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Parent ADHD and Evidence-Based Treatment for Their Children: Review and Directions for Future Research

Andrea Chronis-Tuscano[#1], **Christine H. Wang**[#1], **Kelsey E. Woods**[1], **Jennifer Strickland**[2], and **Mark A. Stein**[2]

[1]University of Maryland, College Park

[2]University of Washington, Seattle Children's Hospital

[#] These authors contributed equally to this work.

Abstract

One fourth to one half of parents of children with attention-deficit/hyperactivity disorder (ADHD) have ADHD themselves, complicating delivery of evidence-based child behavioral and pharmacological treatments. In this article, we review the literature examining the relation between parent ADHD and outcomes following behavioral and pharmacological treatments for their children with ADHD. We also review research that has incorporated treatment of parent ADHD (either alone or in combination with child treatment) with the goal of improving parenting and child outcomes. Finally, we offer recommendations for future research on the relation between parent ADHD and evidence-based treatment outcomes for their children, with the purpose of advancing the science and informing clinical care of these families.

Keywords

parent ADHD; behavioral intervention; child ADHD; parenting; stimulant medication

Evidence-based interventions for children with ADHD (i.e., stimulant medication and behavior therapy) rely heavily on parents to administer or implement child treatments (Chronis, Chacko, Fabiano, Wymbs, & Pelham, 2004). Pharmacological treatment for children with ADHD, although arguably less demanding for parents, requires forethought to schedule and attend appointments with prescribers, obtain refills, and administer medication to their children one or more times per day. Behavioral therapies require parents to be consistent, scheduled, and routinized, proactively implementing positive and negative consequences according to pre-determined behavioral plans. It is estimated that one-fourth to one-half of children with ADHD have at least one parent who also has ADHD (Johnston, Mash, Miller & Ninowski, 2012). The high incidence of ADHD (or elevated ADHD symptoms) in parents poses unique challenges for the success of evidence-based ADHD medication and/or behavioral interventions for child ADHD.

Address correspondence to Andrea Chronis-Tuscano, University of Maryland, Department of Psychology, College Park, MD 20742, achronis@umd.edu.

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Background

Consistent with ADHD in children, adult ADHD is characterized by core symptoms of inattention and hyperactivity/impulsivity, along with executive functioning deficits and difficulty with emotion regulation. Although best practices for diagnosing adult ADHD remain somewhat controversial, the gold standard involves collecting information about adult ADHD symptoms and associated social and academic/occupational difficulties present in childhood and adulthood from the perspective of multiple informants whenever possible. Given that ADHD symptoms (e.g., poor concentration) overlap with symptoms of other disorders, and individuals with ADHD experience high rates of comorbidity (Kessler et al., 2006), differential diagnosis is a key component of adult ADHD assessment. Finally, there must be clear evidence of impaired functioning (e.g., social and academic/occupational).

Evidence-based treatments for adult ADHD include stimulant mediation (Faraone & Glatt, 2010) and cognitive-behavioral therapy (CBT; Knouse & Safren, 2010). As in children, stimulant medication for adults with ADHD reduces core symptoms and has some limited effects on functional domains (Surman, Hammerness, Pion & Faraone, 2013). CBT with an emphasis on psychoeducation and skills acquisition has been rigorously tested in recent years, and results have shown CBT improves ADHD symptoms (based on self-, clinician- and informant-report), organizational skills, self-esteem, depression and other psychiatric symptoms (Knouse & Safren, 2010).

Given the obvious mismatch between the demands evidence-based treatments for childhood ADHD place on parents and the likelihood that parents, too, will have ADHD, research on this important topic has grown over the past decade. In this paper, we review research: (1) examining the relation between parent ADHD and outcomes following behavioral and pharmacological treatments for their children (2) examining the impact of treating parent ADHD on parenting and child outcomes and (3) combining and sequencing treatments for both parent and child ADHD. Lastly, we discuss future directions for research and clinical implications.

Consistent with our prior review on this topic (Wang, Mazursky-Horowitz & Chronis-Tuscano, 2014), we searched for the following terms: “maternal ADHD or paternal ADHD or parent* ADHD, child* ADHD, treatment” on PsycINFO and Medline databases. Only peer-reviewed articles published in English were included (unpublished dissertations were excluded). We included articles that: (1) focused on treatment of child ADHD (e.g., medication or behavioral); (2) and examined parent ADHD in relation to child treatment outcomes (e.g., child ADHD, child externalizing behavior, impairment). Studies that examined other forms of parental psychopathology (e.g., depression) or did not examine parent ADHD in relation to post-treatment functioning were excluded. Two doctoral students searched among all results for relevant papers by reading the titles and/or abstracts to determine if papers met these two inclusion criteria and examined the reference section of these articles for additional articles of relevance. We summarize these studies in Table 1, and the following sections of this review paper will highlight the main issues that characterize the literature on parent ADHD as a predictor of child ADHD treatment outcome.

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Parent ADHD and Child Behavior Therapy: Overview and Review of Current Findings

Behavioral interventions, grounded in principles of operant conditioning and social learning theory, are efficacious in the treatment of children and adolescents with ADHD (Evans, Owens, Bunford, 2014). Despite the varied delivery formats, common elements of behavioral interventions include antecedent control, differential attention, modeling and non-physical punishment. Parent involvement is pivotal in all behavioral treatments to enhance generalization of treatment across time and settings; however, the level of parent involvement differs across interventions. For example, in behavioral parent training (BPT), parents are the primary agents delivering the intervention. BPT involves teaching parents behavioral skills, including: implementing consistent routines/structure; delivering labeled praise for appropriate behavior; ignoring minor, irritating or non-dangerous attention-seeking misbehaviors; giving clear, concise commands; providing contingent rewards for appropriate behaviors; delivering non-physical punishments (i.e., time out, removal of privileges) in a neutral manner; and implementing home point/token systems. Consistency in use of these strategies is a critical element of successful BPT outcomes.

Another example of a behavioral intervention for children with ADHD is the Summer Treatment Program (STP; Pelham et al., 2010). The STP is an intensive behavioral intervention combining a point system, social skills training, high frequency labeled praise, and daily report card (DRC) implemented in real-time in the context of recreational and academic activities. The STP is delivered by paraprofessionals and parents attend weekly BPT groups to increase generalization of child behavior to the home setting.

Several more recently-developed ADHD interventions for youth focus specifically on particular domains of functioning. For example, Mikami, Lerner, Griggs, McGrath, & Calhoun (2010) developed Parental Friendship Coaching, in which parents learn to coach their children in appropriate social interactions, set up successful play dates, and manage peer conflict with the ultimate goal of improving children's peer relationships. Targeting the academic domain, Power and colleagues (2012) developed Family School Success (FSS), which includes BPT, parent-teacher consultation, behavioral homework interventions, and home-school interventions (i.e., DRC). Despite targeting somewhat different domains, all behavioral interventions seek to improve functioning by modifying the child's environment.

The high incidence of ADHD (or elevated ADHD symptoms) in parents of children with ADHD can pose unique challenges for the success of these behavioral interventions due to parents' own difficulties with executive functioning (EF) and emotion dysregulation. Inattentive symptoms and EF deficits may impact the degree to which parents are attentive during sessions, remember to practice and implement behavioral strategies outside of session, keep consistent schedules and daily routines, plan ahead to implement antecedents that can prevent misbehavior from occurring, and provide external structure at times when children have to organize a series of steps to complete a goal (e.g., morning, homework, and bedtime routines). Additionally, parental impulsivity and/or emotion dysregulation could interfere with effective implementation of differential attention or neutral responses to child misbehavior. Finally, placing parents in the role of modeling and coaching the child in social

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(e.g., Parental Friendship Coaching) and academic activities (e.g., Family School Success) requires a level of social skill and organizational ability on the part of parents, which may be problematic for parents who struggle themselves with social relationships or organization. Thus, despite some variability in the extent to which the various evidence-based behavioral treatments rely on parents as the primary agent delivering the intervention, it is clear that parent ADHD (or elevated symptoms) have the potential to impact the success of many evidence-based child interventions given the important role parents play in treatment.

