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Randomised controlled trial of parent groups for child antisocial behaviour targeting multiple risk factors: the SPOKES project

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Background: There is a pressing need for cost-effective population-based interventions to tackle early-onset antisocial behaviour. As this is determined by many factors, it would seem logical to devise interventions that address several influences while using an efficient means of delivery. The aim of this trial was to change four risk factors that predict poor outcome: ineffective parenting, conduct problems, attention deficit/hyperactivity disorder (ADHD) symptoms, and low reading ability. **Methods:** A randomised controlled trial was carried out in eight schools in London, England. Nine hundred and thirty-six (936) 6-year-old children were screened for antisocial behaviour, then parents of 112 high scorers were randomised to parenting groups held in schools or control; 109 were followed up a year later. The intervention lasted 28 weeks and was novel as it had components to address both child behaviour (through the Incredible Years programme) and child literacy (through a new 'SPOKES' programme to help parents read with their children). Fidelity of implementation was emphasised by careful training of therapists and weekly supervision. Controls received an information helpline. Assessment of conduct problems was by parent interview, parenting by direct observation and child reading by psychometric testing. **Results:** At follow-up parents allocated to the intervention used play, praise and rewards, and time out more often than controls, and harsh discipline less; effect sizes ranged from .31 to .59 sd (p-values .046 to .005). Compared to control children, whose behaviour didn't change, intervention children's conduct problems reduced by .52sd, ($p < .001$), dropping from the 80th to the 61st percentile; oppositional-defiant disorder (ODD) halved from 60% to 31% ($p = .003$). ADHD symptoms reduced by .44sd ($p = .002$), and reading age improved by six months (.36sd, $p = .027$). Teacher-rated behaviour didn't change. The programme cost £2,380 ($3,800) per child. **Conclusions:** Effective population-based early intervention to improve the functioning of with antisocial behaviour is practically feasible by targeting multiple risk factors and emphasising implementation fidelity. **Keywords:** Aggression, antisocial behaviour, parent training, prevention, randomised trial.

Persistent antisocial behaviour in children is common: oppositional-defiant and conduct disorders (ODD/CD) affect 5% of the population (Loeber & Farrington, 2000). The children are seriously impaired: at home, they evoke criticism and have few friends, and at school they are disruptive and typically leave with no qualifications (ibid.). There is strong continuity to adulthood criminality, drug and alcohol misuse, and unemployment (ibid.). The public cost of a high-risk youth over the lifetime has been estimated to be $1.7–2.3 million (Cohen, 1998) and individuals with conduct disorder aged 10 cost society ten times as much as controls by age 28 (Scott, Knapp, Henderson, & Maughan, 2001). US and UK governments have made tackling child antisocial behaviour a priority. The US Surgeon General's report (2001) on youth violence described it as an epidemic and called for rigorous evaluation of prevention programmes. The UK government spent £0.5bn ($1bn) setting up SureStart early intervention programmes (Melhuish et al., 2008) and enacted a range of measures including Parenting Orders to control antisocial children.

Antisocial behaviour is continuously distributed, so primary prevention can occur by stopping those with moderate levels escalating to a full-blown disorder, and secondary prevention can occur by treating the disorder and preventing the long-term complications. The call for innovative early interventions has arisen because current treatments for established antisocial behaviour are unsatisfactory in many ways. First, only about a quarter of cases meeting criteria for ODD/CD receive specialised help (Ford, Hamilton, Goodman, & Meltzer, 2005). Second, many specialist treatments offered are not grounded in empirically based theory, but rather on general beliefs about psychotherapeutic counselling or medication (Bickman, Noser, & Summerfelt, 1999). Third, many children and families only receive treatment in later childhood or adolescence, when outcomes are poorer (Surgeon General, 2001). Fourth, treatments shown to be efficacious in the university clinics of their originators typically show little effectiveness in the few

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independent replications in 'real-life' practice (Weisz, Doss, & Hawley, 2006). Fifth, most child mental health services are for clinically referred cases: there are relatively few routinely delivered prevention programmes. There is therefore a need to develop and test interventions that address these issues by offering a service early on in child development starting with a whole population – i.e., primary prevention or early intervention – rather than only waiting until later to offer 'treatment' for those who get referred when the condition is more severe and entrenched.

