

Efficacy of the Incredible Years Basic parent training programme as an early intervention for children with conduct problems and ADHD

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Abstract

Background The efficacy of the Incredible Years (IY) Basic parent training (PT) programme for a community-based sample of families with pre-school children at risk of developing both conduct problems and attention deficit hyperactivity disorder (ADHD) was examined.

Methods Pre-school children displaying signs of both early-onset conduct problems and ADHD were randomly allocated to either IY PT intervention, or to a waiting list (WL) control group. Child symptoms were assessed before and after the intervention.

Results Post intervention, the intervention group was associated with significantly lower levels of parent-reported inattention and hyperactive/impulsive difficulties, even after controlling for post-intervention changes in child deviance. In addition, 52% of those in the intervention condition, compared with 21% in the control condition, displayed clinically reliable improvements post intervention, giving an absolute risk reduction of 31% and a number needed to treat of 3.23.

Conclusions Findings from this study indicate that the IY PT programme is a valuable intervention for many pre-school children displaying early signs of ADHD.

Keywords

ADHD, conduct disorder, conduct problems, Incredible Years, parenting

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Introduction

Attention deficit hyperactivity disorder [ADHD; American Psychiatric Association (APA) 1994] is characterized by developmentally inappropriate levels of inattention, impulsivity and overactivity (APA 1994; Barkley 1997). These problems typically emerge in early childhood, are relatively persistent and result in cross-situational impairment (e.g. at home and at school; APA 1994). The current Diagnostic and Statistical Manual of Mental Disorders (4th edition) specifies three subtypes of ADHD: predominantly inattentive subtype; predominantly hyperactive/impulsive subtype; or combined subtype. Problems must be evident in two or more settings (e.g. home and school), and the child must show significant impairment in social, school, or work functioning (APA 1994, 2000). Prevalence estimates indi-

cate that between 3% and 6% of school-aged children meet diagnostic criteria for ADHD (Szatmari 1992; APA 1994, 2000).

Left untreated, the long-term prognosis for these children is poor. Children with ADHD are at a much greater risk of experiencing problems in the educational, personal and social domains (Daley 2006). Children with ADHD are also at a heightened risk of developing conduct problems, substance abuse, and interpersonal and occupational difficulties that can persist into adulthood (Manuzza *et al.* 1991; Taylor *et al.* 1996).

The disorder is also highly comorbid (Szatmari *et al.* 1989a). Chief among these comorbidities are conduct problems [including oppositional defiant disorder (ODD) and conduct disorder (CD)], occurring in an estimated 30–70% of children diagnosed with ADHD (Szatmari *et al.* 1989a; Biederman *et al.* 1991). These children typically experience more severe

symptoms, more peer rejection, and their parents are more likely to encounter higher levels of psychosocial adversity (Abikoff & Klein 1992; Kuhne *et al.* 1997), which poses a significant clinical and public health problem (Szatmari *et al.* 1989b).

Intervention

Guidance from both the National Institute for Clinical Excellence in the UK and American Pediatric Association in the USA indicates that a combination of psycho-stimulant medication (e.g. methylphenidate) and specific psychosocial therapies is the optimal intervention package for the management of ADHD symptoms. Despite evidence for the short-term benefit of this combination, no controlled evidence for the generalized long-term effectiveness has, as yet, been provided. There are also some ethical objections to the prescription of stimulant medication to young children, especially in light of the fact that ADHD is not typically diagnosed until the child reaches middle childhood (APA 2000). Thus, behavioural-psychosocial treatment is considered an appropriate first-level treatment for pre-schoolers with symptoms of ADHD and CD (Conners *et al.* 2001).

Evidence for the efficacy of psychosocial intervention for parents of children with ADHD appears stronger for pre-school children (Sonuga-Barke *et al.* 2001; Bor *et al.* 2002), weaker for school-aged children and non-existent for adolescents (Pelham *et al.* 1998). The success of psychosocial intervention in the pre-school years is based on the premise that early intervention, before the transition to school and before the child's behaviour becomes associated with antisocial tendency and school failure, offers the best opportunity of altering the developmental course of the disorder (Daley 2006).

