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The effect of adding Coping Power Program-Sweden to Parent Management Training-effects and moderators in a randomized controlled trial

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ABSTRACT

For children with oppositional defiant disorder (ODD), Parent Management Training (PMT) is a recommended treatment in addition to child Cognitive Behavioral Therapy (child-CBT). There is however a lack of studies investigating the additive effect of group-based child-CBT to PMT for children between 8 and 12 years. The current study investigated the incremental effect of group-based child-CBT, based on the Coping Power Program, when added to the Swedish group-based PMT program KOMET. Outcomes were child behavior problems, child prosocial behavior, parenting skills and the moderating effect of child characteristics. One hundred and twenty children 8–12 years with ODD or Disruptive Behavioral Disorder NOS and their parents were randomized either to combined child-CBT and PMT (n = 63) or to PMT only (n = 57) in Swedish Child- and Adolescent Psychiatric settings. Participants were assessed pre- and post-treatment using semi-structured interviews and child- and parent ratings. After treatment, behavior problems were reduced in both groups. Prosocial behavior were significantly more improved in the combined treatment. Parenting skills were improved in both groups. In moderator analyses, behavior problems and prosocial behavior improved significantly more in the combined treatment compared to PMT only in the group of children with high levels of ODD symptoms.

1. Introduction

Effective treatments for children with oppositional defiant disorder (ODD[1]) Diagnostic and Statistical Manual of Mental Disorders, DSM-5, (American Psychiatric Association, APA 2013) are important to halter a development into more severe disorders such as conduct disorder (CD) or antisocial personality disorder (APA, 2013) during adolescence and early adulthood. Children at high risk for antisocial development constitute a subgroup where treatment success is especially needed. Research indicates that a larger number of risk factors is related to a higher likelihood that a child with conduct problems will continue exhibiting antisocial behaviors in adolescence and adulthood (e.g. Burke, Loeber, & Birmaher, 2002). There is not a single risk factor that leads to the development of antisocial development, but rather combinations and interactions of individual characteristics, family relations and stressors and environmental factors (Dodge & Pettit, 2003; Loeber & Farrington, 1998). Example of risk factors are genetics, child temperament, behavior impulsivity/inhibition difficulties, low verbal intelligence, deficiencies in social cognition, parenting strategies, deviant peers as well as low SES and disadvantaged neighborhoods (Burke et al., 2002). A common comorbid diagnosis among children with ODD is Attention Deficit Hyperactivity Disorder (ADHD). About 50% of children with ADHD also fulfill an ODD diagnosis (Loeber, Burke, & Pardini, 2009). Children with co-occurring ADHD and ODD/CD have a more severe prognosis than children with only ADHD or only ODD/CD (Angold, Costello, & Erkanli, 1999).

Treatments are not only important for reducing risk for severe future antisocial behavior, but also to reduce individual suffering and societal costs associated with an antisocial development (Christenson, Crane, Malloy, & Parker, 2016). Numerous studies have shown that Parent Management Training (PMT) is an effective treatment for ODD and CD in reducing child behavior problems (e.g. Furlong et al., 2013). While PMT targets many of the risk factors involved in antisocial development such as authoritarian or passive parenting, coercive patterns between parent and child, and parental stress, there are some risk factors, in particular related to the child, that remain untreated.

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[1] Abbreviations: ODD = Oppositional defiant disorder; DBD NOS = Disruptive behavior disorder not otherwise specified; CD = Conduct disorder; ADHD = Attention deficit hyperactivity disorder; PMT = Parent Management Training; child CBT = child focused Cognitive behavior therapy.

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Examples of these are child tendency to attribute hostile intentions to others, inadequate problem-solving skills and inability to handle anger due to affect regulatory deficiencies. These risk factors may be targeted in child Cognitive Behavior Therapy (child-CBT) where children are trained in affect regulation, perspective taking, problem-solving strategies, prosocial behavior and in handling peer pressure (Kazdin, Esveldt-Dawson, French, & Unis, 1987; Lochman & Wells, 2002a,b). Meta analyses suggest that studies combining PMT and child-CBT show larger effect sizes than studies with PMT only (Fossum, Handegard, Adolfsen, Vis, & Wynn, 2016; McCart, Priester, Davies, & Azen, 2006). However, several of these meta analyses compare treatment effects of PMT or PMT in combination with child CBT to an untreated control only (e. g Furlong et al., 2013; Michelson, Davenport, Dretzke, Barlow, & Day, 2013) or compares the effect of child CBT and PMT together with other parent directed psycho-social treatments (e.g. Fossum et al., 2016) or includes other conditions such as ADHD (e.g. Battagliese et al., 2015), which makes it harder to know whether PMT only is better than combining PMT with another intervention for children with disruptive behavior. A few studies have directly, within the same study, compared whether a combination of child-CBT and PMT improves treatment effects and compared this to PMT. Webster-Stratton and colleagues (1997) as well as and Drugli, Larsson, and Clifford (2007) have evaluated the Incredible Years for young children (4–8 year old) in USA and Norway respectively. Both studies showed increased post-treatment effects in child social problem-solving and conflict management skills when child-CBT was added to PMT and compared to PMT only. Behavior problems were reduced in both treatment groups but no significant difference was seen between the two conditions. In the one-year follow-up, however, behavior problems decreased significantly in the PMT and child CBT condition compared to the PMT only condition in the US study while this was not found in the Norwegian study (Larsson et al., 2009). Studies examining the additive effect of child-CBT to PMT for older children aged 8–12 years with behavioral problems are scarcer. When individually delivered child-CBT and PMT for children 8–12 years of age has been compared to individual PMT, the combined treatment was more successful in improving behavior problems, reducing parental stress and depression and increasing child prosocial behavior than PMT or child CBT alone at one year follow up (Kazdin, Siegel, Bass, 1992).

The Coping Power Program is a group-delivered CBT-program for children 8–12 years, which has been investigated within the school setting, both as stand-alone intervention and in combination with PMT (Lochman & Wells, 2002a,b). The results showed that the combination of child-CBT and PMT yielded larger effects in terms of reduced covert delinquency and improved teacher-rated behavioral outcomes compared to child-CBT only (Lochman & Wells, 2004). The Coping Power Program child component in addition to PMT has also been evaluated in child and adolescent psychiatric settings, where it was compared to treatment as usual (van de Wiel et al., 2007). The Coping Power Program showed medium to large between-group effect-sizes on reduction of behavior problems when compared to family therapy, but only small between-group effect-sizes when compared to behavioral therapy. In summary, there is as far as we are aware, limited knowledge of the effects of the combination of group-delivered child-CBT and PMT when compared to group delivered PMT only, for children 8–12 years with clinical levels of behavior problems.

Knowledge about how child and/or family characteristics might influence treatment outcome is essential for good treatment planning in clinical practices. A clinician needs to know for which client a certain intervention may be more effective. In the context of PMT, it is important to know for which families that PMT only is effective and when the addition of child-CBT to PMT yields more effective outcomes. Numerous studies have investigated predictors and moderators for PMT. For instance, two meta analyses showed that maternal mental health, such as depression and stress, and low family income predicted lower treatment effects (Lundahl, Risser, & Lovejoy, 2006; Reyno & McGrath, 2006).

There are few studies evaluating moderators of treatment effects for the combination of child-CBT and PMT compared to PMT only. Severity of child behavior problems before treatment has been associated with a smaller treatment effect in PMT in some meta-analyses (Reyno & McGrath, 2006), other studies have shown that PMT was more effective for children with a clinical level of problem behavior compared to a sub clinical level (Deković et al., 2011). A high number of ODD symptoms has been associated with increasingly poor functioning in relationships with peers, partners and parents in adult life (Burke, Rowe, & Boylan, 2014). Further, children with Callous/Unemotional traits (CU Traits), i.e., lack of empathy, deficient guilt/remorse, and shallow affect, constitute a more severe subgroup of children with conduct problems (Hawes, Dadds, Brennan, Rhodes, & Cauchi, 2013; Kahn, Byrd, & Pardini, 2013). A recent meta-analysis concluded that it is difficult to draw firm conclusions about treatment effects for children with high CU traits due to the mixed results (Wilkinson, Waller, & Viding, 2016). In some of the studies, CU traits predicted a negative treatment response while others did not show this prediction. Some studies has shown a reduction in both CU traits and antisocial behavior after participating in different types of interventions, such as PMT, child-CBT and multisystemic treatments, but that these children begin with a poorer premorbid functioning, which might explain the earlier described reduced treatment effects for children with CU traits. There is a need to further investigate treatment outcomes for this group, especially within a larger-sample RTC-design and long-term follow-up (Wilkinson et al., 2016).

The overall aim of the present study was to investigate to what extent child-CBT in combination with PMT has an additive effect in reducing child behavior problems and increasing prosocial behavior, as well as improving parenting behaviors, when compared to PMT only for children aged 8–12 years with behavior problems, examined in a randomized controlled trial conducted in child- and adolescent psychiatry outpatient clinics.

Three specific questions were formulated:

1. How effective is the combination of group based PMT and child-CBT in a Swedish child and adolescent psychiatry setting in reducing child behavior problems and improving child prosocial, problem-solving and emotional skills, compared to PMT only?
2. How effective is the combination of PMT and child-CBT treatment in enhancing functional parental strategies, parental sense of competence and reducing parental stress as compared to PMT only?
3. How does severity of disruptive behavior, presence of CU traits, comorbid ADHD, and risk level for antisocial development moderate child behavior outcomes in child-CBT combined with PMT compared to PMT only?

We hypothesized that the combined treatment would lead to more prosocial behavior and more effective problem-solving skills, compared to the PMT only group. We expected a significant behavior problem reduction and increased parental strategies in both groups since all participants were receiving PMT.