If early interventions are to be maximally effective, it would seem logical for them to draw upon modern scientific studies which show that several different factors influence the emergence of antisocial behaviour. Four factors that independently contribute to poor outcomes are (1) hostile parenting (Loeber & Farrington, 2000); (2) the frequency and severity of conduct symptoms (ibid.); (3) ADHD symptoms (Taylor, Chadwick, Heptinstall, & Danckaerts, 1996); and (4) poor reading ability (Trzesniewski, Moffitt, Caspi, Taylor, & Maughan, 2006). However, many excellent interventions mainly address only one factor, for example family functioning or child cognitions. In contrast, a number of recent high-quality prevention trials have begun to address these issues. For example, Webster-Stratton, Reid, and Stoolmiller (2008) combined parent training with child social skills training to good effect, and the Montreal study found some enduring effects 10 years later using this approach (Lacourse et al., 2002). Some have added literacy or school behaviour components led by teachers (Barkley, Shelton, & Crosswait, 2000; Tolan, Gorman-Smith, & Henry, 2004); the Tri-Ministry study offered a universal peer-led reading programme combined with social skills training but got very modest effects (Hundert, Boyle, Cunningham, Duku, & Heal, 1999). Fast Track was a model efficacy trial, with six separate types of intervention, but also had modest effects – the mean effect size on antisocial behaviour was .11 standard deviations (Conduct Problems Prevention Research Group, 1999); it was also too expensive to replicate widely (Foster et al., 2006).

This trial was planned to address the concerns raised above. To increase access to treatment for children with elevated levels of antisocial behaviour, a whole population in schools in a deprived area would be screened and the intervention only offered to children at risk. To avoid intervening too late, 5- and 6-year-olds would be involved. The four major risk factors described above would be targeted. To reduce resources required so that the intervention could be more easily sustainable in the community, only parents would be seen in treatment: there would be no child therapists, or training of school staff. As far as we are aware, this is the first trial of its type in the world.

Aims

The aims were to evaluate: a) the proportion of parents of antisocial children who would take up the intervention; b) whether the intervention improved levels of four major risk factors predictive of long-term outcome in children with antisocial behaviour; c) the cost of the intervention.

Methods

Protocol

Design. Stage one: screening of all children in the school year. Stage two: Randomised controlled trial (RCT) of eligible cases. Measures were taken before randomisation, and one year later (four months after the end of the experimental intervention).

Study population. The trial was named Supporting Parents On Kids Education in Schools (SPOKES) and ran from 1999 to 2001 in eight schools in Lambeth, London, among the 5% most deprived English Boroughs. All children in reception and year one classes (kindergarten) were screened; see Figure 1.

Eligibility. First, children had to exhibit conduct symptoms above the screen cutoff level. Second, parents had to show: (1) ability to understand English; (2) ability to attend at group times; (3) interest in attending; (4) acceptance of RCT study; (5) child free of clinically apparent developmental delay.

Consent. Written consent was obtained; the local research ethics committee approved the project.

Randomisation. Two annual cohorts were screened in four schools, one in the remainder (total 12 cohorts in 8 schools). After screening, 8–16 cases (mean 10.7) per cohort were assessed and then the trial coordinator forwarded cases to the trial statistician who, blind to any other information, randomised them individually to the intervention or control group using GENSTAT.

Masking. Assessors and parents were blind to allocation status at initial assessment. At follow-up, questionnaires were entered by data staff blind, videotapes were coded by researchers blind, and interviews were carried out by assessors blind.

Parenting group intervention

Groups were delivered in school to 4–8 parents for 2½ hours one morning per week. The children were not seen. Twenty-eight weeks of intervention were offered across three terms: a 12-week behavioural programme followed by a 10-week literacy programme and finally a 6-week revision.

Child behaviour programme. This was the 12 week 'Incredible Years' (IY; Webster-Stratton et al., 2008) school age programme that includes videotape clips of