Given the importance assigned to family and parenting characteristics in the development of pre-school children, parenting programmes are generally viewed as an essential component of early intervention. Some parent training (PT) programmes have a successful history as an effective intervention for treating children with ODD and CD (Webster-Stratton 1990, 1998; Brestan & Eyberg 1998; Scott *et al.* 2001). In essence, PT provides parents with child behaviour management techniques that are grounded in the principles of social learning theory. In spite of its origin as a treatment method for children with antisocial behaviour, recent studies have found that some PT programmes work equally well for children with comorbid ADHD (Hartman *et al.* 2002; Pelham *et al.* 1998), and that conduct problems and ADHD symptoms may develop during a sensitive period in development through an interaction between the child's emo-

tional dysregulation and parents' rejecting and coercive parenting (Kochanska 1993; Morrell & Murray 2003).

Evidence for psychosocial intervention for young children

Pisterman and colleagues (1989) examined the efficacy of a group-based PT programme on the compliance behaviour of pre-school children with symptoms of ADHD. The treatment group showed significant improvements on observational measures of parent-child interactions and child compliance behaviour post intervention. These gains were maintained at 3-month follow-up.

More recently, Sonuga-Barke and colleagues (2001) compared a PT intervention with a parent counselling and support treatment, and a waiting list (WL) control group. It was found that PT significantly reduced ADHD symptoms and improved mothers sense of well-being. Fifty-three per cent of children in the PT group displayed clinically significant improvement following intervention. Similarly, Bor and colleagues (2002) evaluated intervention outcomes from standard and enhanced behavioural family intervention with WL control for pre-school children with comorbid attentional/hyperactive difficulties and disruptive behaviour. Significant reductions in behaviour problems and increased parental competence were found in both family intervention groups compared with the control group, with 80% of the children in the intervention group showing clinically significant improvements in observed negative behaviour, including reductions in both conduct problems and in attention and hyperactive difficulties.

Rationale for examining Incredible Years (IY) for ADHD

The IY basic parenting programme (Webster-Stratton & Hancock 1998) has been identified as one of 11 'Blueprint' interventions by the Center for Violence Prevention at the University of Colorado (Mihalic *et al.* 2002), having satisfied stringent scientific criteria (including use of long-term follow-ups, randomized controlled trials, replication by independent researchers, and that they were published in sufficient detail to effective implementation by others). There is a strong evidence base for the effectiveness of this programme in enhancing parenting competencies and in reducing disruptive behaviours in children, and these gains have been maintained at long-term follow-up (Webster-Stratton 1990, 1998; Scott *et al.* 2001). Many of these children with disruptive behaviours have co-occurring ADHD symptoms, and there is evidence that the IY programme is equally effective for these children (Scott *et al.* 2001; Hartman *et al.* 2002).

Table 1. Demographic characteristics of participants*

Variable	Intervention (BPT) (n = 50)		Control (WL) (n = 29)		Total (n = 79)	
	Mean	SD	Mean	SD	Mean	SD
Child's age (months)	46.50	6.08	45.90	6.38	46.28	6.16
Mother's age (years)	27.54	5.80	28.00	4.48	27.71	5.32
Number of children in family	2.52	1.32	2.79	1.63	2.62	1.44

*Groups did not differ significantly on any characteristic (χ^2 and analysis of variance).
BPT, behavioural-psychosocial treatment; WL, waiting list.

The IY parenting programme was selected as the intervention programme for this study because of the impressive evaluation data on the programme and the availability of training and supervision in Wales. Furthermore, a core component of the programme aims to help parents to develop skills to promote their child's emotional development. For children with ADHD symptoms in particular, this component may provide a valuable medium by which to break the negative interaction between coercive parenting and the child's emotional dysregulation (Morrel & Murray 2003), thus improving the child's emotional regulation and ADHD symptoms in the long term. The programme was evaluated using a community sample of pre-school children presenting signs of co-occurring disruptive behaviours and ADHD symptoms in 11 Sure Start centres in north and mid-Wales (Hutchings *et al.* 2004; Hutchings *et al.* 2007).

