

**A Parenting Intervention for Childhood Behavioral Problems:
A Randomised Controlled Trial in Disadvantaged Community-based Setting***

Authors:

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Abstract

Objective: A community-based Randomised Controlled Trial (RCT) was conducted to test the effectiveness of the Incredible Years BASIC parent training program (IYBP) for children with behavioral problems. The trial was conducted in urban areas characterised by high levels of disadvantage. Potential moderators of intervention effects on child behavioral outcomes were also explored. **Methods:** Families were included if the child (aged 32-88 months) scored above a clinical cut-off on the Eyberg Child Behavior Inventory (ECBI). Participants (n=149) were randomly allocated on a 2:1 ratio to an intervention group (n=103) or a waiting-list control group (n=46). Child behavior, parenting skills and parent well-being were assessed at baseline and six months later using parent-report and independent observations. An intention-to-treat analysis of covariance (ANCOVA) was used to examine post-intervention differences between groups. **Results:** There were statistically significant differences in child disordered behavior which favored the intervention group on the EBBI Intensity (effect size=0.7, $p<0.001$) and Problem subscales (effect size=0.75, $p<0.001$). Intervention effects on child hyperactive-inattentive behaviors and social competence, as well as parent competencies and well-being were also found. Moderator analyses showed that the effects of the IYBP intervention on the primary child outcomes were not moderated by child/family demographic characteristics or risk factors. **Conclusion:** The results illustrate the effectiveness of the IYBP in alleviating problem behavior amongst children and in improving well-being amongst families living in disadvantaged areas. The findings also highlight the importance of parental intervention in early childhood for those parents and children who are most in need of support. *Trial Registration: ISRCTN29121945.*

Keywords: child behavioral problems, conduct disorder, parent training, parenting, parent-child relationships, child development

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Abbreviations: IYBP = Incredible Years BASIC parent program; RCT = Randomised
Controlled Trial.

Introduction

Conduct problems (e.g. aggressive, oppositional and hyperactive-inattentive type behaviors) are common in early childhood and are becoming more prevalent (Collishaw, Maughan, Goodman & Pickles, 2004). Early childhood behavioral difficulties are highly predictive of a range of difficulties, including poor scholastic achievement (Reid, Gonzalez, Nordness, Trout & Epstein, 2002), anti-social behavior and peer-rejection (Ladd, Birch & Buhs, 1999), as well as poor outcomes in adulthood such as criminal behavior, poor employment prospects and mental ill health (Colman et al., 2009; Fergusson, Horwood & Ridder, 2005).

Low levels of parental supervision/involvement and harsh and inconsistent discipline are particularly strongly associated with the development of conduct problems (Shaw & Winslow, 1997). Parental mental illness and disrupted family life, which may affect the quality of parent-child interactions, have also been associated with behavioral deviancy (Trapolini, McMahon & Ungerer, 2007). Parent behavior may also mediate the link between risk factors such as difficult child temperament, and the likelihood of developing conduct disordered behavior (Paulussen-Hoogbeem, Stams, Hermanns, Peetsma & van den Wittenboer, 2008). All of these factors may be further compounded by exposure to high levels of socioeconomic disadvantage which have been shown to increase the risk of developing childhood behavioral difficulties (Frick & Morris, 2004; Wasserman et al., 2003).

Evidence-based parenting programs have been identified as an important early intervention strategy designed to improve child functioning, with the long term goal of producing productive and well-adjusted adults (Barlow, Smailagic, Ferriter, Bennett & Jones, 2010; Brestan & Eyberg, 1998). Several group-based parenting programs have been found to be effective in reducing problem behaviors and improving prosocial behavior in children (Furlong et al., 2011; Kaminski, Valle, Filene & Boyle, 2008). Research also indicates that

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parenting programs can improve parenting competency, whilst also benefiting parental psychosocial health and overall family adjustment (Hutchings et al., 2007a).

Recent evidence suggests that parenting programs can be effectively incorporated into community-based services (Gardner, Burton & Klimes, 2006; Hutchings, Bywater & Daley, 2007b). However, to date, most trials of parenting programs have been conducted in clinical settings (e.g. Larsson et al., 2008). Furthermore, reviewers have pointed out that only a small number of parenting program trials meet the methodological (Serketich & Dumas, 1996) or clinical criteria for inclusion in meta-analyses aimed at exploring the clinical effectiveness of parenting programs (Furlong et al., 2010). For example, many trials in this area do not use adequate randomisation procedures (e.g. Scott, Spender, Doolan, Jacobs & Aspland, 2001) and/or appropriate methods for dealing with incomplete or missing outcome data (e.g. Braet et al., 2009; Larsson et al., 2008); other studies do not include children with clinically significant conduct problems (e.g. Dionne, Davis, Sheeber & Madrigal, 2009; Patterson et al., 2002). These limitations may compromise our understanding of the clinical effectiveness of parenting interventions under ‘real world’ conditions.

Exploring the factors and/or conditions which may facilitate or attenuate the outcomes of parent training programs is also critical for intervention research and program development/delivery. For example, studies have shown age and gender to play an important role in outcomes, with males and younger children benefiting more from parent training than females or older children (Lundahl, Risser & Lovejoy, 2006; Reid, Webster-Stratton & Hammond, 2003). Conversely, socioeconomic disadvantage, disrupted family life, and parental psychopathology have been associated with poorer treatment outcomes in parent training (Reyno & McGrath, 2006). The identification of subgroups who may respond differentially to parent training is important in highlighting the conditions under which

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optimal outcomes may be achieved in the delivery of community-based interventions (Gardner, Hutchings, Bywater & Whitaker, 2010).