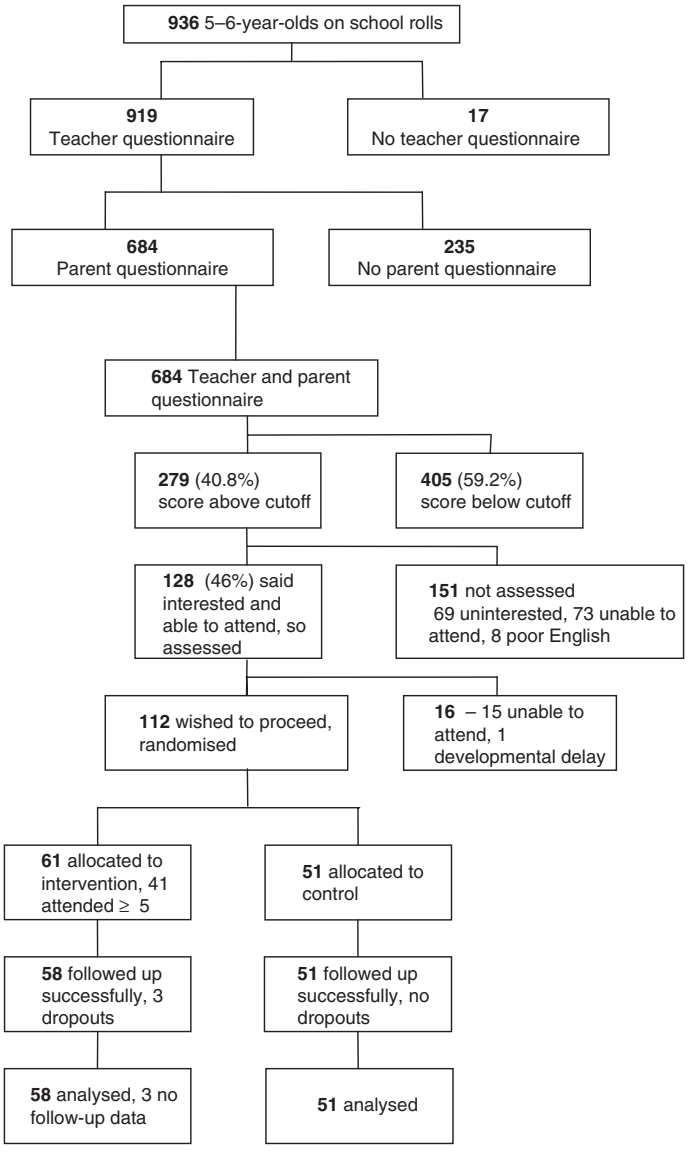

Figure 1 Participant flow

parents with their children. The content covers promotion of desirable child behaviour and on-task attending through play, praise and rewards, handling misbehaviour, applying consequences, and time out. Through detailed group discussion and role play, the parental behaviour that leads to better child behaviour is drawn out and practised.

Child literacy programme. This is a manualised programme (Sylva, Scott, Totsika, Ereky-Stevens, & Crook, 2008). It begins with a 'whole language' approach, where parents are encouraged to discuss the child's book, to link the text to the child's everyday experiences and to help the child 'predict' what might happen next. They are encouraged to play rhyming games with their children and to 'discover' print in their ordinary environment, e.g., the names of cereals, trainers, etc. It then teaches the Pause Prompt Praise (McNaughton, Glynn, & Robinson, 1987) approach to reading. When a child encounters an unknown word, the parent is taught to pause for 5 seconds; if the child doesn't succeed, the parent gives a specific prompt, and then praises the child for complying. Other elements included role-play and homework, family literacy workshops, and two home visits.

Personnel. For the behaviour programme, the leader of 7 groups had a psychology degree plus IY group-leader certification. Other leaders were a senior mental health nurse with advanced 'mentor' certification (3 groups), a senior family therapist 'mentor' (1 group) and a psychology graduate with IY training (1 group). Co-leaders were certified group leaders with mental health training (5 groups), or uncertified psychology graduates (7 groups). For the literacy programme the leader was a teacher with extensive experience of remedial reading. All but two leaders were employed locally.

Training. All behaviour programme leaders were trained in IY by: (1) attendance at a three-day accredited training; (2) observation of a 12-week group, with (3) attendance at weekly supervision led by mentors (4) leading 3 groups of clinically referred children; (5) accreditation from the programme origi-

nator. Co-leaders completed stages (1) to (3); some completed (4). Training for the literacy programme was similar.

Fidelity. This was strongly emphasised, through (a) the initial training described above; (b) self-completed treatment adherence schedules after each session; (c) responding to weekly written feedback from participants; (d) attendance at weekly supervision meetings led by a 'mentor'; (e) supervisors attending the programme developer's workshops annually.

Telephone helpline intervention

Control parents were offered a telephone helpline manned by the same staff, who advised them how best to access regular services. This intervention had the advantage of being brief and flexible.

Measures

Screen. Teachers and parents were asked to complete the Conduct Problems scale of the Strengths and Difficulties Questionnaire (Goodman, 2001), with five questions scored not true = 0, somewhat true = 1, certainly true = 2 (range 0–10). Additionally, the eight DSM-IV oppositional-defiant disorder items were used, scored not true = 1, just a little true = 2, pretty much true = 3, very much true = 4 (range 0–32). Parent and teacher scores were summed. The cutoff was SDQ ≥ 5 or DSM ≥ 10, one standard deviation above the population mean for 5–6-year-olds, designed to capture most cases at risk of lifetime-persistent antisocial behaviour.

Participant characteristics. An interview covered family structure and income, housing type, ethnicity and parental education; the General Health Questionnaire 12 covered maternal psychiatric symptoms (Goldberg et al., 1997).