Aims of the study

Specifically the aims of the study were to:

- 1 evaluate the effectiveness of the IY parenting programme for reducing ADHD symptoms in pre-schoolers with conduct problems and comorbid ADHD symptoms;
- 2 examine whether post-intervention improvements for ADHD symptoms were independent of changes in conduct problem scores.

Methods

Participants

Participants in the research were drawn from an existing sample of 133 families that had been previously randomized to one of two conditions on a 2:1 basis: intervention (PT) and wait-list control (WL) (Hutchings *et al.* 2004; Hutchings *et al.* 2007). The 133 families came from a sample of 255 families, who had been identified by their local health visitors, and who lived in desig-

nated Sure Start areas in north and mid-Wales. Families were eligible for inclusion into the research if they had a child aged between 36 and 48 months, and if parents reported their child's behaviour to be above the clinical cut-off on either the problem or Intensity subscale of the Eyberg Child Behaviour Inventory (ECBI; Intensity score = 127 or problem score = 11; Eyberg & Ross 1978; Eyberg 1980). To be eligible for this study, the parents must also have rated their child's behaviour to be above the clinical cut-off on the Hyperactivity subscale of the Strengths and Difficulties Questionnaire (SDQ; Hyperactivity score = 7; Goodman 1997). After these criteria were employed, 79 of the 133 families met inclusion criteria for this study, showing signs of both early-onset externalizing problems and hyperactivity. Fifty of these families were in the intervention group, and 29 in the WL control group.

Demographic characteristics for the sample are presented in Table 1. All primary caregivers interviewed were mothers [mean age 27.71 years (SD = 5.32)]. Thirty-nine per cent of families were single parents. The mean age of the index child was 46.28 months (SD = 6.16), and they were predominantly male (68%). There were no significant differences between the intervention and control groups on these socio-demographic characteristics at baseline, indicating that the groups were well matched on these factors.

Measures

Child and family factors were assessed using a combination of interview, questionnaire and direct behavioural observation. The measures were administered to primary caregivers at baseline, and 6 months later, with the intervention being delivered during the intervening period.

Screening: parent report measures

ECBI (Eyberg & Ross 1978; Eyberg 1980)

This is a 36-item parent report measure assessing the occurrence of problem behaviours in children aged from 2 to

16 years. Each behaviour is rated on two scales: a seven-point Intensity scale which measures the frequency of particular behaviours, and a *Yes-No Problem* scale that identifies whether the parent perceives the behaviour to be a problem. The scale demonstrates good stability, with reliability coefficients from 0.86 (test–retest) to 0.98 (internal consistency) (Robinson *et al.* 1980). The ECBI has shown good convergent validity, with ECBI scores being significantly correlated with scores on the Child Behaviour Checklist (Achenbach & Edelbrock 1986) and the Parenting Stress Index (Abidin 1990). The ECBI has been shown to discriminate well between children with and without conduct problems (Eyberg & Ross 1978; Baden & Howe 1992).

SDQ (Goodman, 1997)

This 25-item inventory was designed as a behavioural screening measure to assess the occurrence of particular behaviours that have been associated with conduct problems, hyperactivity, emotional symptoms and peer problems in children. The scale has demonstrated good stability, whether judged by internal consistency (mean Cronbach's alpha: 0.73), cross-informant correlation (mean: 0.34), and test–retest stability after 4–6 months (mean: 0.62) (Goodman 2001). In terms of discriminant validity, high SDQ scores have been associated with a strong increase in psychiatric risk (Goodman 2001).

Parent report measures (outcome)

Conners Abbreviated Parent/Teacher Rating Scale (Conners 1994)

This 10-item scale assesses the incidence of ADHD symptoms observed by the parent in children aged 3–7 years. It comprises of the most highly loaded symptoms from the factor scales of the Conners Parent and Conners Teacher Rating Scale. The respondent (parent) is asked to rate the frequency of particular behaviours on a four-point scale ranging from 0 (not at all) to 3 (very much).

