Do Parents' ADHD Symptoms Affect Treatment for their Children? The Impact of Parental ADHD on Adherence to Behavioral Parent Training for Childhood ADHD

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Abstract

Nearly half of all youth with Attention-Deficit Hyperactivity Disorder (ADHD) have at least one parent who also meets criteria for the disorder, and intergenerational ADHD is a significant risk factor for poor outcomes following evidence-based behavioral parent training (BPT) programs. Given that BPT is predicated on consistent parental involvement, symptoms of ADHD in parents may be a significant barrier to effective engagement with BPT treatment. In the present investigation, we examine the effect of parental ADHD symptoms on BPT treatment engagement for children with ADHD-predominantly inattentive presentation (N=148, ages 7–11). We examine the following parent- and clinician-rated treatment engagement domains: between-session skill adherence, in-session participation, perceived skill understanding, treatment-engagement attitudes, and session attendance. Parent- and clinician-rated between-session adherence was the only treatment engagement domain related significantly to parental ADHD symptoms. This finding was robust and remained even after accounting for symptoms of parental anxiety and depression, child ADHD symptom severity, and various sociodemographic factors (parental education level, household income, employment status, and being a single parent). These findings suggest that targeting parental ADHD symptoms in the context of parenting interventions may be a promising approach for improving adherence and treatment outcomes for BPT interventions.

Keywords

Attention-Deficit/Hyperactivity Disorder (ADHD); parenting; adherence; behavioral intervention; treatment engagement

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Behavioral Parent Training (BPT) has a long-standing history of success for treating childhood Attention-Deficit Hyperactivity Disorder (ADHD). Multiple empirical investigations (Evans, Owens, Wymbs, & Ray, 2018; MTA Cooperative Group, 1999) and metanalytic reviews (Daley et al., 2014; Fabiano et al., 2009; Pelham & Fabiano, 2008) have affirmed BPT as a well-established treatment for ADHD, and numerous psychological and psychiatric professional organizations (Pliszka et al., 2007; Wolraich et al., 2019) recommend BPT as a front-line intervention for children with ADHD. Improvements following BPT are observed across domains and include decreased ADHD symptoms, externalizing problems, organizational deficits, and interpersonal challenges, as well as increased positive behaviors/decreased unwanted behaviors during behavioral observations (Evans et al., 2018; Fabiano et al., 2009; Pfiffner et al., 2014).

ADHD is a highly heritable condition (0.88; Larsson, Chang, D'Onofrio, & Lichtenstein, 2014), and as many as half of children with ADHD have at least one parent who meets diagnostic criteria for the disorder (Johnston, Mash, Miller, & Ninowski, 2012). Children with ADHD whose parents or caregivers also have symptoms and impairment related to ADHD (herein referred to as *parental ADHD*) are less likely to respond favorably to BPT (Chronis-Tuscano, Wang, Woods, Strickland, & Stein, 2017; Wang, Mazursky-Horowitz, & Chronis-Tuscano, 2014). Parental ADHD symptoms are associated with attenuated improvements in children's ADHD symptoms, externalizing problems, social skills, academic functioning, and overall impairment (Chronis-Tuscano et al., 2011; Dawson, Wymbs, Marshall, Mautone, & Power, 2016; Griggs & Mikami, 2011; Harvey, Danforth, McKee, Ulaszek, & Friedman, 2003; van den Hoofdakker et al., 2014), as well as diminished improvements in parenting skills (Chronis-Tuscano et al., 2011; Harvey et al., 2003). Because parental ADHD affects a non-trivial proportion of the childhood ADHD population, it is critically important to examine potential mechanisms for the diminished improvements following BPT associated with symptoms of parental ADHD.

ADHD that is occurring in parents may limit their capacity to adhere to BPT protocols. In classic BPT programs, parents (and other caregivers) are taught skills grounded in social learning and operant theory that are applied in daily life contexts to address children's problem behaviors. BPT success is predicated on consistent, accurate, *in vivo* application of the parenting skills learned during treatment. Parent engagement in treatment is a multi-faceted construct entailing parental attendance, in-session participation, and out-of-session homework completion (Chacko et al., 2016; Lindsey et al., 2019). Because parents are the primary intervention target in BPT, their engagement with treatment is an important factor for treatment success, and parental adherence is a powerful predictor of treatment-related improvements in child behavior following BPT (Clarke et al., 2015; Garvey, Julion, Fogg, Kratovil, & Gross, 2006; Lindsey et al., 2019; Rooney, Hinshaw, McBurnett, & Pfiffner, 2018; Villodas, McBurnett, Kaiser, Rooney, & Pfiffner, 2014).

However, consistent application of BPT skills at home requires attentional and executive functioning resources (c.f. Johnston et al., 2012 for a review). For example, working memory abilities allow parents to hold learned skills in one's focus of attention while simultaneously processing their children's behavior and determining when and how to apply the strategies. Behavioral inhibition skills are required to inhibit ineffective, prepotent

parenting responses in favor of applying learned BPT skills. Intact time management, organization, and planning skills are necessary to prioritize commitments and arrange schedules for session attendance, create and implement coherent behavior plans, and schedule skill practice. Emotion regulation abilities enable parents to manage parenting stresses effectively, inhibit negative emotional responses, and sustain motivation to attend treatment, participate during session, and implement learned skills at home. Finally, attentional resources are required for learning new skills, participating actively during session, and attending sufficiently to their children's behavior so that skills may be applied as temporally close to the problem behavior as possible. Weak attentional and executive resources associated with ADHD in adulthood (Alderson, Kasper, Hudec, & Patros, 2013; Boonstra, Oosterlaan, Sergeant, & Buitelaar, 2005; Nigg et al., 2005) are likely to pose barriers to compliance. The difficulty that parents with ADHD face with adhering to treatment are compounded by the general disruptive effects of chronic disorganization, poor planning, and time mismanagement in non-parenting career-life domains (Alderson et al., 2013; Barkley & Murphy, 2010; Boonstra et al., 2005), leaving little time and energy for parents to implement learned BPT skills.