2. Method

2.1. Trial design

The study used a randomized controlled design with pre- and post measurements, completed by parent and child. Children and their families were randomized to either (a) Parent Management Training, KOMET or (b) Parent Management Training, KOMET and child-CBT training, the Coping Power Program. The study was conducted within a child- and adolescent psychiatric outpatient setting. Baseline and post treatment data were collected through pen and paper questionnaires, interviews and assessments were conducted at the outpatient clinics as

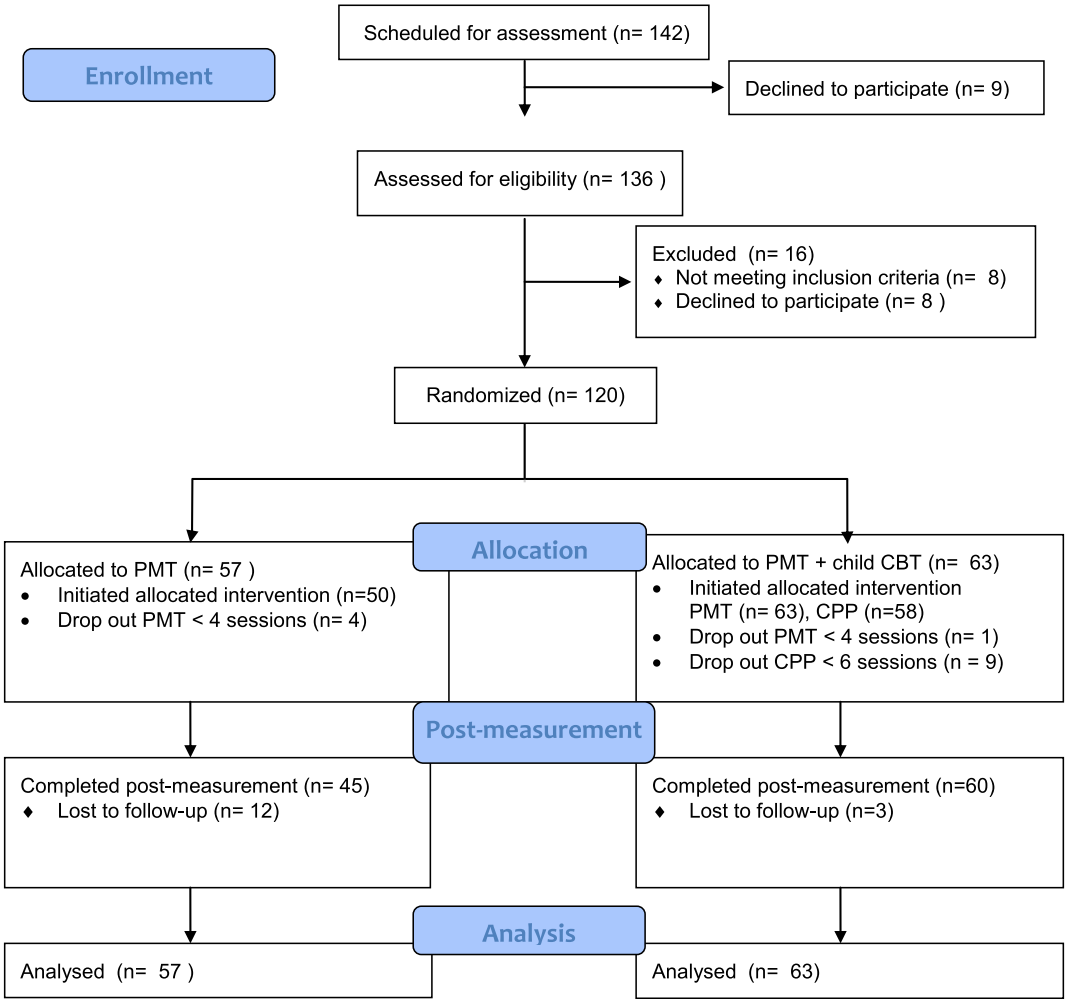

Fig. 1. Flowchart showing the inclusion of children.

well as through questionnaires distributed through a secure Internet-based webpage. During the intervention, parent also filled out four short questionnaires at three time points to detect time for change in main outcomes during treatment. These data are not reported within the current paper. Teachers rated child behavior problems and prosocial behavior after informed consent. Due to the low response rate (28% at pre-assessment), teacher ratings were not included in the analysis.

2.2. Participants

The study included 120 children, 8–12 years old, diagnosed with Oppositional Defiant disorder, Conduct Disorder or Disruptive Behavioral Disorder NOS and was conducted within regular child and adolescent outpatient mental health care in Mid-Sweden. Exclusion criteria were (a) autism (b) mental retardation (c) severe other psychiatric comorbid disorder that required treatment (se Fig. 1). Mean age of the children was 9.34 years (SD = 1.23) and a majority (73%) were boys. Sixty-seven percent of the children had a comorbid ADHD diagnosis (American Psychiatric Association, 2013). There were no significant differences between the groups on any of the variables at baseline (see Table 1).

2.3. Procedure

Children were recruited from spring 2014 until spring 2016 from six outpatient clinics in Mid-Sweden, five of which were situated in the Stockholm area and one outside of Stockholm. Following information about the project by trained local clinicians and group leaders, research assistants (experienced clinical psychologists) first met with the family, informed them about the project, answered their questions, and conducted interviews and assessments after written informed consent. Parents first filled out rating scales through an Internet–based, secure, homepage and were after that interviewed using semi-structured interviews (see measures below). Research assistants (clinical psychologists/or psychology students trained and supervised by the first author) administered the child assessment and child measures. Both parent and child interviews were recorded. Blinded research assistants conducted post treatment interviews in 50% of the cases. Randomization was made within each outpatient clinic using pairwise blocked randomization. The randomization was made using a true random number service (www.random.org) by a researcher not involved in the assessment phase and the families were informed about the allocation after the pre-treatment assessment. The study protocol was approved by the regional ethics review board in Stockholm and registered on Current Controlled Trials www.isrctn.com (ISRCTN10834473).

2.4. Treatments

The Parent Management Training program used in this study is the Swedish PMT program KOMET (Kling, Forster, Sundell, & Melin, 2010), which is based on social learning theory and inspired by the Incredible Years (Webster-Stratton, Reid, & Hammond, 2004) and Parent Management Training – Oregon model (Patterson, Chamberlain, & Reid, 1982). KOMET has shown similar results as other well-known evidence-

Table 1
Characteristics and demographics of participants included in the study.

	Total	PMT	PMT/child CBT	*Statistics*	*p*
	n (%)	*n* (%)	*n* (%)	*t- test/χ*	
Child Characteristics	*N* = 120	*N* = 57	N = 63		
Age	9.34 (1.23)	9.40 (1.25)	9.29 (1.24)	t(118) = .52	.61
Boys	88 (73)	40 (70)	48 (76)	χ^2 (1) = .55	.46
Both parents born abroad	111 (7.50)	5 (8.77)	4 (6.35)	$\chi^2(1)$ = .25	.62
ODD diagnosis	109 (90.8)	51 (89.5)	58 (92.1)	χ^2 (1) = .24	.62
ODD symptoms (*Mean (SD)*)	5.38 (2.05)	5.37 (1.51)	5.38 (1.37)	t(118) = −.48	.92
7-8 ODD symptoms	27 (22.5)	14 (24,6)	13 (20.6)	χ^2 (1) = .27	.61
DBD NOS diagnosis	12 (9.2)	6 (10.5)	6 (9.52)	χ^2 (1) = .03	1.0
CD diagnosis	5 (4.2)	2 (3.5)	3 (5)	χ^2 (1) = .12	.73
ADHD diagnosis	80 (67)	38 (67)	42 (67)	χ^2 (1) = .00	1.0
EARL-20B/21G	11.70 (3.57)	11.79(3.59)	11.62 (3.57)	t(118) = .26	.79
CU traits	5.70 (2.15)	5.73 (2.73)	5,93 (2.52)	t(118) = .52	.60
CU traits: high level	27 (22.5)	8 (14.0)	15 (23.8)	$\chi^2(1)$ = .1.85	.17
Parent/family characteristics					
Mothers participating	80 (66.7)	38 (66.6)	42 (66.6)	χ^2 (1) = .00	1.0
Parental educational level					
Elementary school	9 (7.5)	6 (10.5)	3 (4.7)		
High school	57 (47.4)	19 (33.3)	30 (47.3)		
University	54 (45)	24 (42.1)	30 (47.3)	χ^2 (1) = .18	.66

Note; Both parents born abroad = Both parents born in a foreign country; ODD = Oppositional Defiant Disorder; ODD NOS= Oppositional Defiant Disorder Not Otherwise Specified (fulfills 3 diagnostic criteria of ODD); CD = Conduct Disorder; ADHD = Attention Deficit Hyperactivity disorder; CU traits = Callous/Unemotional traits assessed with the Antisocial Process Screening Device (APSD) in combination with the Strengths and Difficulties Questionnaire (SDQ) Prosocial scale; EARL-20B/EARL-21G = Early Assessment Risk List for boys/girls risk level of future antisocial behaviors; ODD = Oppositional Defiant disorder; 7–8 ODD symptoms = children who fulfill 7 or more DSM-5 diagnostic criteria for ODD; University = University level education compared to elementary + high school.

based PMT programs designed to improve parents' behavior-management skills (e.g., the Incredible Years; Webster-Stratton & Reid, 2004) and Cope (Cunningham, Bremner, & Boyle, 1995; Stattin, Enebrink, Ozdemir, & Giannotta, 2015). KOMET is a group-treatment for parents, led by two group-leaders, consisting of 11 group sessions of 2.5 h each with 6 families (parents of 6 children) in each group. The KOMET program focuses on increasing positive parent-child interaction using playtime, praise and rewards, giving clear instructions/commands and reducing the reinforcement of negative behavior by not focusing on minor disruptive behavior and instead working with non-punitive consequences.