This study involved a Randomised Controlled Trial (RCT) evaluation of the effectiveness of the Incredible Years Basic Parenting Program (IYBP; Webster-Stratton, 2005) for Irish parents of children who were displaying significant and persistent behavioral difficulties. Recent findings have indicated that 15% of Irish children experience considerable socioemotional and/or behavioral adjustment difficulties (Williams et al., 2009); this figure is comparable to figures from the wider literature which suggest a prevalence of 10 to 20% (Attride-Stirling, Davis, Markless, Sclare, & Day, 2001; Emerson & Einfield, 2010). Additional research suggests that almost one-quarter of parents use harsh or coercive disciplinary strategies with their children (Halpenny, Nixon & Watson, 2009). This is important because children of parents who report more frequent use of physical and harsh forms of punishment, are more likely to display problematic behaviors (Halpenny et al., 2009; Larzelere, Cox & Smith, 2010). Thus, a substantial proportion of families in Ireland and elsewhere may benefit from parent training interventions.

The IYBP is a short, 12-18 session, group-based intervention guided by behavioral and social learning principles and considered to be a “model” program for addressing conduct problems in early childhood (Mihalic, Fagan, Irwin, Ballard & Elliot, 2002; NICE, 2007). Available evidence indicates that the IYBP leads to significant improvements in parenting skills and child adjustment (Gardner et al., 2006; Hutchings et al., 2007a; Webster-Stratton, 1998; Webster-Stratton, Reid & Hammond, 2004). There are currently different versions of the IYBP, but it has been previously delivered and researched as a 12-session program. However, the current study was original, in that it involved the new 14-session program (Webster-Stratton & Reid, 2010) which is an updated version of the original 12-week program; according to Webster-Stratton, the program developer, this is the current

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recommended protocol or dosage (C.S. Webster-Stratton, personal communication, June 8, 2011).

The principal aim of this study was to assess the effectiveness of the IYBP for improving child behavioral and social adjustment, as well as parental competencies and well-being in disadvantaged community-based service settings. We hypothesised that: (1) parent training would lead to improvements in the intensity and frequency of child behavioral problems, including child conduct disorder and hyperactive-inattentive behaviors; (2) there would be positive changes in children's social skills; and (3) that the intervention would lead to improvements in parenting practices and parental stress and well-being. Potential moderators of parent training outcomes were also explored by assessing the role of key child, family and social characteristics in influencing child response to treatment.

Method

Participants and Study Setting

Families were recruited to the study using existing service systems including public health service waiting lists, local schools, community-based agencies and self-referral. Participants were eligible if the primary caregiver rated their child (aged 32–88 months) above the clinical cut-off on either the Intensity subscale (Intensity score ≥ 127) or the Problem subscale (Problem score ≥ 11) of the *Eyberg Child Behavior Inventory* (ECBI; Eyberg & Pincus, 1999). This cut-off has been used in similar research and is considered to indicate potentially significant psychopathology (Hutchings et al., 2007a). Parents also had to be willing and able to attend the program. In total, 149 families were eligible and agreed to participate in the research. At follow-up, 137 parents were retained in the trial (Figure 1).

The intervention was delivered in community-based organizations or Family Resource Centres which provide statutory-funded, individual or group services/support for vulnerable families who experience difficulties, such as socioeconomic disadvantage, social

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isolation, mental health issues, substance misuse, community conflict and domestic violence. Facilities include talks, activities, workshops, children's groups, individual advice and support, assessments and childcare for pre-school children. These centres are located in four urban areas which are designated as 'disadvantaged' according to information on demographic profile, social class composition and labour market situation (Haase & Pratschke, 2008).

[Figure 1 about here]

Randomisation, Allocation Concealment and Blinding

Participants were blindly allocated on a 2:1 basis using a computer-generated random number sequence, to a parent training intervention group (n=103) or a waiting-list control group (n=46). This ratio results in a small reduction in statistical power, but allows for the inclusion of a larger intervention group, which is ethically desirable in effectiveness evaluations conducted in community-based settings. The unit of randomisation was the parent-child dyad and participants were block randomised by area to ensure that parents attended the program in their locality.

Randomisation was carried out by an independent statistician who was not involved in data collection. Participant allocation was subsequently conveyed through private correspondence to an administrator who informed participants of their treatment allocation. Child age and gender were not restricted in randomisation. Post-hoc analyses revealed no significant differences between intervention and control groups with respect to age ($p=0.19$). Whilst there were proportionately more boys in the control group (31/46; 67%) when compared to the intervention group (60/103; 58%), this difference was not statistically significant ($p=0.14$). Concealment of the allocation sequence was ensured by randomising participants after they had been recruited and had completed baseline assessments.

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Researchers were blinded to group allocation and parents were asked not to inform researchers at follow-up assessment as to whether or not they had taken part in the program.

Procedure

Information sheets were administered to referred families and written informed consent was provided by parents and guardians of participating children. Two cohorts of parents were recruited during a six-month period. Baseline assessments for the first cohort of parents (n=53) were carried out in February/March 2008 with six-month post-baseline follow-up assessments undertaken in July/August of the same year. The second cohort (n=96 parents) was interviewed in July/August 2008 with subsequent follow-up assessments in January/February 2009. At both time points, data were collected from one parent only, most of whom were mothers (143 mothers, 6 fathers). Parents in the intervention group received the IYBP following baseline assessment. The six-month follow-up assessments took place approximately three months after intervention completion. The assessment of treatment effects at this time point did not allow insight into how participants fared immediately post-treatment. However, the intervening period provided reasonable time for parents to implement new parenting skills and to allow any child behavior changes to emerge. Control group parents were offered the IYBP after the six-month follow-up. Participants were provided with a small payment after both the baseline and follow-up assessments as a token of thanks for completing assessments. There was no financial incentive associated with taking part in the program itself.

