



Effectiveness of interventions and factors of relevance in the treatment of children with conduct problems

Sturla Fossum

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UNIVERSITY OF TROMSØ
Faculty of Medicine
Department of Clinical Medicine

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“Det er lettere å styre en nasjon enn å oppdra et barn”

Winston Churchill

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1. Summary

The principal aim of this dissertation was to study the effectiveness of treatment of children for severe conduct problems, and to explore factors of relevance for the effects of treatment on these children. In three studies, 127 children aged 4-8 years and their families participated in a randomized controlled trial of the Incredible Years training sessions that were implemented in two outpatient clinics for children and adolescent's mental health in two cities in Norway. In addition, a meta-analysis was performed in order to identify the effects of treatment on children and adolescents with conduct problems and to explore additional treatment effects, i.e. effects in day-care and school, changes in children's and adolescents' social functioning and changes in parental distress.

In the replication study of the Incredible Years moderate reductions in children's conduct problems were reported by the parents, while 40% of the children were within the normal range in terms of conduct immediately after treatment, according to their mothers. Positive additional effects were obtained in terms of parents experiencing moderate to large reductions in parental stress. Alterations in parenting behaviour were also moderate to large, and self-reported inconsistent and harsh disciplining were both significant partial mediators of change in children's conduct problems. Although parents reported positive reductions in parental stress, maternal stress was a significant predictor of worsened treatment outcome. Furthermore, Attention Deficit Hyperactivity Disorder (ADHD) predicted worsened treatment outcome as experienced by both mothers and teachers. Finally, the mothers of girls scored the girls less below cut-off at posttreatment than did mothers of boys.

In general, although the similarities in parents' perceptions of boys and girls with conduct problems at pretreatment were more evident than the differences, parental stress was more pronounced among parents of girls, and mothers' of girls reported more symptoms of depression. Teachers, on the other hand, viewed the boys as less socially competent and more aggressive.

In the meta-analysis, the effect sizes (ES) indicated moderate reductions in children's and adolescents' conduct problems in studies with untreated control groups, while in studies without untreated controls, the ESs in reductions in aggressive behaviours were large. The changes in aggressive behaviours in day-care or school, alterations in social functioning and reductions in parental distress were moderate in size. In the moderator analyses, the variable sample

size was significant in studies with untreated controls, while the following variables; age of the child, diagnostic assessment and mode of treatment, were all significant in studies without untreated comparisons.

It is concluded that children's and adolescents' conduct problems can be treated with positive results and that important additional treatment gains can be achieved. However, factors such as parental stress and a child diagnosis of ADHD can influence treatment effects negatively. Further steps to improve generalization effects may be needed, both in the treatment of conduct problems in general and specifically when employing the Incredible Years in Norway.

2. Abbreviations used in this thesis

ADHD	Attention Deficit Hyperactivity Disorder
ANCOVA	Analysis of Covariance
ANOVA	Analysis of Variance
APA	American Psychiatric Association
BT	Behaviour Therapy
CBCL	Child Behavior Checklist
CBT	Cognitive Behaviour Therapy
CD	Conduct Disorder
CT	Child Therapy
DBD	Disruptive Behaviour Disorders
DSM-IV	Diagnostic and Statistical Manual of Mental Disorders 4 th ed
ECBI	Eyberg Child Behavior Inventory
ES	Effect size
FT	Family Therapy
IY	Incredible Years Training Sessions
NNT	Numbers Needed to Treat
ODD	Oppositional Defiant Disorder
PT	Parent Training
SD	Standard Deviation
TOCA-R	Teacher Observed Classroom Adaption Revised
WLC	Waiting list control

3. List of papers

1. Larsson, B., **Fossum, S.**, Clifford, G., Drugli, M. B., Handegård, B. H., & Mørch, W-T. (2008). Treatment of oppositional defiant and conduct problems in young Norwegian children: results of a randomized controlled replication trial. *European Child and Adolescent Psychiatry, e-publication ahead of print.*
2. **Fossum, S.**, Mørch, W-T., Handegård, B. H., Drugli, M. B. & Larsson, B. (in press). Parent training for young Norwegian children with ODD and CD: predictors and mediators of treatment outcome. *Scandinavian Journal of Psychology, a revised version of this paper is in press.*
3. **Fossum, S.**, Mørch, W-T., Handegård, B. H., Drugli, M. B. (2007). Childhood Disruptive Behaviors and Family Functioning in Clinically Referred Children: Are Girls Different from Boys? *Scandinavian Journal of Psychology, 48, 375-382.*
4. **Fossum, S.**, Handegård, B. H., Martinussen, M., & Mørch, W-T. (2008). Psychosocial interventions for disruptive and aggressive behaviour in children and adolescents: A meta-analysis. *European Child and Adolescent Psychiatry, e-publication ahead of print.*

4. Introduction

A recent review shows that oppositional defiant and conduct problems are common in young children (Costello, Egger, & Angold, 2005). Disruptive Behaviour Disorders (DBD), such as Oppositional Defiant Disorder (ODD) and Conduct Disorder (CD) are frequently seen by the mental health and community services in the US (Loeber, Burke, Lahey, Winters & Zera, 2000) and disruptive behaviours are frequent reasons for referring children and adolescents to mental health services in Norway (Andersson, Halsteinli, Kalseth, Pedersen, & Waagan, 2002; Andersson & Norvoll, 2006). Children with ODD and CD are at risk of developing a variety of problems, including peer rejection, school failure, psychopathology, substance abuse and criminality (Burke, Loeber, & Birmaher, 2002), and the prognoses are poor (Loeber et al., 2000). Because of the stability of aggressive behaviours, DBD are a major mental health problem (Simonoff et al., 2004), and Romeo, Knapp & Scott (2006) have recently reported a substantial annual cost of severe conduct problems in children aged 3-8 years in the community; nevertheless, the burden fell most heavily on the families. The need for better knowledge of these conditions in general is thus great, and of effective treatments for DBD in particular. This is particularly true for Norwegian children and their families. Due to this lack of knowledge the Research Council of Norway organised an expert conference that recommended that treatment programmes such as Multi-Systemic Therapy (MST), Parent Management Training (PMT), Marte-Meo and the Incredible Years training sessions (IY) should be implemented and empirically validated in Norway (Norges Forskningsråd, 1997). As a consequence of these recommendations, IY was validated at the university clinics in Trondheim and Tromsø. This was the background to making this dissertation.

4.1. Development of disruptive and aggressive behaviours

Aggressive behaviour, like most human activity and human behaviours, changes with age both in its incidence and in the processes that lead to its initiation (Hartup, 2005). From the preschool period until middle childhood there is a decrease in the frequency of temper tantrums, management problems, bullying and destructiveness (Earls & Mezzacappa, 2005). When six longitudinal studies of child aggression were pooled, the researchers reported that physical aggression from school entry until early adolescence is rare (Broidy, Nagin, Trembley et al, 2003). However, among both boys and girls, a small group of children stand out as exhibiting notably more physically aggressive behaviour than their peers throughout childhood, and such aggressive behaviour appears to be stable over time in both sexes. For instance, Lahey, Loeber,

Hart et al. (1995) reported that 88% of CD boys met the diagnostic criteria at least once during a three year follow-up period. Approximately half of those children that had been identified as aggressive at pre-school age develop persistent problems (Richman et al, 1982; Fischer et al., 1984 in Earls & Mezzacappa, 2005) and there seem to be a developmental trajectory of early onset ODD that leads to CD in a proportion of the children (Loeber et al., 2000). A recent study suggested that life-time prevalence of ODD is 10.2% and that these children are at increased risk of developing a DSM-IV life-long disorder such as mood disorders (45.8%), anxiety disorders (62.3%), impulse-control disorders (68.2%), and substance abuse disorders (47.7%) (Nock, Kazdin, Hiripi, & Kessler, 2007). A plausible assumption would be that those individuals who display conduct disturbances early in life, not only tend to display more symptoms of greater severity, but also commit more severe crimes and account for a disproportionately large number of the total offences in their respective age groups (Earls & Mezzacappa, 2005).

4.2. Classifying conduct problems

A conceptual consideration of mental disorders, such as ODD and CD, depends on whether we regard the underlying construct as a true category, qualitatively different from other conditions as well as normal states, or it simply reflects difficulties in functioning at the extreme end of a continuum (Jensen, Hoagwood & Zitner, 2006). Measures such as the Child Behavior Checklist (CBCL) and Eyberg Child Behavior Inventory (ECBI) represent an understanding of a continuum of children's behaviors. Psychiatric diagnoses, however, take a categorical approach to defining the presence or absence of a particular disorder. To meet the diagnostic criteria for one or several psychiatric diagnoses, the symptoms displayed must impair the child's functioning in one or more domains of functioning (American Psychiatric Association (APA), 1994). This dissertation adopts both of these approaches; that is, aggressive and disruptive behaviours as a continuum as well as diagnostic categorizations. The classification of mental disorders is frequently debated in the field of children's and adolescent's mental health. Nevertheless, diagnostic categories are useful and important for communication purposes and provides notable information of functioning (Volkmar, Schwab-Stone, & First, 2002).