Parenting. Observation: the procedure of the Conduct Problems Prevention Research Group (CPRG) (1999) was used, with videotaping of parent–child interaction for 15 minutes across three tasks: (i) child-directed play, (ii) parent-directed task, (iii) parent instructs the child to tidy away the toys. Scoring was frequency counts by three raters blind to allocation status; coders used a modified version of the CPRG scheme. Factor analysis gave three summary codes: *a.* total attends to child; ICC on 20 tapes was .82. *b.* seek cooperation (question requests in conditional tense, e.g., 'would you tidy the toys away?'), ICC .69; *c.* total commands, ICC .83.

Interview: we used a semi-structured interview developed by Michael Rutter and colleagues. It has shown discriminant validity, e.g., between parents raised in institutions and controls (Dowdney, Skuse, Rutter, Quinton, & Mrazek, 1985), and between parents whose children were hyperactive and controls (Woodward, Dowdney, & Taylor, 1997), and concurrent validity when compared to direct observation (Dowdney, Mrazek, Quinton, & Rutter, 1984). The version used here had six scales, each with five rating points. The parent gives detailed recent examples, then after further questioning the investigator makes a rating covering the previous month. Reliability between the three interviewers was calculated on 30 interviews after two months of training on pilot study cases; intraclass correlations ranged from .62 to .77.

Expressed emotion (EE): this is a measure of emotions expressed towards the child throughout the interview. It was rated on a 5-point scale using Camberwell Family Interview criteria (Vaughn, 1989); for warmth the ICC was .76, for criticism .73.

Questionnaire: the Parenting Practices questionnaire (Webster-Stratton et al., 2008) has four subscales: positive involvement, appropriate discipline, inconsistent parenting, and harsh discipline; the first two and last two were combined.

Child antisocial behaviour. The Parent Account of Child Symptoms (PACS; Taylor, Schachar, Thorley, & Wieselberg, 1986) was the trial's primary outcome. This is a standard investigator-based interview similar to, but shorter than, the Child and Adolescent Psychiatric Assessment (Angold et al., 1995), and has been used in large surveys (Taylor et al., 1996). Antisocial behaviours (lying, stealing, tantrums, rudeness, disobedience, destructiveness, aggressiveness) are scored 0–3 for severity and frequency in the last month and the mean calculated (range 0–6); ICC was .89. Oppositional defiant disorder diagnosis was elicited from the parent interview using DSM-IV criteria (ICC .85). The Eyberg Child Behaviour Inventory is a parent-completed questionnaire of 36 oppositional behaviours (Boggs, Eyberg, & Reynolds, 1990). Teachers rated antisocial behaviour using DSM-IV questionnaire items. Direct observation was not used to assess antisocial behaviour since the paradigm used, one-to-one activity with the parent, fails to elicit substantive oppositional behaviour and is not reliably predictive of current or later disruptiveness (Wakschlag et al., 2008).

Child ADHD symptoms. These were measured with the PACS interview; ICC was .81.

Child reading ability. This was measured using the British Ability Scale (Elliot, Smith, & McCulloch, 1996). This is an individually administered test of the child's ability to read single words. Researchers received extensive training until they reached 95% agreement. Assessors were blind to allocation status.

Child emotional disorder symptoms. These were measured by the PACS interview and covered depression, fears, eating and sleeping problems (ICC .78).

Participant satisfaction questionnaire. (Webster-Stratton et al., 2008).

Statistical analysis

Calculation of sample size. The trial was designed to detect a minimum important difference in effect size of .6 SD on the primary outcome measure.

Analysis strategy. All analyses were carried out on an 'intention to treat' basis (i.e., all cases were analysed irrespective of how much intervention they actually received). An ANCOVA/multiple regression approach was used, entering post-score as the dependent variable, and the pre-score, the random allocation status and the school indicator variables (8 schools) as independent variables. To account for possible correlations between observations for cases within the same therapy group, and to safeguard against non-normality of some of the low-dimensional outcomes (mainly parenting interview), standard errors that are robust against correlations within clusters (here the 13 therapy groups) and departures from normal distribution assumptions were used. The analyses modelled school effects by fixed effects. The complete cases analyses assume that missing data are missing completely at random (MCAR). To ensure robustness of findings, the analyses were repeated using maximum likelihood methods. This allows the modelling of school effects by more appropriate random effects and is valid under the less stringent assumption of missingness arising at random (MAR), that is, the probability of an observation being missing can depend on treatment group, baseline values or school. This is pertinent for some of the parenting measures where there were greater missing values. Specifically, normal mixed models with random effects for schools and therapy groups within the intervention arm were fitted. All analyses were carried out in Stata 9.