Adverse effects of parental ADHD on adherence do not appear to operate by disrupting attendance. Among the limited number of studies examining effects of parental ADHD on BPT engagement, parental ADHD predicted neither session attendance (Chronis-Tuscano et al., 2011) nor rates of attrition (Thompson et al., 2009). However, these indices do not assess the *quality* of treatment engagement or measure implementation of learned strategies in context. For skills-based interventions such as BPT, adherence to between-session assignments (e.g., homework completion) may be a more valid indicator of treatment engagement (Meichenbaum & Turk, 1987; Nock & Ferriter, 2005) and may be more sensitive to the disruptive effects of parental ADHD symptoms.

Parental adherence difficulties are potentially complicated by the presence of co-occurring mental health conditions among adults with ADHD. Adults with ADHD are at increased risk for internalizing symptoms and impairment (Sobanski, 2006), and over 40% of parents of children with ADHD have a history of depression (Chronis et al., 2003). Anxiety and depression may similarly affect parents' engagement with BPT treatment. Anhedonic and fatigue symptoms associated with depression may reduce treatment attendance, participation during session, and practice of BPT skills at home. Parental depressogenic or anxious thoughts may lead parents to focus on children's negative behaviors rather than attending to positive behaviors as recommended in most BPT curricula. Anxiety may also sap parents' energy and motivation for BPT skill implementation. Thus, internalizing-related symptoms may be an independent risk factor for reduced BPT engagement, and it is therefore important to assess whether potential attenuations in parental treatment engagement are secondary to anxiety and depression in addition to ADHD-related sequelae.

In addition, implementing learned BPT strategies at home may be particularly challenging for working parents or parents who are the single caregivers for their children given the significant time commitments and additional responsibilities associated with maintaining a job/career or being a single parent. Family income level and parental level of education may similarly affect parents' ability to utilize and practice learned BPT skills. Because adult

ADHD shows strong, negative associations with level of education, household income, and employment status and positive associations with rates of single parenthood (Barkley, Fischer, Smallish, & Fletcher, 2006; Barkley & Murphy, 2010; Hechtman et al., 2016; Kuriyan et al., 2013), relations between parental ADHD and treatment engagement may be secondary to these sociodemographic factors. Moreover, parents with greater ADHD symptoms and impairment may similarly have children with more severe symptoms and impairment, and parenting demands are likely greater for children with greater symptomatology. Therefore, it is possible that the poor treatment engagement secondary to parental ADHD symptoms may be related to the increased demands associated with parenting a more impaired child. Yet, no study to date has examined whether relations between parental ADHD symptoms and BPT treatment engagement may be secondary to these common co-occuring parent- and child-level factors.

Most studies of BPT treatment engagement utilize samples comprised primarily of children with ADHD-combined presentation or other disruptive behavior disorders. Extrapolating conclusions regarding treatment adherence to parents of children with ADHD-Inattentive Presentation (ADHD-I) assumes that presentations have similar parenting demands. However, ADHD-I is uniquely associated with distinct attention profiles, reduced oppositionality, and greater social withdrawal and sluggish cognitive tempo (Bauermeister et al., 2005; Huang-Pollock, Mikami, Pfiffner, & McBurnett, 2007; McBurnett, Pfiffner, & Frick, 2001) that likely require differing parenting demands and may affect BPT engagement. Inattentive symptoms are also associated strong genetic loadings and well-characterized developmental continuity into adulthood, and parents of children with high inattention may be more likely to experience symptoms themselves (Chang, Lichtenstein, Asherson, & Larsson, 2013). Despite apparent importance, the effect of parental ADHD on BPT treatment adherence within this subpopulation remains unexamined.

The current study examines the effect of parental ADHD symptoms across several parent- and clinician-rated treatment engagement domains: between-session skill adherence, in-session participation, perceived skill understanding, treatment-engagement attitudes, and session attendance. Given the significant treatment adherence barriers posed by parental ADHD (e.g., chronic disorganization, poor time management, failure to plan skill practice), we hypothesize that those with higher parental ADHD symptoms will exhibit reduced between-session adherence, in-session participation, and treatment-engagement attitudes. Because past (albeit sparse) literature fails to support associations between parental ADHD and attendance, we do not expect significant relations in the present study; however, we examine this possibility. We include possible confounds such as the role of comorbid psychopathology (primarily internalizing symptoms in this population; Sobanski, 2006; Chronis et al., 2003); and the effects of socioeconomic disadvantage (i.e., level of education, household income, employment status, and rates of single parenthood; Barkley, Fischer, Smallish, & Fletcher, 2006; Barkley & Murphy, 2010; Hechtman et al., 2016; Kuriyan et al., 2013). Finally, we control for severity of child ADHD in order to avoid spurious attribution to parental ADHD symptoms when the associations are better explained by child ADHD. We hypothesize that parental ADHD symptoms will be a robust predictor and show strong associations to treatment engagement even after controlling for other parent- (e.g., internalizing symptoms; single parent household, level of education, employment status,

household income) and child-level (e.g., ADHD symptom severity) factors that may affect treatment engagement.

Methods

Participants

The current study comprises a secondary data analysis of a two-site, randomized controlled trial of the Child Life and Attention Skills (CLAS) program, a multicomponent behavioral intervention combining BPT, child skills training, and classroom management strategies tailored to address challenges specific to children with ADHD-Inattentive Presentation (ADHD-I) (Pfiffner et al., 2014). Participants aged 7 to 11 with a diagnosis of ADHD-I were randomly assigned to receive (a) multicomponent CLAS, (b) single component BPT tailored for children with ADHD-I (Parent Focused Treatment, PFT), or (c) treatment as usual. Both CLAS and PFT were associated with significant improvements in inattentive symptoms, organizational skills deficits, and overall impairment within the home setting relative to treatment as usual (Pfiffner et al., 2014). Groups receiving active treatment (i.e., CLAS and PFT groups) are examined exclusively herein ($n = 148$, age $M = 9.19$, $SD = 1.13$).

