

Paper 2

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Parent training for young Norwegian children with ODD and CD problems: predictors and mediators of treatment outcome

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Participants were 121 children, aged 4-8 years referred for conduct problems, and their mothers. A parent training intervention was implemented in two outpatient clinics in Norway. Treatment responders were defined as children scoring below a cut-off on the Eyberg Child Behavior Inventory, a score below an optimal cut-off for children in day-care and school as reported by teachers, in addition to a 30% reduction or greater in observed negative parenting. Self-reported parenting practices were explored as potential mediators. The results of logistic regression analyses showed that high levels of maternal stress, clinical levels of ADHD, and being a girl predicted poorer outcome in conduct problems at home, while pretreatment clinical levels of ADHD predicted poorer outcome as perceived by the teachers. Harsh and inconsistent parental disciplining emerged as significant partial mediators of changes in conduct problems, highlighting the importance of altering parenting practices to modify young children's conduct problems.

Key words: Predictors, mediators, conduct problems, parent training.

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INTRODUCTION

Disruptive behavior disorders including oppositional defiant disorder (ODD) and conduct disorder (CD) are among the most common reasons for referring children and adolescents to outpatient treatment in child and adolescent psychiatric clinics in Norway (Anderson, Halsteinli, Kalseth, Pedersen, & Waagan, 2002). Children with ODD or CD are at risk of developing a variety of problems such as peer rejection, school failure, psychopathology, substance abuse and criminality (Burke, Loeber, & Birmaher, 2002). Because of the stability of child aggressive behaviors, disruptive behavior disorders constitute a major health problem (Simonoff et al., 2004).

While several effective interventions have been developed for children and adolescents (Fonagy & Kurtz, 2002), parent training seems to be the treatment of choice for young children (Brestan & Eyberg, 1998; Fossum, Handegård, Martinussen, & Mørch, in press).

The main focus of parent training is to help parents alter their child's behavior by teaching them to use more appropriate and positive parenting practices. Introducing an evidence-based parent training intervention in Norway, the Incredible Years program (IY; Webster-Stratton & Reid, 2003a), predictors and mediators related to outcome are of particular interest in evaluation of treatment effects.

Mediation effects refer to underlying processes of change in treatment, or mechanisms of action.

Weersing and Weisz (2002) noted a lack of studies exploring mechanisms of change in studies applying parent training interventions. Changes in parenting practices may serve as mediators in parent training and cause changes in child conduct problems. Some studies of the IY program have explored mediating effects of parenting practices. In the US, Beauchaine, Webster-Stratton, & Reid (2005) reported that reductions in inconsistent and harsh child disciplining mediated treatment outcome in a study pooling data from six independent clinical trials. In a replication of the IY in the UK, Gardner, Burton, and Klimes (2006) further noticed that changes in positive parenting skills significantly mediated changes in child conduct problems.

In a recent meta-analysis of predictors in parent training, low family income resulted in a large standardized effect size, while variables such as low educational level/ occupation, maternal psychopathology and severe pretreatment child behavior problems produced moderate effect sizes (Reyno & McGrath, 2006). These findings indicate that such variables influence treatment outcome negatively. Maternal age has also been identified as a significant predictor of treatment outcome in IY in the sense that children with mothers with median age above 35 experienced less reduction in conduct problems compared to children with younger mothers (Beauchaine et al., 2005).

In addition to the variables identified in meta-analyses the following are important: ODD and CD comorbidity with other diagnoses, and the co-occurrence of

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ODD/CD with Attention Deficit Hyperactivity Disorder (ADHD), anxiety or depression is particularly high (Angold, Costello, & Erkanli, 1999). ADHD in children with ODD is a plausible marker for early onset of CD (Loeber, Burke, Lahey, Winters, & Zera, 2000). In general, parents and teachers perceive children with comorbid ODD and ADHD as more disruptive compared to those only fulfilling diagnostic criteria for ODD (Gadow & Nolan, 2002). ADHD is therefore an important potential predictor of child behavior problems both at home and in day-care.

Further, aggressive behavior in children is related to parental distress (Kashdan et al., 2004) identified to influence treatment response negatively (Kazdin, 1995). In a study focusing on sex differences in young children with ODD, similarities between behaviors and competences among boys and girls' as perceived by the parents were more striking than differences, yet parental levels of stress were significantly higher among the parents of girls (Fossum, Mørch, Handegård & Drugli 2007). Consequently, parental stress and sex of the child should be addressed as potential predictors of treatment outcome.