Results

Participant flow and enrolment

See Figure 1. Six hundred and eighty-four (75%) parents completed questionnaires; the teacher SDQ conduct scores of children of non-completers were identical (1.29 vs. 1.29), suggesting that the sample gathered was representative. Two hundred and seventy-nine (41%) of the screened population were above the cutoff level for antisocial behaviour, a considerably higher proportion than the national figure of 16%, but typical of highly disadvantaged neighbourhoods. One hundred and twenty-eight families (46%) were eligible for the trial and wished to take part; 112 eventually did so, representing 40% of those above the screen cutoff. The commonest reason given for not taking part was because the parent was too busy due to jobs or courses. The 112 participants had similar SDQ conduct scores to the 167 non-participants, mean 5.3 vs. 5.1 (sd 2.9, $p = .49$).

Sample

See Table 1. The sample was disadvantaged, with around three times the national rate of single parents, parents who left school early and minority families, and six times the rate of poverty. There were no significant differences between experimental groups on any of these variables.

Uptake of interventions

Parenting groups. A mean of 5.1 parents (sd 2.4) were in each group. The median attendance was 15 out of 28 sessions; 46/61 parents (75%) attended ≥ 5 sessions ('attenders'), 15 attended < 5 ('drop-outs'). Reasons given for dropping out were (1) they got a job, had to fulfil new commitments, or moved away ($n = 11$); or (2) they found the programme unhelpful ($n = 4$). Fifty-nine of the 61 (97%) parents who took part were mothers – 56% of the families had only a single parent mother, and the fathers of the remainder were usually at work at group times. Satisfaction questionnaires were available on 37/46 (80%) of the attenders, of whom 100% said they would recommend or strongly recommend the programme to a friend, and 97% said their overall feeling about the group was positive or very positive.

Table 1 Personal characteristics of families

	Parenting groups ($n = 61$)	Helpline ($n = 51$)	Mean values for England
Child age in years (mean, sd)	5.18 (.30)	5.24 (.31)	–
Child male	41 (68%)	38 (73%)	51%□
Child in ethnic minority	24 (33%)	18 (35%)	9%□
Single parent	35 (56%)	24 (48%)	22%□
Mother left school at 16, no further qualifications	21 (35%)	19 (36%)	13%□
Public housing	32 (53%)	22 (42%)	17%□
Child gets free school meals	22 (36%)	17 (33%)	18%□
Household income < £175 ($280) weekly	24 (40%)	18 (34%)	5%□
Mother mental health reaches caseness (GHQ 12 score 3+)	20 (33%)	16 (31%)	24%#
Child antisocial behavior score (PACS interview; mean, sd)	1.12 (.44)	1.15 (.49)	.8 (.4)+
Child ADHD score (PACS interview)	.61 (.45)	.59 (.43)	.5 (.5)+
Child reading score (BAS)	6.2 (8.8)	7.2 (14.7)	

□data from *Social Trends* London: ONS, 2000.
#data from *Mental Health of children in Britain* London: ONS, 2005.
+data from Taylor et al., 1991.

Telephone helpline. Fifty-one parents were allocated; 7 contacted the information helpline, all with concerns about disruptive behaviour, 1 attended a local clinic and received counselling.

Other services used. Ten percent of parenting group children vs. 14% helpline children received extra reading tuition at school, 12% vs. 7% extra reading tutoring at home, 0% vs. 2% specialist intervention for behaviour and 0% vs. 2% psychotropic medication for behaviour.

Parenting behaviour

Preliminary analyses indicated that correlations between measures within method were small to modest (highest was between critical EE and warmth, –.39); correlations between parenting measures across method were low (highest was between EE warmth and interview praise, .24). This indicates that the parenting measures were assessing largely separate aspects of the relationship. Parent interviews revealed that compared to controls, intervention parents used more play, praise, rewards, and time out, and less harsh discipline (spanking and prolonged exclusion) at follow-up (Table 2). Interestingly, parents in both arms of the trial reduced their usage of play and time out over the year between assessments, but intervention parents desisted less. The intervention parents also showed increased warmth and decreased criticism towards their child. Direct observation showed an increase in attending and praising in the intervention group parents compared with controls, and an increase in seeking cooperation. On the parenting questionnaire there was no change in either group. Re-analysis by normal mixed modelling confirmed these findings, except that the significance of the improvements on time out, positive attending and seeking cooperation was reduced to a trend (with *p*-values between .05 and .1).