The child treatment employed in the trial is the child-component of the Coping Power Program (CPP) (Lochman & Wells, 2002). The CPP is a manual-based group CBT intervention for children 8–12 years old. In CPP children are trained in anger management, problem-solving, perspective taking, social skills and handling group pressure. Whereas the original CPP consists of 32 one-hour sessions, a shorter manual with 24 sessions was developed in 2006 (Lochman, Boxmeyer, Powell, Roth, & Windle, 2006). Evaluations showed significant reductions in teacher-rated externalizing behavior after treatment, controlling for dosage of parent attendance at parent meetings. In comparison to the control condition, the abbreviated version of Coping Power has been found to produce reductions in teacher-rated child externalizing behaviors, proactive and reactive aggression, and CU traits compared to control children at a 3-year follow-up (Lochman et al., 2014).

To adapt to the Swedish child- and adolescence psychiatry context and to be able to offer parent and child group treatments simultaneously, the 24-session one-hour treatment was reshaped into a Swedish 15-session version with 2.5 h each session. The manual was translated into Swedish and minor adjustments were made to fit the longer treatment sessions as well as the Swedish child and adolescent psychiatric setting, where a large proportion of the children have attention difficulties. For instance, the number of short breaks was increased and writing exercises were often done orally or in small groups to maintain attention to the task. School-based exercises and tasks in the original version were home-based in the Swedish version. The increased time frame also made it possible to increase the amount of free time where the children could play and interact with each other and this gave more opportunities for children and group-leaders to practice problem-solving skills in action in real situations.

Twenty-nine therapists were involved in delivering the treatments. Nine percent were group leaders in both KOMET and CPP. The therapists were clinical psychologists (58.6%), social workers (17.2%), teachers (13%) and nurses (6.9%), all working at the child and adolescent psychiatric outpatient units. 72% had three or more years of working experience, and 38% had previous group leader experience. The PMT therapists had all been trained in KOMET during 18 training hours, had received 18 h of supervision and were certified group-leaders. The child-CBT therapists had been trained for 12 h and received 8 h supervision per group they treated. Of the total number of sessions, 7,6% of the Coping Power and 3,1% of the KOMET sessions were analyzed for treatment fidelity and group-leader competence by independent and experienced clinical psychologists. The evaluation of Coping Power group-leader management and clinical skills assessment, described in Lochman, Dishion, Boxmeyer, Powell, and Qu (2017), showed adequate fidelity and competence in 88% of the videos rated. The KOMET group-leaders were assessed using the same instrument as in the KOMET group-leader certification, resulting in 100% adequate fidelity and competence.

2.5. Measures

Parents rated five primary outcome measures targeting disruptive behavior and prosocial behaviors, which were completed at the pre- and post measurements. As secondary outcome variables, parents rated parental strategies, sense of competence, stress, treatment satisfaction and treatment alliance. Children rated their behavior problems, prosocial behavior and completed problem-solving tasks.

2.5.1. Primary parent rated outcome measures

The Strengths and Difficulties Questionnaire (SDQ; Goodman, 2001). The SDQ consists of 5 subscales with five items each (range 0–2 from "not true" to "certainly true"): emotional problems, conduct problems, hyperactivity/inattention, peer relationship problems and prosocial behavior. The four problem scales can be summarized into a total difficulty score. In the present study, the parent-rated SDQ Total

difficulties score was used with a Crohnbach's alpha of .76 at pre- and .83 at post-measurement. The SDQ Prosocial scale captures child capacity to consider other people's feelings and child helpfulness towards other people and was used in this study because of the construct's relevance to intervention aims. This was of certain interest for the present study why this subscale was included whereas the other subscales were not analyzed separately. Parent-rated SDQ prosocial subscale Cronbach's alphas were α = .70 at pre- and .71 at post assessment. *The Parent/Teacher Disruptive Disorder Behavior rating scale* (DBD) (Pelham, Gnagy, Greenslade, & Milich, 1992) was filled in by parents and teachers. The scale consists of three subscales: Inattention (9 items), Oppositional/defiant (8 items) and Impulsivity/over activity (9 items), and is evaluated on a scale ranging from 0 to 3 (not at all to very much). In the present study, the DBD oppositional/defiant score (α = .79 at pre- and 85 at post-assessment) and the total DBD score (α = .91 at pre- and .95 at post-assessment) were used. To measure child prosocial behaviors, communicative skills, and self-control, the *Social Competence Scale – Parent version* (Conduct Problems Prevention Research Group (CPPRG), 1995) was used, a 12 item scale that includes items describing prosocial behavior and emotion regulation. The measure has a 5-point scale, from "not at all" to "very well". Cronbach's alphas were α = .85 at pre- and .90 at post-assessment. In order to capture child prosocial behavior, we used the Norwegian version of the *Social skills Rating System* (SSRS; Ogden, 2003; Sörlie, Hagen, & Ogden, 2008) modified from Gresham and Elliott (1990). The Norwegian SSRS includes Parent, Teacher and Child version and the response choices are modified from a 3-point to a 4-point Likert scale (range 0–4 from never to almost all the time). The parent version has 38 items assessing cooperation, assertion, responsibility, and self-control domains. Cronbach's alphas for the total sum were α = .82 at pre- and .87 at post-assessment.

2.5.2. Secondary parent rated outcome measures

Parenting strategies was assessed using the *Parenting Practices Interview (PPI)* (Webster-Stratton, Reid, & Hammond, 2001). High to moderate temporal stability has been demonstrated (Baydar, Reid, & Webster-Stratton, 2015). In the present study, three subscales were used: Appropriate discipline (12 items; α = .79 at pre-, and .81 at post-assessment), Harsh and inconsistent disciplines (15 items α = .80 at pre-, and .76 at post-assessment) and Praise and Incentives (11 items α = .73 at pre-, and .74 at post-assessment). To evaluate parental self-efficacy and satisfaction in the parental role, the *Parenting sense of competence* (*PSOC*; Ohan, Leung, & Johnston, 2000) was used, 17 items divided in two scales: parental satisfaction, (α = .79 at pre- and .78 at post-assessment), and parental efficacy (α = .75 at pre- and .72 at post-assessment), range 0–6 from "strongly disagree" to "strongly agree". Parental stress was assessed by the *Percieved Stress Scale* (*PSS*; Cohen, Kamarck, & Mermelstein, 1983), a 14-item scale targeting the degree to which situations in life are appraised as stressful. In the present study a short version of 10 items was used (range 0–4 from "never" to "very often" α = .75 at pre- and .72 at post-assessment). Treatment satisfaction was assessed post treatment with the *Family Satisfaction Survey* (Ogden 2008), which contains 11 items concerning treatment satisfaction (range 0–3, α = .75 at post assessment). Items included were for example parents opinion about the quality and effectiveness of the treatment, if the treatment had been helpful for the child and if the methods taught had been useful in the family daily life. Treatment alliance, measured at three times during the treatment and directly after treatment, evaluated how satisfactory the parent considers the parent-therapist relationship. It consists of two questions constructed for the present study: "I get on well with my group-leaders" and "The group-leaders and I collaborate well with the problems that I have".

2.5.3. Child assessment

The Strengths and Difficulties Questionnaire (Goodman, 2001) was used to assess self-rated behavioral and emotional problems. The total difficulties (α = .73 at pre- and .76 at post-assessment) and the prosocial scale (α = .56 at pre- and .71 at post-assessment) were included in the present study. Child social skills was assessed using the Norwegian version of the *Social Skills Rating System* (*SSRS,* Sörlie et al., 2008); α = .90 at pre- and .92 at post-assessment). The children completed the *Home interview with Child* (*HIWC*, Conduct Problems Prevention Research Group, Fast Track Project), 1991) to assess problem-solving strategies and the tendency to interpret others' actions as hostile. The children were first told to picture themselves in eight specific situations and then to answer questions about why another child is behaving the way he/she is, what intentions the other child might have and what the interviewed child would do in the situation. The descriptions concern two types of social situations, ambiguous minor harm situations and unsuccessful peer entry situations where the child is either explicitly told he/she cannot join the group, or is ignored by the children in the group. The responses to of the "why" question were coded into one of three categories: hostile, non-hostile, and don't know. The " What would you do-question" was coded into one of six categories: don't know, do nothing, ask why/ask again, make a command, threaten adult punishment or make a threat, or retaliate/be aggressive (Conduct Problems Prevention Research Group (CPPRG) (1991). Children's problem-solving strategies were assessed using the *Problem Solving Measure for Conflict* (PSM-C; Lochman & Lampron, 1986) where the child is presented to a story with a problem situation and an ending of the story, and is asked for a solution of the problem that leads to the ending. The answers are coded into 10 different answer categories. This measure was not included in the present analysis since the children remembered their pre treatment assessment stories, which made it difficult to assess the children's automatic answers. The *child's alliance with the group-leaders* was assessed at three different time points during treatment. The questions used for this study were: "I get along well with my group-leaders", "I don't want to work on my problems with the group-leaders" and "The group-leaders and I collaborate well around my problems".

2.6. Potential moderators of treatment effects

The moderators investigated in this study were severity of ODD, level of CU traits, level of risk for antisocial development and comorbid ADHD. The severity of ODD at baseline, as well as comorbid ADHD, was evaluated with the *Kiddie –SADS, Present and Lifetime Diagnosis (Version P/L)* a semi structured diagnostic interview with an excellent test-retest reliability (Kaufman et al., 1997). The assessment was made by research assistants/clinical psychologists with several years of experience of working within Child and adolescent psychiatry. To find children with more severe problem levels, the number of ODD diagnostic criteria fulfilled was divided into three groups: 1) light problem level with three diagnostic criteria fulfilled (Disruptive behavior Disorder NOS), 2) Medium problem level with four to six diagnostic criteria of ODD fulfilled and 3) High problem level with seven to a maximum of eight diagnostic criteria fulfilled. The variable comorbid ADHD was made dichotomous (present/not present).