Indeed, several studies have reported that parent ADHD or elevated ADHD symptoms are associated with less improvement following behavioral treatment for their children with ADHD (see Wang, Mazursky-Horowitz, & Chronis-Tuscano, 2014 for a review). These studies vary widely in methodology (see Table 1 for methodological details for each of these studies), but have (with a few exceptions) found that parent ADHD (or elevated ADHD symptoms) are associated with reduced improvement in child ADHD and externalizing symptoms following behavioral treatment. These findings extend to domains of child impairment, such that parent ADHD also predicts less improvement in social relationships and academic functioning following behavioral interventions that target these domains (Dawson, Wymbs, Marshall, Mautone, & Power, 2014; Griggs & Mikami, 2011; Jensen et al., 2007; see Table 1).

Findings from these studies also suggest diminished effects of behavioral interventions on parenting following BPT when parents have elevated ADHD symptoms (e.g., Chronis-Tuscano et al., 2011; Griggs & Mikami, 2011; Harvey, Danforth, McKee, Ulaszek, & Friedman, 2003; see Table 1). Specifically, studies using both observational and questionnaire methods suggest that parent ADHD symptoms are associated with relatively less improvement in negative parenting following BPT, whereas effects of behavioral interventions on positive parenting outcomes seem to be less related to parent ADHD symptoms (Chronis-Tuscano et al., 2011; Griggs & Mikami, 2011; Harvey et al., 2003). Such outcomes align with studies of parent ADHD and parenting, which tend to report more consistent associations between adult ADHD and negative parenting as opposed to positive parenting (Johnston et al., 2012). It could be that, for parents with ADHD, inhibiting negative parenting behaviors (e.g., harsh or negative tone) is particularly challenging. Further, it has been theorized that parents with ADHD may be more “in tune” with their children with ADHD, potentially resulting in less consistent associations between adult ADHD and positive parenting (Psychogiou, Daley, Thompson & Sonuga-Barke, 2007).

However, not all studies have found that parent ADHD predicts poorer outcomes following behavioral treatment (Table 1). For example, following 8 weeks of the STP for Adolescents (STP-A), Sibley and colleagues (2013) reported that parent ADHD symptoms were not related to changes in parent-reported parent-adolescent conflict. Additionally, Thompson and colleagues (2009) compared an 8-week BPT program for preschool-age children with ADHD to a no-treatment control condition, and found that children in the treatment group improved on parent-report of child ADHD symptoms at post-treatment, even after controlling for parent ADHD. Lastly, in a study comparing the efficacy of BPT and Routine Clinical Care to Routine Clinical Care alone, maternal ADHD symptoms neither predicted nor moderated intervention effects on parent-reported child ADHD or externalizing

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symptoms (van den Hoffdakker et al., 2010). Thus, there are mixed results regarding the potential effect of parent ADHD on child ADHD treatment success. We will now review and consider some of the factors that might explain the discrepant findings in this literature.

Range and severity of parent ADHD symptoms

Several considerations are needed in order to reconcile this discrepant literature. One important consideration is the mean and range of parent ADHD symptomatology in the various studies (see Table 1). Several adult ADHD rating scales exist, each with clinical cut-offs (Taylor, Deb & Unwin, 2011). For example, Sibley et al. (2013) used the 18-item Adult ADHD Self-Report Scale (ASRS; Adler et al., 2006) to assess ADHD in parents. Parents in this study had low levels of ADHD symptoms (ASRS clinical cutoff = ≥21; Taylor, Deb & Unwin, 2011), which may in part explain why parent ADHD did not predict parent-adolescent conflict at post-treatment. Similarly, the samples in both Thompson et al. (2009) and van den Hoffdakker et al. (2010) had mean scores on the Adult ADHD Rating Scale (AARS; Barkley & Murphy, 1998) well below the clinical cut-off (AARS clinical cut off for ages 30-49 = ≥23.7; Table 1).

Thus, overall, studies that found parent ADHD had no effect on child behavior or parenting treatment outcomes seem to have mean levels of adult ADHD symptoms well below the clinical range. In contrast, studies that report parent ADHD predicts negative treatment outcomes examined parent ADHD both continuously and categorically (e.g., parsing parent ADHD symptoms into low, medium, high ADHD symptoms). For example, the group mean for the mothers in the “high” ADHD symptoms group in the Sonuga-Barke et al. (2002) and Harvey et al. (2003) studies were both in the clinical range (Table 1). Additionally, DSM-5 criteria notes five ADHD symptoms or more to be present to meet clinical threshold for adults. The mean number of parent ADHD symptoms in the study by Chronis-Tuscano et al. (2011) met this clinical criteria (see Table 1). Other studies that categorically examined parent ADHD demonstrated parents in the “high ADHD symptoms” group also met this DSM-5 symptom threshold (e.g., Dawson et al., 2014; Griggs & Mikami, 2011). In sum, higher, clinical levels of parent ADHD symptoms seem to be associated with more negative child behavioral treatment outcomes.

Treatment components accommodating parent ADHD symptoms

Another important consideration when trying to reconcile this discrepant literature is considering whether treatments directly addressed or accommodated parent ADHD-related difficulties. Of studies that reported parent ADHD did not predict child treatment outcome, flexible and individualized delivery was emphasized, such as allowing repetition and increasing treatment “dose” (Sibley et al., 2013; Thompson et al., 2009; van den Hoofdakker et al., 2010, 2014). Adult ADHD psychosocial treatments emphasize overlearning until skills are automatic and no longer “rely” on EF abilities (Knouse & Safren, 2010). van den Hoffdakker et al. (2010, 2014) reported parent ADHD did not predict negative child treatment outcomes following 12 2-hour sessions of BPT implemented over 20 weeks. Similarly, Thompson et al., (2009) reported pacing the intervention to the mother's preference. Thus, a format in which skills are slowly introduced with enough time for problem-solving issues before moving on to the next skill may be most successful for

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parents with ADHD. Increased treatment dose may be another important consideration for parents with ADHD. The 12 2-hour sessions of BPT used by van den Hoffdakker et al. (2010, 2014) is equivalent to 24 total hours of therapeutic contact, whereas most other BPT studies reviewed herein included 8-12 total hours of therapeutic contact (e.g., 1 hour sessions implemented over 8-12 consecutive weeks) (see Table 1). Additionally, the STP-A study by Sibley et al. (2013) included 360 hours of active therapeutic contact. Further, Thompson et al. (2009) delivered the intervention in the home setting, while traditional BPT studies are delivered in a clinic setting. Implementation in the home setting may increase generalizability because therapists have the opportunity to model appropriate responding to negative child behaviors in the setting in which they naturally occur. In sum, increased treatment dose and implementation over longer durations in the home setting may produce better outcomes for families in which both the parent and child have ADHD.

Additionally, studies in which the negative association of parent ADHD with child ADHD treatment outcome was not present often included treatment components that targeted parent ADHD-related difficulties, such as focusing on parent disorganization (e.g., Sibley et al., 2013; Thompson et al., 2009) perhaps reducing the impact of these parent symptoms. The most successful adult ADHD CBT treatments emphasize compensatory skills, organization and planning, and difficulties with motivation (Knouse & Safren, 2010). Thompson et al. (2009) reported targeting maternal organization skills during treatment when warranted. Sibley et al. (2013) assisted parents with developing an organized blueprint for implementing a home behavioral contract, which could serve to address parent organizational difficulties. Thus, perhaps a similar approach, where parent ADHD-related difficulties (e.g., disorganization) are addressed, needs to be taken when working with parents with ADHD who are participating in psychosocial treatments for their children's ADHD.