Participants were recruited at two treatment sites (the University of California, San Francisco and the University of California, Berkeley), and families were referred from local child psychologists and psychiatrists, pediatricians, and school personnel including principals, school mental health professionals, and learning specialists. Recruitment flyers were also posted in online parenting networks and professional organizations. Across four years, six cohorts of children participated, with a mean number of 25 children in each cohort (range = 20–30).

To be considered for inclusion, children were required to meet the following criteria: (a) primary diagnosis of ADHD-I based on DSM-IV criteria, as confirmed by the Kiddie Schedule for Affective Disorders and Schizophrenia (K-SADS:PL) clinical interview; (b) ages 7–11 (grades 2–5); (c) attending school full time in a regular classroom; (d) Full Scale IQ greater than or equal to 80 as confirmed by the Wechsler Intelligence Scale for Children, Fourth Edition (Wechsler, 2003); (e) living with at least one parent for one year prior to recruitment; (f) family schedule that permitted participation in CLAS or PFT groups; (g) school proximity within 45 minutes of either treatment site to allow for teacher consultation meetings; and (h) no evidence of pervasive developmental disorders or other neurological illnesses. Families of children who were taking nonstimulant psychoactive medication for ADHD were excluded because of difficulty withholding medication to confirm ADHD-I symptoms, as were cases planning to initiate or change any psychoactive medication treatment (stimulant or otherwise) in the near term. The status of non-psychiatric medication regimens (e.g., taken for asthma, allergy, etc.) did not affect study inclusion or exclusion.

Demographic data for families participating in the present study (i.e., children receiving CLAS and PFT) are as follows: Mean child age was 9.19 (range 7–11 years), with 24% in second grade, 32% in third grade, 24% in fourth grade, and 20% in fifth grade. Boys comprised 58% of the sample. 57% were Caucasian, 14% were Latinx, 10% were Asian American, 5% were African American, and 14% identified as Mixed Race. Total household

income was below $50,000 for 15% of families, between $50,000 to $100,000 for 26% of families, $100,000-$150,000 for 28%, and above $150,000 for 28%[1]. 83% of parents were the biological mothers of participants, 7% were biological fathers, 2% were stepmothers, 7% adoptive mothers, and 1% were adoptive fathers. 81% of parents reported graduating from college, and 13% reported being single parents. Note that only 4% of children were taking medication for ADHD. For a detailed characterization of sample composition and demographic variables, see (Pfiffner et al., 2014).

Procedure

A detailed description of participant screening, flow, attrition, diagnostic procedures, therapist qualifications, and treatment fidelity are provided elsewhere (Pfiffner et al., 2014). Briefly, participant screening occurred in a three-tiered process. First, telephone screening calls were conducted with parent and teachers to assess initial eligibility status. Those meeting initial criteria were mailed rating scale packets containing parent- and teacher versions of the Child Symptom Inventory (CSI; Gadow & Sprafkin, 2002) and Impairment Rating Scale (Fabiano et al., 2006). Children meeting the following criteria were invited to complete a full diagnostic assessment for consideration within the study: (a) six or more symptoms of inattention rated as occurring 'often' or 'very often' by parents or teachers on the CSI at the item level, (b) five or fewer hyperactive/impulsive symptoms rated as occurring 'often' or 'very often' by parents or teachers on the CSI at the item level, and (c) at least one area of functioning rated as 3 on the IRS by both parent and teacher, thereby indicating cross-setting impairment.

Child diagnostic status was determined using clinical interviews as well as the Kiddie Schedule for Affective Disorders and Schizophrenia (K-SADS:PL; Kaufman, Birmaher, Brent, Rao, & Ryan, 1996), a semi-structured interview that assesses for current or lifetime symptoms and impairment related to ADHD, oppositional defiant disorder, mood disorders, anxiety disorders, and psychosis based on DSM-IV criteria. K-SADS psychometric properties are well-established (c.f., Kaufman et al., 1996). To be considered for study inclusion, children were required to meet full DSM-IV criteria for ADHD-I based on K-SADS interview (i.e., six or more symptoms of inattention and fewer than 6 symptoms of hyperactivity/impulsivity.) Parents also completed a battery of questionnaires pre- and post-treatment. All procedures were approved by the Committees on Human Research at the University of California, San Francisco and the University of California Berkeley, and parents and children provided their informed consent and assent, respectively.

Intervention

Child Life and Attention Skills (CLAS).—CLAS consists of three empirically supported modalities of behavioral intervention adapted for children with ADHD-I: behavioral parent training, child skills training, and classroom management practices with daily report card. For a detailed description of CLAS, see Pfiffner et al., 2014.

[1]Note: income data is consistent with that of the greater San Francisco area where the present study was conducted.

Parent component: Parent training consisted of ten 90-minute weekday groups, along with up to six 30-minute individual family meetings (parent, child, clinician). Behavioral parent training curriculum was adapted from extant parent training programs (Barkley, 1997; Forehand & McMahon, 1981) and modified to include modules targeting challenges specific to ADHD-I. Parent stress management skills were also included. Homework assignments consisting of between-session practice of learned skills were given weekly.

Child Component: The child skill component consisted of ten 90-minute weekday groups that ran concurrently with the parent group sessions. Modules were adapted from a social skills program for children with ADHD (Pfiffner & McBurnett, 1997) and focused on building independence, organization, assertiveness, and social skills. Parents reinforced skills using a token economy outside of the child group to encourage generalization of the skills across contexts.

School Component: Teachers were taught evidence-based classroom management strategies to scaffold and support attention and generalization of learned child skills within the classroom (DuPaul, Weyandt, & Janusis, 2011; Fabiano et al., 2010; Pfiffner et al., 2011). Teachers also implemented a customized school home daily report card whereby teachers rated students three times daily on up to four individualized target behaviors. Up to five teacher consultation meetings were conducted with teachers, parents, children, and study personnel to discuss daily report card goals, classroom accommodations, and the skills taught within the child group.