Child outcomes

Antisocial behaviour. See Table 3. On PACS interview, children allocated to the intervention arm showed a reduction of .52 sd compared to controls, moving from the 80th percentile to the 61st; controls did not change. Eyberg questionnaire scores reduced by .34 sd. There was a dose–response

Table 2 Parenting behaviour

		Pre-score		Post-score	Between groups*		
	Arm	*n*	Mean (sd)	Mean (sd)	Post-score difference (95% CI)	Test statistic (df) *p*-value	Effect size
Interview							
Play	Parenting groups	57	5.28 (4.08)	4.04 (3.71)	1.31 (.19 to 2.4)	t(60) = 2.3 *p* = .023	.31
	Helpline	48	5.25 (4.51)	2.68 (3.37)			
Praise	Parenting groups	46	2.07 (1.12)	2.18 (1.11)	.59 (.18 to .99)	t(54) = 2.9 *p* = .005	.59
	Helpline	42	1.76 (.82)	1.49 (.78)			
Rewards	Parenting groups	47	1.15 (1.04)	1.21 (.83)	.39 (.09 to .69)	t(54) = 2.6 *p* = .012	.41
	Helpline	42	.89 (.80)	.75 (.73)			
Consequences	Parenting groups	47	1.51 (1.38)	1.17 (1.10)	–.04 (–.52 to .44)	t(55) = –.2 *p* = .86	.03
	Helpline	43	.93 (1.03)	1.04 (1.14)			
Time Out	Parenting groups	43	1.14 (1.50)	.78 (1.16)	.47 (.01 to .94)	t(54) = 2.1 *p* = .046	.38
	Helpline	42	.57 (.83)	.25 (.49)			
Harsh discipline	Parenting groups	45	1.07 (1.63)	.65 (.92)	–.68 (–1.25 to –.11)	t(52) = –2.4 *p* = .02	.48
	Helpline	40	.68 (1.11)	1.02 (1.08)			
Expressed emotion							
Warmth	Parenting groups	56	1.88 (.78)	2.14 (.61)	.47 (.16 to .79)	t(55) = 3.0 *p* = .004	.63
	Helpline	43	2.07 (.67)	1.86 (.77)			
Criticism	Parenting groups	56	1.12 (.63)	.79 (.59)	–.33 (–.59 to –.07)	t(55) = –2.6 *p* = .013	.51
	Helpline	43	1.23 (.68)	1.09 (.65)			
Direct observation							
Positive attention	Parenting groups	50	22.2 (11.8)	27.4 (18.2)	6.7 (.1 to 13.3)	t(53) = 2.0 *p* = .046	.54
	Helpline	41	22.3 (13.5)	19.9 (11.3)			
Seek cooperation	Parenting groups	50	3.22 (3.1)	3.33 (3.3)	1.1 (.06 to 2.2)	t(53) = 2.1 *p* = .039	.35
	Helpline	41	3.95 (3.2)	2.39 (2.5)			
Give commands	Parenting groups	50	53.8 (26.4)	50.9 (29.5)	3.7 (–3.4 to 1.7)	t(53) = 1.0 *p* = .30	.14
	Helpline	41	48.7 (26.1)	43.9 (22.9)			
Questionnaire							
Appropriate and positive	Parenting groups	45	93.2 (11.5)	93.0 (9.6)	2.4 (–1.4 to 6.3)	t (50) = 1.3 *p* = .21	.23
	Helpline	38	89.1 (9.5)	91.0 (10.7)			
Harsh and inconsistent	Parenting groups	45	44.2 (9.2)	41.3 (10.8)	–2.2 (–6.3 to 1.8)	t (50) = –1.6 *p* = .13	.28
	Helpline	38	45.8 (9.2)	44.0 (8.0)			

*Adjusted by regression for pre-score differences and school; based only on cases with pre and follow-up scores. Df = individuals in control arm plus number of therapy groups (13), minus one.

