Chapter 1

General introduction
Attention-deficit and disruptive behavior disorders in children at preschool age form a major problem for parents and are associated with a wide range of functional impairments (DuPaul, McGoe, Eckert, & VanBrakle, 2001). In the preschool years, children start to develop peer relations and are getting prepared to enter school. Severe behavior problems in this period may therefore have profound impact on later development (Bufferd, Dougherty, Carlson, Rose, & Klein, 2012).

Preschool children with disruptive behaviors are a significant public health challenge (Walkup, Stossel, & Rendleman, 2014), and also form an economic burden because of increased health care costs, parents’ productivity loss, and immaterial costs related to reduced quality of life (Gupte-Singh, Singh, & Lawson, 2017). Various studies have pointed to the often severe, chronic, and stable character of disruptive behaviors (Bufferd et al., 2012; Law, Sideridis, Prock, & Sheridan, 2014; Riddle et al., 2013). Given the high prevalence of disruptive behaviors among preschoolers in various countries (Lavigne, Lebailly, Hopkins, Gouze, & Binns, 2009; Wichstrom et al., 2012) and the impairing consequences for the children, families, teachers, and peers, early recognition and treatment is important (Forehand et al., 2016).

Symptoms of disruptive behavior disorders versus normal behavior

Disruptive behaviors are common during the preschool years, with the presence of temper tantrums peaking at the age of 30 months and elevated levels of physical aggression between 24 and 48 months (Tremblay, 2010). Most of the preschool children learn to control their emotions and to adapt their behavior to the social environment. However, approximately 7-11% of children show disruptive behaviors notably more frequent and intense as their peers, and tend to persevere in these behaviors (Keenan & Wakschlag, 2004; Tremblay, 2010). Furthermore, preschool children with severe disruptive behaviors show increased levels of negative affect, and lower levels of thoughtful and deliberate forms of behavior control (Martel, Gremillion, & Roberts, 2012). Thus, not only the quantity but also the quality of disruptive behavior is different in preschool children with disruptive behavior disorders, compared to normally developing preschool children (Chacko, Wakschlag, Hill, Danis, & Espy, 2009; Wakschlag et al., 2007).
Attention-deficit/hyperactivity disorder (ADHD) and oppositional defiant disorder (ODD) in preschool children

ADHD and ODD are the most common psychiatric disorders in young children (Chacko et al., 2009; Wakschlag et al., 2007). According to the Diagnostic and Statistical Manual of Mental Disorders IV-Text Revision (American Psychiatric Association, 2000), an ADHD diagnosis implies six symptoms of inattentive behavior and/or six symptoms of hyperactive/impulsive behavior with some impairment from the symptoms being present in at least two settings. ODD refers to a pattern of negativistic, hostile, and defiant behavior lasting at least 6 months with a minimum of four out of eight symptoms of oppositional, defiant behavior with impairment from the symptoms being present in at least one setting. In both ADHD and ODD, specific disruptive behaviors may be rated only as a symptom in case they have persisted for at least 6 months and are inconsistent with developmental level.

The estimated prevalence of preschool ADHD in studies on community samples that were based on semi-structured parent interviews, varies between 1.9 and 3.3 %, depending on the country (e.g. lower rates in Norway than in the USA; (Bufferd, Dougherty, Carlson, & Klein, 2011; Dreyer, 2006; Egger & Angold, 2006; Kaplan & Adesman, 2011; Wichstrom et al., 2012). In one study, prevalence ratings were higher (12.8%), but it is questionable if a diagnosis of ADHD was warranted in all cases as the DSM impairment criterion was not part of the assessment (Lavigne et al., 2009). In older children, the prevalence of ADHD is clearly higher. A cohort study in the Netherlands in children aged 5-8, showed a prevalence of ADHD of 4.6%, based on a structured interview and assessment of impairment (Rijlaarsdam et al., 2015). More children were diagnosed with ADHD at age 6 (5.4%) compared to 3-year old children (2.4 %) (Bufferd et al., 2011). A recent systematic review and meta-analysis on the prevalence of ADHD in children and adolescents aged ≤18 years all over the world in the last 36 years, resulted in a pooled estimate of 5.2% when clinical parent interviews were used and 7.2% based on parent-rated or teacher-rated symptom checklists, (Thomas, Sanders, Doust, Beller, & Glasziou, 2015), albeit with quite some variability across countries, e.g. 11% in the Middle East compared to 7% in North America and 6% in Europe.