4.2.1 ODD and CD diagnosis

ODD and CD are classified as disruptive behavior disorders. According to the APA, the following are the diagnostic criteria in the Diagnostic and Statistical Manual of Mental Disorders 4th ed. (DSM-IV) for ODD and CD:

ODD - the presence of four or more of a total of eight symptoms that last for at least six months. The symptoms of ODD includes that the child (1) often loses his/ her temper, (2) often argues with adults, (3) often actively defies or refuses to comply with adults' requests or rules, (4) often deliberately annoys people, (5) often blames others for his or her mistakes or misconduct, (6) is often touchy or easily annoyed by others, (7) is often angry and resentful, and (8) is often spiteful or vindictive.

CD - the presence of three or more of a total of 15 symptoms lasting for 12 months and at least one symptom being present during the past six months. The symptoms of CD includes that the child (1) often bullies, threatens or intimidates others, (2) often initiates physical fights, (3) has used a weapon, (4) has been physically cruel to people, (5) has been physically cruel to animals, (6) has stolen when confronting a victim, (7) has forced someone into sexual activity, (8) has deliberately engaged in fire setting, (9) has deliberately destroyed others' property, (10) has broken into someone else's house, building or car, (11) often lies to others, (12) has stolen items of nontrivial value without confronting the victim, (13) is often out late without permission, starting before age 13, (14) has run away from home overnight at least twice, (15) often play truant from school, starting before the age of 13.

Another criterion for classifying children with ODD or CD is that these behaviours impair one or more domains of the child's everyday functioning, that is either at home, in social functioning and/or in day-care/ school (see above). ODD and CD are frequent comorbid conditions to other diagnostic categories (see below).

4.2.2 ODD and CD prevalence

The prevalence of ODD and CD varies. The range of estimates of ODD ranged from 0.3% to 22%, with a median of 3.2%, while the prevalence of CD ranged from 0.0% to 11.9% with a median of 2%, according to a review by Lahey, Miller, Gordon, & Riley (1999). APA estimates the prevalence of ODD between 2 to 16%, while the estimated prevalence of CD ranges between 6% and 16% in males and from 2% to 9% in females (American Psychiatric Association, 1994). A recent epidemiological survey of eight- to ten-year-old Norwegian children in Bergen showed that the prevalence of ODD was 2.5%, and 0.5% for CD (Heiervang, Stormark, Lundervold et al., 2007).

4.2.3 Comorbid conditions to ODD and CD

Children referred for disruptive behaviors are at increased risk of co-occurring psychiatric disorders (Maughan, Rowe, Messer, Goodman, & Meltzer 2004). Ninety percent of persons with a life-long disruptive disorder have at least one

comorbid disorder (Moffitt, Caspi, Rutter, & Silva, 2001). Heiervang et al. (2007) reported a high degree of overlap between behavioural disorders and Attention Deficit Hyperactivity Disorder (ADHD), while the overlap between disruptive disorders and emotional disorders was weaker in the Norwegian sample in Bergen. A meta-analytic review of comorbidity of common child diagnostic disorders shows that for a DSM-IV diagnosis of ODD/ CD and ADHD the range of overlap varies from 3.1% - 13.3% (Angold, Costello, & Erkanli, 1999). Children who suffer from co-morbid CD and ADHD are at heightened risk of persistent antisocial development, compared to children who suffer from either disorder by itself (Simonoff et al., 2004). ADHD in children with ODD is regarded as a plausible marker for the early onset of CD (Loeber, et al., 2000), and parent and teacher ratings indicate that comorbid ODD and ADHD are associated with higher symptom load and social impairment in children (Gadow & Nolan, 2002). The range of co-occurrence of ODD/ CD and depression varies from 4.0% - 41.4% and the co-occurrence of ODD/CD with anxiety ranges from 5.5% - 25% (Angold et al., 1999). It is argued that the presence of anxiety has a moderating effect on the severity of disruptive behaviors (Russo & Beidel, 1994), while some argue that co-occurring CD and anxiety represent the most severely disturbed sub-group of disruptive children (Zoccolillo, 1992).

4.3. Etiology

Early development of ODD and CD is affected by several factors. These include child factors such as difficult temperament, high rates of disruptive, impulsive, inattentive, and aggressive behaviours, and family factors such as parenting, parental psychopathology, marital adjustment and maternal age, among others. Table 1 presents a brief review of some major child, parent, family, and other factors that placing a child at risk of developing CD.

Table 1. *Factors that place children at risk for onset of disruptive behaviour disorders*

Child factors	<ul style="list-style-type: none"> * Child temperament. A more difficult temperament on a scale from "easy" to "difficult" as characterized by more negative mood, fewer approaches to new stimuli, and less adaptability to change. * Neuropsychological deficits and difficulties. Deficits related to language, memory, motor coordination, integration of auditory and visual cues, and "executive" functioning of the brain (such as abstract reasoning). * Poor bonding/Attachment to conventional values. Little interest in or commitment to school or family life. * Academic performance. Academic deficiencies.
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- | | |
|----------------------------------|---|
| Parent and family factors | <ul style="list-style-type: none">* Psychopathology and criminal behaviour in the family. Criminal behaviour, antisocial personality disorder and alcoholism of the parent.* Parenting. Harsh and inconsistent parenting.* Monitoring of the child. Poor parental supervision, lack of monitoring of child's whereabouts, few parental rules.* Quality of the family relationships. Less parental warmth, affection and emotional support, and less attachment.* Marital discord. Unhappy marital relationships, interpersonal conflict, aggression of the parents.* Family size. More children in the family.* Sibling with antisocial behaviour. Presence of sibling with antisocial behaviour (especially older brother).* Socioeconomic disadvantage. Overcrowding, unemployment, receipt of social welfare, and poor housing. |
| Other factors | <ul style="list-style-type: none">* Prenatal and perinatal complications. Pregnancy and birth-related complications including maternal infection, prematurity and low birth weight, impaired respiration at birth, and minor birth injury.* Exposure to violence. Exposure to violence in the home, on TV, or other forms of violence.* Antisocial peers. The child associates with peers who engage in aggressive and antisocial behavior. |

Note. The list of risk factors highlights only major influences. From Kazdin (2002).

In general, it seems that no single characteristic or factor seems to be necessary or sufficient for the onset of DBD. Rutter (2005) points out that there is robust evidence for environmentally mediated risk of psychopathology and individual differences in people's (and children's – my specification) responses to risk environment, and that these effects are often dependent on genetic susceptibility. Even though some risk factors are more important than others in the development of DBD the accumulation of risk factors is important. One or two risk factors may not increase risk very much. With several risk factors, however, the likelihood of the outcome may increase sharply (Rutter, Tizard, & Whitmore, 1970; Sanson et al., 1991 in Kazdin, 2002). Still, the three most significant risk factors in the Ontario Child Health Survey (Offord et al., 1987 in Earls & Mezzacappa, 2005) were family dysfunction (relative odds 3.1), parental mental illness (relative odds 2.2), and low income (relative odds 3.7 – low income had its effect on children aged 4-11 and not on adolescents).

4.4. Treating disruptive behaviours

In the 1960s, Gerald Patterson began extensive research aimed at understanding the emergence and maintenance of aggressive child behaviour in the home (Kazdin, 2005). Using observations of child-parent interactions at home, he explored the importance of attention to and reinforcement of child deviant behaviour, use of commands, delivery of harsh punishment, and failure to attend to appropriate child behaviours, and the tone of interaction in the development of aggressive behaviours. These observations led to the acknowledgement of parenting as an important factor in the development of children's aggressive behaviours (see above, Patterson, 1982; Patterson, Reid, & Dishion, 1992) and for many years, parenting practices have been recognized to be among the most powerful predictors of antisocial behaviour (Patterson, 1986). Several aspects of child rearing, such as poor supervision, lack of parental warmth, and harsh styles of discipline are correlated with disruptive behaviour in children (Kazdin, 1996; Stormshak, Bierman, McMahon, & Lengua, 2000). Children experiencing high levels of coercion at home often display high levels of aggression among their peers and in school (McFadyen-Ketchum, Bates, Dodge, & Pettit, 1996). Because of the relevance and importance of parenting in the development of disruptive behaviors, there has been a rapid growth of parent training interventions that focus on altering the parent's interactions with their child, promoting prosocial behaviours and lowering the incidence of deviant behaviours. Typically in parent training interventions, parents are trained to identify, define and observe problem behaviours in new ways (Kazdin, 2001). Parents are taught to reduce negative parenting practices such as critical and hostile responses and to increase positive parenting practices using praise, parental warmth and so forth. Programmes typically provide parents with in depth-knowledge of social learning principles, reinforcement programmes and time-out (from reinforcement). Parent training interventions are one of the most well-validated therapeutic techniques (Kazdin, 2001), and are considered as well established – i.e they have been shown to be effective in independent replicated clinical trials (Brestan & Eyberg, 1998).