Parent Focused Treatment (PFT).—Participants receiving the PFT intervention received the parent component of the CLAS intervention, described above. The number of sessions, length of sessions, session content, between-session assignments, and parent/therapist meetings were identical to those receiving the CLAS intervention. Teachers were provided psychoeducational materials about ADHD-I and information about classroom accommodations in lieu of the teacher consultation meetings provided in CLAS.

Measures

Treatment Engagement.—Parents and clinicians provided separate, weekly ratings of treatment engagement on a 7-point scale ranging from 1 (not at all) to 7 (a great deal). Parent-rated items assessed four treatment engagement domains including: Between-Session Adherence ("How well do you think you did on the assignment"), In-Session Participation ("How much did you participate in today's session"), Skill Understanding ("How much did you understand the material presented in today's session"), and Treatment Engagement Attitudes (mean of "How interesting was today's session for you" and "How helpful was today's session"[2]). Clinician-rated items similarly assessed several treatment engagement domains including: Between-Session Adherence ("Please rate how well the parent implemented the homework assignment"), In-Session Participation ("Seemed to be engaged in today's session"), and Skill Understanding ("Appears to understand the material

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[2]Examination of study models using treatment engagement attitude measures independently and as a composite did not change the pattern or interpretation of results. To reduce the probability of family-wise error, we present composite scores herein.

presented today"). The mean of the weekly ratings for each treatment-engagement domain served as the dependent variables included in the study's analyses. Similar measures of treatment engagement have been used extensively within extant literature (Garvey et al., 2006; Lindsey et al., 2019; Rooney et al., 2018; Springer & Reddy, 2010; Villodas et al., 2014). Session attendance was also collected.

Parental ADHD Symptoms.—A composite score reflecting baseline parental self-rated ADHD symptoms was created using the average T-scores from the ADHD DSM subscale of the Conners' Adult ADHD Rating Scale (CAARS; Conners, Erhardt, & Sparrow, 1999) and the Attention Problems subscale of the Adult Self Report (ASR; Achenbach & Rescorla, 2003)[3]. The CAARS ADHD DSM subscale measures adult ADHD symptoms consistent with DSM-IV criteria on a 4-point scale from 0 (not at all, never) to 3 (very much, very frequently), while the ASR Attention Problems subscale contains symptoms and impairments related to inattention rated on a 3 point scale from 0 (not true) to 2 (very true or often true). Both measures are associated with high external validity and test-retest reliability (Achenbach & Rescorla, 2003; Conners et al., 1999), and show strong internal consistency in the present sample (αs = .86 and .90).

Parent Predictors.

Parental anxiety and depression: T-scores from the Anxious/Depressed subscale of the Adult Self Report (ASR; Achenbach & Rescorla, 2003) measured parental anxiety and depression symptoms. The ASR Anxious/Depressed subscale contains symptoms and impairments related to anxiety and depression rated on a 3 point scale from 0 (not true) to 2 (very true or often true). The psychometric properties are well-established and include test-retest reliability and predictive validity for anxiety and depressive disorder diagnoses (Rescorla & Achenbach, 2004), and show strong internal consistency in the present sample (α = .88).

Parental sociodemographic characteristics: Four baseline parent variables were also examined as covariates of treatment engagement. *Parent Education* was reported on an ordinal scale as follows: 1= 8th grade or less, 2=Some high school, 3=High school graduate or GED, 4= Some college or post high school, 5= College graduate, 6= Advanced graduate school. *Employment Status* was assessed dichotomously as 1= working (either part or full time employment) or 0=not working (unemployed, stay at home parent, retired, or disabled). Household Income was reported on an ordinal scale as follows: 1= under $50,000 annually, 2=between $50,000-$100,000 annually, 3= between $100,000 to $150,000 annually, and 4= above $150,000 annually. *Single Parent Household* was coded dichotomously as 1=single parent, 0=not a single parent.

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[3]Similarly, examination of study models using parental ADHD symptom measures individually did not change the pattern or interpretation of results. To reduce measurement error and the probability of family-wise error, we present parental ADHD composite scores.

Child Predictors

ADHD: Baseline, parent-rated symptom severity scores from the ADHD subscale of the Child Symptom Inventory (CSI, Gadow & Sprafkin, 2002) were used to assess children's ADHD symptoms and had good internal consistency in the present sample (a=.83). The CSI measures ADHD consistent with DSM-IV criterion A on a 4-point scale from 0 (never) to 3 (very often). The ADHD subscale of the CSI has normative data, test-retest reliability, and predictive validity for a categorical diagnosis of ADHD (Gadow & Sprafkin, 2002)

Data Analytic Plan—All statistical analyses were performed using SPSS (Version 26; IBM Corp, 2019). Multiple regression analyses were used to examine associations between treatment engagement and parental ADHD. We then performed follow-up analyses controlling for the following variables entered at step 1: cohort, child medication status at baseline, child age, child race, and parent race. However, each covariate was either nonsignificant or did not change the pattern or interpretation of results. Simple regression analyses without covariates are therefore presented. Treatment group (CLAS vs PFT) was also included in regression models but did not predict treatment engagement or change the pattern/interpretation of results. Therefore, treatment groups are examined together to reduce family-wise error and simple models without treatment group covariates are presented.

Results

Preliminary Analyses

Very few data were missing (1%), so none were imputed. All outcome variables were screened for multivariate outliers using Mahalanobis distances (p<0.001) and univariate outliers as reflected by scores exceeding 3.5 standard deviations above the mean in either direction. None were identified.

