Title
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Permalink
https://escholarship.org/uc/item/7z53w234

Journal
Family process, 56(3)

ISSN
0014-7370

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Publication Date
2017-09-01

DOI
10.1111/famp.12252

Peer reviewed

Parental Cognitive Errors Mediate Parental Psychopatholgy and Ratings of Child Inattention

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Abstract

OBJECTIVE & METHOD—We investigate the Depression-Distortion Hypothesis in a sample of 199 school-aged children with ADHD-Predominantly Inattentive presentation (ADHD-I) by examining relations and cross-sectional mediational pathways between parental characteristics (i.e., levels of parental depressive and ADHD symptoms) and parental ratings of child problem behavior (inattention, sluggish cognitive tempo, and functional impairment) via parental cognitive errors.

RESULTS—Results demonstrated a positive association between parental factors and parental ratings of inattention, as well as a mediational pathway between parental depressive and ADHD symptoms and parental ratings of inattention via parental cognitive errors. Specifically, higher levels of parental depressive and ADHD symptoms predicted higher levels of cognitive errors, which in turn predicted higher parental ratings of inattention.

CONCLUSION—Findings provide evidence for core tenets of the Depression-Distortion Hypothesis, which state that parents with high rates of psychopathology hold negative schemas for their child's behavior and subsequently, report their child's behavior as more severe.

Child psychopathology assessment guidelines emphasize comprehensive multi-method, multimodal, and multi-informant methodologies (e.g., Pelham, William, Fabiano, & Massetti, 2005). Yet maternal-report symptom-rating scales often serve as the predominant type of behavioral data employed by clinicians and researchers alike. Unfortunately, at least a subset of parents have a tendency to over-report the presence and severity of psychopathology in their children (De Los Reyes & Kazdin, 2005). Thus, relying solely on parental reports can lead to inaccurate and inappropriate diagnoses and treatment planning. A leading explanation for this phenomenon is the Depression-Distortion Hypothesis, which theorizes that parents with depressive features hold more negative schemas for their child's behavior and consequently over-report the severity of their child's psychopathology (Richters, 1992). Although Richters (1992) originally suggested that the empirical evidence supporting the Depression-Distortion Hypothesis is limited, the phenomenon now has been documented utilizing a variety of empirical methods (e.g., cross-sectional, longitudinal),

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within different types of populations (e.g., community, clinically-referred), and across various outcomes (e.g., internalizing and externalizing psychopathology, social functioning; as reviewed by De Los Reyes & Kazdin, 2005). It has been estimated that between 1.7% and 16.0% of the variance in parental reports of psychopathology is associated with maternal depression (Fergusson, Lynskey, & Horwood, 1993).

The Depression-Distortion Hypothesis is grounded in well-supported cognitive theories of depression stating that individuals with depression hold global, stable, and internal attributions for negative events, sometimes described as "distortions," "maladaptive thinking," or "cognitive errors" (Abramson, Metalsky, & Alloy, 1988; Sweeney, Anderson, & Bailey, 1986; Yurica & DiTomasso, 2005). Common cognitive errors include "jumping to conclusions" (i.e., one event seemingly is reflective of a generalized negative conclusion), "mentally filtering" (i.e., disqualifying positive evidence and only focusing on negative evidence), and "personalization" (i.e., blaming someone for causing negative events or situations without adequate evidence; Yurica & DiTomasso, 2005). The connection between depression and cognitive errors has been supported in a multitude of populations and within various contexts (e.g., parental attributions of child misbehavior and negative family functioning). Specifically, parents with depressive features are likely to perceive their child's misbehavior as controllable, intentional, and caused by negative, internal child factors (Bolton et al., 2003; Leung & Slep, 2006). Furthermore, parents with depressive features are likely to display stable, global, and dispositional attributions for their own role in their child's misbehavior, creating a sense of "learned helplessness" in the assessment of their parenting and perceived control over the family (Leung & Slep, 2006).