The children and families in this study participated in a Norwegian replication study of the IY parent training and child therapy programs. The IY has shown promising treatment effects in randomized controlled trials in the US (see for instance, Webster Stratton & Hammond, 1997; Webster-Stratton, Reid, & Hammond, 2004), and in independent replications conducted both in the UK (Scott, Spender, Doolan, Jacobs, & Aspland, 2001; Gardner et al., 2006) and in Canada (Taylor, Schmidt, Pepler, & Hodgins, 1998). The IY has recently shown positive results in an uncontrolled Swedish (Axberg, Hansson, & Broberg, 2007) and a Norwegian RCT replication study (Larsson et al, in press). In the Norwegian study (Larsson et al., in press) effect sizes showed moderate reductions ($d = .17 - .75$) in child disruptive and aggressive behaviors. Alterations in parenting skills were positive, ranging from moderate to large effect sizes, i.e., mothers were less harsh in their disciplining, less inconsistent in their disciplining, and more positive in their parenting practices after parent training.

Objectives

The aims of the study were first to explore if alterations in parenting practices, e.g. changes in positive parenting, harsh and inconsistent disciplining, mediate changes in children's conduct problems. When introducing IY in Norway, it is of particular interest to explore the role of parenting practices as potential mediators of change in conduct problems. Secondly, we determined whether pretreatment scores in child and family variables were factors predicting treatment outcomes, both as experienced by mothers at home and in changes in observed negative maternal parenting practices. Due to the possible importance of parenting practices in parent training, factors potentially ex-

plaining less alteration in negative parenting practices are of particular interest. The originator of the treatment program used this outcome as an indication of clinical significant outcome (Webster-Stratton & Hammond, 1997).

Finally, we address if clinical levels of ADHD predict treatment outcomes as experienced by the teachers in the child's day-care and school settings. The inclusion of potential explaining factors is based on previous reviews of treatment outcome in parent training.

METHOD

In this study, we included children treated with parent training (PT) or parent training combined with child therapy (PT+CT) in analyses of predictors of treatment outcome, while also a waiting-list condition (WLC) was included in analyses of mechanisms related to parent training, altogether a sample of 121 children (Larsson et al., in press).

Subjects

The child characteristics for inclusion in the study were: (a) age of 4-8 years; (b) the primary referral reason was misconduct at home as experienced by parents (e.g. noncompliance, aggressive or oppositional behaviors); (c) the child had no debilitating physical impairment; (d) the child's behavior was within clinical range (above the 90th percentile and a score above 119 for girls and 126 for boys) on the ECBI based on Norwegian norms (Reedtz et al., 2008), and (e) the child met diagnostic criteria for ODD and/or CD according to the Diagnostic and Statistical Manual for Mental Disorders 4th edition (DSM-IV, American Psychiatric Association, 1994) or sub-clinical diagnostic criteria for ODD or CD. Following the recommendations by Angold and Costello (1996) regarding sub-clinical diagnosis, children who scored one criterion less than the four criteria required for a formal DSM-IV ODD diagnosis, or the three required for a formal CD diagnosis, while also displaying diminished functioning, were included. The participants were randomly assigned to PT (n=47), PT+CT (n=52) or WLC (n=28).

In the two active treatment conditions, the children's mean age was 6.6 years (SD = 1.3). Twenty-eight children (28.3%) lived in one-parent families, and a step-parent was involved in 18 (18.2%) families. A total of six children (6.1%) were living in foster care, of which two (2%) were in kinship foster care. Of the families, two (2%) were not native-speaking Norwegians. None of the demographic variables indicated significant difference between the three treatment conditions (for detailed information, see Larsson et al., in press).

Procedures

All children were referred for disruptive behaviors to two child and adolescence outpatient clinics at two university sites in Norway in the period of August 2001 - January 2003. Information about treatment was provided to referral agencies such as teachers, physicians and child welfare workers throughout the project period. Informed consent was obtained from the parents on the basis of verbal and written information. Before inclusion, each parent completed the ECBI and a diagnostic interview, the Kiddie-SADS (KSADS, see below) was conducted with the parents as informants. Children not

meeting the diagnostic intake criteria and a score above the 90th percentile on the ECBI in either mother or father reports were excluded. Assessment was performed before and after treatment. Of the potential participants fulfilling the inclusion criteria, two families refused to participate. The teachers received questionnaires by mail after parents had given their consent, resulting in a participation rate of 86 teachers pre- and posttreatment.