In a meta-analysis of the prevalence of ADHD among preschoolers, school-aged children, and adolescents (Willcutt et al., 2012), the frequency of ADHD types in preschool children was somewhat different from that in school-aged children. The estimated prevalence of the predominantly hyperactive-impulsive type was highest in preschool children (4.9%), steadily decreasing into school-age (2.9%) and adolescence (1.1%). The prevalence of the
predominantly inattentive type was lowest in preschool children (2.2%), increasing in school-age (5.1%) and adolescence (5.7%). Besides the difference in prevalence of types of ADHD across ages, sex differences also differed between preschool children and older children. In a Scandinavian study (Wichstrom et al., 2012), 2.4% of boys and 1.5% of girls were diagnosed with ADHD. In the Dutch cohort study, 4.9% of boys and 4.3% of girls between 5 and 8 years old met the criteria for ADHD (Rijlaarsdam et al., 2015). In the before mentioned meta-analysis of Willcutt (Willcutt et al., 2012), no gender differences were found in the preschool age period, while twice as many boys as girls were diagnosed with ADHD in school-age and adolescence.

The estimated prevalence of preschool ODD diagnosis ranges between 1.8 and 10.2% (Bufferd et al., 2011; Keenan & Wakschlag, 2004; Wichstrom et al., 2012), while 7% of the older children have chronic oppositional, defiant behavior problems up to adolescence (Tremblay, 2010). Prevalence rates were higher (16.8%) in a study without assessment of impairment (Lavigne et al., 2009). The lowest percentage (1.8%) was revealed from a Norwegian study, using a semi-structured parent interview to diagnose ODD in 4-year old children, with hardly any sex differences in prevalence of ODD (Wichstrom et al., 2012). A Dutch cohort study on 5-8 year old children found a prevalence of ODD of 4.6% in case a structured parent interview was used, and severe impairment was required (Rijlaarsdam et al., 2015), with more boys (5.5%) than girls (3.8%) being diagnosed. A meta-analysis on sex differences in the prevalence of ODD in children aged 5-15, revealed a male:female ratio of 1.59:1 (Demmer, Hooley, Sheen, McGillivray, & Lum, 2017).

There is good evidence for at least two (Burke et al., 2014) or three (American Psychiatric Association, 2013; Stringaris, Zavos, Leibenluft, Maughan, & Eley, 2012) subdimensions of ODD: negative affective and oppositional behavior, and in case of three subdimensions, hurtful behavior (Whelan, Stringaris, Maughan, & Barker, 2013). The negative affect subdimension (i.e. anger and irritability) and the behavioral subdimension (i.e. argumentative and defiant behavior) are associated with distinct kinds of behavior problems in later life. Anger and irritability are found to be associated with current and later internalizing problems, while oppositional behavior is associated with ADHD and conduct disorder (Burke, Hipwell, & Loeber, 2010; Dougherty et al., 2015; Whelan, Stringaris, Maughan, & Barker, 2013). In preschool children, negative affect, especially anger, was found to be the key characteristic of ODD (Smith, Lee, Martel, & Axelrad, 2017) and irritability at young age predicts increases in anxiety, disruptive behavior and larger functional impairment later in life (Dougherty et al., 2015).
Both ADHD and ODD are complex disorders with a complex etiology. There is consensus in the field that multiple interacting risk factors, such as interactions between susceptibility genes (Neale et al., 2010) and pre- and postnatal environmental factors (Froehlich et al., 2011; Sciberras, Mulraney, Silva, & Coghill, 2017) contribute to ADHD symptomatology. Up to 70% of referred preschool children with ADHD continue to have ADHD symptoms seven years later, with more parental psychopathology, fewer family economic resources, and more externalizing and internalizing symptoms at baseline assessment being predictive of ADHD persistence (Law et al., 2014). Interacting genetic and environmental factors also contribute to the development of ODD symptoms, with strong intergenerational mechanisms at play (Tremblay, 2010). A cross-sectional model of risk factors for symptoms of ODD in a 4-year old community sample showed direct effects of familial stress and conflict, and of increased parental hostility on parent-rated, but not teacher-rated ODD symptoms (Lavigne, Dahl, Gouze, LeBailly, & Hopkins, 2014). Concerning persistence of preschool ODD symptoms, studies showed significant continuity between age 3 and 6 (Bufferd et al., 2012; Bunte, Schoemaker, Hessen, Van Der Heijden, & Matthys, 2014).