Observation of mother and child behaviour: Dyadic Parent–Child Interaction Coding System (DPICS; Eyberg & Robinson 1981)

Mother and child behaviour was assessed using a 30-min live home observation system (the DPICS; Eyberg & Robinson 1981). The DPICS comprises 37 behaviours relating to both parent and child, which are summarized into four 'parenting' composite variables: (1) positive parenting (including praise,

positive affect, physical positive behaviour); (2) critical parenting (including negative commands and critical statements); (3) total commands, and parent non-verbal affect (valence); and three 'child' composite variables: (1) child deviance (including negative and destructive behaviour and non-compliance); (2) pro-social behaviours (including physical warmth and positive statements); and (3) child non-verbal affect (valence).

Observational coding is continuous and records the total frequency of each behaviour per specified interval. The observation was divided into six 5-min segments, which were recorded consecutively. The observations were carried out in a naturalistic, unstructured setting, whereby the families were instructed to continue with what they would normally do at that particular time of day. In order to obtain sufficient parent–child interaction data, families were instructed to stay in one room, and to have TVs and computers switched off.

Six trained observers coded the interactions. In order to maintain inter-rater reliability observers coded videotaped practice interactions on a weekly basis. Inter-rater agreement was assessed by having 20% of observations coded by a second rater. All coders were blind as to participant group status. An acceptable level of inter-rater agreement was achieved (75%).

Design

This study included children presenting signs of early-onset co-occurring ADHD symptoms and disruptive behaviour from within a randomized controlled group design (stratified for sex and age of index child) with two conditions (PT and WL) and two time points (pre- and post-intervention).

Randomization

The study utilized a pragmatic randomized controlled trial design. Participants were block-randomized by area. The unit of randomization was the parent–index child pair. The fourth author blindly, and randomly, allocated participants on a 2:1 basis (intervention to control) after they were stratified by age and sex, using a random number generator. This design gives the opportunity to evaluate a larger intervention sample than a 1:1 ratio with only small loss of statistical power, and is a design favoured in this field of research. The benefits of this 2:1 design are mainly ethical in that more families receive the intervention, less have to wait for it, and additional places are available to be offered to non-research parents at each local service area in the subsequent (control) group.

Allocation was carried out after baseline assessment. Interviews and observations were carried out by researchers blind to participant allocation status at both time points to reduce bias.

Procedure

Pre and post intervention, participating families were visited in their home on two occasions within a 3-day interval. At the first visit, interview and questionnaire measures were administered to the parent. This visit lasted approximately 1 h. Live observations were carried out during the second visit. These visits took place between the hours of 4 and 7 PM at the family home and lasted for approximately 40 min. During the 30-min observation, the parent and index child were instructed to stay in one room, with the TV off, and to interact as they would normally do at that time of day.

Intervention and treatment integrity

Twelve intervention groups were delivered in 11 Sure Start areas across North and mid-Wales. The programme promotes positive parenting through the use of reinforcement, and there is a strong evidence base for the effectiveness of the programme in enhancing parenting skills, reducing child conduct problems, as well as improving parent-child relationships (Webster-Stratton 1998; Scott *et al.* 2001). Skills taught on the programme include (1) how to establish a positive relationship with their child through play and child centred activities; (2) encouraging praise, reward and incentives for appropriate child behaviours; (3) guidance in the use of effective limit setting and clear instruction giving; and (4) strategies for managing non-compliance. Parents acquire these skills through facilitator-lead group discussion, brain storming, videotape modelling, role-play and rehearsal of taught intervention techniques, both within the group, and through home assignments. Parents attended the group for 2.5 h per week for 12 weeks, and received weekly telephone calls from the group leader to encourage and monitor progress.

The groups were run by experienced and certified group leaders, who adhered to the programme delivery as specified in the programme manual. The programme addresses implementation fidelity by: providing all course materials, CDs, handouts, books, raffle prizes, etc.; ensuring leaders had a 3-day basic leader training and had previous experience in running a group; completion of a group leader peer and self-evaluation questionnaire to evaluate treatment exposure, adherence, treatment delivery; parent-completed satisfaction questionnaires; completion of session-specific checklists to monitor treatment

integrity, participant responsiveness, treatment delivery and treatment differentiation; access to mentor supervision, to evaluate progress and delivery method, e.g. reviewing videotapes within a 3-h weekly supervision session with an IY trainer; and certification – evaluation of treatment fidelity based on observation of random videotapes by an independent IY trainer.