Lastly, para-professional delivery of behavioral therapy may also ameliorate difficulties associated with parent ADHD. In the Sibley et al. (2013) STP-A study that found no association of outcome with parent ADHD, paraprofessional staff primarily delivered the treatment. Parents attended weekly group BPT, but were not involved in the daily implementation of behavior therapy within the program. Thus, parent ADHD symptoms may have less of an influence on treatment outcomes when parents are not the primary agents of treatment.

In sum, another pattern that emerged from this review is that studies that demonstrated parent ADHD has no effect on child ADHD treatment outcome incorporated treatment elements that likely addressed and/or reduced the effects of parent ADHD-related difficulties. Specifically, treatment setting (e.g. home versus clinic), treatment pace and dose (e.g. 24 hours versus 8-12 hours of therapeutic contact), and the individual delivering treatment (e.g. parent versus paraprofessionals) may all influence the degree to which parent ADHD is associated with child treatment outcomes.

Father ADHD symptoms and child ADHD treatment success

Few studies have examined paternal ADHD and its relation to treatment outcome for children with ADHD. This is surprising given research indicating that fathers of children

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with ADHD are more likely to have adult ADHD compared to fathers of non-ADHD comparison children (Chronis et al., 2003), and that paternal ADHD is associated with child ADHD and externalizing symptoms (Psychogiou et al., 2007; Romirowsky and Chronis-Tuscano, 2014). Examining paternal influences is especially important given evidence indicating maternal and paternal parenting have combined and unique effects on child developmental outcomes (Simons & Conger, 2007).

Only two studies included in our review examined fathers' ADHD symptoms as predictors of behavioral treatment outcome (see Table 1). One study found, compared to children who received routine clinical care (RCC) alone, children in the BPT+RCC group demonstrated improvement in parent-reported child externalizing symptoms at post-treatment when fathers had high, as opposed to low, ADHD symptoms (van den Hoofdakker et al., 2014). In the same study, maternal ADHD had no predictive or interactive effects with treatment group on child externalizing or child ADHD outcomes (van den Hoofdakker et al., 2010). This suggests that the presence of paternal ADHD versus maternal ADHD may require a different approach to child treatment.

In the only other study that examined paternal ADHD as a predictor of treatment outcome, Harvey et al. (2003) demonstrated after 8 weeks of BPT, maternal inattention and impulsivity were positively correlated with a host of outcomes, such as self-reported parenting, as well as observed maternal and child behaviors (Harvey et al. 2003). However, paternal, but not maternal, ADHD symptoms was specifically correlated with observed negative tone and self-reported overreactive parenting. In summary, results suggest that paternal ADHD symptoms may be specifically related to harsh or negative parenting, whereas maternal ADHD symptoms had implications for a broad range of parenting and child outcomes.

These preliminary results highlight the importance of considering both maternal and paternal ADHD symptoms, as they may have differential effects on child treatment success. Again, the severity and range of paternal ADHD symptoms needs to be considered. For example, in van den Hoffdakker et al. (2014)'s study, the sample mean AARS score for fathers was well below the AARS clinical-cutoff (see Table 1). Thus, even "high" paternal ADHD symptoms in this study were likely still in the normative range. However, in the study by Harvey et al (2003), some fathers did experience clinically significant paternal ADHD symptoms (Table 1). Thus, paternal ADHD appears to predict parenting outcomes following BPT when fathers experience elevated levels of ADHD symptoms, similar to what is seen in mothers. This is in line with other studies reporting that paternal psychopathology predicts increased negative parenting and decreased positive parenting at rates similar to that seen in mothers with psychopathology (e.g., Wilson & Durbin, 2010).

Parent ADHD presentations and comorbid psychopathology

ADHD is a highly heterogeneous disorder, with variations in the inattentive and hyperactive/impulsive symptom dimensions and high levels of comorbidity with other disorders (Kessler et al., 2006). Evidence suggests the inattentive, hyperactive/impulsive and combined adult ADHD presentations have different clinical correlates (Wilens et al., 2009). Thus, theoretically, adult inattentive and hyperactive/impulsive symptom dimensions may also be

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related to different aspects of parenting. Indeed, a review by Johnston et al. (2012) concluded that parent inattentive symptoms seem to be more consistently related to parenting difficulties than are hyperactive/impulsive symptoms. Specifically, Chen and Johnston (2007) demonstrated maternal inattention to be uniquely related to inconsistent parenting, and maternal impulsivity to be uniquely related to use of positive reinforcement. Thus, it is likely the two parent ADHD dimensions also have different effects on child ADHD treatment outcomes.

Only three studies examined the two adult ADHD symptom dimensions as unique predictors of child treatment success (Table 1). Harvey et al. (2003) reported that, following BPT, although both parent ADHD dimensions were related to several parenting outcomes, only paternal inattention (but not impulsivity) predicted observed father negative tone and only maternal inattention (but not impulsivity) predicted observed child verbal misbehavior. Additionally, Griggs and Mikami (2011) reported that both parent inattention and impulsivity predicted observed facilitation in Parental Friendship Coaching (a treatment focusing on promoting positive social engagement between peers) following treatment, but only parental inattention, and not impulsivity, predicted teacher-reported peer acceptance and rejection at post-treatment. Lastly, Jensen et al. (2007) reported that parent inattention was related to child ADHD, reading and overall impairment at 3-year follow-up in the Multimodal Treatment Study for ADHD (MTA; MTA Cooperative Group, 1999). In sum, while the literature is scant, parent inattentive symptoms seem to be more closely linked to parenting and child outcomes than that of parent hyperactive/impulsive symptoms. Of course, the greater variability in symptoms of inattention among parents in these studies, mirroring what is seen in the general adult ADHD population, could contribute to these findings.

Further, high rates of comorbidity (e.g., depression, substance use) have been documented in adults with ADHD (Kessler et al., 2006). Thus, it is important to consider co-morbid psychopathology when examining associations between parent ADHD and child treatment outcome. Some studies included in this review controlled for other parent mental health symptoms, although this was not the case for all studies (see Table 1). Among studies reporting parent ADHD negatively predicted child treatment outcomes, parent ADHD remained a significant predictor of child treatment outcomes beyond symptoms of other disorders. Overall, parent ADHD symptom dimensions and related comorbid disorders may have unique effects on child ADHD treatment success. Treatments tailored for families where both parent and child have ADHD likely need to consider the individualized nature of the parent's symptom presentation.

Maintaining treatment gains following treatment termination

Parent ADHD may be associated with either uptake of treatment during the implementation phase and/or difficulty sustaining effects after treatment termination. While most studies examined parent ADHD as a predictor of child functioning immediately following treatment, a handful of studies included in this review examined longer-term effects on child functioning (see Table 1). The majority of these studies demonstrated that parent ADHD predicted worse child functioning at follow-up (Dawson et al., 2014; Jensen et al., 2007;

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Sonuga-Barke et al., 2002); one study demonstrated parent ADHD had no effect on functioning at post-treatment or follow-up (Thompson et al., 2009). Interestingly, Dawson and colleagues (2014) found minimal effects of parent ADHD on child academic outcomes at immediate post-treatment; however, at 3-month follow-up, parent ADHD symptoms predicted lower parent-teacher relationship quality and more academic problems in the FSS group. Overall, while the literature is small, results of existing studies suggest that parent ADHD predicts child functioning following treatment termination perhaps even more so than at post-treatment, indicating that future studies should include longer follow-up periods. This also suggests that treatment may need to incorporate maintenance sessions for families in which a parent also struggles with ADHD.