**Comorbidity of ADHD and ODD**

Preschool ADHD and ODD frequently co-occur (Bufferd, 2012; Lavigne, 2009; Law, 2014), with comorbidity rates in clinical preschool samples ranging from 50-65% (Kadesjo, Hagglof, Kadesjo, & Gillberg, 2003). Numerous studies have tried to explain this high amount of co-occurrence. Key underlying features of ODD, i.e. negative affect (Burke et al., 2014) and of ADHD, i.e. deficiencies in emotional self-regulation (Barkley, 2016) may be linked, explaining the co-morbidity of ODD with ADHD (Barkley, 2016; Burke et al., 2014; Martel, 2009; Smith et al., 2017). In their longitudinal study on the development of symptoms of ADHD and ODD from age 3 to age 6 in a sample of high risk children, Harvey (Harvey, Breaux, & Lugo-candelas, 2016) found that symptoms of ADHD at age 3 predicted the presence of argumentative/defiant ODD symptoms at age 6. Preschool children with both a diagnosis of ADHD and ODD particularly exhibit weak inhibitory control performance (Pauli-Pott, Dalir, Mingebach, Roller, & Becker, 2014), resulting in a high frequency of hard to manage oppositional behaviors. Yet, research has suggested that most forms of psychopathology occur more dimensionally than categorically, and dimensional models of psychopathology may provide a better understanding of psychiatric disorders (Kamphuis & Noordhof, 2009; Widiger & Samuel, 2005; Witkiewitz et al., 2013).
A study of youth psychopathology showed a best fit for a 3-factor model including internalizing disorders (depression, general anxiety), externalizing disorders (conduct disorder, ODD, ADHD), and substance use. Such a factor model creates the opportunity to distinguish various diverse types of problem behavior in a behavior domain instead of distinct psychiatric disorders (Witkiewitz et al., 2013). In preschool children, one cluster of externalizing problems may also be a good fit and more appropriate approach than the categorical DSM approach of ODD and ADHD as separate disorders. Therefore, and, because parents typically seek help for parenting problems regardless of the precise diagnosis, in this thesis we have chosen to report on the spectrum of disruptive behaviors, including both ODD and ADHD symptoms.

**Treatments for preschool children with disruptive behaviors**

The effectiveness of behavioral parent training for preschool children with disruptive behavior problems is well established. Recent meta-analyses and reviews concerning effective treatments for preschool children with disruptive behaviors have emphasized behavioral parent training as first-step treatment as well (Charach et al., 2013; Comer, Chow, Chan, Cooper-Vince, & Wilson, 2013; Mulqueen, Bartley, & Bloch, 2013; Murray, 2010; Rimestad, Lambek, Zacher Christiansen, & Hougaard, 2016). Given the high persistence of disruptive behaviors and serious impairments in later life, it is important to start treatment as early as the preschool years. There is consensus between guidelines that the first focus in the treatment of disruptive behaviors in the preschool age group should be on behavioral interventions (Atkinson & Hollis, 2010; Pliszka, 2007; Steiner & Remsing, 2007; Village, 2011).