Baseline level of Callous unemotional (CU) traits was measured with a scale developed by Dadds and colleagues (Dadds, Fraser, Frost, & Hawes, 2005) where items from the APSD (Frick & Hare, 2001) and the SDQ (Goodman, 2001) prosocial scale are combined. This *APSD-SDQ scale* has demonstrated good internal validity in several studies (Dadds et al., 2009). In the present study Cronbach's alphas were α = .70 at pre- and .72 at post-assessment. The scale consists of 8 items (range 0–2 from not true to certainly true). High levels of CU traits were identified by including the children above 10th percentile (8 points and above). The moderator was made dichotomous (above/below).

High level of risk for antisocial development was assessed using the risk assessment instruments *Early Assessment Risk List for Boys* (EARL-20 B; Augimeri, Webster, Koegl, & Levene, 2001, p. 17) and *Early Assessment Risk List for Girls* (EARL-21G; Levene et al., 2001). The EARL-20B/21G assessments were employed by clinical psychologists trained

Table 2
Descriptive Statistics - means, standard deviations and within group effect size measured with within –group Cohen's *d* pre to post measurement.

Measure	PMT			PMT + Child CBT		
	M (SD)	M (SD)	Cohen's d	M (SD)	M (SD)	Cohen's d
Parent ratings	*n* = 55	*n* = 39		*n* = 63	*n* = 60	
Child Behavior Problems						
DBD total	47.09 (13.87)	40.18 (15.54)	0.59	46.34 (12.06)	37.24 (15.81)	0.92
DBD ODD	14.07 (4.7)	11.05 (5.09)	0.84	14.14 (3.91)	10.93 (4.70)	0.73
SDQ Total	28.15 (5.74)	23.56 (5.99)	0.98	27.46 (5.33)	23.17 (6.00)	0.83
Child Social skills						
P-COMP	28.09 (7.56)	31.00 (8.15)	−0.52	27.08 (5.92)	33.17 (8.03)	−0.82
SSRS Total	47.15 (8.71)	49.89 (11.53)	−0.39	46.12 (10.44)	50.92 (11.92)	−0.59
SDQ Prosocial	6.09 (1.99)	6.28 (2.10)	−0.10	5.73 (1.99)	6.7 (1.90)	−0.63
Parental skills and competences						
PSOC- Efficacy	26.22 (4.44)	29.18 (3.77)	−0.77	24.87 (5.32)	28.14 (4.14)	−0.77
PSOC - Satisfaction	36.69 (6.22)	40.42 (6.03)	−0.78	36.57 (7.66)	40.27 (7.21)	−0.66
PPI Harsch	34.80 (10.65)	24.90 (8.19)	1.54	32.20 (10.26)	23.57 (8.36)	1.11
PPI Appropriate	32.27 (9.98)	25.56 (9.98)	0.94	32.40 (10.20)	27.20 (9.65)	0.88
PPI Praise	37.38 (8.61)	42.07 (7.94)	−0.68	34.1 (8.41)	40.31 (8.37)	−0.75
PSS	27.51 (5.21)	23.87 (7.40)	0.57	27.95 (6.51)	24.72 (6.52)	0.61
Child ratings	*n* = 57	*n* = 44		*n* = 63	*n* = 49	
SDQ total	15.38 (5.65)	13.71 (5.10)	0.29	15.72 (5.09)	14.57 (5.39)	0.21
SDQ prosocial	7.40 (1.80)	7.59 (1.81)	−0.09	7.32 (1.82)	7.51 (1.77)	−0.11
HIWC Action	16.58 (5.04)	15.56 (4.92)	0.19	17.54 (5.49)	15.72 (4.23)	0.32
HIWC Hostile	6.66 (3.03)	4.42 (3.89)	0.12	6.70 (3.80)	4.60 (3.98)	0.33
SSRS total	65.10 (15.77)	69.21 (14.89)	−0.31	63.52 (15.82)	63.52 (17.33)	−0.23

Note. DBD = The Parent/Teacher Disruptive Disorder Behavior rating scale; SDQ = Strengths and Difficulties Questionnaires; P-COMP = Social Competence Scale- Parent version; SSRS = Social Skills Rating System; P-SOC = Parenting Sence Of Competence; PPI = Parenting Practices Interview; PSS = Percieved Parental Stress; HIWC = Home Interview With Child.

in risk assessment, pre- and post treatment, in a semi-structured interview with parents. The risk factors are subdivided into family factors (e.g., socioeconomic status, parental strategies, parental stress and presence of antisocial family values), child factors (e.g., age of conduct-problem onset, child antisocial values and socialization problems), and responsiveness factors (family and child motivation for treatment). Each risk factor is rated as either 0 (absent risk), 1 (partially present risk) or 2 (definitely present risk). By adding the ratings of all risk factors, a total sum score is obtained that estimates overall risk level for an antisocial development. The EARL-20B has been validated in Sweden (Enebrink, Långström, Hultén, & Gumpert, 2006). To identify children with a high risk for antisocial development, those with a risk score of 15 and above were included in the high risk group for the moderator analysis. This variable was made dichotomous.

2.7. Statistical analyses

To discern a small between group effect size with alpha-value of .05 and 80% power, according to the program G-Power, a sample size of 130 participants (65 in each arm) was needed. The difference in change between combined child CBT and PMT compared with PMT only was evaluated pre-to post-treatment on all the dependent variables by testing the significance of treatment × time in a full maximum likelihood Linear Mixed Model (LMM) analysis that included random intercept and slope in a compound symmetry covariance structure. The statistical analyses were conducted according to the intent-to-treat principle and based on all available data in the Linear Mixed Model without excluding missing cases (Gueorguieva & Krystal, 2011). Moderation effects were analyzed for the child behavior variables by adding the moderator to the model (moderator × treatment × time). Between-group effect sizes (Cohen's *d*) at post-treatment were calculated based on the estimates obtained in the LMM by dividing the difference in slope (i.e. coefficient of time × group interaction effect) by the observed pre-treatment standard deviation for the whole group (Feingold, 2009). Within-group effect sizes were based on observed values and calculated by dividing the mean difference with respective standard deviation, correcting for correlation between time-points (calculated using equations [8] in Morris and DeShon (2002). Analyses of missing data was conducted using Little's missing completely at random test. All data were analyzed using IBM SPSS version 23.

3. Results

3.1. Attrition

Of participants randomized to treatment (N = 120), 102 (85.8%) completed the post assessment (see Fig. 1). A significantly larger proportion of families not completing post assessment had parents with a lower level of education (primary school compared to high-school, $\chi^2(1, 120) = 4.60, p = .03$). There were no differences concerning age or gender of the children or parent gender in the attrition group compared to those completing post assessment. The baseline measures were not significantly different between study-completers and those who dropped-out from the post-treatment assessment ($p > .05$). The attrition rate for those who started treatment was somewhat larger in the PMT only group, 6.8% compared to 2.9% in the combined treatment group although not significant (Fisher's Exact Test $p = .11$). Little's test showed, when including measurements included in the analysis, that missing data was missing completely at random and unrelated to the observed variables (χ^2 (N=120, 2542) = 54.56, p = 1.0).

3.2. Treatment effects

Since all participants received PMT, a well-evaluated treatment targeting behavior problems, we expected to see general treatment effects in disruptive behavior in both the PMT only and the PMT and child-CBT group. This was also the case, as shown in Table 2 where pre- and post treatment assessment including within-group effect-sizes are presented, showing medium to large within-group effect-sizes for the majority of parent-rated behavior, prosocial behavior and parental strategies outcomes. The child ratings generally showed small within-group effect sizes.

Table 3
Pre-to post measurement Time, Group, Interaction effects (group X time) and effect sizes based on estimated means and SD.

Measures	Time effect	*p*-value	Group effect	*p*-value	Time x group interaction effect		Between group effect size
	F(df)		*F(df)*		*F (df)*	*p*-value	*Cohen's d* based on F value
Parent ratings							
Child behavior problems							
DBD total	F(1,101.46) = 43.99	.00***	F(1,194.66) = .43	.51	F(1,101.46) = 2.31	.13	0.26
DBD ODD	F(1,104.34) = 51.53	.00***	F(1,173.61) = .10	.75	F(1,104.54) = 0.25	.62	0.10
SDQ total	F(1,106.82)= 68.46	.00***	F(1,162.25) = .04	.51	F(1,106.81) = 0.01	.92	0.02
Child Social skills							
P-COMP	F(1,106.36) = 37.43	.00***	F(1,169.18) = 3.49	.06	F(1,106.35) = 5.71	.02*	0.49
SSRS total	F(1,102.72) = 20.67	.00***	F(1,96.75) = 1.04	.31	F(1,102,72) = 1.49	.23	0.20
SDQ Pro-social	F(1,105.39) = 11.10	.00	F(1,187.32) = 4.08	.05*	F(1105.39) = 5.89	.02*	0.41
Parental strategies							
PSOC: Efficacy	F(1,102.57) = 47.89	.00***	F(1,174) = 2.27	.13	F(1,102.57) = .97	.33	0.17
PSOC Satisfaction	F(1,103.13) = 40.45	.00***	F(1,196.49) = .09	.76	F(1,103.13) = .19	.67	0.07
PPI Harsh	F(1,102.13) = 100.27	.00***	F(1,172.04) = 1.25	.27	F(1,102.13) = .16	.69	0.07
PPI Appropriate	F(1,102.28) = 76.39	.00***	F(1,214.10) = .00	.96	F(1,102.28) = .04	.85	0.24
PPI Praise	F(1,98.54) = 29.49	.00***	F(1,167.51) = .02	.89	F(1,98.54) = .15	.70	0.07
PSS	F(1,108.81) = 31.06	.00***	F(1,175.61) = .03	.87	F(1,108.81) = .00	.92	0.02
Child ratings							
SDQ-total	F(1,98.57) = 4.44	.04*	F(1,148.42) = .01	.96	F(1,98.57) = 0.29	.60	0.12
SDQ Prosocial	F(1,102.15) = 1.18	.28	F(1,148.42) = .00	.96	F(1,102.15) = .02	.89	0.03
HIWC Hostile	F(1,120) = 28.43	.00***	F(1,164.29) = .00	.93	F(1,120) = .03	.85	0.04
HIWC Action	F(1,90) = 7.75	.00	F(1,143.78) = .96	.33	F(1,107.32) = .47	.49	0.15
SSRS	F(1,90.16) = 1.86	.18	F(1,110.34) = .00	.96	F(1,89) = .24	.62	0.09