Parent ADHD and Child ADHD Medication Outcomes

Parent ADHD symptoms may also have implications for the success of pharmacological treatment for child ADHD. Stimulant medications are the most commonly used, evidence-based intervention for child ADHD (Faraone & Buitelaar, 2010). Successful adherence to child stimulant medication regimens requires parents to obtain the prescription from the child's medical provider, purchase the medication, administer and monitor daily medication intake, and plan ahead to obtain refills--taxing the parent's executive functioning system. Thus, given the high demand on parents to regulate children's medication regimens, parent ADHD symptoms, particularly inattentive symptoms, may interfere with child medication response via poor adherence and monitoring. Very few studies have examined the extent to which parent ADHD is related to child medication adherence and/or response, however (see Table 1).

While the literature is small, empirical evidence suggests parent ADHD negatively predicts child medication outcomes. Gau et al. (2008) demonstrated that paternal ADHD, but not maternal ADHD, predicted poor adherence to immediate release methylphenidate in a large sample of Taiwanese children between the ages of 5-16 years. Poor adherence was defined using both objective measures (i.e., pill counts) and patient and parent report. Information regarding which parent was responsible for medication administration (or whether teens were responsible for administering their own medication) was notably absent from this study. Chazan et al. (2011) demonstrated that maternal ADHD symptoms predicted both adherence and response to child ADHD medication. Maternal ADHD symptoms, but not maternal ADHD diagnosis, predicted less improvement in parent-reported child ADHD symptoms at 6-month follow-up, after controlling for psychosocial adversity, child ADHD severity, child oppositional defiant disorder (ODD), methylphenidate (MPH) dose, and treatment adherence. Such findings indicate maternal ADHD symptoms may be important to child medication response even if such maternal ADHD symptoms are not at diagnostic threshold. Paternal ADHD did not predict child response. In contrast to these findings, Grizenko et al. (2006) demonstrated that family history of ADHD was positively related to child medication response, such that children who evidenced successful response to MPH had *more* first-degree relatives at risk for ADHD compared to children who evidenced poor response to MPH.

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Overall, there is evidence that both maternal and paternal ADHD symptoms may interfere with child ADHD medication adherence and response. Further, there are mixed findings regarding whether ADHD in first-degree relatives predicts positive or negative child ADHD medication response. Notably, methodologies of the three studies reviewed vary widely, likely contributing to disparate outcomes. Additionally, whether the same processes (e.g., parent forgetfulness) contribute to reduced treatment success for both behavioral and pharmacological treatments among families with ADHD remains to be studied.

Treating Parents with ADHD with Medication to Enhance Parenting and Child Outcomes

Given the evidence reviewed herein suggesting that parent ADHD may interfere with administration and implementation of evidence-based child ADHD treatments, the question of how to best treat these families is of utmost clinical importance. Only a few studies have explored whether treatment of parent ADHD improves parenting, and has downstream effects on child behavioral difficulties (see Table 1). Although cognitive-behavioral treatments for adult ADHD have been developed and tested (Knouse & Safren, 2010), to date the few studies that have examined effects of treating ADHD in parents have largely taken a pharmacological approach (Table 1).

Case studies were the first to suggest that treatment of maternal ADHD with stimulant medication could result in subsequent improvements in parent-reported and observed parenting and child behavior (Evans, Vallano & Pelham, 1994). Over a decade later, using a double-blind, placebo-controlled design, Chronis-Tuscano et al. (2008) examined treatment of parent ADHD and subsequent parenting changes in a small sample of mother-child dyads with ADHD. Treating mothers with ADHD with osmotic-release oral system (OROS) MPH predicted improved maternal ADHD symptoms and self-reported inconsistent discipline and corporal punishment. However, medicating mothers had no effect on self-reported maternal involvement, positive parenting or monitoring, nor on collateral reports or laboratory observations of parenting (Chronis-Tuscano et al., 2008, 2010).

Wietecha et al. (2012) compared effects of a non-stimulant, atomoxetine (ATX) to placebo for 24 weeks and subsequent self-reported parenting outcomes among parents with ADHD (offspring were not required to have ADHD, although some met ADHD symptom criteria). At 24 weeks, for the whole sample, there were no differences in family or marital functioning or parenting between treatment groups. However, among parents who were impaired with regard to parenting at baseline, parents in the ATX group demonstrated more improvement in self-reported parenting efficacy than the placebo group. Further, child ADHD moderated treatment outcome, such that parents in the ATX group experienced less improvement in self-reported parenting stress than that of parents in the placebo group when their children had ADHD. However, no group differences were noted when children did not have ADHD. Despite changes in parenting self-efficacy, no significant group differences in self-reported parenting behaviors were noted at 24 weeks. Similarly, in a very small sample, Babinski, Waxmonsky, and Pelham (2014) observed parent-child dyads with ADHD interacting before and after BPT while parents received either adult ADHD stimulant

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medication or placebo. No adult medication effects were demonstrated on observed parenting or child behaviors. Thus, across multiple studies, treating parents with ADHD using pharmacological interventions has shown minimal to no benefit on parenting or child outcomes.

Only one study to date has demonstrated improvements in parenting and child behavior resulting from administration of stimulant medication to parents with ADHD. Waxmonsky et al. (2014) found that, following 3 weeks of titration and 4 to 8 weeks on optimal dose, mothers with ADHD evidenced a significant decrease in commands and an increase in praise, and children showed a decrease in inappropriate behaviors. However, despite improvements in parenting and child behavior resulting from treatment for parents' ADHD symptoms, parent ADHD symptoms were still related to higher absolute frequencies of negative parenting behaviors at post-treatment.

Overall, it appears that adult ADHD stimulant medication may improve parents' self-perceptions of some parenting behaviors and parenting self-efficacy (Chronis-Tuscano et al., 2008; Wietecha et al., 2012). However, effects on objective/observed parenting behaviors are tenuous at best. Only Waxmonsky et al. (2014) demonstrated small but significant improvements on observed parenting and child behavior following parent stimulant medication initiation, perhaps because optimal doses of parent stimulant medication were implemented over 4 to 8 weeks, while other studies only implemented optimal parent stimulant dose for 2 weeks (Chronis-Tuscano et al., 2008) or examined only acute effects of parent stimulant medication (Babinski et al., 2014). There is no consistent theoretical framework that addresses how long parents should be on medication before changes in parenting or child behavior are demonstrated. However, if one considers that patterns of parenting behaviors have been established over the life of the child, it is likely that sustained parent medication will be needed to yield positive behavioral changes. Clearly, longer-term follow up studies are needed to best determine whether parent medication can improve parenting and child outcomes. Similar long-term studies should also be conducted with CBT for adult ADHD in order to assess the impact of this treatment on child outcomes.

Combined Treatments for Maternal and Child ADHD

Given that the literature to date suggests that parent ADHD predicts poorer child BPT and medication outcomes, and that some evidence demonstrates treatment of parent ADHD has beneficial effects on parenting, a logical question is whether combining treatments for parent and child ADHD could yield more optimal outcomes. In particular, it is likely that skills training will be needed in addition to medication for adult ADHD to improve outcomes for these families and that treatment of parent ADHD *before* delivering child ADHD treatment could best enhance child outcomes.

In line with this assumption, Jans et al. (2015) tested whether stimulant treatment and group Dialectical Behavior Therapy (DBT) for maternal ADHD before BPT implementation enhanced subsequent BPT outcomes compared to receiving supportive counseling before BPT. Results at 6-month follow-up indicated maternal ADHD improved more in the treatment group compared to the control group and both groups improved from baseline on

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parent- and child-reported externalizing behaviors at 6-month follow-up. However, there were no differences between groups on parent- and child-reported child externalizing behaviors, parent report on child externalizing behavior at home, and parent and teacher report of overall child psychopathology symptoms. Thus, treating maternal ADHD before implementing BPT did not seem to have incremental benefits on outcomes compared to no treatment of maternal ADHD. Unfortunately, the study design did not allow conclusions to be drawn about any one component aimed to treat parent ADHD since multiple treatments (e.g., DBT and medication for parent ADHD) were delivered both conditions, and many of the children were treated with child stimulant medication prior to BPT (Stein, 2015).