Behavioral parent training has been shown to improve parent-reported child disruptive behaviors, including ADHD symptoms, as well as parenting skills and parenting sense of competence, with moderate effect sizes (Charach et al., 2013; Comer et al., 2013; Mulqueen et al., 2013; Rimestad et al., 2016). Both generic and ADHD-specific parent training programs may be suitable to treat disruptive behavior problems (Daley et al., 2017): two recent comparisons of generic programs (Helping the Noncompliant Child & Incredible Years) with an ADHD-specific program (New Forest Parenting Program) failed to show superiority of one program over the other on child behavior, nor on parenting stress and parenting behaviors (Abikoff et al., 2015; Forehand et al., 2016; Sonuga-Barke et al., 2017).
However, most studies were conducted in the context of research settings with recruited children, in which parents, children, and clinicians may have different characteristics than in real life clinical settings (Weisz, Krumholz, Santucci, Thomassim, & Ng, 2015; Weisz, Ugueto, Cheron, & Herren, 2013; Weisz, Weiss, & Donenberg, 1992). In research settings, recruited children with a specific problem are treated by trained research employees, and families are supported in several ways to facilitate treatment participation (i.e. child care during treatment, paid transport to the clinic). In clinical care, families of referred children are typically characterized by children frequently having comorbid conditions, high rates of externalizing problems, frequent crises, numerous changes in the most urgent area for help in daily functioning, complex family systems, and psychopathology in parents and siblings (Weisz et al., 2015). Practitioners in outpatient clinics have large caseloads with various problems, high productivity requirements, and minimal time for treatment preparation and supervision (Weisz et al., 2015). In the last decade, only 4.5% of all studies on youth psychotherapies were conducted with referred children and practitioners in a clinical practice context (Weisz et al., 2015), showing less effectiveness compared to studies in research settings (Weisz et al., 2017; Weisz, Jensen-Doss, & Hawley, 2006; Weisz et al., 2015).

Little is therefore known about behavioral parent training outcomes for referred preschool children under routine care conditions. A benchmark study showed behavioral parent training (the Incredible Years program; (Webster-Stratton & Reid, 2003)) to be effective for young children with diagnosed ADHD symptoms and disruptive behavior problems in an outpatient mental health setting (Trillingsgaard, Trillingsgaard, & Webster-Stratton, 2014). Also, a former study in our group on behavioral parent training for parents of referred children aged 4-12 with ADHD and behavioral problems, compared to care as usual, revealed a significant effect of parent training on disruptive behaviors (Van den Hoofdakker et al., 2007).

We do not yet know well enough for whom behavioral parent training works best. What we do know, is that there is large variability in the degree to which individual preschool children improve through parent training (Sonuga-Barke et al., 2002; Webster-Stratton, Reid, & Beauchaine, 2011). Studies on predictors and moderators of treatment outcome are important as they may guide clinicians in selecting the most appropriate treatment for a child or family. Various possible predictors for outcome have been studied, particularly child factors. Pretreatment severity of disruptive behaviors was found to be associated with response to treatment; children with high levels of behavior problems before behavioral parent training showed more progress than children with lower levels (Hautmann et al., 2007).
Changes in disruptive behavior after treatment did not differ between boys and girls (Beauchaine, Webster-Stratton, & Reid, 2005; Hautmann et al., 2010; Sonuga-Barke et al., 2002).

The influence of parental factors, such as parental psychopathology and parenting practices, on behavioral parent training outcome has been understudied. As behavioral parent training aims to modify children’s behavior through their parents as mediators, parental psychopathology may influence the capability of parents to implement adequate parenting skills in daily practice and may therefore play a role in outcome of behavioral parent training. Previous research mostly focused on paternal internalizing problems, particularly in mothers, such as depressive mood, parenting stress and parenting self-efficacy. Maternal depressive mood was not found to be a significant predictor of behavioral parent training success in young children (Beauchaine et al., 2005; Hartman, Stage, & Webster-Stratton, 2003; Lavigne et al., 2007; Werba, Eyberg, Boggs, & Algina, 2006), which is in contrast to behavioral parent training applied in older children with ADHD (Hinshaw, 2007) or disruptive behavior disorders (Muratori et al., 2014). Concerning parenting stress, findings differed between studies on preschool children; two studies found a negative influence of parenting stress on behavioral parent training response (Fossum, Morch, Handegard, Drugli, & Larsson, 2009; Lavigne et al., 2007), but two other studies did not (Beauchaine et al., 2005; Hautmann et al., 2010). Also regarding parenting self-efficacy, findings between studies varied. Higher levels of maternal self-efficacy predicted better outcome on parent-child interaction therapy (PCIT; (Werba et al., 2006)), whereas another study found no effect of parenting self-efficacy on improvement of the child’s ADHD symptoms after parent training (Sonuga-Barke et al., 2002).