Note. * = $p < .05$; ** = $p < .01$, *** = $p < .001$; DBD = The Parent/Teacher Disruptive Disorder Behavior rating scale; SDQ = Strengths and Difficulties Questionnaires; P-COMP = Social Competence Scale- Parent version; SSRS = Social Skills Rating System; P-SOC = Parenting Sence Of Competence; PPI, Parenting Practices Interview; PSS, Percieved Parental Stress; HIWC = Home Interview With Child.

For the primary outcome, the mixed effects model showed main effects of time, but no group- or interaction effects, or significant differences between the two conditions on the parent-rated outcomes measuring child behavior problems (DBD total, DBD ODD scale), see Table 3. Further, we found a time effect, but no group- or interaction effects for general child difficulties when evaluated by the parents (SDQ total). Interestingly, the mixed effects model showed a significant treatment × time interaction effect on parent-ratings of child prosocial behavior when evaluated with the P-COMP (F (1, 106.35) = 5.71, $p < .05$) and the SDQ prosocial behavior scale (F (1, 105.39) = 5.89 $p < .05$) favoring the combination of PMT and child CBT (medium effect sizes) but not with the SSRS (small effect size), as can be seen in Table 3. When using Bonferroni family-wise correction for multiple testing of the primary variables, the changes in social skills variables were still significant.

Both within-group (based on study-completers) and between-group effect sizes were small for outcomes evaluated by the children. The child ratings of their own wellbeing as measured by the SDQ, their social skills in the SSRS, their problem-solving strategies and tendency to hostile attributions in Home interview with child, showed no significant Treatment × Time interaction effect.

All parents received the same PMT treatment and were therefore expected to get similar results in the pre to post-assessment of parenting strategies. In accordance with this, the within-group effect sizes were medium to large in both groups, as shown in Table 2, but there were no significant Time × Group interaction effects and small model effect sizes (Table 3).

3.3. Moderator analyses

When child severity of ODD symptoms was added to the analysis, we found a Time x Group x Moderator effect in parent-rated behavior problems for the DBD ODD scale (F (2, 100.58) = 3.56, $p < .05$) as well as for parent-ratings of social skills assessed by the SSRS (F(2, 101.15) = 4.83, $p < .05$) (see Table 4). This indicates that the children with the most severe levels of ODD, i.e., with 7 or 8 diagnostic criteria according to clinician rated K-SADS, had a significant beneficial effect from the combined PMT and child CBT treatment on both behavior problems and prosocial behavior. This effect is also supported with a trend for the results of the parent-rated DBD total and SDQ total difficulties scales, and the child-rated SSRS ($p < .10$). The moderator analyses on child CU traits before treatment showed a Time x Group x Moderator effect where children scoring high on CU traits showed more prosocial problem-solving skills in a problem-solving task in the group randomized to child CBT and PMT, compared to PMT only (F(1, 105.91) = 6.13, $p < .05$). No other moderator effects were evident for children with CU traits. The level of risk for antisocial development, as measured by EARL-20/21 B/G, showed a time x group x moderator for parent-rated SDQ total difficulties (F(2,106.27) = 3.98, $p < .05$), indicating that children with high risk for antisocial development showed a beneficial effect of the combined treatment, compared to families randomized to PMT only. Comorbid ADHD showed no Time x Group x Moderator effect in any of the outcome measures.

4. Discussion

The aim of this study was to investigate the effects of combining child-CBT and PMT compared to PMT only in reducing behavior problems and increasing prosocial behavior for children 8–12 years with disruptive behavior. We examined this in an RCT in an outpatient clinical child and adolescent psychiatric setting. Behavioral problems were improved in both groups but not significantly more in the combined treatment group compared to PMT only. Results showed that when child CBT was added to PMT, there was a significant increase pre- to post-assessment in child prosocial behavior compared to the PMT only condition, which was in line with our hypothesis. Moderator analyses further indicated that larger treatment effects were achieved for children with high levels of ODD, and to some extent also for those with a high risk for future antisocial development. For children with more severe ODD there was a significantly larger reduction of behavioral problems and an increase of prosocial behavior in the combined of child CBT and PMT compared to PMT only, and for those with a

Table 4
Moderator effects of ODD severity, callous/unemotional traits and level of risk for antisocial development based on estimated means and SD.

Measures	Moderator severity ODD		Moderator high CU traits		Moderator high risk EARL-20		Moderator comorbid ADHD	
	Time x group x ODD severity		Time x group x level c/u traits		Time x group x level of risk		Time x group x level of risk	
	F (df)	*p*-value	*F (df)*	*p*-value	*F (df)*	*p*-value	*F (df)*	*p*-value
Parent ratings								
Child behavior problems								
DBD total	F(2,100.40) = 2.86	.06	F(1,103.56) = .01	.91	F(2,102.03) = 1.16	.32	F(1,101.98) = .00	.94
DBD ODD	F(2,100.58) = 3.56	.03*	F(1,108.08) = .06	.82	F(2,105.21) = .93	.40	F(1,103.88) = .04	.84
SDQ total	F(2,104.92) = 2.71	.07	F(1,109.44) = .36	.55	F(2,107.27) = 3.98	.02*	F(1,107.42) = .09	.76
Child social skills								
P-COMP	F(2,104.49) = .48	.62	F(1,110.67) = .18	.67	F(2,106.04) = .28	.76	F(1,107.21) = .14	.71
SSRS Total	F(2,101.15) = 4.83	.01**	F(1,104.21) = .08	.77	F(2,102.88) = 2.14	.12	F(1,102.95) = .12	.74
SDQ Prosocial	F(2,104.61) = .63	.53	F(1,12.20) = .12	.73	F(2,105.60) = .10	.90	F(1,104.60) = .45	.50
Child ratings								
SDQ total	F(2,92.89) = .10	.75	F(1,98.97) = .1.02	.32	F(2,102.98) = .42	.66	F(1,103.90) = .05	.82
SDQ prosocial	F(2,101.07) = .90	.41	F(1,101.18) = .03	.86	F(2,103.15) = .97	.38	F(1,103.22) = .11	.74
HIWS action	F(2,107.45) = .0	.98	F(1,105.91) = 6.13	.02*	F(1,110.11) = .04	.96	F(1,109.16) = .42	.52
HIWS hostile	F(2,120) = .75	.48	F(1,120) = .01	.94	F(1,120) = 2.10	.13	F(1,120) = .00	.94
SSRS total	F(2,90.07) = 2.76	.07	F(2,91.91) = .68	.41	F(2,91.33) = .1.33	.27	F(1,91.72) = .75	.39

Note. * = $p < .05$; ** = $p < .01$, *** = $p < .001$; DBD = The Parent/Teacher Disruptive Disorder Behavior rating scale; SDQ = Strengths and Difficulties Questionnaires; P-COMP = Social Competence Scale- Parent version; SSRS = Social Skills Rating System; HIWC = Home Interview With Child.

higher risk a larger improvement in general child emotional and behavioral difficulties. Further, children with elevated levels of CU traits showed significantly increased problem-solving ability in the combined treatment, compared to PMT only, whereas comorbid ADHD showed no moderator effects.

Since all parent received the same treatment, we hypothesized that they would show equal improvement in regards of parental strategies in the pre-to post-assessment evaluation of the study. However, improved behavior and prosocial behavior among children in the combined treatment group might influence parents and improve their parenting, leading to positive parental strategies and reduced harsh parenting. This was not supported from data in the pre-to post-evaluation although it is not clear if parenting behaviors might change during a follow-up period after children's behavior have improved. We will continue to follow the sample in one- and two-year follows-up, where the possible varying long-term effects of the treatments may be discerned.

Only a few studies have evaluated the possibly additive effect of child CBT to PMT, mainly focusing on younger children and individually administered treatment. This study is the first study to investigate the additive effect of group delivered child-CBT compared to group-PMT in the ages of 8–12 years. However, the results of the present study are consistent with studies of group delivered child-CBT and PMT compared to PMT only in younger ages (4–8 years), where similar between-group effect sizes for both behavioral problems and parental strategies have been reported (Larsson et al., 2009; Webster-Stratton & Hammond, 1997). The results are also comparable to individually delivered child-CBT, Problem-Solving Skills Therapy (PSST) for children aged 8–12 years in combination with PMT (Kazdin, Siegel, & Bass, 1992). Interestingly, in the PSST-study, between-group effect-sizes for PSST and PMT seemed larger for the social competence (Cohen's $d = 0.52$) than behavioral problem outcome (Cohen's $d = 0.39$) (our calculations), lending support to the present study findings of increased prosocial behavior for children in combined child-CBT and PMT. The child-CBT in the present study, the Coping Power Program, has not previously been evaluated in combination with PMT and compared to PMT only.