Sequencing Treatments for Mothers with ADHD and their Young Children: A SMART Trial

Assuming that some combination of parent and child ADHD treatment will be needed in families in which both the parent and child have ADHD, we are currently conducting a pilot Sequential Multiple Randomization Trial (SMART; Almirall & Chronis-Tuscano, 2016) to inform the clinical care of these families. The SMART design involves two or more randomizations in order to examine optimal sequencing of interventions. In this study, we are recruiting mothers with ADHD who have young children (ages 3-8 years) with elevated child ADHD symptoms who have never been treated with child ADHD medications (Chronis-Tuscano, Wang, Strickland, Almirall, & Stein, 2016). The focus on young children is consistent with intervention early in the child's development to delay or prevent the need for child stimulant medication since psychosocial treatments are recommended before medication in young children with ADHD (Greenhill et al., 2006). In our SMART, families are first randomized to receive 8 weeks of either maternal stimulant medication (MSM) or BPT. After 8 weeks of initial treatment, participants are then randomized to either continue with the same treatment modality for a second 8 weeks (with as-needed modifications to address non-response) or the alternative treatment is added (see Chronis-Tuscano et al., 2016, for additional details regarding study design, treatment protocols, and outcome measures). Outcomes measured include maternal ADHD symptoms and functioning, parenting (measured via questionnaires and laboratory observations), and child symptoms and functioning. The SMART design will allow us to directly compare first-line maternal stimulant medication to BPT (which no study has ever done), and to examine optimal sequencing of these interventions. Moreover, the SMART design will allow us to examine baseline demographic characteristics and variables observed during the first 8 weeks (e.g., treatment adherence, attitudes, and response) that may moderate the optimal sequencing of treatments. Thus, this design will ultimately enhance a clinician's ability to personalize treatment for these families in a data-driven manner (Almirall & Chronis-Tuscano, 2016).

Given the complexity of the SMART design, we were funded by the National Institute of Mental Health to conduct a pilot development and feasibility study. Thus far, 22 families have completed the first phase of treatment. Based on reliable change indices (RCI) for this subsample, after 8 weeks of individual BPT (n = 10), 80% of mothers significantly increased their positive parenting behaviors and 10% significantly decreased their negative parenting behaviors. This represents a large group effect on positive parenting, g = 1.31, 95% CI [0.31,

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2.31]; however, there was no effect of BPT on negative parenting, $g = -0.15$, 95% CI [−1.05, 0.75]. In the MSM group (n = 12), RCI analyses indicated that 33.3% of mothers significantly increased their positive parenting behaviors after Phase 1 of the study, although none significantly reduced their negative parenting behaviors. In the MSM group, there was no group effect on positive parenting, $g = -0.15$, 95% CI [−0.97, 0.67], or negative parenting, $g = 0.04$, 95% CI [−0.78, 0.86]. Thus, our very preliminary findings based on a small subsample suggest that BPT improved positive parenting in the majority of mothers, whereas maternal medication management did not. This suggests that in targeting parenting difficulties, maternal medication management alone is unlikely to be sufficient. Of note, neither BPT nor MSM improved negative parenting in most families, consistent with the extant literature reviewed herein (see Table 1). It remains to be seen whether treating mothers' ADHD with pharmacological interventions before delivering BPT yields the most positive outcomes as compared to unimodal treatment or treatment in which BPT is administered first, followed by maternal ADHD medication. The fully-powered SMART trial will ultimately inform clinicians as to how to personalize and sequence treatment for a family based on clinical characteristics at baseline and indicators during the first phase of treatment (e.g., adherence, initial response, treatment acceptability).

Conclusions & Future Directions

Clinicians who treat children with ADHD are likely to encounter parent ADHD at the diagnostic level in one-fourth to one-half of children with ADHD (Johnston et al., 2012), although a higher percentage will likely have elevated ADHD symptoms that do not meet diagnostic levels, but may still interfere with child treatment. Grounded in our contextual model of ADHD in families (Johnston & Chronis-Tuscano, 2014) and empirical evidence reviewed herein, we conclude that parent ADHD symptoms are likely to impact adherence and response to evidence-based behavioral and pharmacological treatments for their children, and thus treatment will necessarily need to encompass consideration of parent ADHD in order to be successful.

The topics discussed in this review highlight a multitude of gaps in our current knowledge about the relation between parent ADHD and child ADHD treatment outcome. First, the extent to which parents in research studies have clinical levels of adult ADHD symptoms, as opposed to normative or subclinical levels of ADHD symptoms, seems to be a critical issue contributing to inconsistent findings across studies. It is likely that parents with clinical levels of ADHD will be less likely to derive full benefit from evidence-based treatments for their children, with little to no effect at more normative variations in parent ADHD symptoms. Moreover, most existing studies did not specifically examine whether parents were impaired in a particular functional domain thought to impact treatment (e.g., parenting skills in BPT studies, social skill in Parental Friendship Coaching or organizational skill in FSS) (see Wietecha et al., 2012 for an exception). Perhaps parents with clinical levels of ADHD symptoms who are impaired in the skills required to implement a particular treatment will experience less treatment success. Future research should consider parent ADHD severity level and baseline impairment in a more nuanced manner.

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Another concern with the existing literature on this topic is our measurement of parenting constructs. Currently measurement of parenting across studies has focused almost exclusively on positive and negative parenting. Virtually absent in the literature (see Mokrova, O'Brien, Calkins, & Keane, 2010 for an exception) is measurement of the more executive aspects of parenting, such as planning, organization, routines, supervision, and flexibility, which are likely linked to inattentive symptoms and poor EF, and can certainly result in increased home chaos and poor child treatment outcomes. Although observational measures of parenting are the gold standard, it can be challenging to assess the executive aspects of parenting in the laboratory. It will be important for future research to determine how to best measure the executive aspects of parenting, as it is likely that parent EF deficits impact adherence to both pharmacological and behavioral treatments for children with ADHD.

As is unfortunately the case for the developmental psychopathology literature more generally (Pomerantz, Parent, Forehand & Seehuus, 2015), and the ADHD literature specifically (Fabiano, 2007), few studies in this review considered ADHD symptoms in both mothers and fathers (see Table 1). Given the difficulty in recruiting fathers for child ADHD treatment studies, preliminary examination of father ADHD data even when sample sizes are small (e.g., Dawson et al., 2014; Griggs & Mikami, 2011) may be important to move the field forward and inspire larger studies. Future studies on this topic must consider each parent's role in caregiving, as the effects of parent ADHD may be most pronounced in the parent primarily responsible for day-to-day child care activities (e.g., morning, homework, bedtime routines; social programming, medication administration, medical or therapy appointments). Level of involvement in caregiving could dictate the extent to which paternal ADHD might be related to child outcomes. For instance, for families in which the mother is largely responsible for caregiving and in which the father is uninvolved or only minimally involved, effects of father ADHD on child treatment outcome may be negligible. In contrast, if the father is highly involved in caregiving, paternal ADHD may be more detrimental to the child's success (Romirowsky & Chronis-Tuscano, 2014). Thus, consideration of mothers' and fathers' roles in different dimensions of parenting are critical when examining the role of paternal ADHD symptoms on child treatment outcomes.