Few measures were discarded due to missing data. Only maternal ratings are reported in this study because the participating mothers outnumbered the fathers and to reduce number of statistical tests.

Treatment

The IY intervention program developed by professor Carolyn Webster-Stratton at the parenting clinic, University of Washington, is a manualized and video-based training program for young children with conduct problems. Parents assigned to the BASIC parent training condition (PT)(Webster-Stratton & Reid, 2003a) were divided into groups of 10-12 parents, approximately parents of six children in each group. The parents met weekly for 12-14 weeks for two hours with two accredited therapists. During the sessions, parents watched 250 video vignettes showing examples of everyday life parent-child interactions. The therapists led discussions regarding central aspects of parenting on the basis of the video vignettes. The aims of the parent program are to strengthen families and promote parent competencies by increasing their positive and self-confidence in parenting, reduce negative parenting practices, improve parents' problem-solving skills and anger management, and improve school involvement. Parents received home tasks and each session started with the parents describing their experience of these exercises. On average, parents attended 92% of the scheduled meetings ($M = 11.2$, $SD = 1.6$).

In the PT+CT condition, the parents and their children met simultaneously at the clinic, but the child and parent sessions were held separately. In child therapy (the "Dinosaur school"), approximately six children met for two hours weekly for 18-20 weeks with two therapists. Child training is a video-based program that comprises more than 100 video vignettes depicting children in a variety of everyday life situations and settings (e.g. at home with parents, in the classroom and on the playground). In addition to the videotapes and related discussions, the training program involves fantasy play with life-size puppets, including a boy, a girl and various animals. The puppets present their ongoing interpersonal problems in the group, exposing interpersonal skills, e.g. how to make new friends, being a friend, and so forth. Exercises were sent home with the child every week. The child training is described in detail elsewhere (Webster Stratton & Reid, 2003b). Attendance in child therapy was high with an average of 91% of the planned sessions ($M = 15.6$, $SD = 1.9$).

Attrition

A total of two families (2%) dropped out of treatment, both children were boys and from PT.

Therapists and treatment integrity

A total of 15 therapists administered the parent training program and nine therapists administered child therapy at the two sites. Each of the therapists had a Bachelor's or Master's degree in mental health-related fields and was experienced in

clinical work. The therapists in parent training were trained according to certification procedures established by the IY program and they were certified by the program developer. The therapists received continuous supervision through observations, role play, and video reviews from the second author (WTM), a professor of psychology and certified trainer in the IY program. In order to ensure treatment integrity, the therapists followed a treatment manual, completed standard check-lists, and tracked group activities (number of vignettes showed, role-plays, home-tasks etc.) throughout treatment sessions. All sessions were videotaped for evaluation by the trainer and weekly peer and self-evaluation meetings.

Outcome variables

Three criteria for clinically significant outcomes were chosen: The first criterion pertains to child functioning at home, the second criteria is related to independent observation of negative parenting, and the third criterion pertains to child behaviors in day-care or at school.

Conduct problems at home. The ECBI is a 36-item inventory for parental ratings of conduct problem behaviors among children aged 2-16 years (Robinson, Eyberg, & Ross, 1980). On each item of the intensity scale, the parent is asked to respond on a seven-point Likert scale ranging from 1 = "Never" to 7 = "Always", as an indicator of intensity of specific child problem behaviors. The Cronbach alpha (α) was .84. The Norwegian norms of the ECBI (Reedtz, et al., 2008) permit evaluations of the extent to which parents perceive the child as being within normative range. Children scoring above one SD of the normative mean on the ECBI (an ECBI intensity score greater than 114.6) at posttreatment were defined as non-responders, while children scoring below this cut-off score were defined as responders.

Observations of negative parenting in the clinic. The Dyadic Parent-Child Interaction Coding System-Revised (DPICS-R; Eyberg & Robinson, 1981) was used to score parental behaviors. The DPICS-R is an observational measure developed specifically to record conduct problems among children and their parents, consisting of 35 categories. Mothers showing a reduction equal to or greater than 30% in negative (negative + critical command) parenting practices from pre- to posttreatment were considered as responders, while mothers showing reductions less than 30% or an increase in negative parenting were considered non-responders. The sequences of parent-child dyads lasted for 15 minutes for each parent-child dyad which was videotaped.