Measures

Parents provided demographic and background information on their families and children. Psychometrically robust parent-report measures and independent observations were used to provide a comprehensive assessment of child behavior and social competencies, as well as parenting skills and well-being. The internal consistency of all scales was calculated

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on baseline data using Cronbach's α . Measures were administered by researchers (blinded to allocation) either in participants' homes, or in a local family centre.

Child behavior measures. The *Eyberg Child Behavior Inventory (ECBI;* Eyberg & Pincus, 1999) was used as the primary outcome measure of child problem behavior. This screening tool, which is widely employed in clinical practice and intervention studies, consists of two subscales that elicit parents' perceptions of 36 problem behaviors. The 'Intensity' subscale comprises a 7-point Likert scale which measures how frequently each behavior occurs; the 'Problem' subscale elicits information on the number of problem behaviors exhibited by the child, as well as a 'Yes-No' response on whether or not the parent considers the child's behavior to be problematic ($\alpha=0.89$ and 0.87 for the Intensity and Problem subscales respectively). ECBI normative data, based on a sample of children in a south-eastern region of the US ($n=798$), indicate a mean score on the Intensity scale of 96.6 (35.2) and 7.1 (7.7) on the Problem scale (Eyberg & Pincus, 1999).

Additional secondary measures were used to enhance sample description and to evaluate the intervention outcomes. The *Strengths and Difficulties Questionnaire (SDQ;* Goodman, 1997) was used to assess child problem behavior and socioemotional well-being. This 25-item measure consists of five subscales relating to emotional symptoms, conduct problems, hyperactivity, peer problems and pro-social behavior ($\alpha=0.77$). The scores on each subscale (except the 'Pro-social' scale) may be summed to generate a 'Total Difficulties' score for use in the analysis. The *Conners Abbreviated Parent Rating Scale (Conners, 1994)* provided a brief, 10-item measure of hyperactive-inattentive behaviors ($\alpha=0.86$) including restlessness, over-activity, emotional reactivity and inattention. The *Social Competence Scale (Corrigan, 2002)* is a brief 12-item scale which assesses child social functioning including emotional self-regulation and pro-social behaviors ($\alpha=0.86$). Typical items include: "Your child shares things with others" or "Your child can calm down when excited or all wound up".

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Respondents are asked to rate the extent to which this statement reflects their child's behavior on a five-point Likert scale.

Parental well-being measures. Levels of parental psychopathology and dysfunctional parent-child interactions were assessed to determine whether the intervention had led to any changes in parental distress and competency. The *Parenting Stress Index-Short Form* (PSI-SF; Abidin, 1995) was used to obtain an overall measure of parent stress and functioning ($\alpha=0.93$). The scale comprises 36 items which measure the distress experienced by parents in their parenting role as well as dysfunctional parent-child interactions. The 21-item *Beck Depression Inventory* (BDI; Beck, Ward, Mendelson, Mock & Erbaugh, 1961) was also used to assess the overall prevalence and severity of depressive symptoms and behaviors amongst parents ($\alpha=0.93$).

Observational measure. The *Dyadic Parent-Child Interactive Coding System-Revised* (DPICS-R; Robinson & Eyberg, 1981) provided an independent observational measure of parent-child interactions and behaviors based on a 30-minute observation period (in 5 minute intervals). The coding system comprises 21 parent behavior categories (e.g. commands, questions, praise, positive affect and physical behaviors) and 7 child behavior categories (e.g. destructive and physically negative behaviors, smart talk, crying and positive affect). Coding is continuous and is based on the frequency of a given behavior during parent-child interaction.

Summary variables of observational data were created for analysis. 'Child Problem Behavior' represents the aggregate of frequency counts for aversive child behaviors including destructive and aggressive behaviors (e.g. throwing items or hitting, shouting, crying, whinging and smart talk), whilst 'Child Positive Behavior' consists of the summed counts of physically and verbally warm or positive behaviors. 'Positive Parenting', comprising eight parent behavior categories, represents the summed frequency counts for use of praise and

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encouragement and positive physical behaviors towards the child (e.g. displays of affection). ‘Critical Parenting’ comprises three parent behavior categories including the use of negative commands, critical statements, and physically negative behaviors (e.g. snatching an item away from the child).

Observation procedure. Live observations were carried out mainly in the participants’ homes while the parent and child engaged in play (e.g. doing a jigsaw puzzle, painting a picture, playing with toys). Parents were instructed not to interact with the observer and to continue with normal activities for the duration of the observation. They were also asked not to view television or play computer games. A number of observations were carried out in a community centre (n=22; 12 at baseline and 10 at follow-up) to facilitate parental participation. Observations were conducted at both baseline and follow-up, for the second cohort of parent participants only (i.e. 54% (80/149) of the total sample; 56 intervention, 24 control). It was not possible to conduct observations during the first wave of participant recruitment due to observational training and service delivery timetabling constraints. Observers were blind to participant treatment allocation and all received five days of intensive training. Once reliability with the primary coder was achieved, it was subsequently maintained by means of team coding meetings, coding videotaped parent-child interactions and practice observations in order to ensure standardised coding of parent-child interaction. In total, 20% of all home/centre observation visits were attended by two coders who coded simultaneously in order to assess agreement and inter-rater reliability. Reliability checks were conducted at both baseline and follow-up; an average inter-rater agreement of 70% is deemed reliable according to the DPICS manual (Robinson & Eyberg, 1981).