It is not difficult to imagine how cognitive errors may distort a parent's response style on a child behavior rating scale. In comparison to parents with lower rates of depression, who are more likely to attribute child misbehavior as unintentional, controllable by the parent, and attributable to environmental or transient causes, a parent with higher symptoms of depression and associated cognitive errors may exaggerate the frequency and severity of the child's misbehavior when considering and responding to scale items. For example, many children experience difficulty getting along with peers; however, one mother with a high level of depressive features may view an instance in which her child experiences social conflict and think, "My child always gets into fights because she is mean and bossy. She's never going to have any friends and there is nothing I can do to help her because I'm a lousy mom!" Another mother with a low level of depressive features may view the same instance and think, "My child had a rough day on the playground today. Maybe she didn't get enough sleep and was cranky. We can talk about problem-solving strategies tonight and she'll have a better day tomorrow." Subsequently, when completing a behavior rating scale, the first mother may be more likely than the second to display cognitive errors when recalling instances to support her item responses, such as "jumping to conclusions" (e.g., remembering one negative event when making generalized ratings), "mentally filtering" (e.g., disqualifying instances in which her child behaved and only focusing on instances of misbehavior), or "personalizing" (e.g., blaming the child and/or a lack of parental control for generalized negative behavior and family functioning), thus over-reporting specific symptom ratings.

Depression-Distortion Hypothesis in Reports of ADHD

Parental ratings of ADHD may be vulnerable to the type of distortion specified by the Depression-Distortion Hypothesis given that depression is prevalent in caregivers of children with ADHD (Cunningham, Benness, & Siegel, 1988; Faraone & Biederman, 1997). As well, similar to parent ratings of other forms of psychopathology, substantial discrepancy is found between parent ratings of ADHD symptoms and ratings of teachers or clinicians (Wolraich et al., 2004). Inter-rater agreement for parents and objective raters appears equally low across types of assessment tools (rating scale versus interview modalities), as well as type of ADHD symptom evaluated (inattentive versus hyperactive-impulsive; e.g., $r = .27$ for each, Wolraich et al., 2004). Furthermore, given that (a) the Depression-Distortion Hypothesis is the most consistently supported explanation for informant-discrepant child behavior reports (De Los Reyes & Kazdin, 2005), and (b) parents of children with ADHD are more likely to experience depression than parents of control children (Cunningham, Benness, & Siegel, 1988; reviewed by Johnston & Mash, 2001), it seems pertinent to examine the Depression-Distortion Hypothesis in reports of ADHD symptoms.

In 2002, Chi & Hinshaw investigated the Depression-Distortion Hypothesis in a large, multi-site sample of children diagnosed with ADHD-Combined Type (ADHD-C). Results supported the phenomenon of the Depression-Distortion Hypothesis in this population by demonstrating that higher ratings of parental depression significantly predicted higher parental ratings of ADHD (compared to teacher and child ratings). Other potential contributors to the Depression-Distortion Hypothesis also were examined, such as family socioeconomic status and child verbal intelligence, but all failed to demonstrate significant associations with inflated parental ratings of ADHD (Chi & Hinshaw, 2002).

Richters (1992) originally suggested that alternative factors to parental depression may also contribute to the phenomenon in which parents hold negative schemas for their child's behavior and subsequently overestimate their ratings of child psychopathology. In families of children with ADHD, the level of comorbid parental ADHD symptoms seems likely to be a contributing factor to biased parental ratings of child psychopathology for several reasons. To begin, parents with high levels of ADHD symptoms are more likely to report an external locus of control for their parenting than are parents with low levels of ADHD symptoms (Banks, Ninowski, Mash, & Semple, 2008), perhaps as a form of self-protection or an adult version of the "Positive Illusory Bias" (Owens, Goldfine, Evangelista, Hoza, & Kaiser, 2007) previously claimed to be common in children with ADHD. For example, it may be less self-damaging to think, "I got a note home about my son's behavior in class today because he is a difficult child and always will be" compared to, "I got a note home about my son's behavior in class today because I'm not doing enough as a parent to help him learn self-control." Subsequently, parents with higher levels of not only depression but also ADHD symptoms may be more likely to attribute occurrences of child ADHD symptoms to factors outside of their own parental control (e.g., global/stable factors internal to their child) when rating frequency and/or severity on behavior rating scales. The potential tendency for these parents to inflate ratings of their child's ADHD symptoms may be compounded by the fact that ADHD is highly heritable (Nigg, 2006; Willcutt, 2012). Thus, biological parents of children with ADHD may be biased to over-identify and/or over-report ADHD in their

children (reviewed by Faraone, Monuteaux, Biederman, Cohan, & Mick, 2003). For example, a parent may recognize developmentally normative behaviors in their child and misattribute them to global/stable ADHD symptoms internal to the child (e.g., a child forgets his notebook at school one day and his parent thinks, "That's because he's forgetful, like I was at his age. I guess he'll grow up to be just like me!"), which may subsequently contribute to inflated ratings of the child's ADHD symptoms on behavior rating scales. Given the similarity in maladaptive cognitive distortions experienced by parents with high levels of ADHD and depressive symptoms, in addition to respect for continuity with terms used in existing literature, we will use the "Depression-Distortion Hypothesis" terminology when referring to the contribution of parental psychopathology (including parental ADHD) to negative schemas for child behavior and subsequently more severe ratings of child behavior.