Ten trained observers scored the video tapes. They were blind to assigned treatment condition of the participants. Before scoring the video tapes, the observers were trained for 80 hours and had to maintain a reliability of .80 on practice tapes between the observers. In order to maintain accuracy in their coding, observers met regularly for training sessions. In order to maintain consistency between the two sites, observers coded videotaped interactions across sites for inter-rater reliability and met for discussion via TV conferences.

Conduct problems in day-care/at school. The Preschool Behavior Questionnaire (PBQ) consists of 30 items addressing conduct problems and is completed by day-care teachers for children aged 4-6 years (Behar, 1977). In this study, seven items scored on a 0-2 scale in the aggression ($\alpha = .80$) subscale were used. On the *Teacher Report Form (TRF;* Achenbach, 1991) teachers were asked to rate schoolchildren's academic performance, four general adaptive characteristics, and 112 emotional and behavioral problems scored on a 0-2 scale. In

this study, the aggression subscale, consisting of 25 items ($\alpha=.94$) was used. Responders in day-care and school settings were children scoring below the 80th percentile on the PBQ for children in day-care, and the 88th percentile on the TRF for children in school. Children scoring above these cut-off scores were considered non-responders. These cut-off scores have been established in comparisons between the present clinical sample and Norwegian normative data for the PBQ/TRF measures (Drugli, Larsson, Clifford & Fossum, 2007).

Predictors of treatment outcome

Information was gathered from the KSADS, a semi-structured diagnostic interview, in which episodes of psychopathology in the children according to DSM-IV are assessed (Kaufman et al., 1997; American Psychiatric Association, 1994). A modified version of the KSADS was used and diagnoses most relevant for 4-8 year-old children were assessed. Three trained interviewers conducted the interviews. All interviews were recorded and a random selection of 10% of the interviews showed a high percentage of inter-rater agreement, in all cases above 90%. Clinical levels of ADHD imply diminished functioning (six symptoms of attention problems, hyperactivity or a combination of the two) or sub-clinical (one symptom less than formal DSM-criteria) levels of ADHD. An anxiety disorder, that is generalized as well as various specific anxieties such as phobias, imply a score above cut-off

and diminished functioning indicated by the DSM-IV.

Parental stress. The Parent Stress Index (PSI) was used to assess parents' perceived stress related to both child behaviors and parenting ($\alpha=.94$). A total score was calculated on 101 items rated on a 1-5 scale (Abidin, 1995) and ranged from 101 to 505. Parents who score at or above 260 on total stress score should be offered referral for professional consultation according to Abidin (1995). (Due to a protocol error, some parents in the first wave of assessment did not fill out the PSI, resulting in a lower number of subjects for the PSI than for other measures).

Symptoms of parental depression. The Beck Depression Inventory (BDI) a widely used measure of depressive symptoms, (Beck, Steer, & Garbin, 1988) was administered to parents. The BDI measures 21 attitudes and symptoms on a scale ranging from 0 to 3 ($\alpha=.89$). Total scores range from 0 to 63.

Potential predictors in kindergarten/ at school. Clinical levels of ADHD as reported by the parents (see description above) were used as a potential predictor of disruptive behaviors in day-care/ or in school.

Mediators of treatment outcome

Parenting practices. The Parenting Practices Interview (PPI) was adapted from the Oregon Social Learning Center's Dis-

Table 1. Pretreatment characteristics for outcome variables, potential predictors and mediators (pretreatment scores of parenting, SD and mean change scores and belonging SD)

	Mean (SD)	Range	Characteristic
<i>Outcome variables¹:</i>			
Conduct problems (ECBI intensity score) ^a	156.6 (22.8)	111 - 220	98.9% children above cut-off, 1.1% child below cut-off
Negative parenting (DPICS-R)	5.0 (6.1)	0 - 34	-
Teacher reports (TRF/ PBQ z-value) ^b	3.8 (2.6)	-.3 - 9.4	79.1% children above cut-off
<i>Predictors¹:</i>			
Sex of the child (%boys/ %girls)	20.2 / 79.8	-	-
ADHD ^c	n = 56	-	21.2% sub-clinical, 35.4% in clinical range
Anxiety	n = 10	-	9.7% specific anxiety, 1.1% post traumatic stress disorder
Maternal age	33.3 (5.6)	24 - 59	-
Marital status	-	-	59.1% married/ co-habitats
Maternal education ^d	2.2 (1.0)	-	-
Maternal stress (PSI total stress) ^e	265.1 (39.3)	179 - 342	10.8% > 99 th %, 23.1% > 95 th %, 20% > 85 th %
Symptoms of depression (BDI) ^f	6.6 (6.6)	0 - 34	7.4% mild, 4.2% moderate, 1.1% clinical
<i>Mediators²:</i>			Mean change ^g (SD)
Parent reports of harsh discipline (PPI)	2.3 (.5)	1.2 - 4.1	.4 (.5)
Parent reports of inconsistent discipline (PPI)	3.2 (.7)	1.8 - 5.8	.4 (.7)
Parent reports of positive parenting (PPI)	4.3 (.6)	2.8 - 5.9	-6 (.7)