Studies on parental externalizing problems as predictors for behavioral parent training outcome focused on parental ADHD. However, parenting factors may also be relevant. A recent meta-analysis on associations between ADHD symptoms in parents and parenting behaviors revealed that parental ADHD symptoms predicted harsh and lax parenting, with small but robust effects (Park, Hudec, & Johnston, 2017). Dysfunctional parenting discipline strategies, i.e., both authoritarian, emotional harsh, inconsequent, permissive parenting behaviors, and low parental sense of competence, i.e., frustration regarding the parenting role and insufficient competence concerning the parenting role, may be associated with less effectiveness of behavioral parent training on child behavior. A study investigating whether parents’ ADHD behaviors played a role in response to behavioral parent training for preschool children with ADHD found elevated levels of maternal ADHD symptoms to be associated
with less successful parent training (Sonuga-Barke et al., 2002). In contrast, another recent study in preschool children with ADHD found no association between parental ADHD and outcome on child behavior after behavioral parent training (Forehand et al., 2017). In older children with ADHD, maternal ADHD symptoms predicted worse outcome on child behavior after behavioral parent training, mediated by less reduction of observed negative parenting (Chronis-Tuscano et al., 2011). However, we previously found that paternal ADHD symptoms, but not ADHD symptoms of mothers, moderated outcome of behavioral parent training in four- to twelve-year-old children with ADHD (Van den Hoofdakker et al., 2014).

**Behavioral parent training**

In a previous study involving school aged-children with ADHD, we demonstrated the effectiveness of our behavioral parent training program, based both on the Helping the Noncompliant Child (Forehand & McMahon, 1981) intervention and the Defiant Children program (Barkley, 1987), for behavioral and internalizing problems (Van den Hoofdakker et al., 2007). We adapted the manual that has been used in that study for preschool children (Behavioral Parent Training Groningen-Preschool; BPTG-P). This treatment was provided in a group or individual format and consisted of twelve sessions. The primary focus of the behavioral parent training was to decrease disruptive behaviors in preschool children by enhancing parenting skills. Parents learned to manipulate antecedents of child behaviors to enable the child to control their behavior, and how to react to child behaviors in an effective, controlled, consistent, and consequent way (contingency management techniques).

Treatment was tailored for each child, based on target behaviors selected by the parents in the first session. Homework tasks, customized to the target behaviors, were an essential element of the training. Every session started with discussions about the exercises parents practiced at home with their child, and ended with new homework assignments. In between, a new topic was discussed and practiced.

Parent training program components that are associated with larger effects on young children’s behavior include encouraging positive parent-child interactions and communication skills, adequate use of time-out, learning parents to react in a consistent way, and practicing new skills with the child during parent training sessions (Kaminski, Valle, Filene, & Boyle, 2008). BPTG-P includes most of these components, except practicing with the child during the sessions. Compared to other parent training programs, BPTG-P has a specific focus on stimulus control techniques to help children to control their behavior, stay focused and perform adequately. The content of BPTG-P is outlined in Table 1.
### Table 1 Outline of Behavioral Parent Training Groningen-Preschool