Only one study to the authors' knowledge has examined the role of parental ADHD in the Depression-Distortion Hypothesis (i.e., Faraone et al., 2003). Contrary to expectations, results from this study failed to find a significant relation between parental ADHD and parental ratings of child ADHD; however, parental ADHD in this report was measured categorically (i.e., presence or absence of ADHD diagnosis), and reports of child ADHD were measured by symptom count rather than symptom severity, which may have resulted in restricted variance. Additionally, the categorical measurement of parent and child ADHD did not allow for examination of symptom cluster influence, such as investigation of the potential impact specifically in ratings of inattention. Given the differences in ADHD symptom cluster presentation and manifestation (Milich, Balentine, & Lynam, 2001; Willcutt et al., 2012), there may be an association between the level of parental ADHD symptoms and parental ratings of child ADHD symptoms that is obfuscated unless inattention is evaluated independent of hyperactivity/impulsivity. It is possible, for example, that the influence of parental ADHD symptoms is not evident in reports of behaviorally overt hyperactive/impulsive ADHD symptoms, but instead is evident in reports of the less overt symptoms of inattention, which may be more difficult to attend to and recall with accuracy. Thus, although there is no existing support in the literature for the role of parental ADHD in the Depression-Distortion Hypothesis, future investigations may find that parental ratings of ADHD are more sensitive to detection of potential response-style bias if inattention is measured 1) linearly to capture symptom severity rather than count, and 2) independent of the related, and yet distinct, hyperactive/impulsive symptom domain.

Finally, no associations or mediational pathways with depression and/or cognitive errors were examined in the Faraone et al. (2003) report. It may be that although a direct relation between parental ADHD symptoms and parental ratings of child ADHD is not evident, a more complex mediational pathway between levels of comorbid ADHD and depressive symptoms, cognitive errors, and parental ratings exists. For example, parental ADHD symptoms may partially account for, or contribute to, parental ratings of child ADHD, but only when high levels of parental depression and cognitive errors are present.

Limitations to Existing ADHD Depression-Distortion Hypothesis Literature

All of the existing studies (to the authors' knowledge) investigating the Depression-Distortion Hypothesis related to ADHD have been conducted with samples of children with ADHD-C (e.g., Chi & Hinshaw, 2002) or samples that do not account for ADHD symptom cluster (e.g., Faraone et al., 2003). It is possible that the relation is even *more* robust for families of children with ADHD-Inattentive presentation (ADHD-I) than in families of children with ADHD-C. Specifically, children with ADHD-I often are identified at an older age compared to children with more behaviorally overt forms of ADHD (Milich et al., 2001), sometimes described as "slipping through the cracks." Thus, parents of children with ADHD-I may be particularly discouraged by a perceived lack of identification and support for their child's difficulties, and in a search for understanding, may adopt overly personal explanations, leading to a heightened experience of the Depression-Distortion Hypothesis. For example, a parent of a child with ADHD-I may think, "Nobody at school has complained about my child's inattention, so it seems like he can focus when he wants to. Is he doing this on purpose with me just to push my buttons?" Also, it is possible that ADHD-I symptoms, which are less obvious and perhaps subsequently more difficult to recall with accuracy, may lend themselves to biasing factors not yet documented in existing Depression-Distortion Hypothesis literature, such as parental ADHD.