Notes: ¹N = 93 in the analysis of predictors, and ²n = 121 analysis of mediators. ^aECBI = Eyberg Child Behavior Inventory a score equal or above 119 for girls and 126 for boys are scores above the 90th%, ^bTRF = Teacher Report Form and a score of 6 equals the 88th percentile and on the Preschool Behavior Questionnaire (PBQ) a score of 9 equals the 80th percentile. ^cADHD = Attention Deficit Hyperactivity Disorder, sub-clinical = one criteria less than required in a formal DSM-IV and clinical levels = criteria in DSM-IV. ^dParental education levels: 1 = not completed high school, 2 = completed high school, 3 = higher education, 4 = completed higher education. ^eParent Stress Index (PSI) score of 258 equals the 85th%, 294 equals the 95th% and 320 equals the 99th%. ^fBeck Depression Inventory (BDI) cut-scores are 0-13 minimal depression, 14-19 mild depression, 20-28 moderate depression, 29-63 severe depression. ^gMean change = mean change from pre- to posttreatment and the corresponding SD. PPI = Parenting Practices Interview, DPICS = Dyadic Parent Child Interaction Coding System.

cipline Questionnaire (Webster Stratton, Reid, & Hammond, 2001). Parents reported the probability and frequency with which they used harsh child discipline techniques, consisting of 14 items on a 7-point scale ($\alpha=.80$); inconsistent discipline, consisting of eight items on a 7-point scale ($\alpha=.69$); and positive parenting, consisting of 15 items on a 7-point scale ($\alpha=.65$). The mean values of the scales on the PPI were applied. Table 1 presents detailed information of pretreatment characteristics for outcome variables, potential predictors and mediators.

Statistical methods

Predictors. Bivariate logistic regression analysis was performed in order to test for three outcomes of clinical significance. First, we wanted to determine if mother reports in child and family variables at pretest served as predictors of treatment outcome using a score below/above normative range on the first dependent variable (ECBI). In this analysis, pretreatment ECBI score was used as control variable. Second, we wanted to assess the associations between treatment outcome in parenting (as defined as a 30% reduction in negative parenting) and child and family variables as independent variables. Finally, the relationships between treatment outcome in day-care and school settings were assessed, using a composite PBQ/TRF score as dependent variable, and diagnostic status and clinical levels of ADHD as independent variables.

Mediators. When assessing whether parenting practices mediate the relationships between treatment and changes in child disruptive behaviors, simple and multiple regressions and the Aroian test (Aroian, 1947) were used. In this analysis, we first tested whether all three variables in the model were correlated (see figure 1, below). Second, a step-by-step regression analysis was employed, with changes in disruptive child behaviors as measured by the ECBI as dependent variable, and changes in parent reports of positive, harsh and inconsis-

tent parenting, using the subdomains on the PPI as explaining variables. In the mediation analysis, the web-site by Preacher and Leonardelli (2008) was employed for the Aroian tests.

RESULTS

Predictors of treatment outcome

Mothers scored 37 (39.8%) of the children as responders and 56 (60.2%) as non-responders at posttreatment, when considering the children's conduct problems as measured by the ECBI in the two treatment conditions. Mother reports on the ECBI showed that the mean score for responders was 90.7 (SD = 16.4), while non-responders had a mean score of 138.3 (SD = 20.8). For observed negative parenting, 88 mother-child dyads were observed pre- and posttreatment. In all, 30 mothers (30.3%) achieved 30% or greater reduction of observed negative parenting at posttreatment, while 58 (69.7%) were non-responders. According to teachers, 68 (79.1%) children scored above the optimal cut-off before treatment, while 58 (67.4%) children were still above this cut-off at posttreatment and 28 (32.6%) children scored below.