Moreover, it is critically important to consider synergistic or interactive associations of mother and father ADHD with child treatment outcome. To date, no study has examined interactive effects of maternal and paternal ADHD on child treatment outcome. On one hand, research on paternal and maternal psychopathology has documented an interactive effect, such that high psychopathology in both parents predicted worse child functioning compared to high psychopathology in one parent only (Brennan, Hammen, Katz, & Le Brocque, 2002). Thus, the presence of ADHD in both mothers and fathers may further reduce the effectiveness of BPT compared to that when only one parent has ADHD. Psychopathology in both parents may directly interfere with BPT implementation, and may also be a proxy for additional psychosocial adversity, which has also been shown to predict reduced treatment success (Murray et al., 2008). On the other hand, if one parent has ADHD and the other is highly organized, the organized parent may compensate for the other parent's difficulties, particularly if the organized parent is responsible for the executive aspects of parenting. Alternatively, some recent research (see XXX this issue) suggests that

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parents with ADHD characteristics may be more “in sync” with one another and as a result experience less conflict, frustration, and inconsistency than in families where there is a “mismatch” between mother and father ADHD symptoms. It will be important for future studies to examine these complex issues.

While the literature on parent ADHD and child ADHD medication outcomes is scarce, a few considerations are warranted. The studies reviewed herein used both objective measures and self-report to assess adherence. Additional data related to child medication adherence, such as appointment attendance, medication administration setting (i.e., home vs. school), dosing schedule (i.e., once vs. multiple administrations per day), and data on prescription refills, should also be examined. Perhaps most importantly, the parent responsible for administering children's ADHD medications is an important factor to consider in any study of this kind. Forgetfulness, a cardinal symptom of ADHD, is the top reason (i.e., 30% of all cases) cited for lack of adherence to medication in general (Osterberg & Blaschke, 2005). Forgetfulness as it relates to parent ADHD may manifest as inconsistency in administering child medication, obtaining prescription refills, or attending medication management follow-up visits, all of which have implications for child medication adherence and response. Further, formulation and dosing of child ADHD medication (i.e., once vs. multiple daily doses) could also be an important consideration. Overall, the relation between parent ADHD symptoms and child medication outcomes is a relatively unexplored body of research that has important clinical implications.

Across both behavioral and pharmacological treatments for children with ADHD, age or developmental level of the child is an important consideration for future research, as the parental role in treatment (and caregiving more generally) surely varies as a function of this. Consequently, the relationship between parent ADHD and child treatment outcome likely varies with child age as well.

It is clear that efforts to ameliorate detrimental effects of parent ADHD on child treatment outcomes should be a research priority. Results from our current trial as well as past studies (e.g., Chronis-Tuscano et al., 2011) demonstrate that reduction in negative parenting is particularly difficult to achieve among parents with elevated ADHD symptoms. Moreover, **t**raditional BPT programs do not typically focus on parent organization as a stand-alone skill, but this may be necessary for parents with ADHD. Devoting, at minimum, one session to structuring the home, daily routines, and other important life areas may set the necessary foundation for more complicated BPT skills. Indeed, studies have demonstrated that treatments integrating elements targeting parent psychopathology for children with ADHD produces incremental benefit compared to traditional BPT (Chronis-Tuscano et al., 2013). Given the heterogeneity in presentation and the high levels of comorbidity among adults with ADHD, an individualized approach to treatment for these families may be required as opposed to a “one size fits all” approach. A functional analysis of the ways in which a parent's ADHD symptom presentation and co-occurring symptoms impact adherence and implementation of child treatments can inform the development of treatment components to address these issues.

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For parents with clinical levels of ADHD, it is also likely that alterations to the duration, pacing, and delivery format of behavioral treatment could result in clinical benefit. Moreover, it is possible that some parents with elevated ADHD symptoms may be able to implement treatment in the short-term, but may have more difficulty sustaining behavioral programs over the longer-term when the support from a therapist decreases (e.g., Dawson et al., 2014). Additional investigation is needed regarding how best to implement BPT for families where parents and children have ADHD in order to sustain treatment effects (e.g. treatment duration, timing between sessions). Speculatively, weekly therapist feedback may help parents with ADHD "stay on track" with the prescribed treatment plan. Current findings suggest skills deterioration may occur once therapist support is removed. Additionally, therapists may highlight implementation issues that parents with ADHD may otherwise not recognize as problems (e.g., consistency in implementation of BPT). A treatment approach like Parent –Child Interaction Therapy, which involves in-vivo practice, in-the-moment feedback, and mastery of skills before progressing to new skills, may be particularly beneficial for parents with ADHD. Therapist check-in between sessions, booster sessions, and/or motivational interviewing may also be useful adjuncts to behavioral treatment components when delivering clinical services to children of parents with ADHD.

Our efforts thus far to examine whether treating parent ADHD results in beneficial outcomes for child ADHD treatment have been met with some limited success. Regarding adult pharmacological treatment, evidence suggests parent ADHD medication may not be sufficient to ameliorate parenting difficulties seen among adults with ADHD, although results are mixed (Table 1). Regarding adult-focused psychosocial treatment, the one study conducted thus far demonstrated combined adult ADHD medication and DBT did not yield beneficial effects on child BPT outcomes. However, psychosocial treatments for adult ADHD is still in its nascent stages, with CBT, DBT and mindfulness all being potentially efficacious for adults with ADHD (Knouse & Safren, 2010). Thus, future studies should examine whether elements of CBT for parents (Knouse & Safren, 2010) would yield beneficial effects in conjunction with modification of behavioral interventions for children (e.g. treatment duration, dose, pacing, boosters). It is likely that combined treatments will be needed to result in the greatest benefit to these families, and recent efforts have begun to examine the sequencing and individualization of these treatments using innovative research designs.

It is our intention that this comprehensive review will inspire future research on this topic that extends in a thoughtful way what we have learned thus far about the relation between parent ADHD and child ADHD treatment outcomes, and that will provide data-driven guidance to clinicians treating these complex families.

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Table 1

Parent ADHD and Child Treatment outcome Studies

	Main predictor & outcome	Child Age (M, SD)	N=	Fathers	Treatment	Control Group	Controlled for:	Adult ADHD Assessment[1]	Adult ADHD (categorical vs. continuous)	Outcome variables	F/U?	Main findings
Parent ADHD and child BT outcome studies												
Sonuga-Barke et al. 2002	IV: high, med, low maternal ADHD sxs DV: child ADHD sxs	3.0	83	NO	8 weeks of BPT	NONE	baseline child ADHD symptoms, SES, child sex, maternal satisfaction, efficacy, maternal mental health and other child bx problems	AARS (SR) high (27.18±8.03) med (10.44±2.28) low (2.52±1.74)	categorical (high, med, low)	PACS (PR) WWPHS (PR) BL (PR)	3 months	Children of mothers with high ADHD sxs showed little change in ADHD sx after BPT at post and f/u; children of mothers with low and medium ADHD sxs showed improvement at post and f/u
Jensen et al 2007	IV: tx group, time, moderators DV: child ADHD/ ODD symptoms, social skills, reading scores, impairment and diagnostic comorbidity	10-13 (M=11.9 ± 0.95)	485	DN report	14 months of MM, BT, MM +BT	CC	site/location, medication use, special education services; public assistance, child comorbidity, child ADHD severity, child sex, parent depression	CAARS (SR)	continuous	DISC (PR) SNAP (PR & TR) WIAT SSRS (PR & TR) CIS (PR) SCAPI (PR); use of public assistance	3 years	Parent inattentive symptoms did not moderate tx o/c; Parent ADHD did predict worse overall improvement (child adhd, impairment, and reading) 3 years later in all tx groups
Harvey et al 2003	IV: maternal and paternal ADHD sxs DV: observed parenting and child behavior	4-12 (M=7.19±2.35)	49	YES (36%)	8 weeks BPT	NONE	BDI (SR) and AU (SR)	ADDES[2] (SR); Mother inattention (M=7.59 SD = 4.4) Father inattention (M=8.31 SD=4.14)	continuous and categorical (high, moderate, average)	PS (PR) MCRPR (PR) PCI (O)	NONE	At post, maternal inattention and impulsivity were related to higher levels of child noncompliance and negative verbalizations and maternal repeating and arguing behaviors (O); maternal and paternal inattention and impulsivity were positively correlated with lax or permissive parenting (SR)
Griggs & Mikami 2011	IV: parent ADHD sxs DV: social functioning, parenting	6-10	62	YES (14%)	8 weeks of Parental Friendship Coaching	WLC	baseline functioning, ODD, child aggression, child IQ, TX group, child med status, parent edu	CSS (SR) inattention: (6.48±4.88) impulsivity: (1.32±1.47)	continuous and categorical (low vs. high)	DSAS (TR) PCI (O)	NONE	Parent inattention predicted less peer acceptance (TR) at post in both groups. Parent inattention predicted more peer rejection (TR) at post in the Parental Friendship Coaching group only; parents with high levels of inattention and impulsivity exhibited