Additionally, previous research regarding the Depression-Distortion Hypothesis in samples with ADHD has been limited to examination of ADHD symptoms and problem behavior, and absent for additional important constructs associated with ADHD that are relevant for assessments, such as functional impairment and Sluggish Cognitive Tempo (SCT). These constructs have utility in augmenting assessments with information necessary for ADHD diagnosis (i.e., evidence of impairment to academic, social, or occupational functioning serves as Criterion D in the Diagnostic and Statistical Manual of Mental Disorders [DSM; American Psychiatric Association, 2013] and treatment planning (i.e., SCT difficulties such as daydreaming, slow processing, and fluctuations of arousal are related to, but partially distinct from, DSM symptoms of inattention and hyperactivity/impulsivity in being associated with, and predicting, various relevant impairment outcomes; Carlson & Mann, 2002; McBurnett et al., 2014; Mueller, Tucha, Koerts, Groen, & Lange, 2014; Servera, Bernad, Carrillo, Collado, & Burns, 2015). However, it is possible that these factors may be less susceptible to the Depression-Distortion Hypothesis than are ADHD symptoms. Specifically, given that ratings of ADHD symptoms consistently demonstrate low reliability between raters (e.g., parents versus teachers; Wolraich et al., 2004), context (e.g., school versus home; Langberg et al., 2010), and even method while holding rater and context consistent (e.g., identical DSM-5 items presented to the same rater in different questionnaires at two closely spaced points in time; Solanto & Alvir, 2009), experts have postulated that characteristics inherent in ADHD symptom rating scales make them particularly vulnerable to subjective interpretation based on factors other than actual child behavior variance (Johnston, Weiss, Murray, & Miller, 2014), one of which may be rating style bias. Thus, given the historically low reliability of ADHD symptom ratings, the importance of functional impairment in ADHD assessments (American Psychiatric Association, 2013), and the increasing emphasis on SCT (e.g., Barkley, 2013; McBurnett,

Pfiffner, & Frick, 2001), evaluation of the potential role of the Depression-Distortion Hypothesis in these important domains (or conversely the possibility that functional impairment and SCT may be less subject to influences causing poor consistency across informants) is needed.

Finally, despite the underlying theoretical support for the Depression-Distortion Hypothesis, no studies to the authors' knowledge have yet investigated a measure specifically designed to assess "distortions", or a pathway between depression and distortions. Examination of a mediational pathway from parental depression to parental ratings of child ADHD via a measure of cognitive errors (i.e., perceptions of child misbehavior as controllable, intentional, and attributed to negative, internal child factors; Bolton et al., 2003; Leung & Slep, 2006) seems necessary to provide more direct evidence for the Depression-Distortion Hypothesis.

Current Study

Our goals were twofold. First, we sought to investigate the Depression-Distortion Hypothesis in a sample of children diagnosed with ADHD-Inattentive presentation by examining the association between parental factors (i.e., parental depressive and ADHD symptoms) and parental ratings of child behavior. Based on previous research, we predicted that parental self-reported depressive symptoms would be associated with higher parental ratings of inattention. Given the lack of support for the role of parental ADHD symptoms in the Depression-Distortion Hypothesis in the existing literature, the relation between parental ADHD symptoms and parental ratings of inattention was exploratory. Similarly, parent ratings of SCT and functional impairment were examined without explicit hypotheses in light of the shortage of research examining the Depression-Distortion Hypothesis with these outcome variables. If the Depression-Distortion Hypothesis is supported across different domains of child behavior, this would either suggest that (1) parents with higher levels of depressive symptoms broadly perceive their child's behavior as being more severe, or (2) parents with higher levels of depressive symptoms have children who behave more severely. If the Depression-Distortion Hypothesis is supported only for parent ratings of inattention but not functional impairment or SCT, this would suggest that there is something unique about the association between parental depression and parental ratings child inattention (compared to ratings of child behavior in general), either driven by differences in parental perception and/or the actual severity of child behavior across domains.

Second, we investigated cross-sectional mediational pathways between parental psychopathology (i.e., parental depressive and ADHD symptoms) and parental ratings of child ADHD via parental cognitive errors. We predicted that the associations between parental psychopathology and parental ratings of child ADHD would be mediated by cognitive errors, thus providing evidence for a key underlying mechanism of the Depression-Distortion Hypothesis. Specifically, we predicted that parent psychopathology would lead to distorted cognitions, which in turn would lead to higher parental ratings of child ADHD. Although our data are cross-sectional (rather than longitudinal) and consequently permit only examination of cross-sectional associations, even evidence of such cross-sectional

associations seems likely to be helpful in delineating key relationships among constructs of interest and paving the way for future longitudinal research.

Method

Participants

Participants included 199 parents and children participating in a randomized clinical trial (RCT) investigating the efficacy of an integrated psychosocial intervention for children with ADHD-I across two academic institution sites (University of [name removed for blind review], n = 96; University of [name removed for blind review], n = 103). Boys constituted just over half the sample (58.3%); children averaged 8.6 years of age (range 7–11) and were from varied ethnic/racial backgrounds. At the time of assessment, 4.5% of children were taking stimulant medication to address ADHD-related symptoms. 182 of the parents were biological parents of the identified child and 17 were non-biological parents or caretakers. More specifically, the sample was comprised of 167 biological mothers, 13 biological fathers, 10 adoptive mothers, 3 adoptive fathers, 2 stepmothers, 1 grandmother, and 3 other caregivers. Further demographic information for parents and children may be found in Table 1.