Power Analysis

A power analysis was undertaken to determine sample sizes sufficient to register significant change. A minimum reduction of 25 and a maximum reduction of 29 in the mean

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score on the ECBI Intensity subscale were considered significant, in line with previous studies (Hutchings et al., 2007a). Therefore, in order to achieve an effect size of 0.8 and allowing for a drop out rate of 18%, a total sample size of 144 participants was recommended.

The Intervention

The IYBP is a collaborative-based intervention which uses group discussions and role plays in combination with video material to illustrate various parenting and discipline strategies. Program topics include play, attention and involvement, listening, problem-solving, praise and incentives, and limit setting and other non-aversive discipline strategies. The program promotes positive parenting techniques such as child-directed play and encouragement to foster child cooperation, and strengthen parent-child relationships. Child problem behaviors are addressed by encouraging parents to reinforce positive pro-social behavior and to use non-aversive discipline strategies (e.g. time-out) in order to tackle aversive or inappropriate behaviors. Parents practise the new tasks and techniques at home and provide feedback at the next weekly session.

Treatment delivery. Nine intervention groups, each with approximately 11-12 participants, were delivered in weekly two-hour sessions in several locations in a mid-eastern region of Ireland. Both participant cohorts received the 14-session intervention. However, due to time constraints, the 14 sessions were delivered over a 12-week period for the first cohort. Group sessions were held at a time and location that suited the participants. Parents also received a weekly support call from the group leader throughout the course and follow-up sessions were delivered in the event that parents were unavailable to attend on any particular week. Free transportation, crèche facilities or financial reimbursement for childcare and refreshments were provided for the participants to encourage attendance. Partners were also encouraged to attend. Children did not receive any intervention. All training programs (including those which were later offered to participants in the waiting-list control group)

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were supported financially by Archways, a charitable community-based organization that supports the implementation and roll-out of Incredible Years (IY) training and other evidence-based family interventions in Ireland. Two Archways staff are also fully accredited IY group facilitators/leaders.

Treatment integrity/fidelity. The treatment groups were facilitated by two persons who had received a minimum of three days training in the context and techniques of the intervention. Group facilitators worked in the centres where the program was being delivered and had varied backgrounds including psychology, counselling, education or related fields. All 11 group facilitators/leaders had prior experience in delivering the IYBP in community-based settings; three had achieved full accreditation in delivering the IYBP, whilst the remainder were working towards accreditation during the course of the study. The accreditation process involves rigorous independent assessments and regular reviews of delivery performance. During course delivery, all group facilitators received weekly supervision and support from a certified independent IY trainer and attended weekly meetings to assess progress and address issues which may have arisen during group sessions. Group sessions were videotaped and randomly reviewed by a certified trainer to evaluate treatment delivery.

Implementation fidelity was monitored by means of facilitator-completed self-evaluation checklists. A *Leaders' Weekly Checklist* (Webster-Stratton, Kolpacoff & Hollinsworth, 1988) was completed by group facilitators after each weekly session in order to check and record that they had covered all prescribed material (e.g. showed vignettes, covered relevant topics, checked homework). The results showed that 90% (SD=5.77) of all material had been covered across the 14 sessions. According to group facilitators, parents also completed/attempted their homework activities for 73% of the 14 sessions and had partial completion of homework 25% of the time. Similar measures of treatment fidelity have

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been reported elsewhere (e.g. Kling, Forster, Sundell & Melin, 2010). The group facilitators further reported that, of those parents who attempted to implement the skills at home, 80% did so with ‘some success’ on a weekly basis whereas 21% did so with ‘total or most success’. There was no validated independent measure of facilitator adherence to the intervention protocol and neither was the quality of program delivery objectively assessed.

Treatment attendance. Approximately three-quarters (76%) of the first cohort of participants attended 7 or more sessions (mean attendance=10.8 sessions) compared to half (52%) of the second cohort (mean attendance=6.6 sessions). In total, 31% of participants attended three or fewer sessions. The reasons for lack of program engagement were explored in a separate qualitative sub-study that ran in parallel to the main RCT and which included a small sub-sample of parent participants (n=8) who attended fewer than five sessions. Reasons for non-engagement included mainly practical or circumstantial barriers to program attendance (e.g. illness, change in employment status), although a small number of parents expressed dissatisfaction with the ethos of the course (n=2) and concerns around an intrusion of privacy (n=2) (Furlong & McGilloway, 2011).

Analysis

A strict intention-to-treat analysis was carried out whereby all participants were included in the analysis regardless of program attendance. No change from baseline was assumed for participants who were lost to follow-up. An analysis of covariance (ANCOVA) was carried out to examine post-intervention differences between conditions on parent-report and observational measures, controlling for baseline score and intervention status. In this study, participants were nested within parent training groups. Group effects, such as facilitator differences or disparities in family characteristics, may have a potentially biasing effect. Therefore, ‘parent training group’ (i.e. the different parent training groups to which participants were allocated) was also included as a covariate to account for potential

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variances at the group level (Varnell, Murray, Janega & Blitstein, 2004). A 'per protocol' analysis was undertaken in parallel; this excluded only those participants who were lost to follow-up (no parents were excluded on the basis of intervention attendance).

Observational data were analysed using the last observation carried forward for those who did not complete observations at follow-up. A secondary analysis of observational data was also carried out, excluding only those who were lost to follow-up. Inter-rater reliability, as measured by intra-class correlation coefficients (ICCs) for summary variables, showed high consistency (child problem behavior=0.88; child positive behavior=0.97; positive parenting=0.94; critical parenting=0.90). Square root transformations were used for purposes of analysis as observational variables were not normally distributed. Effect sizes for the ANCOVA were calculated using Cohen's guidelines whereby an effect size of 0.2 denotes a small effect, 0.5 a medium effect and 0.8 a large effect of the intervention (Cohen, 1988).