4.5. Characteristics influencing treatment effectiveness

Several child characteristics influence treatment effectiveness. The severity of the conduct problems is an important predictor of treatment outcome (Lahey, Loeber, Burke, & Rathouz, 2002; Simonoff et al., 2004). Parent and teacher ratings indicate that ODD and ADHD are associated with greater symptom and social impairment (Gadow & Nolan, 2002) and children with co-morbid CD and ADHD are at elevated risk of displaying persistent antisocial behaviour (Toupin, Dery, Pauze, Mercier, & Fortin, 2000). As a consequence, co-occurring diagnoses could result in less improvement from treatment.

Disruptive children often display various problems at school, and reduced social functioning (Kazdin, 2002). Approximately half of the children who are disruptive at home are often disruptive in school settings as well (Ramsey, Patterson, & Walker, 1990). These children are also at higher risk of developing serious problems later in life than children who are aggressive in only one setting (Moffitt, 1993). These problems usually manifest themselves in repeated conflicts with peers, teachers or other school staff (House, 1999; in Drugli, 2007). Children who are disruptive in multiple settings are at higher risk of persistent conduct problems (Taylor, Schmidt, Pepler, & Hodgins, 1998; Walker, Colvin, & Ramsey, 1995), and may display more severe forms of behavioural disorder. Aggressive behaviours at school and social problems may therefore be predictive of a poorer response to treatment.

Several family factors are listed as possible risk factors (see above) and these factors can influence the effectiveness of treatment. Both parental psychopathology and high levels of parental stress are predictors of poorer treatment outcome, according to some studies (Kazdin & Wassell, 1998; Kazdin & Wassell, 2000), while in a study by Beauchaine, Webster-Stratton, & Reid (2005) these variables did not predict treatment outcome.

5. Objectives of the dissertation

The overall aim of the present thesis was to study the treatment effectiveness of the IY programmes that aim to reduce disruptive and aggressive behaviours in Norwegian children, and the effectiveness of treatment interventions for DBD in general in a meta-analysis. A specific interest was to study the treatment effectiveness of a well-validated treatment mode developed in the US and to explore treatment effectiveness in Norway and further to explore characteristics in young Norwegian children and factors that influence treatment effectiveness in a Norwegian context. The thesis addresses the following specific issues:

- * The treatment effectiveness of the Incredible Years when introduced in Norway is explored. The focus is on the immediate and long-term treatment effects on children's functioning, considering oppositional and aggressive behaviors, internalizing behaviours and attention. Diagnostic statuses at pretreatment and at one-year follow-up are presented. Alterations in parent's parenting practices, that is negative, inconsistent and positive parenting, and parental stress immediate after treatment and at one-year follow-up are also explored (Study 1).
- * Child and family factors as predictors of poorer treatment outcomes as experienced by the mothers and whether or not these factors influence mothers' negative parenting practices are examined. The significance of ADHD as a potential predictor of worsened treatment outcome as experienced by the teachers is explored. Finally, the role of change in parenting practices as potential mediators of change in children's conduct problems is tested. Predictors explored include child factors; the sex of the child, the diagnoses of ADHD and anxiety, and family factors; maternal symptoms of depression and maternal stress, maternal age, level of education and marital status (study 2).
- * The nature of oppositional and aggressive behaviours in clinically referred young children is explored. The focus is on possible differences between boys and girls in the intensity in the disruptive behaviors, diagnostic status and comorbidity, parenting practices and family factors such as symptoms of parental depression and parental stress (study 3).
- * The effectiveness of various outpatient treatment interventions in reducing conduct problems in children and adolescents is explored. Possible additional treatment effects, that is aggressive behaviour in day-care or in

school, social functioning and parental distress, are explored. Possible moderators of treatment effects are explored, and include: age of the child/adolescent, proportion of boys included in the study, mode of treatment, inclusion of participants, informant (mothers, teachers or method of observation), experimental design, diagnostic assessment, whether or not the study was an independent replication of a model programme, the year of publication, and finally the percentage of the randomized participants not available at post-treatment (study 4).

6. Method

6.1. Participants in the clinical trial (Studies 1-3)

The clinical study was conducted at two university cities in Norway; Tromsø and Trondheim. The children were referred in ordinary ways to the two clinics. In all, 138 children fulfilled the inclusion criteria, while two families refused to participate in the trial. The participants were randomly assigned to either the parent training group (PT), which consisted at pretreatment of 51 children, PT in combination with child training group (PT + CT), consisting of 55 children, or to a waiting-list control group (WLC) consisting of 30 children. In the PT condition four families and in the PT+CT condition three families withdrew from participation before the onset of treatment. Two families withdrew from the study during PT treatment. In WLC, two families withdrew. This left a total sample of 127 children and their families, 45 children in PT, 52 children in PT+CT, and 28 children in WLC. At the one-year follow-up, the children in WLC had been offered treatment after a “waiting period” lasting for 5-6 months and the children in this condition were thus not included in the analysis at one-year follow-up. In the two active treatment groups, 40 in PT and 48 in PT+CT completed the assessment. All families but one were native Norwegians.

The exclusion criteria were gross physical impairment, sensory deprivation, intellectual deficit and autism. Common comorbid conditions in this age group in addition to ODD and CD such as ADHD and other conditions were included (see Table 2). Child and family characteristics for the sample are presented in table 2. There were no significant differences between the three conditions on the demographic variables.

Table 2. *Child and family characteristics in the clinical study*

	n	%
Child characteristics		
Boys	101	80
Girls	26	20
Age of the child in years: mean (SD)	6.6 (1.3)	-
In day-care/kindergarten	39	31
In school	87	69
Child psychiatric diagnosis		
ODD - sub-clinical diagnosis	16	13
ODD - confirmed diagnosis	111	87
CD - sub-clinical diagnosis	14	11

CD - confimed diagnosis	10	8
ADHD	45	35
Anxiety/ depression	13	10
Enuresis	18	14
Encopresis	9	7
Tourette/tics	5	4
Family characteristics		
Living situation		
Both parentsa	60	47
Mother and step-father	26	21
Single parent	41	32
Mother's education		
College or university	16	14
High school or partial college	90	78
Partial high school or less	9	6
Father's education		
College or university	18	19
High school or partial college	69	72
Partial high school or less	9	9

Note. ^aIncluding eight adoptive and four parents with shared custody. Sub-clinical diagnosis refers to children scoring one criterion less than the criteria required for a formal DSM-IV ODD/CD diagnosis (APA, 1994).

6.2. Assessment in the clinical trial (Studies 1-3)

The children were first screened with the ECBI. Children were required to score above the 90th percentile, applying Norwegian norms (Reedtz et al, 2008). A score above the 90th percentile equals a score of 119 for girls and 126 for boys on the ECBI. A diagnostic screening for ODD and/or CD was performed using the diagnostic interview Kiddie-SADS (Kaufman, Birmaher, Brent, & Rao, 1997). In accordance with the suggestions made by Angold & Costello (1996), the children with sub-clinical ODD or CD were included because the prognoses for these children are very similar to those for the children meeting diagnostic criterias of ODD or CD. The term "sub-clinical diagnosis" refers to children scoring one criterion less than the four criteria required for a formal DSM-IV ODD diagnosis (APA, 1994) or the three required for a formal CD diagnosis, while also having a diminished function (see above).

6.3. Treatments for disruptive children (Studies 1 & 2)

The treatments applied in the clinical studies were originally developed by Professor Carolyn Webster-Stratton at the University of Washington (Webster-

Stratton & Reid, 2003). The treatment programme, the Incredible Years (IY) has been developed over a period of more than two decades. Appendix A (see page 55) provides an overview of the clinical studies of IY involving the parent training curriculum, from 1984 until the present, including eight independent replications. In the Norwegian independent replication of the clinical programme, two modes of treatment are evaluated, the Basic Incredible Years Parenting Program (PT) and child training (CT), known as the Incredible Years Dinosaur School Program. Both PT and CT are video-based programmes. No alterations in the treatment curriculum, nor in content or format, were made. The video vignettes were dubbed into Norwegian, and the manual and hand-outs were translated into Norwegian. The IY is recognized as a well-validated, evidence-based treatment programme for disruptive youngsters (see for instance Brestan & Eyberg, 1998; Farmer, Compton, Bums, & Robninson, 2002; Fonagy & Kurtz, 2002).