Children were primarily referred for the study through mailings to principals, school mental health providers, and learning specialists, with the remaining recruited through postings in on-line parent networks, offices of pediatricians and child psychiatrists, and through word-of-mouth. To participate in the study, children needed to meet the following criteria: a DSM-IV diagnosis of ADHD-I (see below for screening/assessment description), a Full Scale IQ > 80, placement with at least one biological or adoptive parent for the past year (in order to ensure stability for participation in an intensive intervention program), and teacher consent to participate in a school-based treatment. Children were excluded from the study if they were taking or anticipating initiation of non-stimulant psychotropic medication during the study period, had a significant developmental disorder (e.g., pervasive developmental disorder) or neurological illness, or if they were in an all-day special education classroom.

Procedure

Initial screening for potential participants began via parent and teacher telephone interviews. Those who met basic screening criteria were sent parent and teacher packets containing the ADHD module of the Child Symptom Inventory (CSI-4; Gadow & Sprafkin, 1994) and the Impairment Rating Scale (IRS: Fabiano et al., 2006) to screen for subjects who were likely to meet full diagnostic criteria for ADHD-I. The small number of children taking stimulant medication completed a 1-week wash-out to assess behavior and obtain ratings off-medication. On the CSI-4, a symptom was judged to be present if rated "often" or "very often" by either parent or teacher. Cases meeting the following guidelines were invited for a diagnostic clinic visit: (a) at least five independent symptoms of inattention endorsed on the CSI by parent or teacher, with at least two inattention symptoms endorsed by each informant; (b) five or fewer independent symptoms of hyperactivity and impulsivity endorsed on the CSI-4 by parent or teacher; and (c) evidence of impairment due to inattention as rated by both parents and teachers on the IRS (i.e., at least one area of

functioning had to be rated = 3 by each informant (Fabiano et al., 2006). A small number of cases that narrowly missed this guideline but were otherwise significant for ADHD-I also were invited to a diagnostic visit. Screening guidelines were intentionally set low, in order not to exclude children who would ultimately meet symptom count and impairment criteria for ADHD-I. Please see Table 1 for parent- and teacher-reported inattention and hyperactivity/impulsivity symptom counts for participating children. As part of the assessment procedure, parents and teachers completed a series of questionnaires that included measures of child ADHD symptoms and parenting/family functioning. Participants provided informed written consent and children provided written assent for participation; study procedures were approved by the Committee on Human Research at the University of [name removed for blind review] and University of [name removed for blind review].

To determine diagnostic status, parents were interviewed by a member of the clinical team and were asked about their child's clinical and developmental history and administered modules from the Kiddie Schedule for Affective Disorders and Schizophrenia for School-Age Children (K-SADS-PL; (Kaufman et al., 1997) assessing ADHD, oppositional defiant disorder, conduct disorder, anxiety disorders, major mood disorders, and psychoses. The K-SADS has good psychometric properties, including adequate test-retest reliability (Kaufman et al., 1997). Twenty percent of the randomly selected audio-recorded K-SADS interviews were rated by an independent clinician with 100% agreement for an ADHD-I diagnosis (kappa =1.0). All cases met full DSM-IV criteria for ADHD-I. Parents also completed a battery of questionnaires over two visits, and children were administered the WISC-IV and a battery of tests and questionnaires at these same visits. All cases progressing from the screening stage met full DSM-IV criteria for ADHD-I.

Measures

ADHD Problem Domains

Attention Problems Clinical Scale from the Behavior Assessment System for Children-Second Edition (BASC-2; (Reynolds & Kamphaus, 2004): The BASC-2 is a norm-referenced, standardized behavioral assessment system that can be completed by parents and teachers. There are several clinical subscales; for this study, the Attention Problems subscale served as a dimensional measure of inattention. Each symptom is rated on a 4-point scale from "never" to "very often". The Attention Problems clinical scale contains normative data, as well as excellent internal consistency (Cronbach alpha levels ranging from .86–.93), test-retest reliability, and construct validity (Reynolds & Kamphaus, 2004). In the current study, the Attention Problems T-score rather than raw score was utilized in order to account for age differences.

Clinical Global Impressions (CGI; NIMH, 1985): Parents and teachers provide a rating of the child's overall impairment on a 7-point scale with lower scores indicating greater functional impairment. The CGI has been used in a host of studies investigating impairment associated with ADHD (e.g., MTA Cooperative Group, 1999).