Results

Participant Characteristics

Baseline and attrition analyses. The baseline characteristics of families, including those who were lost to follow-up, are shown in Table 1. Most participants were socially and economically disadvantaged when compared to average Irish norms (Central Statistics Office, 2006a; 2006b). At baseline, a constellation of co-occurring child difficulties was reported by parents including externalising, aggressive and oppositional behaviors, high levels of hyperactive behaviors and social skills deficits. Child participants were at risk of serious psychological distress, including the development of Conduct Disorder (CD). Risk factors for CD include single parenthood, teenage parenthood, parental depression, family poverty, and parental history of drug abuse or criminality (Webster-Stratton, 1998). The number of risk factors experienced by a child has been shown to increase the likelihood of developing CD (Loeber & Farrington, 2000). In the current study, a risk factor score ranging from 0 to 5 was

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calculated on the basis of the above factors; 60% of participants (90/149) obtained a risk factor score of two or more.

Statistical analyses (Chi-Square and two sample t-tests) indicated no significant differences between intervention and control group participants with respect to all baseline characteristics. Further analyses were conducted to examine differences between those retained in the study and those lost to follow-up. No significant differences were found between the two groups with the exception that children of parents lost to follow-up obtained statistically significantly higher scores on the *Social Competence Scale*.

[Table 1 about here]

Intervention Outcomes

The intention-to-treat analysis revealed statistically significant differences in child problem behavior. A large effect of the intervention on child behavioral adjustment was found on both the ECBI Intensity and Problem subscales. Between-group, post-intervention differences in child behavior were also found in the analyses of our secondary measures. The results of the ANCOVA indicated significant intervention-control group differences on the SDQ ‘total difficulties’ scores. Significant intervention effects were also found at follow-up on parent reported levels of hyperactivity and inattention as measured by the *Conners* scale, and on pro-social behavior as measured by the *Social Competence Scale*. Analysis of observed child positive behavior did not show a statistically significant effect of the intervention, although there was a significant difference in observed child problem behavior for the intervention condition when compared to the control condition (Table 2).

[Table 2 about here]

Significant differences between the intervention and control groups on frequency counts of critical parenting indicated that the intervention group parents used significantly fewer aversive parenting strategies at follow-up when compared to their control group

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counterparts. Significant effects of the intervention on parental stress levels (as measured by the PSI) and on parental depression levels (as measured on the BDI) were also found when compared to control group parents (Table 3)

[Table 3 about here]

Moderator Analysis

Potential moderators of intervention effects on child conduct problems were examined in the intention-to-treat sample, using Multiple Regression on the follow-up data for the primary child outcome measure. Moderator effects on the both subscales of the ECBI were examined. Thus, post-intervention scores on the ECBI Intensity and Problem subscale were used as the dependent variables. Five key child and family variables, which were measured at baseline, were examined as potential moderators: child age, male child gender, being at risk of poverty, socioeconomic disadvantage, and risk factors for Conduct Disorder (see Table 1). A separate regression was conducted for each potential moderator and all analyses controlled for baseline conduct problems. In Step 1, baseline ECBI scores, intervention status and the potential moderator were entered. In Step 2, potential moderator effects were explored by introducing an interaction term (Potential Moderator x Intervention) into the regression model. Effect sizes for moderators were based on changes in the multiple correlation due to the introduction of the interaction term in the second step of the regression analyses (Jaccard & Turrisi, 2003). The results showed no significant moderator effects on child problem behavior outcomes as measured by the ECBI Intensity and Problem subscales; this implies that any post-intervention benefits for the children involved in this study occurred regardless of child and family demographic characteristics or risk factors (effect size (ΔR^2) = 0 for all potential moderators).

Discussion

The findings support the study hypotheses and highlight the effectiveness of the IYBP as an intervention for the early onset of behavioral problems in young children when implemented in community-based services. Although almost two-thirds (63%) of the families in the current study were exposed to multiple risk factors, the parenting intervention had a positive impact on child conduct problems, hyperactive behaviors and social skills. Baseline mean scores on behavioral measures indicated that children were classified as ‘at risk’ for future conduct disorder and delinquency, but at follow-up the children in the intervention group were, on average, below the cut-off for clinical concern on the ECBI, the primary outcome measure.

Encouragingly, child behavior outcomes were not moderated by child characteristics, risks for conduct disorder, or socioeconomic risks/disadvantage. Previous research has indicated that family adversity, in particular, can diminish the outcomes of parent training (Lundahl et al., 2006; Reyno & McGrath, 2006). However, the current study findings indicate that children of families who experience adversity derived considerable benefits from parent training. These results are in keeping with a small number of studies which have found that the IYBP intervention positively influenced child behavior across a range of moderating variables (e.g. Beauchaine, Webster-Stratton & Reid, 2005; Gardner et al., 2010).

Previous research has identified changes in positive parenting as a key mediator of improved child behavior (e.g. Gardner et al., 2006; Gardner et al., 2010) although the findings from the current study were non-significant in this respect. However, prior research has highlighted reductions in critical parenting as a significant lever for improvement in child behavior (e.g. Beauchaine et al., 2005). Likewise, our findings show that there were significant post-intervention improvements in critical parenting in the intervention group.

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Intervention effects on parent-reported stress and levels of depression were also found, thereby suggesting improvements in parental psychosocial functioning.