<table>
<thead>
<tr>
<th>Session</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction, selection and analyses (Antecedent-Behavior-Consequence) of a maximum of five target behaviors</td>
</tr>
<tr>
<td>2</td>
<td>Psycho-education on disruptive behaviors problems, including ADHD symptoms, effect of disruptive behaviors on family functioning, instructions on, and practice of, how to play with the child daily to strengthen the parent child-relationship</td>
</tr>
<tr>
<td>3</td>
<td>Learning to observe and report on children’s behavior in Antecedent-Behavior-Consequences schedules, planning to change behavior, discussing family factors that may influence the application of such a plan</td>
</tr>
<tr>
<td>4</td>
<td>Manipulating antecedents to evoke desirable behavior: giving adequate instructions, anticipating on expected misbehaviors, praising positive behavior</td>
</tr>
<tr>
<td>5</td>
<td>Manipulating antecedents to evoke desirable behavior: setting rules, praising positive behavior</td>
</tr>
<tr>
<td>6</td>
<td>Manipulating antecedents to evoke desirable behavior: structuring the environment, praising positive behavior</td>
</tr>
<tr>
<td>7</td>
<td>Contingency management: learning how to react to children’s behavior in a consequent, consistent and therefore predictable way. Reinforcing positive behavior</td>
</tr>
<tr>
<td>8</td>
<td>Contingency management: helping a child to develop a positive self-image; ignoring negative behavior, praising positive behavior</td>
</tr>
<tr>
<td>9</td>
<td>Contingency management: punishing negative behavior in an appropriate way, praising positive behavior</td>
</tr>
<tr>
<td>10</td>
<td>Contingency management: time-out procedure in case of noncompliance, dangerous or aggressive behavior</td>
</tr>
<tr>
<td>11</td>
<td>Maintenance training; solving remaining problems with learned skills</td>
</tr>
<tr>
<td>12</td>
<td>Maintenance training; solving remaining problems with learned skills, how to maintain learned skills, evaluation</td>
</tr>
</tbody>
</table>

### Stepped care

Stepped care is a recommended approach in various guidelines for treatment of mental health problems, including disruptive behavior disorders, and implies to start treatment with the most cost-effective, and least intense intervention, while constantly monitoring the treatment progress. If necessary, children and their families have to be stepped up to a
more intensive treatment. As discussed, there is considerable evidence that behavioral parent training is an effective treatment for preschool children with disruptive behavior problems, and therefore guidelines recommend this intervention as the first-step treatment. However, we do not yet know which treatment should be advised in case of residual behavior problems after parent training. Studies on second-line interventions are needed to enable clinicians and parents to make a profound choice between various second-line treatment options.

Although behavioral parent training may be an effective treatment for preschool children’s disruptive behaviors, a considerable amount of the children has remaining problems after parent training. Little is known about the best treatment strategy in those cases, and research into second-line treatment options is rare. Two treatments that may be suitable as a second-line therapy for preschool children with residual disruptive behaviors are parent-child interaction therapy (PCIT) and methylphenidate.

**Parent-child interaction therapy**

**PCIT** is an empirically supported treatment for young children with disruptive behaviors, based on both the attachment theory and the social learning theory, that emphasizes improving the quality of the parent-child relationship and changing parent-child interaction patterns (Nixon, Sweeney, Erickson, & Touyz, 2003; Rae Thomas & Zimmer-Gembeck, 2007; Zisser & Eyberg, 2010) in order to decrease disruptive behaviors in children. In **PCIT**, parents are taught specific skills to establish a nurturing and secure relationship with their child while increasing their child’s prosocial behavior and decreasing disruptive behaviors. Medium to large effect sizes have been achieved on behavioral problems through treatment with **PCIT** (Lieneman, Brabson, Highlander, Wallace, & McNeil, 2017; Rae Thomas & Zimmer-Gembeck, 2007).