As reported in (Pfiffner et al., 2014), session attendance was high. Parents attended 8.41 sessions on average (out of 10; SD = 1.98, range = 2–10). Clinican-ratings were significantly higher than parent-ratings on In-Session Participation (Parent: M = 5.65, SD = .71; Clinician: M = 6.20, SD = .62; t = −7.15, d = .83, p <.001) and Between-Session Adherence (Parent: M = 5.01, SD = .75; Clinician: M = 6.03, SD = .76; t = −3.05, d = 1.35, p =.003), but not BPT Skill Understanding (Parent: M = 6.41, SD = .43; Clinician: M = 6.58, SD = .51; t = −3.06, d = .36, p =.64). Therefore, raters are examined separately. Bivariate correlations are presented in Table 2. Of note, parental ADHD symptoms were significantly associated with parent-rated Between Session Adherence (r = −.38, p = <.001) but not parent-rated In-Session Participation, Skill Understanding, or Treatment Engagement Attitudes. Similarly, Parental ADHD Symptoms were significantly associated with clinician-rated Between Session Adherence (r = −.20, p = <.05) but not clinician-rated In-Session Participation or BPT Skill Understanding. Parental ADHD Symptoms were also not significantly related to Session Attendance. Because Between-Session Adherence is the only treatment engagement factor significantly asssociated with Parental ADHD Symptoms, it is the only treatment engagement domain retained for the ensuing regression analyses.

Parental ADHD Symptoms and Treatment Engagement

Effects of parental anxiety and depression symptoms: Next, we examined whether (a) Parental Anxiety/Depression predicts Between-Session Adherence (Step 1), and (b) Parental ADHD Symptoms predict Between-Session Adherence, after controlling for anxiety and depression (Step 2). As shown in Table 2, Parental Anxiety/Depression Symptoms significantly predicted parent-rated Between-Session Adherence $F(1,142) = 28.177$, $\beta = -.41$, $p < .001$, $R^2 = .17$. When entered into the model in step 2 $F(1,141) = 5.26$, $p < .01$, both Parental Anxiety/Depression Symptoms $\beta = -.27$, $p = .01$, and Parental ADHD Symptoms $\beta = -0.22$, $p = .02$, significantly predicted parent-rated Between-Session Adherence and accounted for an additional 3% of the variance ($R^2 = .20$, $R^2 = .03$). However, Parental Anxiety/Depression Symptoms failed to predict clinican-rated Between Session Adherence $F(1,142) = 2.79$, $\beta = -.14$, $p = .10$, $R^2 = .01$. Parental ADHD Symptoms continued to predict clinician-rated Between-Session Adherence $F(1,141) = 4.64$, $\beta = -.23$, $p = .03$, $R^2 = .03$, $R^2 = .01$ after accounting for symptoms of Anxiety/Depression.

Effects of parent sociodemographic factors: We then examined the possibility that sociodemographic characteristics may account for the observed associations between Parental ADHD Symptoms and Between Session Adherence. Using multiple regression, we examined whether (a) parental level of education, employment status, household income, and single parent household predicts Between-Session Adherence (Step 1), and (b) Parental ADHD Symptoms predict Between-Session Adherence, after controlling for parental sociodemographic variables (Step 2). As shown in Table 2, Parent Level of Education, Employment Status, Household Income, and Single Parent Household Status failed to predict parent-rated Between Session Adherence $F(4,133) = .851$, $R^2 = .03$. When entered into the model in step 2, Parental ADHD Symptoms significantly predicted Between Session Adherence $\beta = -.39$, $p < .001$, and accounted for an additional 14% of the variance in Between Session Adherence ($R^2 = .14$, $R^2 = .17$). Similarly, none of the parental sociodemographic variables significantly predicted clinician-rated Between Session Adherence $F(4,133) = 0.46$, $R^2 = 0.01$ and Parental ADHD Symptoms continued to predict Between-Session Adherence, $\beta = -.22$, $p = .01$, after for accounting for sociodemographic factors.

Effect of child symptoms and impairment: In a final set of analyses, we examine the possibility that the observed relations between Parental ADHD and Between-Session Adherence may be an artifact of associations between parental and child ADHD symptoms ($r = .27$; $p < .001$). Using multiple regression, we examined whether (a) parent-rated Child ADHD Symptoms predict Between Session Adherence (Step 1), and (b) Parental ADHD Symptoms predicts Between-Session Adherence after controlling for Child ADHD Symptoms (Step 2). As shown in Table 2, Child ADHD Symptoms did not predict parent-rated Between-Session Adherence $F(1,143) = 0.08$, $R^2 = 0.00$. When entered into the model in step 2, Parental ADHD Symptoms significantly predicted parent-rated Between-Session Adherence, $\beta = -.42$, $p < .001$, and accounted for an additional 16% of the variance in Between Session Adherence ($R^2 = .16$, $R^2 = .16$). Similarly, Child ADHD Symptoms were not a significant predictor of clinician-rated Between-Session Adherence $F(1,143) = 0.56$,

$R^2 = 0.00$. When entered into the model in step 2, Parental ADHD Symptoms continued to predict clinican-rated Between-Session Adherence, $\beta = -.20$, $p = .02$.

Discussion

This is the first study to empirically examine whether parental ADHD symptoms impact engagement with behavioral parent training for their children. Given that as many as half of children with ADHD have at least one parent who also meets criteria for the disorder (Johnston et al., 2012), this study fills a significant gap and extends the literature addressing treatment recommendations for families with intergenerational ADHD symptoms. These findings are particularly relevant for parents of children with the inattentive presentation of ADHD (ADHD-I) who are likely experiencing some symptoms of ADHD given the strong genetic loadings associated with inattentive symptomatology, high heritability of ADHD-I, and well-characterized developmental continuity of inattentive symptoms into adulthood (Chang et al., 2013).

As hypothesized, baseline parental ADHD symptoms were significant, robust predictors of parent- and clinician-rated between session BPT skill utilization such that those with higher ADHD symptoms displayed poorer adherence. One possible explanation for the present findings is that the attentional and executive weaknesses underlying parental ADHD symptoms pose a significant barrier for effective between-session implementation of learned BPT skills. Deficient working memory, behavioral inhibition, organizational, and attentional abilities associated with ADHD symptoms may impede consistent *in vivo* application of learned BPT skills at home. This possibility is corroborated by recent evidence showing that poor parental executive functioning predicts decreased positive parenting practices such as providing effective instructions (Shaffer & Obradovi , 2017) and task scaffolding (Mazursky-Horowitz et al., 2018; Shaffer & Obradovi , 2017), as well as increased harsh, reactive parenting practices (Deater-Deckard, Wang, Chen, & Bell, 2012; Park & Johnston, 2020).