Table 3 Child behaviour

		Pre-score		Post-score	Between groups*		
		n	Mean (sd)	Mean (sd)	Post-intervention difference+ (95% CI)	Test statistic (df) *p*-value	Effect size
Parent interview							
Antisocial behavior	Parenting groups	58	1.15 (.44)	.91 (.36)	−.24 (−.35 to −.12)	t(63) = −4.0 $p < .001$	.52
	Helpline	51	1.12 (.49)	1.13 (.49)			
ADHD symptoms	Parenting groups	57	.61 (.45)	.44 (.34)	−.21 (−.34 to −.08)	t(60) = −3.2 $p = .002$	.44
	Helpline	48	.59 (.43)	.61 (.47)			
Emotional symptoms	Parenting groups	57	.59 (.40)	.42 (.37)	−.04 (−.18 to .10)	t(60) = −.5 $p = .60$	.10
	Helpline	48	.57 (.41)	.44 (.33)			
			Numbers (%)	Numbers (%)			
Oppositional defiant disorder diagnosis	Parenting groups	58	35/58 (60%)	18/58 (31%)	OR = .30 (.12 to .78)	$z = 2.5$ $p = .011$	
	Helpline	51	29/51 (57%)	27/51 (53%)			
			Mean (sd)	Mean (sd)			
Test							
Reading	Parenting groups	57	6.2 (8.8)	24.9 (18.2)	6.5 (.8 to 12.2)	t(56) = 2.3 $p = .027$	.36
	Helpline	44	7.2 (14.7)	18.7 (17.9)			
Questionnaire							
Eyberg Child Behavior Inventory	Parenting groups	51	119.1 (31.6)	103.9 (27.3)	−10.0 (−18.1 to −1.9)	t(57) = −2.5 $p = .016$	.34
	Helpline	45	115.9 (27.0)	113.2 (31.3)			
Teacher-rated oppositional symptoms	Parenting groups	61	4.18 (2.39)	2.38 (2.79)	−.07 (−1.03 to .91)	t(63) = −.15 $p = .88$	.03
	Helpline	51	3.42 (2.20)	2.16 (2.52)			

*Adjusted by regression for pre-score differences and school; based only on cases with pre and follow-up scores. Df = individuals in control arm plus number of therapy groups (13), minus one.

relationship, with double the improvement in child behaviour (.64 vs. .32 sd, $p = .045$) in parents who attended more (median split = 15 or more sessions).

Oppositional defiant disorder. The rate halved from 60% to 31% in the intervention group; controls were unchanged.

ADHD symptoms. On interview these reduced by .44 sd, from the 62nd percentile to the 44th, but emotional symptoms showed no group differences.

Reading. Intervention children improved by .36 sd compared to controls, a reading age advantage of 6 months. Their percentile score went from the 40th to the 75th, from below average ability to the top quarter of the population.

Re-analysis by normal mixed modelling did not change the conclusions regarding any child outcomes.

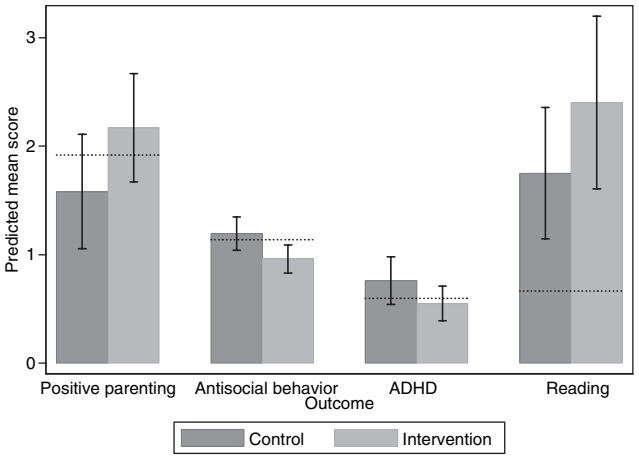

Figure 2 Effect of intervention on four risk factors predictive of poor outcomes. Post-treatment means (bars with 95% confidence intervals) and pre-treatment means (dotted horizontal lines). Positive parenting from interview of praise used, Antisocial behavior and ADHD from interview, Reading from test (scores scaled down 10 × for clarity)

Cost-effectiveness

The programme cost £2,380 ($3,800) per child, calculated on an annual basis of (a) salary costs of £36,000 ($57,600) for two group leaders employed .6 fulltime equivalent, working 4 days a week during school term when they run 3 groups, and working 1 day in school holidays; (b) non-salary costs of £14,000 ($22,400) for materials, travel, childcare, and office costs excluding building rental. Cost effectiveness was thus £4,500 ($7,200) per standard deviation improvement.

Discussion

This trial tested whether a theory-driven, practically sustainable intervention that involved only parents could improve four major risk factors associated with

poor outcomes in children with antisocial behaviour. The intervention changed all four factors on most measures. Parents reported at interview that they spent more time playing with their children and used praise and rewards more; discipline was calmer, with more use of time out and less spanking and prolonged exclusions, but no change in giving consequences. Direct observation showed a similar pattern with more attention and praise, but no reduction in commands. The emotional tone as judged by interviewers was happier, with more warmth and less criticism expressed about the child, although subjective self-reported parenting practices on questionnaire showed no change. Overall, these results indicate that the parenting pattern became less coercive and a more positive relationship was established.