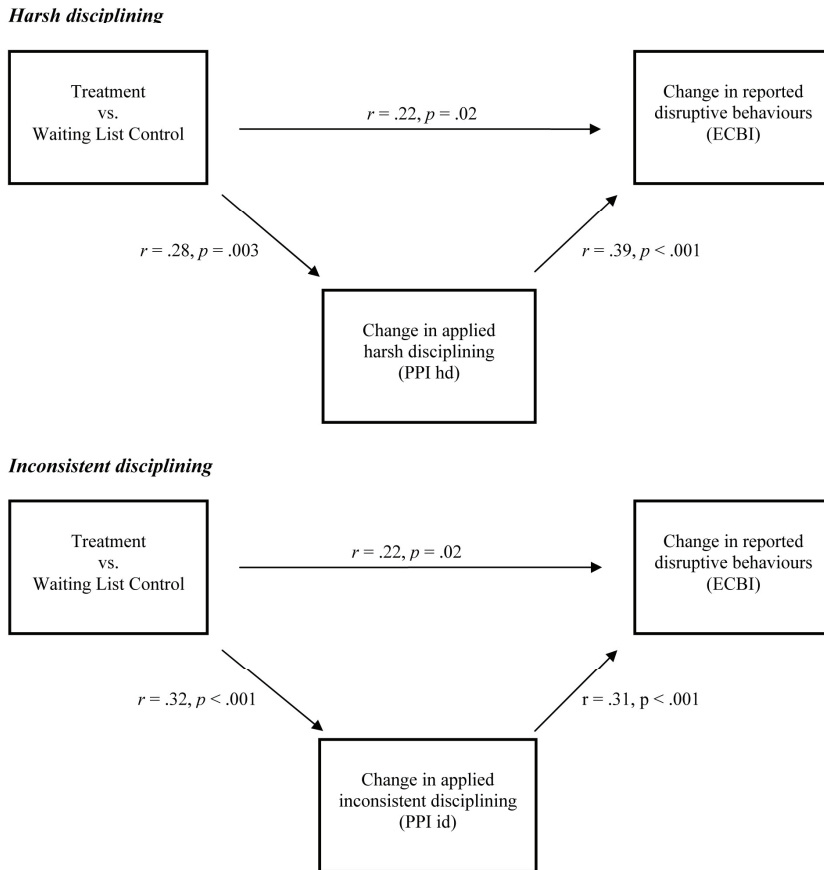
Results of logistic regression analyses showed that the independent variables clinical levels of ADHD, being a girl, and maternal stress predicted a worse treatment outcome in maternal reports on the ECBI. None of the child and family variables did significantly explain unfavorably outcomes in observations of negative parenting. Clinical levels of ADHD, as perceived by the parents, predicted poorer child functioning in day-care and school settings at posttreatment as re-

Table 2. Results of factors potentially predicting a worse treatment outcome after parent training

	Mother reports on the ECBI ¹			30% reduction in observed parental criticism (DPICS) ²		
	Wald	OR	95% CI lower - upper	Wald	OR	95% CI lower - upper
<i>Child factors:</i>						
Sex	6.56*	8.04	1.63 - 39.60	.38	1.57	.38 - 6.61
Clinical levels of ADHD	5.83*	3.11	1.24 - 7.89	.01	.96	.32 - 2.86
Anxiety disorder	.06	.86	.25 - 2.94	2.65	4.52	.74 - 27.70
<i>Family factors:</i>						
Maternal age in years	.04	1.01	.94 - 1.08	2.23	1.08	.98 - 1.19
Marital status	3.61 [†]	2.91	.97 - 8.50	.34	1.44	.42 - 4.91
Education	3.66			.72		
Parent Stress Index total score	3.95*	1.02	1.00 - 1.03	.76	1.01	.99 - 1.03
Beck Depression Inventory	2.94 [†]	1.08	.99 - 1.18	.00	1.00	.93 - 1.08
<i>Functioning in day-care/ school:</i>						
	Teacher reports on the PBQ/TRF ³					
	Wald	OR	95% CI lower - upper			
Clinical levels of ADHD	3.98*	3.26	1.02 - 10.39	-	-	- -

Notes: ¹ $n = 93$, ² $n = 88$, and ³ $n = 86$. ECBI = Eyberg Child Behavior Inventory, DPICS = Dyadic Parent Child Interaction Coding System, PBQ = Preschool Behavior Questionnaire, TRF = Teacher Report Form, ADHD = Attention Deficit Hyperactivity disorder, [†] $p < .10$, * $p < .05$

Figure 1. Mediation model: Parental harsh disciplining and inconsistent disciplining



Mediators (mechanisms of change) in children's conduct problems after parent training

Notes. PPI = Parent Practices Interview, Hd = Harsh disciplining, Id = Inconsistent disciplining, ECBI = Eyberg Child Behavior Inventory.

ported by the teachers on the dependent variable PBQ/TRF. For more detailed information of treatment predictors in parent training, see Table 2.