Results

Attrition

Inclusion of cases in the analyses was performed on an intention to treat basis. Attrition rates were generally low. Out of the 79 families assessed at baseline, 71 (90%) completed follow-up assessment. Of those who failed to complete post-assessment, six were in the intervention group, and two in the control group.

Attendance

Within the intervention condition, 44 out of 50 (88%) attended at least one session, and of those, 37 (84%) attended eight or more sessions. The overall mean attendance was 9.47 sessions ($SD = 2.94$).

Impact of intervention on conduct problems

The focus of this study is on the impact of intervention on ADHD symptoms. The intervention was very successful at reducing CD symptoms, but these results have been presented in a separate paper (Hutchings *et al.* 2007).

Preliminary analyses (equivalence)

Initial analyses examined the equivalence of groups at baseline on primary measures of outcome. Results of a Kolmogorov Smirnov test indicated that both the DPICS child deviance and the SDQ hyperactivity measures were significantly non-normal: $D(79) = 2.18$, $P = 0.00$; and $D(79) = 1.78$, $P = 0.04$ respectively. However, ANOVA is robust to the violation of the non-parametric assumption with more than 15 cases per cell (Green *et al.* 2000).

Using a series of one-way Analysis of Variance ANOVAs, no significant differences were found between the two groups at baseline, indicating that intervention and control families were well matched prior to receiving intervention. These findings are summarized in Table 2.

Table 2. Equivalence of groups

Measure	Intervention (<i>n</i> = 50) Mean (SD)	Control (<i>n</i> = 29) Mean (SD)	<i>F</i>	<i>P</i>
Conners	20.56 (5.86)	19.34 (6.14)	0.761	0.386
Child deviance (DPICS)	17.48 19.78	25.07 (37.78)	1.406	0.239
SDQ Hyperactivity score	8.34 (1.14)	8.24 (1.15)	0.137	0.713

DPICS, Dyadic Parent–Child Interaction Coding System; SDQ, Strengths and Difficulties Questionnaire.

Short-term intervention effects

For the intervention group, the mean scores on the Conners decreased from 20.56 (SD = 5.86) at baseline to 14.60 (SD = 8.12) at follow-up, showing an average reduction in score of 5.96. Scores also decreased for the control group, although this decrease was considerably smaller, with a mean score of 19.50 (SD = 6.09) at baseline decreasing to 17.80 (SD = 6.53) at follow-up, a mean reduction of 1.7.

An ANCOVA was performed to statistically analyse the efficacy of intervention, with the follow-up Conners scores entered as the dependent variable; group (intervention and control) as the fixed factor, and baseline Conners score entered as the covariate. ADHD symptoms improved by an estimated 3.95 points more on average in the treatment group than in the WL control group (95% CI 0.87–7.03, $P = 0.013$). These improvements were found to be significant: $F(2, 76) = 6.53$; $P = 0.013$.

Short-term intervention effects (controlling for changes in child deviance)

To establish whether improvements in ADHD symptoms were independent of improvements in child deviance, further analysis using ANCOVA was conducted, with changes in observed child deviance (DPICS score) from pre to post intervention added as an additional covariate. Results indicated that post-intervention improvements remained significant ($F(3, 65) = 8.77$, $P > 0.004$). These findings are summarized in Fig. 1 and show an advantage of intervention over no intervention even when improvements in conduct problems were controlled for.

Clinical significance of change in children's ADHD symptoms

To examine clinically significant change as opposed to statistical change, two criteria were used to investigate levels of clinical significant change: The Reliable Change Index (RCI; Jacobson & Truax 1991), and a reduction in scores to below clinical threshold on the Conners (Conners 1994). Analysis of clinical signifi-