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	Main predictor & outcome	Child Age (M, SD)	N=	Fathers	Treatment	Control Group	Controlled for:	Adult ADHD Assessment[1]	Adult ADHD (categorical vs. continuous)	Outcome variables	F/U?	Main findings
												less facilitation (O), whereas parents with low inattention and impulsivity exhibited more observed facilitation at post;
Chronis Tuscano et al 2011	IV: maternal ADHD sxs DV: child ADHD, child DBD, parenting	6-10 (M=8.06±1.2)	70	NO	5 sessions of BPT	NONE	pre treatment variables	ADHD Composite based on CAARS (SR) & modified KSADS (SR & CR); (M=5.64±4.45)	continuous	DBD (PR) APQ (PR) DPICS (O)	NONE	Maternal ADHD predicted less improvement in parental inconsistent discipline and involvement (O & SR) and child behavior (PR) at post, but had no effect on positive parenting (O & SR); lack of improvement in negative parenting mediated the relation between maternal ADHD and reduced child improvement
Dawson et al 2014	IV: parent ADHD and treatment group DV: child DBD, academic impairment	7-12 (M=9.33±1.25)	139	YES (9.4%)	12 sessions of FSS	12 sessions; active control (CARE)	child gender, SES, child ADHD med status, child ADHD severity, parent psychopathology	CAARS - SF	continuous and categorical	HPC (PR) HPQ (TR) APRS (TR) SNAP (TR & PR) PES (PR) PTIQ (PR & TR) PCRQ (PR)	3 month	At post, parent ADHD had minimal effects on academic outcomes in FSS, but predicted less homework problems (PR) and more parent self-efficacy as an educator in CARE; at 3-month f/u, parent ADHD predicted minimal outcomes in CARE, but predicted lower parent-teacher relationship quality (PR), more child homework problems (PR) and less child homework responsibility (TR) in FSS
Sibley et al 2013	IV: parent-adolescent conflict, adolescent ODD, parent ADHD DV: post parent child conflict	12-16 (M=13.87 ± 1.29)	20	DN report	8 weeks BT (i.e. STP-A)	NONE	Parent-child conflict (PCC); baseline child ODD	ASRS (SR) (M= 1.53±0.79	continuous	IC-A (PR) DBDI (CLR)	NONE	Baseline conflict predicted improvement in PCC at post; PCC improved over the course of STP-A; Adolescent ODD severity and parent ADHD severity did not significantly predict treatment effects.

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	Main predictor & outcome	Child Age (M, SD)	N=	Fathers	Treatment	Control Group	Controlled for:	Adult ADHD Assessment[1]	Adult ADHD (categorical vs. continuous)	Outcome variables	F/U?	Main findings
Thompson et al 2009	IV: treatment group DV: child ADHD, ODD, parenting	2.5-6.4	41	DN report	8 weeks of NFPP (home delivered)	TAU	baseline scores, child age and gender	AARS (SR) (M=17.38±11.55)	continuous	WWP (PR) PACS (PR) BCL (PR) PFMSS (O) Child ADHD (O) GIPCI-R (O)	8 weeks	Children in the NFPP group improved on child ADHD symptoms (PR) at post, even after adding baseline child ADHD symptoms, child age, gender and parent ADHD symptoms to the model.
van den Hoof-dakker et al 2010	IV: maternal ADHD DV: child externalizing and ADHD	4-12 (M=7.4±1.9)	94	NO	12 sessions of group BPT +Routine Clinical Care (20 wks)	Routine Clinical Care alone (20 wks)	child baseline externalizing and ADHD, treatment group, child IQ, child age, maternal depression, parenting self-efficacy	AARS (SR) (M=10.52±6.83)	continuous	CBCL (PR) CPRS (PR)	NONE	Maternal ADHD did not predict child CBCL externalizing score or ADHD symptoms at post
van den Hoof-dakker et al 2014	IV: father ADHD, depression DV: child externalizing and ADHD	4-12 (M=7.6±1.9)	83	YES (100%)	12 sessions of group BPT + Routine Clinical Care (20 wks)	Routine Clinical Care alone (20 wks)	child baseline externalizing and ADHD, time, treatment, father depression, father self-efficacy	AARS (SR) (M=10.41±7.71)	continuous	CBCL (PR) CPRS (PR)	NONE	Higher father ADHD predicted more favorable outcomes on the CBCL Externalizing in the BPT +Routine Clinical Care group compared to the Routine Clinical Care alone group; No differences were noted between groups in fathers with low levels of ADHD; No effect of father ADHD on child ADHD sxs
Treating parent ADHD with medication and parenting and child behavioral outcomes												
Babinski, Waxmonky & Pelham (2014)	IV: stimulants for parents before and after BPT DV: child behavior and parenting	6-12 (M=8.25±1.36)	12	Yes (9%)	8 weeks of BPT	NONE	child stimulant medication and parent gender (included in exploratory analyses)	ADHD-RS (SR) (M=37.5 SD=4.76)	continuous	DBD (PR) IRS-C (PR) APQ (PR) PCRQ (PR) CGSQ (PR) HSQ (PR) PDR (PR) PCI (O)	NONE	No medication effects were demonstrated on observed parenting or child behaviors.
Chronis-Tuscano et al 2008	IV: stimulant medication for mom's ADHD DV: parenting	6-12 (M=8.74±1.71)	23	NO	OROS MPH for mothers with ADHD (titration: 5 weeks; randomization: 2 weeks)	Placebo	child medication status	modified KSADS (SR & CR) CAARS (SR) (ADHD index M=64.45±8.05)	continuous	APQ (PR)	NONE	After 5 weeks of titration and 2 weeks of optimal dose, medication led to improvements in self-reported maternal involvement, monitoring/ supervision, inconsistent discipline and corporal punishment; however,