6.3.1 Description of Parent Training (PT)

Ten to twelve parents (the parents of about five or six children) met in weekly groups with two therapists at the clinic for 12-14 weeks, for two-hour sessions in PT. The objective of PT is to teach parents the use of positive disciplinary strategies, effective parenting skills, strategies for coping with stress, and ways to strengthen children's social skills, using approximately 250 video vignettes for discussions in the group, role play and rehearsals. The parents are given homework tasks at the end of each session. PT focuses on a collaborative process between parents and therapists and is based on social learning theory, an ecological view of child development (Bronfenbrenner, 1979) and family processes (Patterson, 1982). On average, parents attended 92% of the scheduled meetings.

6.3.2 Description of Child Treatment (CT)

In CT, groups of five to six children met with two therapists at the clinic for 18-20 weekly sessions lasting for two hours. The purposes were to increase the children's social skills; conflict resolution skills; appropriate play skills – such as taking turns, waiting, asking, sharing, helping and complimenting, and cooperation with peers; promote children's use of self-control strategies – that is effective problem-solving and anger-management skills and increase self-esteem and self-confidence. In CT, the therapists make use of video vignettes to promote age-appropriate discussions led by the therapists, role playing, rehearsals and home assignments. Various life-size puppets, a "girl" called Molly and a "boy" called Willy, participate in the sessions as "regular" group members. The headmistress of the dinosaur school, Dina Dinosaur, is very experi-

enced in handling disruptive children, and occasionally she pays the meeting a visit.

The children in the CT condition met at the same time as the parents in PT, but the sessions were held separately. PT and PT+CT started at the beginning of each semester. The children who were randomized to CT attended 91% of the planned sessions.

6.3.3 Inclusion criteria and treatments in the meta-analysis (Study 4)

Inclusion criteria for studies in the meta-analysis were:

- The reports were published or written in the period January 1987 until January 2008.
- The disruptive and aggressive behaviours of the children discussed in the reports were in the clinical range
- The mean age of the children was less than 18
- The studies reported at least one quantitative measure, a rating scale or a method of observation indicating change in disruptive and/or aggressive behaviours.

In cases of researchers who performed more than one study, information about independent respondents in the studies was searched for. In cases of uncertainty of independent data, the study was excluded from the meta-analysis. Other exclusion criteria were:

- Studies of psychosocial interventions not identified or described by the authors (for instance "treatment as usual" modes).
- Studies with single-case design.
- Studies that did not provide information about maintenance of psychopharmacological treatment throughout the study period.
- Studies that reported only follow-up data.

Psychological interventions aimed at reducing aggressive, oppositional and maladaptive behaviours, or enhancing prosocial behaviour through counseling, training programmes or predetermined treatment plans were screened for inclusion. Interventions that only comprised reading interventions ("bibliotherapy") were excluded, while bibliotherapy accompanied by other interventions such as "video-based" interventions were included, resulting in the inclusion of various psychosocial treatments. The inclusion criteria regarding the therapists were open-ended. Therapists might be fully trained professionals, therapists in training, clinical psychology and social work students, and child psychiatry workers or trained paraprofessionals.

For children younger than ten years of age, the majority of the treatment interventions were PT or Parent Management Training, both treatments categorized as behaviour therapy (BT). In some studies BT was accompanied by cognitive behaviour therapy (CBT) interventions, such as Problem Solving Skills Training. The treatments of choice for adolescents seem to be Family Therapeutic (FT)-oriented, such as Multi-Systemic Therapy. In all, two studies were categorized as psychodynamic therapies.

6.4. Statistical packages

The Statistical Package for the Social Sciences (SPSS 1989-2005) was used in the statistical calculations in studies 1-3 and in the moderator analyses and explorations of correlation between reductions in disruptive behaviors and the variables of interest in study 4. In the meta-analysis ESs were calculated from means and standard deviations when these measures were available, using the Comprehensive Meta-Analysis Program (Borenstein & Rothstein, 1999). The statistics employed in each of the studies are presented in the summary of the studies.

7. Summary of the studies

7.1. Summary of study 1

Treatment of oppositional defiant and conduct problems in young Norwegian children: results of a randomized controlled replication trial.

Objectives. The efficacy of the Incredible Years PT and CT programmes was examined in a randomized controlled replication study of 127 Norwegian children aged 4-8 years. Children diagnosed with ODD or CD were randomized to PT ($n = 47$), PT+CT ($n = 52$), or a waiting-list control condition (WLC; $n = 28$). Assessments were carried out at baseline, post-treatment and at a one-year follow-up, using standardized measures and a semi-structured interview.

Statistics. Differences in group means between treatment conditions post-treatment and at the one-year follow-up were analyzed by ANCOVAs using pretreatment scores as covariates. Overall significant effects were followed by a Bonferroni *post hoc* test, resulting in a significance level of $p = .0167$ or better. ESs were calculated using Cohen's (1988) d and η^2 (η^2). For pairwise comparisons, $d = 0.5$ denotes a medium effect, and 0.8 denotes a large effect, while a η^2 of $.06$ represents a medium effect, and a $\eta^2 = .14$ a large effect. Associations between categorical variables were analyzed by means of chi-square tests. In accordance with suggestions by Cook and Sackett (1995), clinical significance was also assessed by estimating the number of subjects needed to treat (NNT) for one subject to achieve success (here functioning within the 90th percentile at posttreatment on the prime outcome measure, the ECBI). NNT is calculated as the inverse of absolute risk reduction for binary outcome. Confidence intervals were calculated as suggested by Altman (1998).

Additional analyses. Of interest when treating disruptive children, is reducing externalizing behaviours in day-care and school settings, besides reducing these problems as perceived by the parents. This information was not included in study 1. In the additional analyses of day-care/school functioning, the measure Teacher Observation of Classroom Adaption-Revised (TOCA-R; Werthamer-Larsson, Kellam and Wheeler, 1991) was used. TOCA-R consists of 10 items describing disobedient and aggressive behaviour problems (i.e. yells at others, fights, breaks rules). Teachers reported on a scale ranging from 1 to 6 to describe the frequency of children's problem behaviour.

The mean scores (SD) for the three conditions on three occasions were:

In the PT condition: 48.2 (13.3), 46.4 (11.2) and 42.9 (11.5), in the PT + CT condition: 48.2 (11.6), 43.0 (9.9) and 43.8 (10.9), and in the WLC condition the scores were 49.2 (13.0) and 49.0 (12.3) on two occasions. Calculations of Cohen's *d* of comparisons between these conditions from pre- to post-treatment showed that PT vs WLC resulted in a $d = .15$, in PT + CT vs WLC resulted in $d = .60$, while in PT vs PT + CT the obtained $d = -.38$, indicating treatment effects in favour of the PT + CT condition. The ANCOVA showed a significant between-group effect regarding improved child classroom adaptation on the TOCA-R ($F_{2, 109} = 4.40, p < .05$). Subsequent *post hoc* testing showed that children in the PT + CT group were significantly ($p = .006$) better adapted than those in the WLC condition. Teachers reported that children in the PT condition showed an improvement on the TOCA-R at one-year follow-up; this difference was non-significant as compared to those in the PT + CT condition.

Conclusions. Both active treatment conditions reduced child conduct problems post-treatment as opposed to the WLC. Applying the terms of Cohen (1988), the ESs were in the moderate range in terms of reductions in child externalizing, child internalizing, child attention in mothers' reports. It is of particular interest that the BASIC IY programme also reduced parental use of harsh and inconsistent disciplinary strategies towards the child as well as increasing the use of positive strategies, all changes showing large effect sizes. Such improvements are also in line with previous findings by the originator of the treatment programme. The differences between the two treatment conditions were nonsignificant, with the exception of fathers in the PT condition reporting significantly lower scores on the ECBI problem score than on the PT+CT condition. Apart from this finding, the differences between the two active treatment regimes were small. Improvements in child behaviour problems were further substantiated after one year, in that about two thirds of treated children now functioned below the 90th percentile on the ECBI, and the same proportion no longer received either a sub-clinical or definitive diagnosis of ODD. Similar trends were also found for CD. The generalization effects in the additional analyses were moderate in the PT+CT condition, but small in the PT condition. At one-year follow-up the differences between the two active treatments were small.