Parental ADHD symptoms appear to be a significant risk factor for poor between-session adherence even after controlling for the effects of child symptom and impairment severity, various sociodemographic factors (e.g., single parent household, parental level of education, employment status, and income), and parental symptoms of anxiety and depression. Parental ADHD and anxiety/depression symptoms each explained unique, non-overlapping variance in between-session BPT adherence. The latter findings are particularly noteworthy, and may explain the rather moderate improvements seen in recent attempts to improve BPT outcomes for youth with ADHD by also treating parents' depressive symptoms (Chronis-Tuscano et al., 2013). In a recent study, Chronis-Tuscano and colleagues (2013) examined the effect of an integrated CBT-based approach for parental depression symptoms + BPT intervention compared to a standard BPT control group for treating childhood ADHD. Relative to standard BPT, the combined intervention was associated with only small-to-moderate improvements in maternal depressive symptoms, negative parenting practices, child oppositionality, and overall child impairment at post-treatment compared to standard BPT. It stands to reason that, if parental ADHD and comorbid internalizing symptoms

independently hamper BPT adherence, treatment of both symptom domains may maximize adherence, but this hypothesis has not been tested.

Although parental ADHD symptoms were associated with reduced between-session adherence, symptoms failed to predict parent- and clinician-rated in-session participation, BPT skill understanding, and treatment engagement attitudes, which was contrary to our initial hypotheses. While within-session participation, skill understanding, and treatment attitudes are important predictors of child outcomes following BPT (Rooney et al., 2018), the present study suggests that these treatment engagement factors are largely unaffected by symptoms and impairment related to parental ADHD. The lack of significant associations between parental ADHD symptoms and attendance was largely expected given the non-supporting, albeit sparse, literature examining this association. For example, parental ADHD symptoms failed to predict attendance (Chronis-Tuscano et al., 2011) and attrition (Thompson et al., 2009) during parenting programs for children with ADHD in previous investigations. Our revised hypothesis is that parental psychopathology has the greatest effect on behaviors that parents must self-initiate (e.g., use of skills between session), whereas the structure and support of the group compensates for parents' attentional difficulties during session or difficulties that may impede session attendance.

Clinical Implications

The findings of the present study have important implications for the development of novel treatment augmentations. That is, treatment adaptations targeting parental ADHD symptoms in the context of BPT interventions may be a promising approach for improving parental adherence (and ultimately child outcomes) by reducing the executive- and attentional-related adherence barriers associated with parental ADHD. For example, Cognitive and Behavioral Therapy (CBT) has strong evidence as an effective treatment for adult ADHD and executive dysfunction (Kooij et al., 2010; Solanto, Marks, Mitchell, Wasserstein, & Kofman, 2008; Solanto et al., 2010). This intervention promotes organizational, time management, planning, and emotion regulation skill development to compensate for the challenges associated with adult ADHD. CBT for ADHD is associated with moderate to large magnitude reductions in ADHD symptoms, as well as improvements in occupational functioning, organizational skills, emotion regulation, and self-esteem (Solanto et al., 2010; Weiss et al., 2008). Because cognitive and behavioral interventions have proven effective in non-parenting domains, it stands to reason that these principles may be a promising mechanism for reducing parental ADHD-related barriers to between-session BPT skill adherence, and future BPT interventions may benefit from integrating CBT for adult ADHD within parent training programs.

To date, only two studies have examined the effect of dual child/parent treatment for youth with ADHD. In one case, a combination of Dialectical Behavior Therapy (DBT) and psychostimulant medication for maternal ADHD prior to a BPT program was compared to a supportive psychotherapy + BPT control group (Jans et al., 2015). In a second study, sequenced maternal stimulant medication and BPT was examined for children and parents with ADHD (Schoenfelder, Chronis-Tuscano, Strickland, Almirall, & Stein, 2019). Both studies support the feasibility of dual parent/child ADHD treatment. However, neither study

examined effects on adherence to BPT, so it remains unclear whether treatment for parental ADHD can improve between-session skill use. Also, it is likely that parental cognitive/behavioral treatment will need to be included and explicitly target BPT adherence, given (a) robust findings that improvements following behavioral interventions are setting-specific and fail to generalize to non-treated domains (Evans et al., 2018; Pelham & Fabiano, 2008), and (b) stimulant medication alone is unlikely to sufficiently reduce ADHD symptoms and improve functional outcomes in adults with ADHD (Biederman et al., 2011; Kooij et al., 2010; Marraccini, Weyandt, Rossi, & Gudmundsdottir, 2016). These studies, coupled with the findings of the present investigation, suggest treating parental ADHD symptoms in the context of BPT programs may be a promising approach for improving parental adherence to BPT skills as well as child outcomes.

Because robust associations between session adherence and parental inattention were identified in our parent sample, most of whom did not meet symptom thresholds for ADHD[4], an interesting implication of our findings is that most parents, not just those with clinically diagnosed ADHD, may benefit from treatment augmentations aiming to reduce the executive function requirements for successful, in vivo BPT implementation. Subclinical inattention and executive functioning challenges may occur secondary to the multiple demands of parenting along with managing a household and/or job/career responsibilites as well as other factors, and these parents may similarly benefit from approaches to reduce EF-related adherence barriers. Such approaches may include (a) increased repetition to promote overlearning of BPT skills, thereby increasing automaticity of learned BPT skills and reducing the attentional and executive resources required for BPT skill implementation; (b) role playing skills in multiple scenarios to generalize skill application and compensate for deficient set-shifting abilities; and (c) introducing 'mantras' to repeatedly highlight more salient aspects BPT skills in order to increase prepotency of learned skills over less effective skills (Solanto et al., 2008). While this approach remains untested, our study hints at the promise of such approaches for improving BPT adherence.