These findings support the general utility of parenting programs in real-world, community-based settings/services as a means of promoting parenting competency and overall family adjustment. Moreover, parenting programs can assist families who experience high levels of socioeconomic disadvantage, whilst promoting positive behavior in children who are at risk of poorer outcomes into adolescence and adulthood. The cost implications of these programs are also an important additional consideration and a separate cost-benefit analysis of the IYBP program, carried out in parallel to the current study, is reported elsewhere (O'Neill, McGilloway, Donnelly, Bywater and Kelly, *in press*).

Comparison with other research. This study is the first RCT evaluation of an updated version of the IYBP intervention. Previous research has evaluated shorter 9- and 12-session interventions (Hutchings et al., 2007a; Reid, Webster-Stratton & Baydar, 2004), whilst a smaller number of studies have evaluated a longer 20- to 22-session program (Webster-Stratton et al., 2004). Despite these differences in treatment length, the effects of the intervention in the current study are consistent with effect sizes reported in other IYBP trials. The findings from our study, which was carried out in urban settings, are comparable with those of a rural-based study in Wales (Hutchings et al., 2007a) and clinical-based work in Norway (Larsson et al., 2008). The Welsh team reported moderate and large effect sizes of 0.63 and 0.89 on the ECBI Problem and Intensity subscales respectively (Hutchings et al., 2007a). Comparable effect sizes, indicating a consistent benefit of parenting intervention for child conduct problems, are reported here. Our study further indicates more substantial effects of the IYBP intervention for child hyperactivity and social competence. Notably, some of the above studies were undertaken within the context of integrated, multi-dimensional community-led early childhood initiatives (e.g. Sure Start in the UK and Head

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Start in the US). However, the current trial was carried out in disadvantaged areas in Ireland, in the absence of any such national initiatives and within a context where other family services were limited, thereby reinforcing the potential utility of ‘stand-alone’ parenting programs for at-risk families in the longer term.

Study Strengths

The key strengths of this study, which was the first to assess the effectiveness of the new 14-week IYBP, include the use of mixed methodologies and close adherence to the high quality practices recommended for RCTs (Schulz, Altman & Moher, 2010). A sample size calculation was conducted to ensure adequate statistical power and strict randomisation and blinding procedures were also applied. An intention-to-treat principle for incomplete or missing data was implemented to ensure that the clinical effectiveness of the program, when implemented in a real-world/community-based setting, was not overestimated (Hollis & Campbell, 1999). A comprehensive error audit, conducted to ensure high quality data, yielded an error rate for data input of less than 0.1%. Subjective parental report was supplemented and amplified with more objective ‘live’ observations of behavior which were carried out by trained researchers and inter-rater reliability on this component of the study was also very high. Study attrition was low and those who were lost to follow-up did not differ from those who remained in the study in terms of demographic characteristics or child problem behaviors.

Study Limitations

The study also had a number of limitations. The observational findings were limited to just over half of the main sample due to time constraints. It is also unclear why the intervention group participants used fewer negative behaviors at baseline than their control group counterparts. This variation in observed behaviors was not attributable to the overall level of observed parent-child interaction, or to baseline levels of child behavior problems.

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The number of boys in the control group in this study marginally outweighed those in the intervention group. These differences, though statistically non-significant, may have had a biasing effect on outcomes and may compromise, to some extent, the generalisability of findings.

Although a number of procedures were put in place to support intervention fidelity and facilitator self-reported fidelity was satisfactory, no independent verification of treatment adherence or assessment of the quality of program delivery was carried out (e.g. by clinicians or raters/observers). The relatively low program attendance of 60%, when compared to 83% in Hutchings and colleagues (2007a) and 88% in Webster-Stratton (1998), was unexpected, although families who experience greater social and economic adversity are generally considered more difficult to engage in intervention and prevention programs (Baydar, Reid & Webster-Stratton, 2003). Therefore, it is likely that the attendance rates in the current study may have been negatively affected by the large proportion of participants who were experiencing significant socioeconomic disadvantage, and especially the second cohort which included parents from a particularly highly disadvantaged inner city area.

Study Implications and Directions for Future Research

This study, one of the first within a European context, focused on a high-risk sample recruited from 'real world' urban settings and showed significantly improved child and parent outcomes following a parenting intervention delivered by regular, community-based service staff. The findings from the current trial support the importance of early childhood intervention and the utility of evidence-based parenting programs in community-based services, in different cultural contexts and in settings characterised by high levels of social disadvantage. This work is an important step in the development, evaluation and delivery of empirically validated interventions for vulnerable young children with conduct problems and their families. These findings should serve to guide future policy and practice decisions for

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governments and practitioners who are considering investing in and/or delivering the IYBP program for children with behavioral problems in disadvantaged communities across different geographical and cultural contexts.

Participants in the current trial were referred to the IYBP by means of self-referral and existing service systems; this indicates, at least in part, the potential for program sustainability into the future. However, if evidence-based parenting programs, such as the IYBP, are to be widely available and successful in the longer term, a number of other factors need to be in place, including the availability of willing and appropriately trained facilitators, ongoing monitoring of intervention delivery and the availability of adequate administrative and financial support for program implementation. Thus, future research should continue to explore the effectiveness of parenting programs in community-based services, as well as the long-term outcomes for service users. Factors which contribute to program attendance in community settings and mediators of treatment response should also be explored. Such research would help to highlight ways in which highly vulnerable parents might be encouraged to engage with programs such as the IYBP and how optimal outcomes might best be achieved for all families in need of support.

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Table 1: Demographic Characteristics at Baseline. Numbers are Frequencies (%).