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	Main predictor & outcome	Child Age (M, SD)	N=	Fathers	Treatment	Control Group	Controlled for:	Adult ADHD Assessment[1]	Adult ADHD (categorical vs. continuous)	Outcome variables	F/U?	Main findings
												there was no effect of medication on collateral reports of mothers' parenting
Chronis-Tuscano et al 2010	IV: stimulant medication for mom's ADHD DV: parenting	6-12 (M=8.74±1.71)	23	NO	OROS MPH for mothers with ADHD (titration: 5 weeks)	NONE	None	modified KSADS (SR & CR) CAARS (SR) (ADHD index M=64.45 SD=8.05)	continuous	DPICS (O)	NONE	After 5 weeks of titration, no maternal stimulant effects on observed parenting or child behavior
Waxmonsky et al 2014	IV: stimulant medication for parent ADHD DV: parenting and child bx	5-12 (M=8.3±2.0)	30	Yes (27%)	Stimulants for parents with ADHD (titration: 3 weeks; randomization: at least 4 weeks)	Placebo	pre-treatment scores (ADHDRS & DPICS)	ADHD-RS (CLR ± CR) (M=39±8.63)	continuous	DPICS (O)	NONE	Mothers with ADHD demonstrated improvement in their parenting (O) and their children's behaviors (O). Mothers evidenced a decrease in commands and an increase in praise, and children evidenced a decrease in inappropriate behaviors.
Wietecha et al 2012	IV: parent ADHD med DV: family functioning	6-17	502	Yes (48.6%)	ATX (non-stimulant) for 24-weeks	Placebo	sex, presence of child with ADHD	CAARS (SR) (M=34.6±8.4)	continuous	PSI (PR) PSCS (PR) CDBRS (PR) APQ (PR)	NONE	Among parents who met clinically impairing functioning at baseline, parents in the ATX group demonstrated more change in self-reported parenting efficacy than the placebo group. Further, child ADHD moderated treatment outcomes. Despite changes in parenting cognitions, there were no significant group differences in parenting behaviors (SR)
Jans et al 2015	IV: treatment of maternal ADHD DV: change in child's externalizing and ADHD sxs	6-12 (M=9.4)	144	Yes (DN report %)	group psychotherapy (GPT) + MPH then BPT	supportive counseling w/out meds then BPT	baseline variables and location of recruitment	ADHS-DC (SR) WURS-k (SR) CAARS-O:L (CR) (M=19.2 SD=5.7)	continuous	K-SADS-PL (SR & PR) HSQ (PR) SDQ (PR & TR)	6 months	Results at 6-month follow-up indicated maternal ADHD improved more in the treatment group compared to the control group and both groups improved from baseline on parent and child reported externalizing behaviors at 6-month follow-up. However, there were no differences between groups on

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	Main predictor & outcome	Child Age (M, SD)	N=	Fathers	Treatment	Control Group	Controlled for:	Adult ADHD Assessment[1]	Adult ADHD (categorical vs. continuous)	Outcome variables	F/U?	Main findings
												parent and child reported child externalizing behaviors, parent report on child externalizing behavior at home, and parent and teacher report of overall child psychopathology symptoms.
Parent ADHD and child medication outcome studies												
Chazan et al 2011	IV: clinical characteristics, parental psychopathology, family functioning, environmental stress DV: child response to med	5-17 (M= 9.8 SD=2.8)	125	Yes (DN report %)	MPH (3-months) to children	NONE	adherence and MPH dose, CGAS baseline score; also had ethnicity, age, sex, ADHD subtype, child ODD, child CGAS, family conflict, and undesired pregnancy history in the model	ASRS (SR) (M=3.37±4.01) SCID ADHD module (SR)	continuous and categorical	SNAP (PR)	6 months	Maternal ADHD symptoms, but not maternal ADHD diagnosis, predicted less improvement in parent-reported child ADHD symptoms at 6-month follow-up. Neither paternal ADHD symptoms nor diagnoses predicted child MPH treatment response.
Gau et al 2008	IV: family psychopathology, demographics, etc DV: child response to IR MPH	5-16 (M=9.5±2.4)	607	Yes (DN report %)	IR and OROS MPH to children	NONE	sex and age; also added child age, frequency of administration, mental retardation, age of onset, center	Interview by board certified child psychiatrists	Possibly categorical	SNAP-IV (PR) CGI-ADHD-S (CLR)	NONE	Paternal ADHD, but not maternal ADHD or sibling ADHD, predicted poor adherence to immediate release methylphenidate (IR MPH). Poor adherence was defined using both objective and subjective measures, such as pill counts and patient and parent report.
Grizenko et al 2006	IV: pattern of familial psychopathology DV: child's response to MPH meds	6-12 (M=9.04±1.8)	118	yes (19%)	MPH for 1 week	Placebo (cross over design)	n/a	FIGS (CLR)	possibly categorical	CGI- (CLR, PR, TR) DISC (PR) RASS (O) CPT CCR (CLR)	NONE	Children who evidenced successful response to MPH had more first-degree relatives at risk for ADHD compared to that of children who evidenced poor response to MPH.

Note. AARS = Adult AD/HD Rating Scale; ADDES = Adult Attention Deficit Disorders Evaluation Scale; ADHD-RS =ADHD Rating Scale; ADHD-S = ADHV Symptom Severity Scale; ADHS-DC = Diagnostic Checklist for Diagnosis of ADHD in Adults; APQ = Alabama Parenting Questionnaire; ASRS = Adult ADHD Self-Report Scale; ATX = Atomoxetine; AU = Alcohol Use Questionnaire; BCL = Behavior Checklist; BL = Behavior Checklist; BT = Behavior therapy; CAARS – SF = Conners Adult ADHD Rating Scale short form; CAARS-O:L = Conners Adult ADHD Rating Scale Observer-Rating Scale; CARE= Coping with ADHD through Relationships and Education; CBCL = Child Behavior Checklist; CC = Community Care; CCR = Consenus Clinical Response; CDBRS = Child Disruptive Behavior Rating Scale; CGAS = Child Global Assessment Scale; CGI = Clinical Global Impressions; CGSQ = Caregiver Strain Questionnaire; CIS = Columbia Impairment Scale; (CLR) = Clinician report; CPRS = Conners' Parent Rating Scale; (CR) = Collateral report; CSS = Current

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symptoms scale; DBD = Disruptive Behavior Disorders Rating Scale; DBDI = Disruptive Behavior Disorders Interview; DISC = Diagnostic Interview Schedule for Children; DPICS = Dyadic Parent Child Interaction Coding System; DN report = Does not report; DSAS = Dishion Social Acceptance Scale; FIGS = Family Interview of Genetic Studies; FSS = Family School Success Intervention Program; GIPCI-R = Global Impressions of Parent-Child Interactions-Revised; GPT = Group Psychotherapy; HPC = The Homework Problem Checklist; HPQ = Homework Performance Questionnaire; HSQ = Home Situation Questionnaire; IC-A = Issues Checklist (abbreviated version); IR = Immediate-Release; IRS-C = Impairment Rating Scale for Children; KSADS = Schedule for Affective Disorders for School-Aged Children; MCRPR = Modified Child-Rearing Practices Report; MM= Med Management; MPH = Methylphenidate; NFPP = New Forest Parenting Program; (O) = Observational measure; OROS = Osmotic-Release Oral System; PACS = Parental Account of Childhood Symptoms; PCI = Parent-Child Interaction; PCRQ = Parent-Child Relationship Questionnaire; PDR = Parent daily report; PES = Parent Educator Scale; PFMS = Preschool Five Minute Speech Sample; (PR) = Parent Report; PS = Parenting Scale; PSCS = Parental Sense of Competence Scale; PSI = Parenting Stress Index; PTIQ = Parent-Teacher Involvement Questionnaire; RASS = Restricted Academic Situation Scale; SCAPI = Services for Children and Adolescents - Parent Interview; SCID = Structured Clinical Interview for DSM-IV Disorders; SDQ = Strengths and Difficulties Questionnaire; SNAP = Swanson, Nolan, and Pelham Rating Scale; (SR) = Self-Report; SSRS = Social Skills Rating System; STP-A = Summer Treatment Program for Adolescents with ADHD; TAU = Treatment as Usual; (TR) = Teacher Report; WLC = Waitlist Control; WURS-K = Wender-Utah Rating Scale; WWPHS = Werry Weiss Peters-Hyperactivity Scale.

[1] Mean levels not reported for all studies

[2] Lower scores mean higher levels of ADHD symptomatology

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