Apart from increased prosocial behavior in the child-CBT and PMT-group, children with the largest pre-treatment behavior problems also showed significantly reduced behavior problems in the combined treatment compared to PMT only. These results need to be followed-up, and may have implications for clinicians and policymakers when considering adding or recommending child-CBT to PMT when behavior problems are more severe. The results of this study show that child-CBT programs, such as the Coping Power Program, may be effective also within a Swedish child- and adolescence psychiatric setting. Coping Power has been translated into many different languages such as Italian, Dutch, Spanish and has been evaluated in Italy (Muratori et al., 2015), The Netherlands (van de Wiel et al., 2007), Pakistan (Mushtaq, Lochman, Tariq, & Sabih, 2016). It is used as a regular treatment in clinics in Canada and Puerto Rico. This study contributes to the generalizability of Coping Power Program to a child- and adolescent setting in a Scandinavian country. Moreover, there was a larger (non-significant) treatment drop-out in the PMT only group, 6,8%, compared to 2,9% in the combined treatment. It might be the case that parents are more likely to give priority to or are more interested in treatments that target their child as well.

In power calculation prior to the study, 130 children were estimated to detect a treatment effect when comparing two effective treatments. 120 children were finally included, which leaves us with a potentially under-powered study. A further limitation is the lack of teacher-reported data. Of the 120 children included in the study, only 28% of the teachers participated in the pre-treatment, which leaves data too scarce to be analyzed. The low response in teacher ratings is probably due to the fact that the teacher contact was achieved through the parents after parental consent. Lack of teacher data diminishes the possibility to compare treatment-effect across countries. Furthermore, data restrictions limited the possibilities to analyze nested data on group or site level in the random effects model. Treatment outcomes also need to be evaluated from a cost-benefit perspective. However, in light of these limitations, the study still contributes with new information on the effects of group-delivered child-CBT and PMT compared to PMT, for which only a few randomized controlled studies are available for children with disruptive behaviors and their families. It would be important to follow-up treatment effects in a longer perspective, as well as evaluate clinical utility and cost effectiveness of the treatments.

In summary, the combination of child-CBT and PMT did not have an additive effect on disruptive behavior problems compared to PMT only, but lead to significantly improved child prosocial behavior. The group of children with higher levels of ODD symptoms or at a higher risk for future antisocial behavior benefitted significantly more from the combined treatment in reduced behavior problems, improved prosocial behavior (severe ODD) and general behavior or emotional problems (high risk). We also found that prosocial problem-solving skills improved more for high CU children when they participated in the

combined treatment.

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Corrigendum

Corrigendum to "The effect of adding Coping Power Program-Sweden to Parent Management Training-effects and moderators in a randomized controlled trial" [Behaviour Research and Therapy. (2018 Apr); 103:43-52]

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The authors regret that an alignment error has been discovered in the dataset included in the above article that partly affected results in Table 1- 4. The changes do not affect the interpretation of the main results, but one of the moderator analyses no longer showed that pro-social problem-solving skills improved more for children with high CU traits in the combined treatment. Furthermore, errors in Table 1 and text describing the sample and variables need to be corrected. The authors would like to apologise for any inconvenience caused. Below follows a detailed summary of the corrections, as well as the tables, figure and the corrected text:

1. In the flowchart in Fig. 1 at page 45, the number of families that completed post measurement of those allocated to PMT was 43 and 14 were lost to follow-up. Six families declined participation.
2. Descriptives in Table 1, page 46, have been corrected.
3. Minor changes in Cronbach's alphas for some of the scales (between −0.01 and + 0.04), and improvements of alpha in the Perceived Stress Scale (+0.09 and + 0.17 at pre- and post-assessment, respectively) and the child rated SDQ prosocial subscale (+0.10 at pre-assessment).
4. The text concerning the moderator ODD severity at page 47 should be: "To find children with more severe problem levels, the number of ODD diagnostic criteria fulfilled was divided into two groups; light to moderate problem level with three to six diagnostic criteria of ODD fulfilled and high problem level with seven to a maximum of eight diagnostic criteria fulfilled."
5. The text concerning the moderator high levels of CU traits at page 47 should be: "High levels of CU traits were identified by including the children above 80th percentile (above 8 points)."
6. The numbers describing post measurement completion and attrition should be corrected. New text under Attrition, page 48: "Of participants randomized to treatment (N = 120), 103 (85.8%) families (parents or children) completed the post assessment (see Fig. 1). A significantly larger proportion of families not completing post assessment had parents with a lower level of education (primary/high school compared to university, $\chi^2(1, 118) = 4.60$, $p = .03$)" and "The drop-out rate for parents who started treatment was somewhat larger in the PMT only group, 8% compared to 1.6% in the combined treatment group, although not significant (Fisher's Exact Test, $p = .12$). Little's test showed, when including measurements included in the analysis, that missing data was missing completely at random and unrelated to the observed variables ($\chi^2(N = 120, 1731) = 99.30, p = 1.0$)." T he reported attrition rates in the discussion (page 50) should also be corrected accordingly.
7. The estimates in Table 3 have been corrected but the changes do not affect the interpretation of the main results of the article. New text under Treatment effects, page 49: "Interestingly, the mixed effects model showed a significant treatment x time interaction effect on parent-ratings of child prosocial behavior when evaluated with the P-COMP (F (1, 106.14)= 6.51, $p < .05$) and the SDQ prosocial behavior scale (F (1, 103.31)= 5.80, $p < .05$) favoring the combination of PMT and child CBT (medium effect sizes) but not with the SSRS (small effect size), as can be seen in Table 3. When using Bonferroni family-wise correction for multiple testing of the primary variables, ($p < .0167$), the changes in the social skills variable P-COMP was still significant and the SDQ prosocial skills variable close to significant ($p = .0178$)."
8. The moderators "High ODD severity" and "High risk for antisocial development," moderated treatment effect in additional variables, whereas the moderator "CU traits" in the Home interview with child (HIWC), action scale, was no longer significant. New text at page 49: "When child severity of ODD symptoms was added to the analysis, we found a Time x Group x Moderator effect in parent-rated behavior problems for the DBD ODD and SDQ total difficulties scales as well as for parent-ratings of social skills assessed by the SSRS and SDQ prosocial (see Table 4)" and "The moderator analyses on child CU traits before treatment showed no moderator effects in any of the outcome measures. The level of risk for antisocial development, as

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Table 1
Characteristics and demographics of participants included in the study.

	Total	PMT	PMT/child CBT	*Statistics*	*p*
	n (%)	*n* (%)	*n* (%)	t- test/χ^2	
Child Characteristics	*N* = 120	*N* = 57	N = 63		
Age (*Mean (SD)*)	9.32 (1.22)	9.31 (1.29)	9.33 (1.16)	t (116) = .11	.92
Boys	88 (73.3)	40 (70.2)	48 (76.2)	χ^2 (1) = .55	.46
Both parents born abroad	6 (5.0)	3 (5.3)	3 (4.8)	χ^2 (1) = .02	1.0[1]
ODD diagnosis	108 (90.0)	50 (87.7)	58 (92.1)	χ^2 (1) = .63	.43
ODD symptoms (*Mean (SD)*)	5.38 (1.40)	5.28 (1.41)	5.46 (1.40)	t (118) = −.70	.49
7-8 ODD symptoms	27 (22.5)	12 (21.1)	15 (23.8)	χ^2 (1) = .13	.72
ODD NOS diagnosis	12 (10.0)	7 (12.3)	5 (7.9)	χ^2 (1) = .63	.43
CD diagnosis	5 (4.2)	2 (3.5)	3 (4.8)	χ^2 (1) = .12	1.0[1]
ADHD diagnosis	80 (66.7)	37 (64.9)	43 (68.3)	χ^2 (1) = .15	.70
EARL-20B/21G (*Mean (SD)*)	11.69 (3.58)	11.49 (3.89)	11.87 (3.29)	t (118) = −.58	.56
CU traits (*Mean (SD)*)	6.61 (2.71)	6.44 (2.83)	6.76 (2.62)	t (116) = −.65	.52
CU traits: high level	25 (21.2)	9 (16.4)	16 (25.4)	χ^2 (1) = 1.44	.23
Parent/family characteristics					
Mothers participating	81 (67.5)	38 (66.7)	43 (68.3)	χ^2 (1) = .03	.85
Parental educational level[2]					
Elementary school	9 (7.6)	6 (10.9)	3 (4.8)		
High school	55 (46.6)	25 (45.5)	30 (47.6)		
University	54 (45.8)	24 (43.6)	30 (47.6)	χ^2 (1) = .188	.67

Note: Both parents born abroad = Both parents born in a foreign country; ODD = Oppositional Defiant Disorder; ODD NOS = Oppositional Defiant Disorder Not Otherwise Specified (fulfills 3 diagnostic criteria of ODD); CD = Conduct Disorder; ADHD = Attention Deficit Hyperactivity disorder; CU traits = Callous/Unemotional traits assessed with the Antisocial Process Screening Device (APSD) in combination with the Strengths and Difficulties Questionnaire (SDQ) Prosocial scale; EARL-20B/EARL-21G = Early Assessment Risk List for boys/girls risk level of future antisocial behaviors; 7–8 ODD symptoms = children who fulfill 7 or more DSM-5 diagnostic criteria for ODD; [1] p-value is based on Fisher's Exact Test; [2] N = 118 in total and 55 in the PMT condition; University education level was compared to elementary + high school.

Table 2
Means, standard deviations and within group effect size measured with Cohen's *d* pre to post measurement.