Limitations and Future Directions

Despite multiple methodological strengths (e.g., multi-method/multi-informant assessment of treatment engagement), several limitations warrant discussion. First, future work should examine the underlying pathways involved in the process linking parental ADHD risk to attenuated between-session BPT skills practice. We examined ADHD symptoms as a risk mechanism for treatment engagement (i.e., attendance, in-session participation, between-session practice, skills understanding, engagement attitudes), but did not directly examine underlying mechanisms of executive dysfunction (e.g., working memory, organization/planning, motivation, emotion regulation) that might contribute to treatment engagement difficulties, and this represents an important focus for future research. Further, we examined parental ADHD symptoms at baseline and mean scores of treatment engagement (collapsed across ten BPT sessions), and it is possible that other patterns of ADHD-related symptoms/impairment or executive dysfunctions and the association with treatment engagement might

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[4]11% (N=16) of parents had an average T-score greater than or equal to 65 on the ASR/CAARS composite, and 11% (N=17) met criteria for ADHD based on DSM symptom count endorsement on the CAARS

emerge over the course of treatment. Future efforts should consider ongoing assessment of parental ADHD symptoms, multi-informant assessment of parental ADHD, parental stimulant/non-stimulant medication status, executive dysfunctions, and other treatment engagement barriers before, during, and after BPT treatment to better understand specific patterns of association with treatment engagement, particularly for predicting weekly between-session BPT skill practice.

It is interesting to note that parental ADHD showed stronger associations to parent-rated between-session engagement ($r = -.38$) relative to clinician-rated between-session engagement ($r = .20$). While this finding might be secondary to inter-rater differences, it is also possible that clinicians' ratings of parental treatment engagement are impacted by whether and how a parent contributed during the BPT session (e.g., what content parents shared during the BPT session, examples provided of homework practice) as well as their history of behavior in prior sessions. For instance, for parents who minimally participated during session discussions, particularly during the homework review portion of the session, clinicians may have less information to provide a rating of between-session engagement, and as a result may rate these parents are less adherent or engaged overall. Further, the present study relied on one or two item measures rated by parents and clinicians for assessing treatment engagement. Although this approach is consistent with prior examinations of parent adherence and treatment engagement in BPT (Rooney et al., 2018; Springer & Reddy, 2010; Villodas et al., 2014), it is important for future work to collect multi-informant data or develop and utilize validated measures of treatment engagement or objective measures such as review of homework products or BPT skill daily diary completion (Lindhiem et al., 2020). In addition, it may be useful to gather measures related to parent's perceptions of barriers and facilitators of their use of the recommended BPT strategies. Future work may also consider digital health strategies (e.g., electronic daily diary assessments delivered via text message) for assessing parents' *in vivo* skills utilization in response to specific child behaviors, which would provide a greater understanding of barriers and facilitators of parental BPT skill utilization in the moment (Lindhiem, Bennett, Rosen, & Silk, 2015).

We also recognize that parental ADHD symptoms were measured continuously and did not represent diagnostic classifications. Although this is an important first step in exploring the association between parental ADHD and treatment engagement, it is possible that parents with clinical levels of ADHD may experience treatment-engagement decrements in multiple domains beyond between-session adherence (e.g., in-session participation, perceived skill understanding). This notion is supported by a recent review of the impact of parental ADHD on evidence-based treatment for children with ADHD. Chronis-Tuscano and colleagues (2017) noted that parental ADHD attenuates child improvement from BPT particularly for parents with clinical or high levels of ADHD symptoms. In the present study, although there was significant variability in levels of parental ADHD, on average, levels of parental ADHD symptoms were in the typical range (T score $M = 50.26$). As such, findings may differ in samples of parents with higher levels of ADHD symptoms.

It may also be argued that rater bias among depressed parents may influence child behavior ratings, such that depressed parents may endorse more symptoms and impairment in their children due to global, depressogenic halo effects. Indeed, we did find a significant, albeit

small magnitude, correlation between parental anxiety/depression symptoms and parent ratings of child ADHD ($r = .18$). In order to examine whether such relations are accounting for the present study's findings, we re-ran study models using teacher-rated symptoms of child ADHD and found an identical pattern of results, suggesting that mono-rater biases (secondary to depression or otherwise) do not account for the observed, robust relations between parental ADHD symptoms and between-session adherence.

Future research is also needed to replicate the findings of the current study using larger and more diverse samples (e.g., broader range of socioeconomic levels, racial/ethnicity backgrounds; balanced gender distribution). Additionally, the present study is comprised of parents and children with ADHD-I exclusively and future efforts should also examine whether findings are consistent among samples with differing ADHD presentations in both youth and parents. Further, parent participants in the present study were highly educated (i.e., 81% reported graduating college), which also limits the generalizability of these findings, particularly in light of potential associations between parent/family sociodemographic barriers (e.g., parent education, work schedules) to treatment engagement. Of note, in the present study, parent education level was not associated with any measure of treatment engagement (bivariately or via multi-variate regression models), and it is therefore unlikely that parent education level accounted for systematic variance in treatment engagement.

Conclusions

As recommendations continue to emphasize identifying and leveraging mechanisms of change as targets for developing novel adaptations to behavioral interventions (DuPaul, Evans, Mautone, Owens, & Power, 2019; Insel & Gogtay, 2014), reducing parental psychopathology may be a promising and viable approach to add to our treatment armamentarium. Dual parental/child treatment for ADHD has the potential to change the *status quo* for childhood ADHD treatment by treating the disorder as a hereditary, intergenerational condition—an approach consistent with known genetic loadings (Larsson et al., 2014). That is, if a dual parent/child intervention produces incremental benefits over traditional BPT modalities, treatment for childhood ADHD may shift from focusing on the child to the entire family ADHD milieu.

Acknowledgments

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Table 1.