	Waiting list controls (n=42)	Intervention (n=95)	Lost to follow-up		Average Irish Values ^a
			Controls (n=4)	Intervention (n=8)	
Lone Parent	15 (36)	37 (39)	3 (75)	5 (63)	21%
At risk of poverty ^b	25 (63)	62 (68)	2 (50)	5 (53)	17%
Mean (SD) age of mother (years) at birth of first child	25 (6.01)	25 (6.35)	19.75 (4.2)	22 (4.67)	29.1
Parent education (no. (%) left school before finishing post-primary)	13 (31)	36(38)	2(50)	2(25)	
No. (%) of boys	31 (73.8)	55 (57.4)	2 (50)	5 (66.7)	
Age in months	55.2 (15.4)	59.0 (15.6)	59.0 (20.2)	61.1 (14.2)	
Socio-economic disadvantage score ^c					
≥ 2/6	28 (68)	60 (65)	3 (75)	6 (75.0)	
Mean (SD.) No	1.9 (1.1)	2.0 (1.2)	2 (1.4)	1.9 (1.0)	
Risk factors for Conduct Disorder ^d					
≥2/5	21 (51)	60 (65)	3 (75)	6 (75)	
Mean (SD) number of risk factors	1.9 (1.4)	2.1 (1.3)	3.25 (1.7)	2.0 (1.1)	

Note: No significant differences between intervention families who remained in the study and those lost to follow-up with χ^2 and two sample t-test

^a Data from 2006 Census (Central Statistics Office)

^b The EU survey of income and living conditions classes equivalised income of €202.49/week as the threshold for risk of poverty (Central Statistics Office, 2006)

^c Employment status; parental status (lone versus married/co-habiting); size of family; parental education; quality of housing; and levels of criminality in the participants' area of residence.

^d Single parenthood; teenage parenthood; parental depression; family poverty; and parental history of drug abuse or criminality.

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Table 2: Summary of Child Measures at Baseline and Follow-up using ANCOVA

	Intention to treat							Per Protocol (42 Control, 95 intervention)*		
	Mean (SD) raw scores				F	Mean Diff (95% CI),p-value	Effect size (95% CI)	F	Mean Diff (95% CI),p-value	Effect size (95% CI)
	Control (n=46)		Intervention (n=103)							
	Baseline	6 month follow-up	Baseline	6 month follow-up						
ECBI Intensity subscale (Cut off ≥ 127)	159.1 (31.7)	144.9 (33.2)	156.5 (30.0)	121.3 (40.7)	15.6	21.5 (10.7 to 32.2), <0.001	0.70 (0.4 to 1.1)	17.9	24.1 (12.9 to 35.4), <0.001	0.79 (0.4 to 1.2)
ECBI Problem subscale (Cut off ≥ 11)	20.5 (6.7)	17.6 (8.4)	20.3 (7.0)	11.6 (9.0)	18.1	5.9 (3.2 to 8.7), <0.001	0.75 (0.4 to 1.1)	20.8	6.7 (3.8 to 9.6), <0.001	0.85 (0.5 to 1.2)
Conners Hyperactivity (Cut off ≥ 15)	28.5 (7.1)	27.7 (7.1)	28.4 (6.5)	22.7 (8.0)	26.7	4.96 (3.1 to 6.9), <0.001	0.92 (0.6 to 1.3)	29.3	5.5 (3.5 to 7.5), <0.001	1.01 (0.6 to 1.4)
SDQ 'Total difficulties' Score (Cut off ≥ 17)	19.3 (6.9)	16.7 (6.3)	18.1 (5.8)	13.5 (6.8)	7.3	2.2 (0.6 to 3.9), 0.008	0.48 (0.1 to 0.8)	7.9	2.5 (0.7 to 4.2), 0.006	0.53 (0.2 to 0.9)
Social Competence (Cut off ≤ 19)	16.8 (9.3)	19.1 (9.1)	16.7 (8.2)	25.1 (10.4)	21.1	-6.06 (-8.9 to -3.5), <0.001	-0.83 (-1.2 to -0.5)	22.8	-6.63 (-9.4 to -3.9), <0.001	-0.9 (-1.3 to -0.5)
Child Problem Behavior ^a	21.21 (29.2)	24.71 (27.1)	10.38 (11.5)	6.05 (8.25)	18.0	2.0 (1.1 to 3.0), <0.001	1.07 (0.6 to 1.6)	17.2	2 (1.0 to 2.96), <0.001	1.07 (0.6 to 1.6)
Child Positive Behavior ^a	20.13 (15.3)	32.5 (17.6)	24.7 (18.7)	39.48 (20.6)	1.2	-0.43 (-1.22 to 0.4), 0.28	-0.27 (-0.8 to 0.2)	1.1	-0.44 (-1.27 to 0.4), 0.3	-0.27 (-0.8 to 0.2)

* Note: Per-protocol analysis includes families for whom follow-ups were carried out regardless of program attendance levels; ECBI=Eyberg Child Behavior Inventory; SDQ=Strengths and Difficulties Questionnaire

^a Frequency counts in 30 minutes using the DPICS-R. Analysis for observational data: 24 Control, 56 Intervention (23 and 51 respectively in secondary analysis). Analysis performed on square root transformation due to skewness (untransformed means are reported)

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Table 3: Summary of Parental Measures at Baseline and Follow-up using ANCOVA