Measure	*Pre M (SD)*	*PMT*		*PMT + Child CBT*		
		Post M (SD)	Cohen's d	Pre M (SD)	PostM (SD)	Cohen's d
Parent ratings	*n* = 55	*n* = 38		*n* = 63	*n* = 59	
Child Behavior Problems						
DBD total	47.09 (13.88)	40.59 (15.55)	0.59	46.27 (12.03)	37.12 (15.71)	0.93
DBD ODD	14.07 (4.48)	11.05 (5.12)	0.86	14.10 (3.90)	10.93 (4.70)	0.72
SDQ total	20.89 (5.82)	17.21 (6.41)	0.76	20.60 (5.94)	16.46 (6.53)	0.75
Child Social skills						
P-COMP	28.09 (7.57)	30.81 (8.18)	−0.51	27.34 (5.99)	33.44 (8.09)	−0.81
SSRS total	47.15 (8.71)	49.68 (11.61)	−0.36	46.27 (10.71)	51.36 (12.14)	−0.63
SDQ prosocial	6.09 (1.99)	6.24 (2.11)	−0.08	5.75 (1.97)	6.75 (1.88)	−0.66
Parental skills and competences						
PSOC efficacy	26.22 (4.44)	29.16 (4.21)	−0.73	24.75 (5.33)	28.05 (4.75)	−0.73
PSOC satisfaction	36.69 (6.22)	40.70 (5.85)	−0.80	36.29 (7.44)	40.22 (7.26)	−0.71
PPI harsh	34.80 (10.65)	24.51 (8.25)	1.53	32.59 (10.62)	23.85 (8.38)	0.89
PPI appropriate	34.35 (11.01)	28.00 (9.73)	0.66	34.63 (11.05)	29.37 (10.66)	0.54
PPI praise	36.96 (8.55)	41.95 (8.01)	−0.70	35.32 (9.30)	40.25 (8.35)	−0.54
PSS	27.51 (5.21)	23.74 (7.46)	0.59	28.10 (6.56)	24.76 (6.56)	0.62
Child ratings	*n* = 57	*n* = 42		*n* = 63	*n* = 52	
SDQ total	16.21 (5.16)	14.00 (5.52)	0.43	14.70 (5.37)	13.96 (5.54)	0.14
SDQ prosocial	7.39 (1.80)	7.62 (1.74)	−0.11	7.33 (1.82)	7.52 (1.81)	−0.10
HIWC action	17.05 (4.90)	16.54 (4.90)	0.11	17.02 (5.60)	14.90 (4.12)	0.36
HIWC hostile	6.74 (3.29)	6.10 (3.69)	0.17	6.73 (3.62)	5.73 (3.36)	0.26
SSRS total	63.55 (14.29)	67.66 (13.43)	−0.29	64.62 (16.35)	67.56 (18.24)	−0.25

Note. DBD = The Parent/Teacher Disruptive Disorder Behavior rating scale; SDQ = Strengths and Difficulties Questionnaire; P-COMP = Social Competence Scale-Parent version; SSRS = Social Skills Rating System; P–SOC = Parenting Sense Of Competence; PPI = Parenting Practices Interview; PSS = Perceived Parental Stress; HIWC = Home Interview With Child.

measured by EARL-20/21 B/G, showed a significant time x group x moderator interaction for parent-rated behavior problems, the DBD total, the DBD ODD scale and in the SDQ total difficulties scale, indicating that children with high risk for antisocial development showed a beneficial effect of the combined treatment, compared to families randomized to PMT only."

9. In the discussion, the text concerning moderator effects at page 50 should be: "No moderator effects were shown for children with elevated levels of CU traits or comorbid ADHD.", and the last sentence in the last section concerning CU traits at page 50 should be removed: "We also found that prosocial problem-solving skills improved more for high CU children when they participated in the combined treatment."

Corrected sections, corrections in bold
2.6 Potential moderators of treatment effects, page 47.

Table 3
Pre-to post measurement Time, Group, Interaction effects (group X time) and effect sizes based on estimated means and SD.

Measures	Overall time effect	p-value	Group effect	p-value	Time x group interaction effect		Between-group effect size
	F (df)		F (df)		F (df)	p-value	Cohen's d
Parent ratings							
Child behavior problems							
DBD total	F (1, 101.09) = 47.58	.001**	F (1, 148.37) = .10	.752	F (1, 101.97) = 2.85	.095	0.28
DBD ODD	F (1, 102.34) = 51.57	.001**	F (1, 164.19) = .01	.978	F (1, 103.70) = .29	.593	0.11
SDQ total	F (1, 103.42) = 46.52	.001**	F (1, 159.23) = .07	.799	F (1, 104.46) = .97	.327	0.18
Child Social skills							
P-COMP	F (1, 105.11) = 41.31	.001**	F (1, 167.07) = .31	.580	F (1, 106.14) = 6.51	.012*	0.53
SSRS total	F (1, 101.34) = 22.58	.001**	F (1, 146.75) = .19	.661	F (1, 102.34) = 1.72	.192	0.22
SDQ prosocial	F (1, 102.33) = 14.31	.001**	F (1, 156.13) = .91	.343	F (1, 103.31) = 5.80	.018*	0.41
Parental strategies							
PSOC: efficacy	F (1, 100.81) = 49.17	.001**	F (1, 160.73) = 2.82	.095	F (1, 101.72) = .61	.439	0.14
PSOC satisfaction	F (1, 101.13) = 45.06	.001**	F (1, 150.60) = .11	.747	F (1, 102.11) = .13	.715	0.06
PPI harsh	F (1, 96.62) = 104.55	.001**	F (1, 159.24) = 1.52	.219	F (1, 98.52) = .09	.764	0.05
PPI appropriate	F (1, 102.26) = 29.33	.001**	F (1, 163.21) = .02	.883	F (1, 103.58) = .02	.876	0.03
PPI praise	F (1, 106.11) = 35.32	.001**	F (1, 174.76) = 1.09	.297	F (1, 108.20) = .10	.755	0.06
PSS	F (1, 106.70) = 31.82	.001**	F (1, 168.03) = .25	.616	F (1, 107.99) = .01	.912	0.02
Child ratings							
SDQ total	F (1, 102.89) = 4.36	.039*	F (1, 177.24) = 2.40	.123	F (1, 103.45) = 1.69	.197	0.27
SDQ prosocial	F (1, 102.85) = 1.52	.221	F (1, 181.87) = .03	.872	F (1, 103.195) = .01	.912	0.02
HIWC hostile	F (1, 105.70) = 5.07	.026*	F (1, 189.88) = .01	.992	F (1, 106.08) = .34	.562	0.13
HIWC action	F (1, 106.59) = 5.62	.020*	F (1, 188.23) = .01	.999	F (1, 106.15) = 2.44	.121	0.33
SSRS total	F (1, 93.32) = 8.86	.004**	F (1, 154.74) = .25	.618	F (1, 93.14) = .42	.520	0.12

Note. * = $p < .05$; ** = $p < .01$, DBD = The Parent/Teacher Disruptive Disorder Behavior rating scale; SDQ = Strengths and Difficulties Questionnaire; P-COMP = Social Competence Scale-Parent version; SSRS = Social Skills Rating System; P–SOC = Parenting Sense Of Competence; PPI = Parenting Practices Interview; PSS = Perceived Parental Stress; HIWC = Home Interview With Child.

Table 4
Moderator effects of ODD severity, callous/unemotional traits, level of risk for antisocial development and ADHD based on estimated means and SD.

Measures	Moderator high severity ODD		Moderator high CU traits		Moderator high risk EARL-20		Moderator comorbid ADHD	
	Time x group x ODD severity		Time x group x level c/u traits		Time x group x level of risk		Time x group x level of risk	
	F (df)	*p-value*	*F (df)*	*p-value*	*F (df)*	*p-value*	*F (df)*	*p-value*
Parent ratings								
Child behavior problems								
DBD total	F (1, 104.64) = 1.52	.221	F (1, 103.18) = .24	.627	F (1, 107.9) = 9.08	.003**	F (1, 102.76) = .06	.810
DBD ODD	F (1, 107.40) = 4.21	.043*	F (1, 106.01) = .09	.762	F (1, 113.12) = 5.98	.016*	F (1, 102.66) = .53	.468
SDQ total	F (1, 108.33) = 4.02	.048*	F (1, 106.16) = .18	.673	F (1, 112.25) = 7.11	.009**	F (1, 103.76) = .19	.662
Child social skills								
P-COMP	F (1, 109.94) = 1.25	.266	F (1, 109.29) = .12	.733	F (1, 115.18) = 2.69	.104	F (1, 105.08) = .56	.458
SSRS total	F (1, 104.42) = 4.52	.036*	F (1, 103.92) = .09	.767	F (1, 107.76) = 2.51	.116	F (1, 101.69) = .03	.853
SDQ prosocial	F (1, 105.77) = 7.61	.007**	F (1, 109.40) = .02	.887	F (1, 110.54) = .43	.514	F (1, 102.41) = .03	.853
Child ratings								
SDQ total	F (1, 103.04) = .47	.496	F (1, 101.14) = .07	.796	F (1, 110.68) = .02	.892	F (1, 102.35) = .17	.685
SDQ prosocial	F (1, 103.78) = .22	.643	F (1, 102.01) = .38	.538	F (1, 111.02) = .78	.380	F (1, 101.06) = 2.06	.155
HIWS action	F (1, 104.24) = .01	.976	F (1, 102.93) = .01	.994	F (1, 113.88) = .57	.454	F (1, 104.75) = 1.26	.263
HIWS hostile	F (1, 105.06) = 1.02	.315	F (1, 103.59) = .01	.983	F (1, 112.87) = .02	.876	F (1, 103.80) = 2.65	.107
SSRS total	F (1, 91.27) = .02	.888	F (1, 90.46) = 1.04	.310	F (1, 98.21) = 2.20	.141	F (1, 90.95) = .01	.940

Note. * = $p < .05$; ** = $p < .01$, DBD = The Parent/Teacher Disruptive Disorder Behavior rating scale; SDQ = Strengths and Difficulties Questionnaire; P-COMP = Social Competence Scale- Parent version; SSRS = Social Skills Rating System; HIWC = Home Interview With Child. All moderators were dichotomized.