Compared to standard behavioral parent training, **PCIT** is a more intensive and individualized treatment. In contrast to regular behavioral parent training, the number of **PCIT** sessions needed to complete the treatment successfully varies, based on mastery criteria for the parents, and children’s disruptive behaviors to be decreased within nonclinical limits. The two-stage **PCIT** parent training model consists of a parent-child relationship focused phase (child-directed interaction), followed by a behavioral management focused phase (parent-directed interaction). In the child-directed interaction phase parents practice responsive parenting to create a warm relationship with their child, while in the parent-directed interaction phase parents practice with effective commands and limit setting to increase compliance. While in standard behavioral parent training mainly the parents
are involved, in PCIT parents and child participate together. A key component of PCIT is coaching of the parents during their interactions with their child, thus providing the parent the opportunity to practice adequate parenting strategies and to get feedback on their performance immediately, while in regular behavioral parent training the therapist only instructs parents on coping strategies to be applied at home (Thomas & Zimmer-Gembeck, 2007).

Besides being effective in decreasing oppositional behaviors, PCIT may also reduce symptoms of ADHD and related impairments, but this has not yet been investigated. For many young children with ADHD symptoms, escape from parent-directed tasks, rather than not gaining attention, is a prime motivation for non-compliant behavior (DuPaul et al., 2001). Specifically, the reinforcement and ignoring techniques in PCIT may provide a stimulating and predictable environment for children with ADHD symptoms, that supports them to stay focused. Furthermore, in PCIT, parents learn to give adequate commands to their child and use limit setting in case of noncompliance to prevent children to escape from tasks.

**Methylphenidate**

A second often applied treatment option when disruptive behaviors remain after behavioral parent training is treatment with methylphenidate, a well-established treatment for ADHD symptoms in children with ADHD and ODD above six years (Hinshaw & Arnold, 2015; Pringsheim, Hirsch, Gardner, & Gorman, 2015), with moderate effect sizes for parent-rated ADHD symptoms (Greenhill et al., 2001) and moderate-to-large effect sizes for oppositional behavior and conduct problems (Pringsheim et al., 2015). However, in preschool children, the use of methylphenidate is off-label and there have been few studies evaluating the efficacy and safety of methylphenidate in preschool children. Only one randomized controlled study has investigated methylphenidate in preschool children with ADHD (Greenhill, Posner, Vaughan, & Kratochvil, 2008). While that study showed that methylphenidate was effective, the effect size was smaller compared to the effects of methylphenidate in school aged children and adverse events were much more frequent, including emotional lability, appetite loss, trouble with sleeping, stomach aches, social withdrawal, and lethargy. Yet, the off-label use of methylphenidate has increased in this age group (Efron et al., 2003; Zito et al., 2000).

PCIT and pharmacological treatment with methylphenidate are possible candidates for second-line treatment in preschoolers with disruptive behaviors, but a comparison study has never been done before.
Aims of the present thesis

In this stepped care study, we followed 83 children aged 2.5-6 years with ADHD symptoms and behavior problems from their first diagnostic evaluation to directly after the first intervention (i.e., behavioral parent training), at the Accare University Centre for child and adolescent psychiatry in Groningen, The Netherlands. Furthermore, we collected data on 120 non-referred preschool children in Groningen and their parents. In these two groups we investigated correspondence and discrepancies between parents’ ratings of child behavior, as parental ratings of child behavior are often used in clinical evaluation of treatment and in research on treatment outcome (chapter 2). Furthermore, in the group of referred children, we examined whether behavior problems decreased, and parental behaviors improved after the parent training (chapter 3), and evaluated associations between children’s and parental changes (chapter 4). As a substantial part of the children were expected to have remaining clinically significant behavior problems after parent training, and little is known about the best follow-up treatment strategy, we also investigated the effectiveness of two subsequent treatments, i.e. PCIT and methylphenidate. The effectiveness of these two treatments has been compared in a randomized controlled trial (chapter 5). Finally, chapter 6 provides a summary and discussion of our studies, clinical implications, and recommendations for further studies to improve the treatment of young children’s disruptive behaviors.

References


Hamilton, S. B., & MacQuiddy, S. L.


**GENERAL INTRODUCTION**

21


Riddle, M. A., Yershova, K., Lazzaretto, D., Paykina, N., Yenokyan, G., Greenhill, L., ... Posner, K. (2013). The Preschool Attention-Deficit/Hyperactivity Disorder Treatment Study (PATS) 6-year...


