Meta-analysis of early intensive behavioral intervention for children with autism

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CRD summary
The authors concluded that early intensive behavioural intervention was associated with large to moderate improvements in IQ (intelligence quotient) and adaptive behaviour in children with autism compared to no intervention or eclectic treatment. Given the paucity of randomised controlled trials and the unclear quality of the included trials, the reliability of the authors' conclusions is unclear.

Authors' objectives
To evaluate the effectiveness of early intensive behavioural intervention (EIBI) for children with autism.

Searching
PsycINFO, PubMed and ERIC were searched to March 2008. Search terms were reported. Bibliographies of retrieved studies were handsearched for further studies.

Study selection
Published peer-reviewed controlled or comparison studies of EIBI that lasted between 12 and 36 months in children with an independent diagnosis of autism or PDD-NOS were eligible for inclusion. The participants on average should be between two and seven years old. Outcomes eligible for inclusion were full-scale IQ (intelligence quotient) and/or a standardised measure of adaptive behaviour. Studies were excluded if the main outcome was a measure of non-verbal intelligence. Studies were categorised as comparison studies if the non-intervention group received another therapy of similar intensity and duration to the intervention group. Studies were categorised as control studies if the non-intervention group received either no treatment or treatment that was considerably less intense/shorter in duration than the intervention group.

Included studies were of EIBI that ranged from less than 10 hours per week to 40 hours per week for a duration ranging from 12 to 36 months. Comparison conditions were applied behavioural analysis or eclectic treatment of similar intensity and duration to the intervention. Mean age of children ranged from 30.9 months to 66.3 months. IQ pre-treatment ranged from 27.3 to 65.2. IQ was most frequently measured using Bayley Scales of Infant Development, Stanford Binet Intelligence scale or the Wechsler Scales of Intelligence. Adaptive behaviour was assessed using the Vineland Adaptive Behaviour Scale.

One reviewer screened titles and abstracts. A second reviewer performed the study selection on 28% of the identified hits and checked the studies by the second reviewer. Three reviewers then independently selected studies and agreed on the final selection.

Assessment of study quality
The authors did not state that they assessed study validity.

Data extraction
The authors were contacted for raw data on individual participants. Data pre-intervention and as close as possible to two years in intervention were used to calculate means, standard deviations and effect sizes for individual studies.

Data were extracted by three reviewers and inter-rater agreement was calculated.

Methods of synthesis
Statistical heterogeneity was assessed using the Q statistic and the I² statistic. Pooled effect sizes with 95% confidence intervals (CI) were calculated using Hedges g. In the absence of significant statistical heterogeneity, a fixed-effects model was used. One study that had both a control and comparison group was entered separately for each group in the meta-analysis. Publication bias was assessed using Egger's Funnel Plots and Duval and Tweedie's trim and fill method.
Results of the review
Nine studies were included for the review (n=237): one randomised controlled trial (RCT) (n=28) and eight quasi-experimental studies (n=209). Samples sizes ranged from 14 to 61 participants.

EIBI was associated with a large positive effect on full scale IQ (Hedge's g 1.10, 95% CI 0.87 to 1.34; 10 comparisons, n=237) and a moderate positive effect on adaptive behaviour (Hedge's g 0.66, 95% CI 0.41 to 0.90; eight comparisons, n=178).

Sensitivity analysis that included only the comparison group from the study with two non-intervention groups did not significantly alter the findings. There was no evidence of significant statistical heterogeneity or publication bias.

Authors' conclusions
EIBI was associated with large to moderate improvements in IQ and adaptive behaviour in children with autism compared to no intervention or eclectic treatment.

CRD commentary
The review addressed a clear question with well-defined inclusion criteria. Several databases were searched. Unpublished data were excluded from the review. Publication bias was assessed and no evidence of it was found; the authors acknowledged that given the small number of included studies, publication bias could not be ruled out definitively. It was unclear whether language restrictions were applied during the search, so language bias could not be ruled out. Appropriate steps were taken in the study selection and data abstraction stages to minimise reviewer error and bias. No assessment of study validity was conducted, so it was not possible to determine the quality of included studies. Most of the included studies were not randomised, which limited the conclusions that could be drawn. The decision to combine studies in a meta-analysis was appropriate and statistical heterogeneity was assessed and ruled out. Entering a study twice in a meta-analysis may introduce bias; the authors controlled for this by also entering the study only once. Given the paucity of RCTs and the unclear quality of the included trials, the reliability of the authors' conclusions is unclear.

Implications of the review for practice and research
Practice: The authors stated that, at present and given the absence of any other interventions of proven effectiveness, EIBI should be an intervention of choice for children with autism.

Research: The authors stated that randomised controlled trials that compared EIBI to interventions with similar intensity, staff training and supervision were needed. Future research should investigate the role of moderating variables on the effectiveness of EIBI.

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