The primary outcome of the trial was antisocial behaviour assessed at parent interview and this reduced by .52 sd in intervention children, representing a shift of the mean from the 80th percentile to the 61st; controls did not change. Questionnaire assessment gave comparable results. The diagnosis rate of oppositional defiant disorder halved, dropping from 60% to 31%, an indication of the clinical significance of the results. Parent-reported ADHD symptoms improved by comparable margins. Reading improved by .36 sd, a shift from the 40th percentile to the 75th, an advance of 6 months reading age over controls. Emotional symptoms were not the target of the intervention and reduced equally in both trial arms as the children grew older, for example fear of dogs and of the dark reduced. The effect sizes of the changes are larger than in some intervention trials, which may be related to choosing the best interventions and emphasising treatment fidelity and therapist skill (Weisz et al., 2006). However, antisocial behaviour at school did not change. The sample was typical of disadvantaged communities, with high rates of single parents without qualifications living on low incomes in social housing; a third were from ethnic minorities. Forty percent of screen positive parents took part in the study, a good proportion given that they were not seeking help and the majority was in full-time work. The trial serves as a reminder that psychosocial interventions can help ADHD symptoms (Pelham, 2004).

The trial adds to the debate on the causation of child antisocial behaviour. There is growing appreciation of genetic influences, for example the contribution of the MAOA gene (Foley et al., 2004), and one recent twin study found the heritability of pervasive child antisocial behaviour to be 100%, with no contribution of shared family environment (Scourfield, Van den Bree, & McGuffin, 2004). The current study, using the power of an experimental design that examined within-person change, showed that manipulating an important measurable aspect of the child's environment can have a sizable effect on antisocial behaviour, thus showing that parenting is a major causal influence.

The trial was methodologically rigorous and used multi-method, multi-agent measures across several domains. The follow-up rate was high and the analysis was on an intention-to-treat basis. However, there were a number of limitations. First, a quarter of parents did not respond to the screen. The study would have been more comprehensive with a higher return rate, although this is difficult in very deprived areas where problems with literacy, understanding English, and suspicion of authority are prevalent. Second, in order to participate, parents had to agree to be randomised and studied; without this, intervention uptake might have been higher. Third, the parenting intervention was only offered on one morning a week, also limiting access. Fourth, no other intervention was offered (e.g., medication for ADHD), possibly limiting effectiveness. Fifth, while the group format has advantages over individual work (e.g., cost, sharing of experiences, mutual encouragement), it also has disadvantages, e.g., shyer parents may be put off, personal issues cannot be explored in depth, it is hard to catch up missed sessions or go slower to fit an individual's progress. Sixth, behaviour in school was not addressed and did not appear to change, although a questionnaire completed by a different teacher a year later may not be very sensitive; adding a classroom management intervention element for teachers could improve outcomes. Seventh, consumer satisfaction may have been overestimated since non-attenders were not surveyed. Finally, long-term follow-up is needed to see if the effects are enduring.

The findings have important clinical and policy implications. They show that a suitably crafted programme can successfully reach a substantial proportion of parents of children at risk of poor outcomes associated with antisocial behaviour – parents were prepared to invest substantial time to improve their children's prospects, despite often being busy and stressed. The programme was intended to be sustainable under everyday conditions, and two neighbouring local authorities have now adopted it. However, one should not oversell the power of targeted community-wide prevention programmes to reduce population-wide levels as opposed to individual levels of antisocial behaviour, since they do not reach all families. This is for at least two reasons (Dodge, 2009). First, a substantial proportion of later cases of severe antisocial behaviour will come from children who are screen negative. Second, many families do not engage – in this study, 60% of the population with children at risk did not take part. Future trials need to address non-engagement with active strategies.

Prevention programmes require considerable up-front costs. Here, the cost per child allocated was £2,380 ($3,800). This is about three times the cost of referral to an outpatient child mental health clinic, or about half the cost of a year in a publicly funded school. However, the long-term costs of persisting severe antisocial behaviour are so high (Cohen, 1998)

that programmes need only modest effects to have notably positive cost-benefits (Foster et al., 2006).

Conclusion

This study demonstrated that a selective preventive intervention involving only parents can substantially improve four major determinants of poor child outcome, including halving the rate of oppositional-defiant disorder. If sustained, there is the prospect that the children's long-term mental health and social functioning will be improved, including better school attainments and less violence.

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Key points

- Early intervention trials for antisocial behaviour in children tend to be expensive and have small effects.
- This trial taught parents to target four major risk factors: their parenting behaviour, their child's antisocial behaviour, ADHD symptoms, and reading level.
- The effects were relatively large for a prevention trial.
- To make prevention trials for antisocial behaviour maximally effective requires active outreach to unengaged families and the addition of a teacher component addressing classroom management.

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