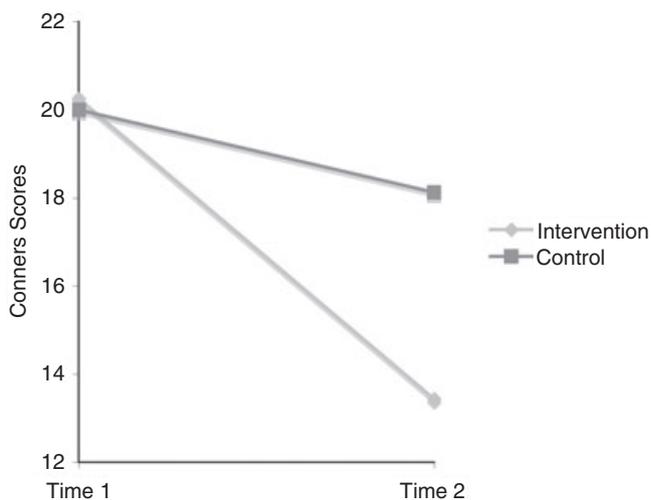


Figure 1. Short-term intervention effects for intervention and control groups (controlling for change in observed child deviance).

cance using RCI criteria indicated that intervention with a 12-week PT course is associated with improvement in, 52% of participants, compared with a 21% improvement in the WL control group, giving an absolute risk reduction (ARR) of 31% (95% CI 11.4–50.6%), which yields a number needed to treat (NNT) of 3.23 (95% CI 1.98–8.77).

Using the clinical cut-off criteria, 58% of the intervention group, compared with 33% of the control group, had follow-up scores that had fallen below the level of clinical concern (≤ 15 ; Conners 1994), yielding an ARR of 24% (95% CI 20.1–45.99%), which gives an NNT of 4.17 (95% CI 2.17–4.98).

Discussion

Overall, the results indicate that the intervention condition was associated with more positive outcomes for children. Using intention to treat analysis, improvements in parent-reported levels of child inattention and hyperactivity from baseline to follow-up were significantly greater in those families randomized to intervention compared with the control group. These findings suggest that the IY PT programme is a successful early

intervention for pre-school children presenting signs of comorbid ADHD type symptoms and disruptive behaviour. The results contribute to the growing evidence in the literature for the effectiveness of PT programmes with families of pre-school children with these types of difficulties. These improvements remained statistically significant even after controlling for changes in observed child deviance, suggesting that, irrespective of co-occurring conduct problems, the IY PT programme may provide an effective intervention for treating early-onset ADHD symptoms alone.

Further investigation of the efficacy of the intervention demonstrated that over half of those in the intervention condition had shown clinically significant improvements in parent-reported negative behaviour. These findings are somewhat consistent with those of Sonuga-Barke and colleagues (2001), and with Bor and colleagues (2002), who reported that 53%, and 80% (respectively) of children in their PT groups demonstrated clinical significant improvements following intervention.

Limitations

These results must be interpreted with some degree of caution, as there are some methodological weaknesses that need to be addressed. Three key limitations are salient. First, the primary outcome measure used was parent-reported. In the context of intervention, parents' expectations of treatment outcome may bias their responses to self-reported outcome measures. The findings would be strengthened if supported by independent behavioural observations and by reports from independent sources (e.g. pre-school teachers). Second, all children in this study scored high on measures of *both* hyperactivity and conduct problems; thus, it was not possible to examine potential differential effects of treatment on subgroups of children. From a clinical perspective, however, this is typical of the presentation of ADHD and conduct problems at this particular age. Third, in the absence of a long-term follow-up, we cannot say that intervention gains were maintained beyond the 3 months post intervention. Nevertheless, there is strong evidence that the effectiveness of the IY parent programme is relatively stable over time, with evidence from independent sources of long-term intervention effects (Webster-Stratton 1990, 1998; Scott *et al.* 2001).

Clinical implications

The IY basic PT programme appears to have a positive effect on ADHD type symptoms. The results of this study suggest that clinics who have already trained IY therapists, and currently do

not have training on any other evidence-based intervention for ADHD, should consider using IY, particularly as a first-line early intervention.

Future studies

The findings from this study leave two important unanswered questions which need to be addressed. First, does the IY programme lead to changes in objective measures of ADHD symptoms in addition to changes in parental reports of ADHD symptoms? Second, which early intervention programme is most effective at changing the developmental course of ADHD? Sonuga-Barke and colleagues (2001) have demonstrated impressive results with their New Forest Parent Training programme (NFPT). Clinicians and commissioners of healthcare interventions would obviously be interested to know whether IY or NFPT was better at altering the developmental course of ADHD. This complex question could only be answered with a head-to-head study of IY and NFPT.

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