Bivariate correlations, means, and standard deviations for parental ADHD symptoms and all treatment engagement variables

	1	2	3	4	5	6	7	8	9	10	11
1. Parental ADHD Symptoms	--	-0.38	-0.07	0.00	-0.08	-0.20	-0.12	0.02	-0.06	0.61**	0.27**
2. PR Between-Session Adherence	-0.38**	--	0.40**	0.31**	0.46**	0.27**	0.09	-0.06	-0.01	-0.41**	0.02
3. PR In-Session Participation	-0.07	0.40**	--	0.67**	0.55**	0.07	0.06	-0.02	0.05	-0.15	0.11
4. PR BPT Skill Understanding	0.00	0.31**	0.67**	--	0.54**	0.04	0.04	0.04	-0.03	-0.01	0.04
5. PR Attitudinal Engagement	-0.08	0.46**	0.55**	0.54**	--	0.19*	0.09	0.03	0.11	-0.04	0.09
6. CR Between-Session Adherence	-0.20*	0.27**	0.07	0.08	0.19*	--	0.76**	0.60**	0.15	-0.14	-0.06
7. CR In-Session Participation	-0.12	0.09	0.06	0.04	0.09	0.76**	--	0.63**	0.13	-0.08	-0.01
8. CR BPT Skill Understanding	0.02	-0.06	-0.02	0.04	0.03	0.60**	0.6**	--	0.12	-0.08	-0.11
9. Session Attendance	-0.06	-0.01	0.05	-0.03	0.11	0.15	0.13	0.12	--	0.02	0.08
10. Parental Anxiety/Depression	0.61**	-0.41**	-0.15	-0.01	-0.04	-0.14	-0.08	-0.08	0.02	1.00	0.18*
11. Child ADHD	0.27**	0.02	0.11	0.04	0.09	-0.06	-0.01	-0.11	0.08	0.18*	1.00
M	50.26	5.01	5.65	6.41	6.11	6.03	6.20	6.58	8.41	55.75	25.24
SD	9.76	0.75	0.71	0.43	0.61	0.76	0.62	0.51	1.98	6.57	7.04
N	147	145	145	145	145	145	145	145	148	146	148

Note. ADHD = Attention Deficit/Hyperactivity Disorder; BPT = Behavioral Parent Training; CR = Clinician Rated; ODD = Oppositional Defiant Disorder; PR = Parent Rated.

*
$p < .05$.

**
$p < .01$

Table 2:

Regression Analyses of Parental ADHD Symptoms Predicting Parent and Clinician-Rated Between Session Adherence to BPT Skills After Controlling for Parent- and Child-Factors

	DV: Parent-Rated Between-Session BPT Skill Adherence							
Baseline Predictors	**Step 1 Model Summary**				**Step 2 Model Summary**			
	B	**SE**	**β**	**t**	**B**	**SE**	**β**	**t**
	$F(1,142) = 28.177^{**}, R^2 = .17$				$F(1,141) = = 5.26^{**}, R^2 = .20,$			$R^2 = .03$
Parental Anxiety/Depression	–0.05	0.05	–0.41	**–5.31**[**]	–0.03	0.01	–0.27	**–2.81**[*]
Parental ADHD Symptoms	-	-	-	-	–0.02	0.01	–0.22	**–2.29**[*]
Parent Factors	$F(4,133) = .851, R^2 = .03$				$F(1,132) = 22.28^{**}, R^2 = .17,$			$R^2 = .14$
Parent Level of Education	–0.12	0.09	–0.12	–1.37	–0.05	0.08	–0.04	–0.53
Employment Status	–0.06	0.15	–0.03	–0.39	–0.14	0.14	–0.09	–1.04
Household Income	–0.02	0.07	–0.02	–0.24	–0.04	0.06	–0.06	–0.67
Single Parent Household	–0.21	0.20	–0.10	–1.03	–0.23	0.19	–0.10	–1.21
Parental ADHD Symptoms	--	--	--	--	–0.03	0.01	–0.39	**–4.72**[**]
Child Behaviors	$F(1,143) = .08, R^2 = .00$				$F(1,142) = 27.13^{**}, R^2 = .16,$			$R^2 = .16$
PR Child ADHD Symptom Severity	0.00	0.01	0.02	0.28	0.01	0.01	0.14	1.69
Parental ADHD Symptoms	--	--	--	--	–0.03	0.01	–0.42	**–5.21**[**]

	DV: Clinician-Rated Between-Session BPT Skill Adherence							
Baseline Predictors	**Step 1 Model Summary**				**Step 2 Model Summary**			
	B	**SE**	**β**	**t**	**B**	**SE**	**β**	**t**
	$F(1,142) = 2.79, R^2 = .01$				$F(1,141) = 4.64^{*}, R^2 = .01,$			$R^2 = .03$
Parental Anxiety/Depression	–0.02	0.01	–0.14	–1.67	0.00	0.01	0.00	0.01
Parental ADHD Symptoms	-	-	-	-	–0.02	0.01	–0.23	**–2.16**[*]
Parent Factors	$F(4,133) = .46, R^2 = .01$				$F(1,132) = 6.41^{*}, R^2 = .06,$			$R^2 = .05$
Parent Level of Education	0.05	0.09	0.05	0.59	0.10	0.09	0.10	1.08
Employment Status	–0.10	0.15	–0.06	–0.66	–0.15	0.15	–0.09	–1.01
Household Income	0.02	0.07	0.03	0.34	0.01	0.07	0.01	0.13
Single Parent Household	–0.13	0.21	–0.06	–0.64	–0.14	0.2	–0.06	–0.71
Parental ADHD Symptoms	--	--	--	--	–0.02	0.01	–0.22	**–2.53**[*]
Child Behaviors	$F(1,143) = 0.56, R^2 = .00$				$F(1,142) = 5.50^{*}, R^2 = .04,$			$R^2 = .04$
PR Child ADHD Symptom Severity	–0.01	0.09	–0.06	–0.75	0.00	0.01	–0.01	–0.11
Parental ADHD Symptoms	--	--	--	--	–0.02	0.01	–0.20	**–2.35**[*]

Note. ADHD = Attention-Deficit/Hyperactivity Disorder; DV = Dependent Variable; PR=Parent Rated;

[*]
$p < .05,$

[**]
$p < .01.$