Mediators of change in parent training

We further tested whether parental reports of harsh and inconsistent disciplining and positive parenting were mediators of changes in child conduct problems as measured by the ECBI. First, treatment condition should be associated with changes on the ECBI and changes in self-reported parenting. In addition, changes in parenting should be significantly related to changes in child disruptive behavior controlling for treatment condition (Baron & Kenny, 1986).

Improvements in parent reports of harsh disciplining correlated to changes in child conduct problems ($r = .39, p < .001$), treatment condition was related to

changes in parental harsh disciplining ($r = .28, p = .003$), and changes in child conduct problems ($r = .22, p = .02$). Improvements in parent reports of inconsistent disciplining correlated to changes in child conduct problems ($r = .31, p < .001$), treatment condition correlated to changes in parent reports of inconsistent disciplining ($r = .32, p < .001$), and changes in child conduct problems ($r = .22, p = .02$). Figure 1 shows the mediation models and the significant correlations for harsh and inconsistent disciplining.

The results of multiple regression analysis using changes in parental reported child conduct problems as the dependent variable (see Table 3) and the independent variables entered as follows: Step 1, the effect of treatment condition on negative behavior; In Step 2 this effect was attenuated when parental harsh or inconsistent disciplining were introduced as potential mediators. Although changes in positive parenting and

Table 3. Results of hierarchical regression analysis

	Total R^2	sig. F change	B	t -value	p -value
PPI harsh disciplining:					
Step 1	.05	$p = .02$			
Treatment vs WLC			.22	2.37	.02
Step 2	.17	$p < .001$			
Treatment vs WLC			.12	1.34	n.s.
Change in parent reports of harsh disciplining			.36	3.93	< .001
PPI inconsistent disciplining:					
Step 1	.05	$p = .02$			
Treatment vs WLC			.22	2.37	.02
Step 2	.11	$p = .007$			
Treatment vs WLC			.14	1.52	n.s.
Change in parent reports inconsistent disciplining			.26	2.76	.007

Notes. $N = 121$. Treatment refers to children in PT and PT + CT conditions, WLC = Waiting List Condition PPI = Parenting Practices Interview.

changes in child conduct problems were correlated, changes in positive parenting were not significantly associated with outcome when controlling for treatment condition (R^2 change was 1.3%, ns), thus positive parenting was not found to be a mediator.

In further analysis of mediators applying the Aroian test, reductions of harsh parenting were significant ($z = 2.46, p < .05$) indicating a partial mediation effect on reductions in child conduct problems for the children in the treatment conditions. Reductions in inconsistent disciplining also showed a significant partial mediation effect (z -value = 2.41, $p < .05$) on reductions in child conduct problems.

DISCUSSION

The main purpose of this study was to explore child and family factors as predictors of short-term treatment outcome in clinically referred Norwegian children with severe oppositional or aggressive behavior problems. Another aim was to explore if changes in parenting behaviors mediated changes in child conduct problems after IY parent training. A relatively large proportion of the children, almost 40%, did function within normative range on the ECBI after participation in IY. However, changes in child behavior problems generalized to day-care and school settings were small as reflected by teacher reports. Similarly, alterations in observed negative parenting were small in that 30% of the mothers were observed using 30% or greater reductions in negative parenting.

Mother reports of changes in harsh and inconsistent child disciplining were large in the Norwegian replication of the IY (Larsson et al., in press). We further reported that both harsh and inconsistent disciplining were significant partial mediators of changes in the children's conduct problems. This highlights the importance of focusing on changes in parenting practices as a means to change severe conduct problems in young children. Both inconsistent and harsh disciplin-

ing parental behaviors were found to be significant partial mediators of conduct problems in children in the US (Beauchaine et al., 2005). Contrary to the findings in the study by Gardner et al. (2006), positive parenting emerged as a nonsignificant mediator in our study. Nevertheless, changes in the application of positive parenting were substantial in the present Norwegian replication study (Larsson, et al., in press). Improving the use of positive parenting in parent training is clinically fundamental, both as a means to strengthen parent-child bonding initially in treatment and to maintain positive parent-child relationships.