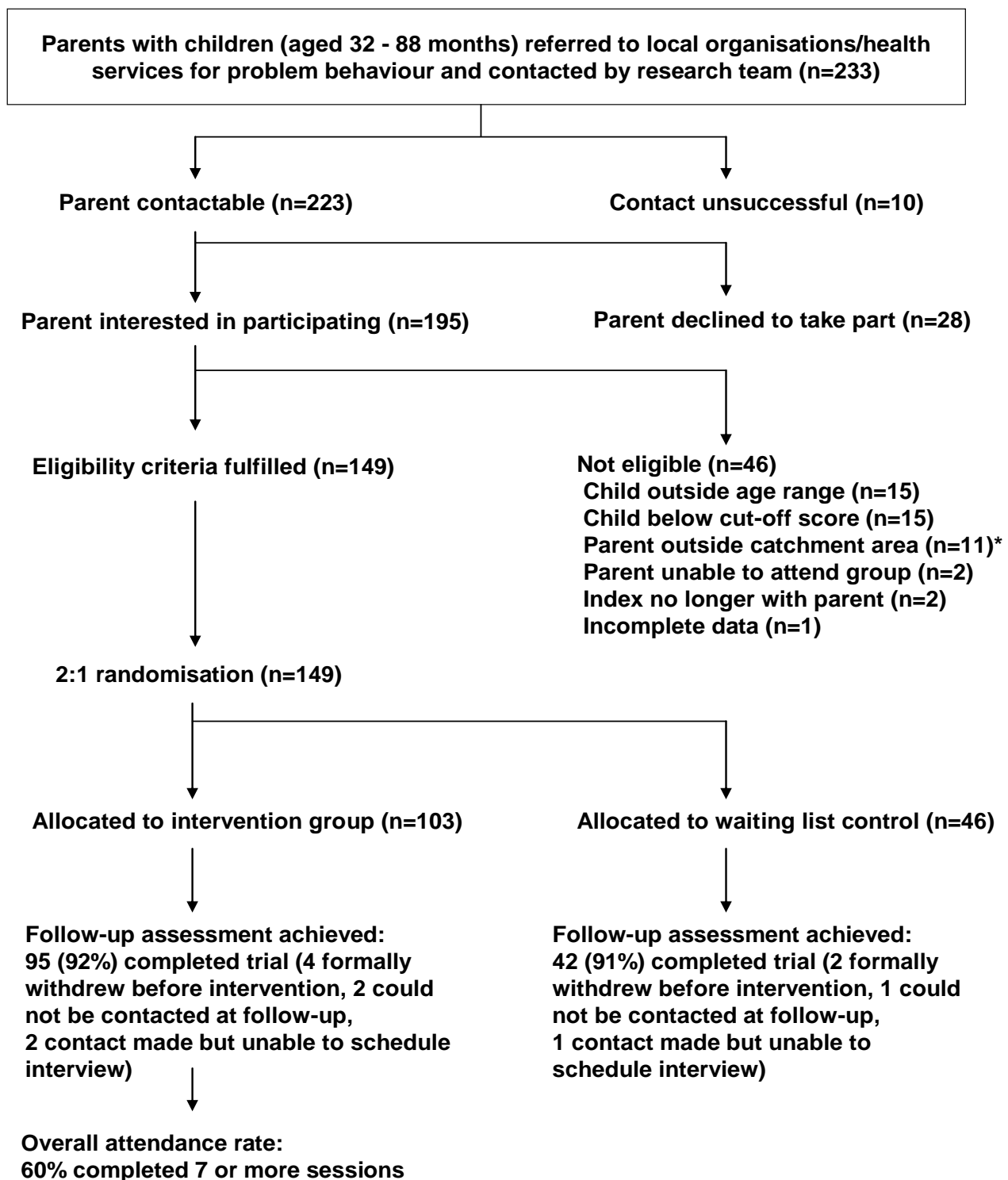
	Intention to treat						Per Protocol (42 Control, 95 intervention)*			
	<u>Mean (SD) raw scores</u>				<i>F</i>	Mean Diff (95% CI), p-value	Effect size (95% CI)	<i>F</i>	Mean Diff (95% CI), p-value	Effect size (95% CI)
	<u>Control (n=46)</u>		<u>Intervention (n=103)</u>							
	Baseline	6 month follow-up	Baseline	6 month follow-up						
PSI Total score	100.6 (23.2)	96.4 (22.4)	103 (22.7)	86.5 (25)	14.5	12.2 (5.8 to 18.5), <0.001	0.69 (0.3 to 1.1)	15.4	13.4 (6.6 to 20.2), <0.001	0.75 (0.4 to 1.1)
BDI (Cut off ≥ 19)	16.3 (12.9)	15.1 (13.1)	16.3 (11.7)	12.9 (12.2)	4.5	2.7 (0.2 to 5.2), 0.035	0.39 (0.0 to 0.8)	4.6	2.9 (0.2 to 5.6), 0.034	0.41 (0.0 to 0.8)
Positive parenting ^a	28.63 (22.1)	33.25 (19.6)	26.82 (21.3)	41.84 (28.2)	2.5	-0.69 (-1.56 to 0.18), 0.118	-0.39 (-0.88 to 0.1)	3.7	-0.85 (1.72 to 0.03), 0.059	-0.49 (-0.99 to - 0.0)
Critical parenting ^a	28.4 (29.5)	17.8 (18.2)	19 (17.8)	8.2 (8.8)	6.3	1.0 (0.21 to 1.83), 0.015	0.63 (0.1 to 1.1)	6.1	1.0 (0.20 to 1.89), 0.016	0.64 (0.1 to 1.2)

* *Note:* Per-protocol analysis includes families for whom follow-ups were carried out regardless of program attendance levels

PSI=Parent Stress Index; BDI=Beck Depression Inventory

^a Frequency counts in 30 minutes using the DPICS-R. Analysis for observational data: 24 Control, 56 Intervention (23 and 51 respectively in secondary analysis). Analysis performed on square root transformation due to skewness (untransformed means are reported)

Fig. 1: CONSORT Diagram: Flow of Sample Recruitment and Attrition



* Parents subsequently offered parent training within their locality

