBI)?

- EIBI is an intervention for young children with ASD based on the principles of Applied Behaviour Analysis (ABA) which aims to improve intellectual ability, communication and social skills.
- Positive behaviours are rewarded and reinforced, while inappropriate behaviours are discouraged.
- The intervention is delivered to children from age 3-4 years, and is personalised to the specific learning needs of each child.
- It is intensive, with 20-40 hours of therapy per week delivered by a trained therapist for 2-3 years. Sometimes parents can be trained to deliver the treatment themselves.
- A one-to-one format is followed with gradual transition into group work and activities in a natural context.

NHS Choices website and Research Autism website provide more information about this treatment. However EIBI is not provided by the NHS. The therapy can be expensive when delivered by a professional therapist, and time consuming whether it is delivered by a therapist or parent.[1]

Is EIBI an effective therapy for ASD?

- A systematic review published in 2012 looked at five studies of EIBI; one randomised controlled trial (RCT) and four controlled clinical trials (in which children were assigned to treatment groups based on parental preference, rather than randomisation).[2]
- The results from the four controlled clinical trials (CCT) were combined in a meta-analysis. This is a way of bringing together results from several studies into one more reliable result.
- The results of this meta-analysis indicate a positive treatment effect for EIBI on adaptive behaviour (everyday life skills), language, IQ and social competence.
- The results from the one RCT showed similar positive effects as the combined CCT results on IQ and expressive language. Less effects were found for adaptive behaviour, daily communication skills and social competence.
- A review of five meta-analyses of 26 studies into EIBI for young children with ASD was also published in 2012.[3]
- Four out of the five meta-analyses suggested EIBI was effective to increase IQ and adaptive behaviour for many children with ASD. The other meta-analysis concluded EIBI was not superior to 'standard care'.
- In a 2014 review of therapies for children with ASD, 25 comparative studies of EIBI were considered. Each of the studies reviewed had more than ten participants. [4]
- Improvements from EIBI were most often seen in cognitive ability and language acquisition of young children receiving high-intensity EIBI over extended time periods (8 months – 2 years).
- Effects on adaptive skills, severity of ASD symptoms and social functioning were less consistent across studies.
- This review concluded that EIBI delivered in an intensive (i.e. more than 15 hours a week over 2 years) and comprehensive (addressing different areas of functioning) way can positively affect the development of some children with ASD.

- A further study looked at the individual participant data from 16 group design studies (309 children received EIBI, 105 were in a control group, 39 received comparison intervention). [5]
- The results of this study suggest that intensity of EIBI and the child's IQ and adaptive behaviour at the start of EIBI is associated with better outcomes from this intervention.

Limitations of studies into EIBI

- Despite broadly positive results for EIBI to benefit some children with ASD, the quality of the research studies limits the strength of the evidence of effectiveness.
- The reviews indicate that there has been a substantial amount of research in this area, but differences between individual studies and the meta-analyses (e.g. including different research designs and different definitions of EIBI) lead to different estimates of effectiveness.
- The inclusion of non-randomised studies in the meta-analysis and the high risk of bias (e.g. small sample sizes) in the individual studies mean that the results need to be interpreted cautiously.
- Differences in how EIBI is delivered make it difficult to compare studies. Few studies report details on levels of adherence to techniques and strategies during therapy.
- Few studies followed-up children for more than one year after therapy.

What do professional guidelines say?

- The New Zealand Autism Spectrum Disorder Guidelines recommend that interventions based on ABA principles should be considered for all children with ASD. While it grades the evidence as fair rather than good, it states that EIBI should be considered as a treatment of value for young children with ASD to improve cognitive ability, language skills and adaptive behaviour.[6]
- The American Academy of Pediatrics and American Academy of Child and Adolescent Psychiatry recognise the limitations of the evidence but acknowledge the likely efficacy of ABA techniques to improve IQ, language, academic performance and adaptive behaviour. [7,8]
- The UK National Institute for Health and Care Excellence (NICE) does not provide specific guidance on therapies based on ABA. NICE recommends consideration of social-communication interventions for the core features of autism. NICE suggest such interventions should aim to increase understanding, sensitivity and responsiveness to the child's pattern of communication and interaction through play-based strategies. They advise interventions are delivered by trained professionals following an assessment.[9]

What do we think?

Evidence suggests that therapies using the principles of ABA, such as EIBI, can have positive effects on adaptive behaviour, language skills and IQ for many children with ASD.

Not every child that receives EIBI will necessarily improve in these areas and other programmes might be as effective, so research is needed to:

- identify which children are most likely to benefit from EIBI;
- look at the long-term effectiveness and how to maintain treatment effects;
- compare this therapy with other treatments of similar intensity.

It is also important that researchers use the same outcome measures, in the same way, in order to be able to compare and combine the results from different trials. [10, 11, 12]

Signposts to other information

- Research Autism has a useful glossary which includes ABA terms.
- The Behaviour Analyst Certification Board provides practice guidelines and certification for ABA providers.
- The UK ABA Autism Education Competence Framework describes knowledge and skills for delivery of ABA interventions. It is

available on the Ambitious about Autism website (scroll down page).

We would like to hear your feedback on this summary – please email us at pencru@exeter.ac.uk if you have any comments or questions.

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