7.2. Summary of study 2

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

Objectives. The aims of the study were first, to determine whether alterations in parenting practices, e.g. changes in positive parenting, harsh and inconsistent disciplining, mediate changes in children's conduct problems. Secondly, it was of interest and importance to determine whether pretreatment scores in child and family variables were factors capable of predicting treatment outcomes, both as experienced by mothers at home and in changes in observed negative maternal parenting practices.

Statistics. Predictors: Bivariate logistic regression analysis was performed in order to test for three outcomes of clinical significance. First, we wished to determine whether mothers' reports of child and family variables at pretest served as predictors of treatment outcome using a score below or above the normative range on the first dependent variable (ECBI). In this analysis, the pretreatment ECBI score was used as control variable. Secondly, we wished to assess the associations between treatment outcome in parenting (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 preschool behaviour questionnaire/teacher report form (PBQ/TRF) score as dependent variable, and diagnostic status and clinical levels of ADHD as independent variables. Mediators: in order to assess whether parenting practices mediate the relationships between treatment and changes in child disruptive behaviours, 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. We then performed a step-by-step regression analysis, with changes in disruptive child behaviours as measured by the ECBI as dependent variable, and changes in parent reports of positive, harsh and inconsistent parenting, using the subdomains on the parenting practices interview as explaining variables. In the mediation analysis, the web-site of Preacher and Leonardelli (2008) was employed for the Aroian tests.

Conclusions. A relatively large proportion of the children, almost 40% of the children according to the mothers, functioned within the normative range on the ECBI after participating in PT. Although these findings indicate favourable treatment outcome and clinically significant progress due to PT for many of the children, these results are poorer than clinically significant changes in studies of the originator of the IY. The improvements in functioning in day-care and

school settings as well as alterations in observed negative parenting were small.

The logistic regression showed that being a girl, high levels of maternal stress and ADHD were significant predictors of poorer treatment outcome at home, and ADHD was a significant predictor of treatment outcome as perceived by teachers in day-care and school settings. None of the variables significantly predicted poorer treatment outcome as regards observed maternal negative parenting.

Both changes in maternal self-reported 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 of changing severe conduct problems in young children.

7.3. Summary of study 3

Childhood disruptive behaviours and family functioning in clinically referred children: are girls different from boys?

Objectives. The topics addressed were differences between the functioning of disruptive boys and girls and their families related to child, parenting and family variables. Baseline assessments of 4 - 8-year-old children; 26 girls and 101 boys, were examined. The child variables included diagnostic information, measures of disruptive behaviours as perceived by parents and teachers in day-care and school settings, social competence as reported by parents and teachers, and independent observations of child behaviour. Diagnostic information utilised included ODD, CD, ADHD and anxiety. The parenting variables addressed were parental self-reports of harsh, inconsistent and positive parenting, and independent observations of positive parenting and the employment of criticism. The family variables addressed were issues of parental stress (both stress due to uncertainty of parenting and stress due to child behaviours), parental symptoms of depression and parental aggression.

Statistics. An one-way analysis of variance (ANOVA) was performed in order to test whether there were sex differences related to parental reports. ESs were calculated in order to determine relative differences between girls and boys. ESs of teachers' and parents' reports of intensity and perceived difficulties in handling disruptive behaviours were calculated using the formula $ES = \text{mean difference}_{(\text{girls} - \text{boys})} / \text{pooled SD}$. A positive ES indicated that the variable of interest was larger for girls, while a negative ES indicated the opposite effect.

The adjusted mean differences between girls' and boys' scores, controlling for the intensity score on the ECBI, were used to calculate the ES of the variables of interest regarding parenting and family stressors, using the formula $ES = \text{adjusted mean difference}_{(\text{girls} - \text{boys})} / \text{pooled SD}$. If data were not normally distributed, which in most cases was due to the small number of girls involved, a Mann-Whitney *U*-test was carried out. Logistic regression analysis was used to compare sex differences in diagnostic status.

Conclusions. In general, the similarities are more obvious than the differences in the functioning of the girls and boys and their families. However, teacher ratings of child functioning indicated that boys displayed significantly more externalizing behaviours, and that they were less socially competent than girls in day-care and school settings. Parents perceived both girls and boys as highly oppositional and aggressive, and the differences were in general small. Nevertheless, the level of stress was higher in girls' than in boys' families, and mothers of girls reported higher levels of depressive symptoms. Girls and boys did not differ regarding diagnostic status, nor did self-reports of parenting practices differ significantly.

7.4. Summary of study 4

Psychosocial interventions for disruptive and aggressive behaviour in children and adolescents: a meta-analysis.

Objectives. To review recent studies focusing on treatment of DBD, including multiple treatments such as behavioural, cognitive-behavioural, family and psychodynamic therapies. The review includes recent psychosocial interventions, interventions aimed at reducing aggressive, oppositional and maladaptive behaviours through counselling, training programmes or treatment plans, focusing on studies published from 1987 until January 2008. Studies with less stringent designs were included, such as those with no control condition (e.g. pre/post designs), in order to hopefully identify a wider spectrum of recent developments in the treatment of DBDs.

The studies were performed in several countries, although the overwhelming majority (63%) were from USA. The remaining studies were performed in Australia (n = 3), Canada (n = 3), UK (n = 4), Ireland (n = 1), Israel (n = 1), Netherlands (n = 1), Norway (n = 2), Sweden (n = 1), USA (n = 41) and unknown (n=8).

Statistics. If information regarding means and standard deviations was unavailable, the most relevant information regarding change in oppositional and aggressive behaviours, such as t-tests, F-tests, or p-values, were used. In cases of studies that reported several measures of aggressive and disruptive behaviours, a mean ES of the measures was calculated and reported. Mothers were preferred to fathers as respondents, since mothers in general outnumbered fathers as respondents, and because many studies did not provide father reports, which in turn could cause difficulties in making comparisons. Combining mother and father reports into a single ES, was considered a threat to the independence of the data.

The pretest score was chosen as the denominator because pretest scores are not influenced by the experimental manipulations (i.e. differential treatment effects) and is therefore more likely to be consistent across studies, permitting an estimate of treatment effects in studies without control groups to be made (Becker, 1988). ESs were calculated as the difference between the mean changes in the two groups (the treatment intervention and control groups), divided by the pooled standard deviation of the pretest score:

$$ES_1 = \frac{m_T - m_C}{SD_{(pooled)}}$$

For studies that did not involve an untreated control group (a pretest – post-test design), a within-group effect size was calculated by dividing the mean change score by the pretest score of the standard deviation:

$$ES_2 = \frac{m_{t1} - m_{t2}}{SD_{t1}}$$

Each ES was weighted by the inverse of its variance (ω) in order to give more weight to studies with larger sample sizes. For pairwise comparisons, $d = 0.2$ denotes a small effect, $d = 0.5$ a medium effect, and 0.8 a large effect, according to Cohen (1988).

Within meta-analyses there is a distinction between fixed effects models and random effects models (see e.g. Hedges & Olkin, 1985; Hedges & Vevea, 1998). The random effects model was used in this investigation, as it is more likely that there is true variation in the population parameters, and the random effects model is more appropriate under these assumptions.

Conclusions. A total of 33 studies had an untreated control condition. All the ESs (100%) were positive in direction, indicating an improvement after treatment, and 21 (63.6%) reported significant results ($p < .05$). A total of 2512 individual participants were included, with mean age ranging from four to 13.5 years. Of the 32 studies without an untreated control condition, all the ESs (100%) were positive in direction, indicating an improvement after treatment, and 24 (75%) reported significant results ($p < .05$). A total of 2459 individual participants were included, with mean age ranging from four to 16 years. The overall mean weighted ES in studies including an untreated control was .62, indicating moderate treatment effects, while the overall weighted ES in studies without an untreated control was .95, indicating large treatment effects. Both these ESs are significantly different from 0, t -values of 9.33 and 9.99 respectively, both p -values $< .001$.

The variable “sample size” was significant in the moderator analysis of studies with untreated controls. Studies involving smaller samples obtained larger ESs than studies with larger samples. The variables “mean age”, “treatment”, and “diagnosis” were significant in the moderator analysis of studies without untreated controls. The finding concerning “mean age” indicated that studies involving younger children obtain larger ESs than studies involving older children and adolescents. The variable “treatment” indicated that BT interventions obtained significantly larger ESs than did FT. The variable “diagnosis” indicated that larger ESs were obtained by studies reporting diagnostic information contrary to studies not reporting this information.