Taking predictors of treatment outcome into consideration, clinical levels of ADHD predicted poorer outcome after parent training, both as experienced by the mothers at home and by the teachers in day-care and school settings. It seems that comorbid ODD and ADHD produce a worse treatment outcome, possibly due to comorbid ODD and ADHD constituting a more severe form of child conduct problems. It should be noted that a large proportion of the children in this study displayed pervasive conduct problems, i.e., conduct problems exhibited both at home and in day-care and at school (see Drugli et al., 2007). To optimize outcomes for children with severe and pervasive conduct problems, interventions should therefore address such problems in each setting where they occur. Beauchaine et al. (2005) noted that in particular children with elevated attention problems benefited from an intervention focusing specifically on increasing teacher adaptive and effective classroom management (IY Teacher Training Programs, Webster-Stratton & Reid, 2003a). Hartman, Stage and Webster-Stratton (2003) noted that boys with attention problems benefited more from the IY program as compared to those without attention problems. Whether the differing findings in the study by Hartman et al. (2003) and our study is an effect of varying methodology in identifying attention problems is unclear.

The levels of stress were high among several mothers participating in parent training in this study and this factor also predicted an unfavorable treatment outcome

in children's conduct problems. Higher levels of mother depressive symptoms tended to influence treatment outcome in the same manner. These findings emphasize the importance of taking stress and depressive symptoms among mothers into consideration when offering parent training to parents having a child with severe conduct problems. In the Swedish replication of the IY, poorer perceived psychological health also predicted a poorer treatment outcome (Axberg et al., 2007). Webster-Stratton and colleagues have developed the ADVANCE intervention program addressing parental communication, personal self-control, problem-solving skills, and strengthening social support and self-care (Webster-Stratton & Reid, 2003a). This intervention has shown to increase treatment effects favorably (Webster-Stratton, 1994).

Although many of the participants in the present study experienced favorable treatment outcome, treatment effects were somewhat lower as compared to studies conducted by the originator of the IY program (Webster-Stratton & Hammond, 1997; Webster-Stratton et al., 2004). It should be noted that most often replication studies produce smaller treatment effects when comparing them to outcomes of studies conducted by originators of various treatment programs (Fossum et al., in press). Whether the smaller treatment effects obtained in this study is due to a smaller treatment dosage or not, is unknown. The duration of the parent training interventions in studies by the originator of the treatment program is longer (see for instance, Webster-Stratton & Hammond, 1997; Webster-Stratton et al., 2004) as compared to the duration of the parent curriculum in the present study.

While fewer girls than boys scored below cut-off on the ECBI at post-treatment, this finding should be interpreted cautiously due to the small number of girls included in the study. Nor Beauchaine et al. (2005) or Axberg et al. (2007) reported sex differences in responsiveness to IY. It is likely that the elevated levels of stress in the families of girls (Fossum et al., 2007) may have contributed to this finding. Neither marital status, nor maternal age or levels of education predicted treatment outcome in this sample, both in the intensity of the children's disruptive behaviors and in the observations of negative parenting practices. In fact, there was tendency for children living in single parent household to score below cut-off more often compared to those living in two-parent household. This may suggest favorable treatment outcomes also for children living in families with possible additional psychosocial risk factors. These findings could be due to social conditions in Norway making the sample relatively homogeneous with respect to socio-demographic variables but also in regard to mother age.

Limitations of the Study

Relatively few children met diagnostic criteria for anxiety disorder and the assessment of clinical levels of ADHD did not meet formal criteria of a diagnosis. As a

consequence, these results should be interpreted cautiously. Further, parental psychopathology, except symptoms of parental depression that might have influenced treatment outcome negatively, was not controlled for. Third, the use and implications of a 30% reduction in observed negative parenting are unclear. Initially we observed low levels of negative parenting as compared to studies in the US (Hartman et al., 2003). For example, a mother using negative parenting three times at pretreatment and twice at post treatment will show a clinical reduction of 30% in observed negative parenting.

Conclusion

Many of the participating children and their families experienced clinically meaningful improvement. This finding is even more important given that the referred sample comprised highly disruptive children with common co-occurring diagnostic features in addition to ODD and CD, such as ADHD and anxiety, and the fact that many of them also displayed pervasive conduct problems. After treatment, two thirds of the sample scored within norms on conduct problems (Larsson et al., in press), overall results in line with previous studies of the IY (Webster-Stratton & Hammond, 1997; Scott et al., 2001). It is noteworthy that no child or family-variables predicted unfavorable outcomes in parenting practices. This is especially important when considering improvement of parenting practices as a means to reduce children's conduct problems.

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