The moderators investigated in this study were severity of ODD, level of CU traits, level of risk for antisocial development and comorbid ADHD. The severity of ODD at baseline, as well as comorbid ADHD, was evaluated with the *Kiddie –SADS, Present and Lifetime Diagnosis (Version P/L)* a semi structured diagnostic interview with an excellent test-retest reliability (Kaufman et al., 1997). The assessment was made by research assistants/clinical psychologists with several years of experience of working within Child and adolescent psychiatry. To find children with more severe problem levels, the number of ODD diagnostic criteria fulfilled was divided into **two groups; light to moderate problem level with three to six diagnostic criteria of ODD fulfilled and high problem level with seven to a maximum of eight diagnostic criteria fulfilled.** The variable comorbid ADHD was made dichotomous (present/not present).

Baseline level of Callous unemotional (CU) traits was measured with a scale developed by Dadds and colleagues (Dadds, Fraser, Frost, & Hawes, 2005) where items from the APSD (Frick & Hare, 2001) and the SDQ (Goodman, 2001) prosocial scale are combined. This *APSD-SDQ scale* has demonstrated good internal validity in several studies (Dadds et al., 2009). In the present study Cronbach's alphas were $\alpha = 0.70$ at pre- and 0.72 at post-assessment. The scale consists of 8 items (range 0–2 from not true to certainly true). High levels of CU traits were identified by including the children above **8**0th percentile (above 8 points). The moderator was made dichotomous (above/below).

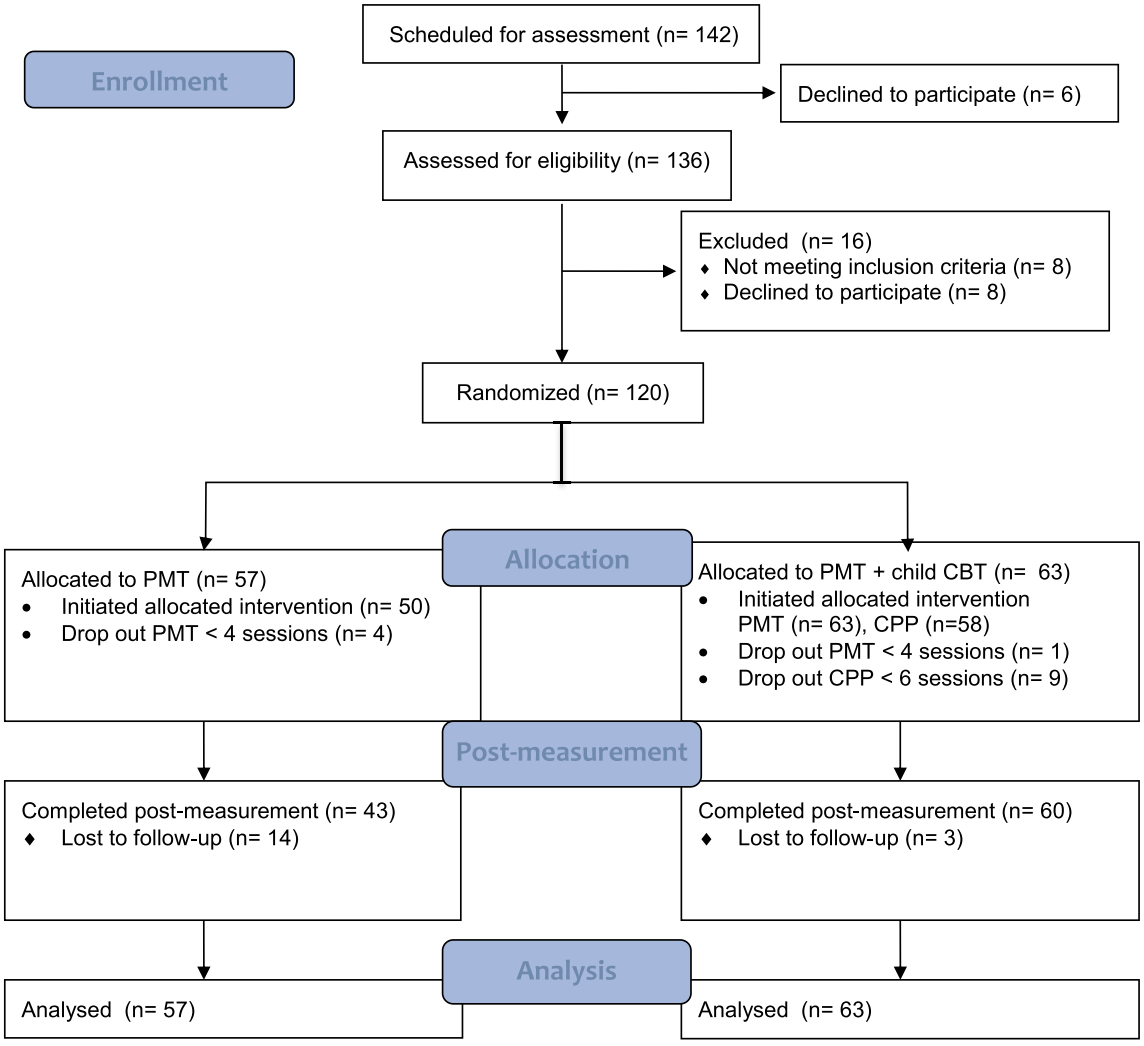

Fig. 1. Flowchart showing the inclusion of children

3.1 Attrition, page 48.

Of participants randomized to treatment (N = 120), 10**3** (85.8%) **families (parents or children)** completed the post assessment (see Fig. 1). A significantly larger proportion of families not completing post assessment had parents with a lower level of education (primary/**high school** compared to **university**, χ^2 (*1, 11**8***) = 4.60, p = .03). There were no differences concerning age or gender of the children or parent gender in the attrition group compared to those completing post assessment. The baseline measures were not significantly different between study-completers and those who dropped-out from the post-treatment assessment (p > .05). **The drop-out rate for parents who started treatment was somewhat larger in the PMT only group, 8% compared to 1.6% in the combined treatment group although not significant (Fisher's Exact Test, p = .12)**. Little's test showed, when including measurements included in the analysis, that missing data was missing completely at random and unrelated to the observed variables (χ^2 (*N* = 120, **1731**) = **99.30**, p = 1.0).

3.2 Treatment effects, page 49.

For the primary outcome, the mixed effects model showed main effects of time, but no group- or interaction effects, or significant differences between the two conditions on the parent-rated outcomes measuring child behavior problems (DBD total, DBD ODD scale), see Table 3. Further, we found a time effect, but no group- or interaction effects for general child difficulties when evaluated by the parents (SDQ total). Interestingly, the mixed effects model showed a significant treatment x time interaction effect on parent-ratings of child prosocial behavior when evaluated with the P-COMP (F (1, 106.**14**) = **6.51,** p < .05) and the SDQ prosocial behavior scale (F (1, **103.31**) = **5.80,** p < .05) favoring the combination of PMT and child CBT (medium effect sizes) but not with the SSRS (small effect size), as can be seen in Table 3. When using Bonferroni family-wise correction for multiple testing of the primary variables, **(p < .0167), the changes in the social skills variable P-COMP was still significant and the SDQ prosocial skills variable close to significant (p = .0178)**.

3.3 Moderator analyses, page 49.

When child severity of ODD symptoms was added to the analysis, we found a Time x Group x Moderator effect in parent-rated behavior problems for the DBD ODD **and SDQ total difficulties scales as well as for parent-ratings of social skills assessed by the SSRS and SDQ prosocial** (see Table 4). This indicates that the children with the most severe levels of ODD, i.e., with 7 or 8 diagnostic criteria according to clinician rated K-SADS, had a significant beneficial effect from the combined PMT and child CBT treatment on both behavior problems and prosocial behavior. **The moderator analyses on child CU traits before treatment showed no moderator effects in any of the outcome measures.** The level of risk for antisocial development, as measured by EARL-20/21 B/G, showed a **significant time x group x moderator interaction for parent-rated behavior problems, the DBD total, the DBD ODD scale and in the SDQ total difficulties scale,** indicating that children with high risk for antisocial development showed a beneficial effect of the combined treatment, compared to families randomized to PMT only. Comorbid ADHD showed no Time x Group x

Moderator effect in any of the outcome measures.

4. Discussion, pages 49-50.

The aim of this study was to investigate the effects of combining child-CBT and PMT compared to PMT only in reducing behavior problems and increasing prosocial behavior for children 8–12 years with disruptive behavior. We examined this in an RCT in an outpatient clinical child and adolescent psychiatric setting. Behavioral problems were improved in both groups but not significantly more in the combined treatment group compared to PMT only. Results showed that when child CBT was added to PMT, there was a significant increase pre- to post-assessment in child prosocial behavior compared to the PMT only condition, which was in line with our hypothesis. Moderator analyses further indicated that larger treatment effects were achieved for children with high levels of ODD, and to some extent also for those with a high risk for future antisocial development. For children with more severe ODD there was a significantly larger reduction of behavioral problems and an increase of prosocial behavior in the combined child CBT and PMT compared to PMT only, and for those **at** a higher risk **of antisocial development there were larger improvements** in general child emotional and behavioral difficulties. **No moderator effects were shown** for children with elevated levels of CU traits **or** comorbid ADHD.