Additional analyses. None of the studies analysed in study 4 focused specifically on the Incredible Years. Nevertheless, the effects of these interventions are of interest in this dissertation. In all, sixteen studies included in the meta-analysis employed the Incredible Years as the treatment intervention, eight studies were from the programme originator Webster-Stratton and her colleagues, and eight studies were independent replications. The total sample in the studies performed by Webster-Stratton et al. was $n = 867$ and in the independent replication the total n was $n = 560$.

The overall ES was = .71 in the studies of the Incredible Years with lower limit = .58 and upper limit = .84. This was significant different from 0, t -value = 10.82, $p < .001$. The ES in Webster-Stratton and colleagues’ work was .77, with a lower limit .60 and upper limit = .95, and in the independent replications the overall ES was .62, lower limit = .44 and upper limit = .80. Both these ESs were significantly different from zero, t -value = 8.60 and $p < .001$ and t -value = 6.83 and $p < .001$, respectively. This finding suggests that the effects obtained in the

independent replication were somewhat lower overall than in the studies conducted by the programme originator and her colleagues.

8. General discussion

The present randomized controlled clinical trial was carried out in two regular child and adolescent outpatient clinics affiliated to two universities in Norway. The study involved stringent procedures before subjects were accepted, including a well validated screening instrument in Norway (ECBI) and thorough diagnostic assessment, with repeated measures using multiple informants. The children had severe conduct problems as perceived by their mothers, fathers or both, with common comorbid diagnostic conditions in addition to ODD, such as ADHD and anxiety. In addition, a substantial proportion of the children had difficulties in day-care and school settings. These children are therefore probably representative of children with severe conduct problems in Norway. The validation of the Incredible Years in Norway had a sound design with low drop-out rate, making the study highly valid.

The meta-analysis included studies identified in the course of an extensive search for literature that focus on various outpatient psychosocial treatment interventions, where the age of participants ranged from 2-18 years. The methodological differences in these studies were controlled for, since ESs were calculated separately for designs with or without untreated controls. As such, the meta-analysis is probably representative of treatment effects for children and adolescents with conduct problems between 1987 and January 2008.

8.1. Discussion of the main findings

All the children in these studies were within the clinical range concerning their conduct problems. The parental perceived changes in the children's conduct were in moderate range in the clinical replication of the Incredible Years in Norway and in the meta-analytical review of studies including an untreated control condition, applying Cohen's (1988) standards. These findings indicate the potential of treating these youngsters with positive results. In the Norwegian replication of IY, approximately 67% of the children no longer fulfilled the diagnostic criteria of ODD or sub-clinical diagnosis of ODD at the one-year follow-up. A relatively large proportion of the children (40% of the treated children according to mothers) scored within the normal range on the ECBI immediately after treatment participation. These findings suggest important clinical progress for many of the children and their families. In the additional meta-analysis focusing on the IY, large positive treatment effects were obtained. This is also noticeable in the review of IY studies in appendix A. The treatment effect in the studies of the originator of the treatment programme was larger, with an overall mean ES = .77, than in the replication studies,

where the overall mean ES = .62. Although the ES in the independent replication studies is somewhat lower than the ESs in the studies involving the originator, these studies indicated a fairly promising treatment results, conducted in various countries and in differing clinical settings. These results thus confirm the findings of the studies performed by the developer of the programme.

The differences in parenting between Norwegian families' of boys and girls were generally small, a finding that confirms a larger study of the role of parenting in boys' and girls' conduct problems (Eddy, Leve, & Fagot, 2001). The alterations in parenting were generally large; that is, parents employed less harsh and inconsistent parenting practices and they were more positive in parenting in self-reports after participation in the IY. This is one of the main focuses in PT (Kazdin, 2005). According to theories of coercive parenting, and in view of the role of parenting in the development of conduct problems (Patterson, 1982; Patterson et al., 1992), it is vital to alter parenting practices in the treatment of conduct problems. Mediation effects refer to understanding the underlying mechanisms of action in treatment. Weersing and Weisz (2002) noted a lack of studies that explore the mechanisms of change in studies that employ PT interventions in their review. The exploration of changes in parenting practices as potential mediators of changes in children's conduct problems is important as a means of verifying the significance of parenting as the main therapeutic interventions in a Norwegian clinical context. Changes in self-reported harsh and inconsistent parenting were both significant partial mediators of change in children's conduct problems, as measured by the ECBI. This highlights the relevance of altering parenting practices as a means of changing young children's conduct problems, and as such it indicates the relevance of coercive processes as described by Patterson and his colleagues' (Patterson, 1982; Patterson et al., 1992), as well as underlining the importance of PT interventions in treating Norwegian children with conduct problems as well, as suggested also by the Norwegian replication of Parent Management Training-Oregon (PMTO; Ogden & Amlund-Hagen, in press). Both inconsistent and harsh disciplining were significant partial mediators of conduct problems in children in the US (Beauchaine et al., 2005). Positive parenting was not a significant mediator in our study or in that of Beauchaine et al. (2005), in contrast to the findings in the study by Gardner, Burton, & Klimes (2006).

Important additional treatment gains were also made by the families of disruptive children, besides a reduction in disruptive behaviors. Parents reported moderate to large reductions in parental stress in the clinical replication study. In the meta-analysis, changes in parental distress were in the moderate range, further highlighting possible relevant progress besides reducing disruptive behaviors in the 33 studies that reported parental distress. The ESs of disruptive

behaviors and the ESs in reductions in parental distress were significantly correlated, further suggesting that these variables are interconnected. However, the level of stress was high among the participating mothers and maternal stress was a significant predictor of worsened treatment outcome, while higher levels of maternal depressive symptoms tended in the same direction, though they were not significant at the .05 level. It is noteworthy that an intervention focusing on parental stress enhanced the therapeutic changes in children as well as reducing parental stress (Kazdin & Whitley, 2003). The same trend was seen in a study by Webster-Stratton (1994) that focused on an intervention aiming at improving communication skills among the parents, although the differences between the PT condition and the PT + communication skills interventions (i.e. the ADVANCED parent training curriculum) were in fact not significant for parental stress (see also Appendix A). The ADVANCED program is incorporated in the parent training interventions in the studies by the originator of the treatment programme, throughout the treatment (20-22 weeks) in these studies (see for instance Webster-Stratton & Hammond, 1997; Webster-Stratton, Reid, & Hammond, 2004), while parental communication and personal self-control are only addressed in the last meeting in the treatment curriculum employed in the clinical replication in Norway (BASIC parent training curriculum). Whether inclusion of the ADVANCED programme in the parent training curriculum employed in Norway actually would increase the treatment effects is unknown. Still, in view of the relevance of maternal stress for the treatment results, focusing on the topics raised by the ADVANCE programme might be of relevance.

In study 2, girls respond more poorly to treatment than boys. This finding was somewhat puzzling, since previous studies of the IY did not report any differences in treatment effectiveness between boys and girls (Axberg, Hansson, & Broberg, 2007; Beauchaine, et al., 2005; Webster-Stratton, 1996). In general the similarities are more evident than the differences between the disruptive boys and girls included in the clinical studies, according to the parents as seen in study 3. However, parents reported higher levels of parental distress when the child concerned was a girl, i.e. higher levels of parental stress due to uncertainty in parenting and higher levels of parental depressive symptoms, although the difference was not significant for fathers. Given the relative importance of parental stress and the significance of maternal reported symptoms of depression in treatment in study 2 and in other studies of predictors of treatment outcome as well (Beauchaine et al., 2005, Kazdin & Wassell, 2000), it seems likely that these factors are of more importance than the sex of the child as such.

An important ambition in treating disruptive children is to reduce maladaptive behaviours in day-care and school settings. In the additional analysis of functioning in day-care in study 1, an immediate positive treatment effect was seen in the PT + CT condition, while the effects were small at post-treatment in the PT condition. However, the differences between the two treatment conditions at the one-year follow-up were small. In general, it seems that the generalization of treatment effects in this clinical sample were small (Drugli, 2007; Drugli & Larsson, 2006). Although the generalization effects in the clinical study were small, a finding also seen in Webster-Stratton and Hammond's study (1997), some optimism is in order. An intervention focusing specifically on the teacher's handling of classroom behaviours did improve treatment effects in these settings (Webster-Stratton et al., 2004). In total, 27 of the studies included in the meta-analysis provided information regarding functioning in day-care and school settings. The children's changes in aggressive behaviours as perceived by teachers were moderate. The ESs reported by teachers were correlated significantly with the ESs reported by the mothers, although only to a moderate degree. This finding suggests that positive treatment effects as perceived by the mothers could also result in positive alterations in behaviour in day-care and school settings as perceived by the teachers, although the sizes of these effects vary. This variation was demonstrated in the test of heterogeneity.

In general, the findings in study 2 indicated that the severity of the child's condition, that is comorbid ODD and ADHD, were of particular importance for the effectiveness of the IY. Comorbid ADHD/ODD was a significant predictor of poorer treatment outcome as perceived by the mothers at home and by the teachers in day-care and school settings. As such, the relevance of ADHD in clinical practice is evident in a Norwegian setting, while a diagnosis of anxiety, in general, specific anxieties of some sort, was not a predictor of poorer treatment outcome. Beauchaine et al (2005) reported that elevated scores of anxiety/depression on the CBCL predicted treatment response, while CBCL attention did not, and Hartman, Stage and Webster-Stratton (2003) reported that children with attention problems did in fact experience greater reductions in conduct problems. Whether our finding is a true difference in a Norwegian context, a chance finding or an effect of the different methodologies employed in screening attention problems (CBCL vs diagnostic interview), is uncertain.

Demographic variables, such as maternal age, maternal level of education, and single-parent families in the Norwegian sample were not significant predictors in study 2, as is also the case in studies of predictors of treatment outcome in the US (Beauchaine et al., 2005; Kazdin & Wassell, 1998 & 2000) and in the United Kingdom (Scott, 2005). This is in itself promising and could indicate im-

portant treatment gains for children and families living under conditions of increased risk of a developmental trajectory of conduct problems and antisocial behaviour. On the other hand, and if this is the case it offers some grounds for concern in terms of treatment effects for children with conduct problems in these studies, or in other studies as well: relatively few of the participants were referred from the child welfare services, which in turn suggests that we were unable to reach the children presumably at most risk. In Norway, the child welfare services are involved in many of these families, as seen in Chapter 5.3, Table 1, e.g. criminal parents, drug- and/or alcohol-abusing parents, poverty-stricken, and so forth. In the clinical sample, 23 children and their families were either referred by or reported having some sort of contact with the child welfare services. This is possibly a low proportion of the children 4-8 years of age in Trondheim and Tromsø with conduct problems.

In the meta-analysis, changes in social functioning were moderate and reductions in disruptive behaviours were moderately, yet significantly, correlated with changes in social functioning. In the clinical studies, the girls and boys did not differ statistically significantly in social functioning as perceived by their mothers and fathers. A study of social competence in children before and after treatment reported important progress in social competence (Drugli, Larsson, & Clifford 2007). These findings indicate important progress for the children involved in treatment. This is especially important, given the possible relevance of social functioning in children's mental health at later stages in development (Mathiesen et al., 2007).

8.2. Limitations and challenges in clinical research

Some important limitations of the studies in this dissertation need to be mentioned. The subject of power in statistical analysis is of relevance in clinical research in general and also in the clinical studies presented here. Power is the likelihood of finding differences between conditions when, in fact, the conditions are truly different in their effects (Kazdin, 2003). For instance, study 1 set out to include 145 families. For ethical reasons, a smaller proportion (20%) of the families was randomized to the WLC as compared to 40% for each of the two active treatments. Consequently, when planning the study we estimated that the true difference of means $d = .65$ or better on the prime outcome measure, the ECBI, between the active treatment condition ($n = 58$) and the WLC condition ($n = 29$) to maintain a power of .80, with $p < .05$. In the study, we ended up with 45 completers in PT, 52 completers in PT + CT, and 28 completers in WLC, which is not far from the original estimates, at least in mother reports. However, in study 1 the within-group change in the WLC condition ECBI intensity was larger than anticipated; $ES = .85$ (see study 1). Although the

waiting-list group did change, the change in WLC in this sample is much larger than the within-group change reported by Weiss and Weisz (1990) in waiting lists with an overall $ES = .31$. Although the parental reported within-group change in the two active treatment conditions was large, the between-group ES s were within the moderate range when Cohen's standards (1988) were applied. In hindsight, the study would probably have been better if the WLC condition had been larger than the 30 subjects originally randomized to this condition. Specifically since much of the within-group ES obtained was due to two specific children who displayed very large reductions during the six-month waiting period. The study attempted to detect differences between the two treatment modes (PT vs PT+CT) with insufficient statistical power.

Another possible problem regarding the external validity of the studies of treatment effects (studies 1 & 2) is related to the therapists. These were recruited and experienced in clinical work before their engagement in IY, and in general, they are probably representative of clinicians working in outpatient clinics for children and adolescents in Norway. However, two circumstances make these therapists somewhat different from most clinicians. First, the therapists were to use 40% of their working hours on IY exclusively, being group leaders for one group at a time. Secondly, the therapists received frequent supervision in clinical work in accordance with IY fidelity procedures. As a result, the therapists may have experienced better work conditions than regular clinicians.

The sample of children in the clinical study in this dissertation is an advantage in that it consisted of a fairly representative clinical sample. It is therefore uncertain whether the findings of these studies (studies 1-3) are valid for children with more moderate disruptive behaviours.

As mentioned above, it is not clear whether the project succeeded in recruiting all possible participants in contact with the child welfare services. We were able to include 23 children with some contact with the child welfare services. If we had succeeded in enrolling more of these participants, as we intended to, it is not unlikely that treatment effects would be affected. At one-year follow-up, parents in families that reported some sort of contact with the child-welfare services scored their children significantly less below the 90th percentile on the ECBI than families with no contact (Drugli, Larsson, Fossum & Mørch, submitted). On the basis of our knowledge of how children in contact with the child welfare services function in a longitudinal perspective (Clausen & Kristoffersen, 2008), this should not be surprising. A major challenge in clinical practice is first to reach these children and their families; furthermore, that the treatment

should possibly also adopt a broader ecological approach than a “PT-alone” format.

8.3. Conclusions and future directions

In general, several different treatment interventions for disruptive and aggressive children produce positive treatment effects. The treatment effects of the IY can be replicated in a Norwegian context and they were generally positive. However, it seems that steps to improve the generalization of treatment effects in a Norwegian context are of some importance. Two distinct interventions developed by Webster-Stratton are of interest: The Dinosaur school in the classroom programme and the Teacher classroom management programme. The second programme has been evaluated in a study by Webster-Stratton et al., (2004) with a sample consisting of children with disruptive and aggressive behaviours in the clinical range, and both these programmes have been explored as means of preventing disruptive behaviours in day-care and school (Webster-Stratton, Reid, & Stoolmiller, 2008). Various steps can be taken in day-care and school settings for disruptive children besides importing and implementing curricula like these; for instance improving collaboration among colleagues and among different service levels - see for instance Nordahl, Sørli, Manger & Tveit (2005).

The subject of thorough clinical assessment before treatment is of relevance for disruptive children and their families. For the children, a diagnosis of ADHD was a predictor of poorer treatment outcome as perceived by both mothers and teachers, and as such, the diagnosis of ADHD provides clinicians with important clinical information. Consequently, clinical information from several sources, including diagnostic assessments, is of importance in both research and clinical practice. A possible unfortunate side-effect of parenting programmes in regular clinical practice that do not employ a thorough assessment or meetings with the children *in vivo* is that conditions such as ADHD may remain undetected.

Both symptoms of parental depression and high levels of parental stress, are factors of relevance in PT. These factors may need clinical attention in efforts to optimize treatment effectiveness. Steps taken could include clinical initiatives to reduce parental stress and parental symptoms of depression, in therapeutic practice and/or, if necessary, in collaboration with various levels of services for mental health and social welfare. An important and intriguing finding of the TOPP (Trivsel og oppvekst – barndom og ungdomstid) study in Norway has been the relevance of social support as experienced by mothers at early stages in a child’s development and the child’s later functioning (Mathiesen et

al., 2007). Clearly, further work is needed to describe and to explain the inter-relationships among predictors of treatment outcome and the ways in which they influence outcome, both in general and particularly in Norwegian clinical practice.

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Appendix A: Clinical studies of Parent Training (PT) interventions in studies of the Incredible Years (IY)

Studies	n	Measures	Effect sizes			Scientific contribution
			PT vs WLC	IT vs WLC	IVM vs WLC	
<i>Studies of the Incredible Years by the program originator</i>						
Webster-Stratton, 19841 - RCT	PT = 13	ECBI intensity	1.08*	1.53**		The first RCT of the video-based group format. Previous studies of IY exist, but according to IY homepage, this is the first RCT. The meaning of the curriculums in PT and IT were matched, the format differed though.
	IT = 11	CBCL	.47	.45		
	WLC = 11	Obs parental crit	1.70**	.87		
Webster-Stratton et al., 1988 – RCT	PT = 27	ECBI intensity	1.35**	1.07**	.73**	Presents treatment effects for various formats. The PT condition is a video-based, group intervention resembling to the BASIC curriculum.
	GD = 24	CBCL	.80**	.35	.65*	
	IVM = 24	PSI parent domain	.35	.27	.31	
	WLC = 27	Obs parental crit	.59*	.26	.43	
		PBQ	.56	.63	.33	
Webster-Stratton, 1990 – RCT	PT = 14	ECBI intensity	.46		.92*	Compares the treatment effects of a video-based, group intervention with parents only receiving the videos from the curriculum.
	IVM = 17	CBCL	.42		.04	
	WLC = 12	PSI parent domain	1.08*		.40	
		Obs parental crit	.77		.16	
Webster-Stratton, 1992 - RCT	IVM = 59	ECBI intensity			.77**	A RCT of individually administered video-curriculum and presents information of who benefits from this mode of treatment.
	WLC = 41	CBCL total score			.56**	
		PSI parent domain			.37	
		Obs parental crit			.24	
Webster-Stratton, 1994 - RCT	PT = 39	CBCL	.16			Introduces the ADVANCE program. ADVANCE addresses parental communication, personal self-control, problem-solving skills, and strengthening social support and self-care. Parents in ADVANCE showed better problem-solving skills (measures not included).
	PT+ADVANCE = 37	PSI parent domain	-.03			
		Obs parental crit	.36			

Studies	n	Measures	Effect sizes		Scientific contribution
			PT vs WLC	PT+CT vs WLC	
Webster-Stratton & Hammond, 1997 – RCT	PT = 26	ECBI intensity	1.47**	1.00**	The first study presenting the CT curriculum of the IY. Includes a CT alone condition not included here.
	PT+CT = 20 WLC = 22	CBCL total score PSI child domain Obs. parental crit. PBQ	1.06** 1.39** .79* -.48	1.00** .77* .56 .30	
Webster-Stratton et al., 2004 – RCT	PT = 31	CCP at home	1.11**	.82**	The first study presenting the teacher training (TT) program. TT increases treatment effects in day-care/ school. Includes treatment conditions not included here.
	PT+TT = 24 PT+TT+CT = 25 WLC = 26	CCP at school Obs parental crit	.49 .81**	1.06** .84** 1.07** .81** .74*	
<i>Independent replication studies</i>					
Spaccarelli et al., 1992 (in the US) – RCT	PT = 16	ECBI intensity	1.12**	.58	The first independent replication of IY to my knowledge. “ps” addresses not IY problem-solving.
	PT+ps = 21 WLC = 16	PSI parent domain	1.09**	.59	
Taylor et al., 1998 (in Canada) – RCT	PT ¹ = 15	ECBI intensity	.65	.22	Compares IY with a Treatment As Usual (TAU) design. The single IY study with such design. Note: the participants in PT ¹ are not identical. The participants in PT vs TAU analyses were not randomized,
	PT ² = 38 WLC = 17 TAU = 32	CBCL total score BDI	.29 -.18	.70** .19	
Harrington et al., 2000 (in the UK) – RCT	PT = 61	ECBI intensity	-.10		Presents information of treatment effects and cost analysis of PT as opposed to hospital care. No significant differences detected. Note! Not all participants were offered IY PT., and further the treatment in residential care is not described. – treatment effects in favour of residential care.
	Residential care = 55	SCBI intensity BDI Obs parental crit	-.09 .14 -.05		

Studies	n	Measures	Effect sizes		Scientific contribution
			PT vs WLC	PT+CT* vs WLC	
Conolly et al., 2001 (in Ireland) – not randomly allocated, allocated by clinical judgements	PT = 27	CBCL total	.48	.40	Presents data from an additional CT* intervention, not an IY program. The study has methodological weaknesses
	PT+CT = 58	GHQ-28	.22	-.02	
	WLC = 18				
Scott et al., 2001 (in the UK) – RCT	PT = 63nb	CBCL	.86**		A well-designed replication of the BASIC PT curriculum. The first study of IY presenting ODD diagnostic information. ^{nb} Large number of missing data from both conditions, particularly on CBCL.
	WLC = 26nb	SDQ	1.06**		
		Obs parental crit	.76*		
Gardner et al., 2006 (in the UK) – RCT	PT = 37	ECBI intensity	.39		A well-designed study of the BASIC PT delivered in community-based voluntary-sector organization. Blind assessment, 18-months follow-up.
	WLC = 29	ECBI problem	.66**		
		BDI	-.10		
Axberg et al., 2007 (in Sweden) – uncontrolled	PT = 83	ES ₂			Presents data from a naturalistic study of the initial presentation of the IY in Sweden. Large drop-out (22.4%). The significant improvements remained after an itt analysis. Within-group calculated ESs.
		CBCL tot	.64**		
		CPRS	.54*		
Larsson et al., in press (in Norway) – RCT	PT = 47	ECBI intensity	.76**	.52*	Presents the first independent replication of the CT program and independent RCT of IY in a Nordic country. Includes diagnostic information not presented here on ODD, CD and ADHD. NB! CBCL total and Obs data not presented in article.
	PT+CT = 52	CBCL total	.47	.61*	
	WLC = 28	PSI total score	.55*	.83**	
		Obs parental crit	.36	.36	
		SCBE	.09	.34	

Note. ¹Not included in any of the meta-analytic reviews in the additional analysis in the dissertation. RCT = Randomized Controlled Trial. PT = parent training, IVM = individually administered video modelling, CT = child training, WLC = waiting list condition, TT = teacher training, CBCL = Child Behavior Checklist; PSI = Parent Stress Index. ECBI = Eyberg Child Behavior Inventory, DPICS = Dyadic Parent Child Interaction Coding System, PBQ = Preschool Behavior Questionnaire. BDI = Beck Depression Inventory. GHQ = General Health Questionnaire. Obs parental crit = Observation of parental criticism, CCP = Composite Conduct Problems.

Calculation of Effects Sizes (ES) in appendix A.

Between groups designs (all but Axberg et al.) were calculated in the following manner:

$$ES = \frac{m_I - m_C}{SD_{(pooled)}}$$

ES were calculated as the difference between the mean changes in the treatment intervention condition(s) (m_I) and the untreated control condition (m_C) divided by the pooled standard deviation of the pretest score for the two conditions ($SD_{(pooled)}$).

Within group ESs (Axberg et al.) were calculated in the following manner:

$$ES_2 = \frac{m_{t1} - m_{t2}}{SD_{t1}}$$

ES₂ were calculated subtracting the mean score at time 1 (m_{t1}) with the mean score at time 2 (m_{t2}) divided by the standard deviation of the pretest score (SD_{t1}).

References appendix A

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10. List of errata

Corrections to Table 3, paper 2: Fossum, S., Mørch, W-T., Handegård, B. H., Drugli, M. B. & Larsson, B. Parent training for young Norwegian children with ODD and CD: predictors and mediators of treatment outcome. Submitted.

The heading to Table 3 should read Table 3 “Results of the regression analysis” and *not* “Results of hierarchical regression analysis”.

To improve the clarity in presentation in the mediation analysis and avoid unnecessary repetition of data, the presentation of the mediations analysis now reads:

Mediators. To establish whether a variable was a mediator, three regression models were analyzed as described by Preacher and Hayes (2004). In model 1 the relationship between change in conduct problems and treatment were assessed. In model 2 the association between change in conduct problems and change in parenting controlling for treatment were addressed. And finally in model 3, the relationship between change in parenting and treatment were calculated. If the calculations show that there are significant associations in all three models, the change in parenting variable may be considered to be a mediator.

The adjusted Table 3

Table 3. *Regressions for the mediator analysis.*

	<i>Beta</i>	<i>t-value</i>	<i>p-value</i>
PPI harsh disciplining:			
Model 1			
Treatment vs WLC	.22	2.37	$p = .02$
Model 2			
Treatment vs WLC	.12	1.34	n.s.
Change in self-reported harsh disciplining	.36	3.93	$p < .001$
Model 3			
Treatment vs WLC	.34	3.02	$p = .003$

	<i>Beta</i>	<i>t-value</i>	<i>p-value</i>
PPI inconsistent disciplining:			
Model 1			
Treatment vs WLC	.22	2.37	$p = .02$
Model 2			
Treatment vs WLC	.14	1.52	n.s
Change in self-reported inconsistent disciplining	.26	2.76	$p = .007$
Model 3			
Treatment vs WLC	.50	3.56	$p < .001$

Note. PPI = Parenting practices interview, WLC = Waiting List Condition.

The results of the analysis or the interpretations of the findings are not altered due to these alterations.