The SCT Scale (KSCT; McBurnett & Pfiffner, 2007): The KSCT contains 15 parent or teacher report items designed to assess severity of SCT symptoms, including forgetfulness,

day-dreaminess, and sluggish/drowsiness. Each item is rated on a 0–3 scale with higher scores indicated more severe SCT. The KSCT has demonstrated adequate psychometric properties (Pfiffner, 2007). For the current study, overall SCT impairment was examined by taking the mean of all KSCT subtypes; Cronbach's alpha was .93.

Parental Characteristics

Beck Depression Inventory (BDI; Beck, Mock, Ward, & Mendelson, 1961): The BDI contains 21-item self-report items designed to assess the intensity of depression. Each item is rated on a 0–3 scale with higher scores indicating more severe depressive symptoms (e.g., Item 1: 0 = "I do not feel sad," 1 = "I feel sad," 2 = "I am sad all the time and I can't snap out of it," and 3 = I am so sad or unhappy that I can't stand it"). The BDI has demonstrated adequate psychometric properties with clinical and nonclinical samples, with adequate construct validity and internal consistency ranging from .73–.92 in nonclinical samples (Beck, Steer, & Carbin, 1988). Beck et al. (1988) report the following suggested cut-off scores: none or minimal depression, <10; mild to moderate depression, 10–18; moderate to severe depression, 19–29; and severe depression, 30–63. Cronbach's alpha for the BDI in the present sample was .90.

Conners Adult ADHD Rating Scale (CAARS; Conners, Erhardt, & Sparrow, 1999): The CAARS is a norm-referenced, 66-item scale designed to assess severity of adult ADHD. Each symptom is rated on a 4 point scale from "never" to "very often" with higher scores indicating higher ADHD severity. The CAARS consistently demonstrates good psychometric properties, including internal consistency, test-retest reliability, convergent and discriminant validity, and sensitivity to treatment outcome (e.g., Adler et al., 2007; Erhardt, Epstein, Conners, Parker, & Sitarenios, 1999; Kooji et al., 2008; Taylor, Deb, & Unwin, 2011). In addition, the criterion cut-off scores for clinically relevant ADHD symptoms on the CAARS (i.e., 66 is the cut-off for "moderately atypical" as outlined on the CAARS scoring protocol; Conners, Erhardt, & Sparrow; 1999) have demonstrated good sensitivity in correctly predicting ADHD diagnosis (Van Voorhees, Hardy, & Kollins, 2011).

Parent Cognitive Error Questionnaire (PCEQ; Kaiser & Pffifner, 2010): The PCEQ is a 24-item parent-report measure assessing the severity of cognitive errors related to attributions of negative child behavior and family functioning. The questionnaire is based on two psychometrically sound and consistently utilized measures of general cognitive errors: the Cognitive Error Questionnaire (Lefebvre, 1981) and the Child Negative Cognitive Error Questionnaire (Leitenberg, Yost, & Carroll-Wilson, 1986). Items for the PCEQ were designed specifically to ask about cognitive errors related to parenting and family functioning. Each item is rated on a 5 point scale ranging from 1 = "almost exactly like I would think" to 5 = "not at all like I would think," with lower scores representing higher rates of cognitive errors related to negative attributions for child behavior and family functioning. Sample items and the cognitive errors related to negative attributions they represent include the following:

> *"Last week, your child brought home a worksheet which he/she had done*
> *incorrectly and needed to re-do. You think to yourself, 'This is awful. Now he/she*

is struggling in school.'" (Cognitive error = jumping to conclusions, global/stable attributions for child behavior).

"Your child comes home from school and sits down to do his/her homework. Usually, your child is prepared with his/her homework planner, but this afternoon, your child realizes that he/she has forgotten the planner at school and does not know what his/her assignments are for the next day. You think to yourself, 'It's all falling apart now. I bet it's going to be a tough year.'" (Cognitive error = mental filter, global/stable attributions for child behavior).

"Your family sits down to watch TV together, and your child starts to argue about which program the family should watch. You think to yourself, "My child always manages to spoil any time we spend together as a family." (Cognitive error = personalization, global/stable/internal attributions of child behavior).

In the present sample, the PCEQ demonstrated adequate psychometric properties. Internal consistency was demonstrated with a Cronbach's alpha = .91. Additionally, convergent construct validity was established via significant correlations with a conceptually related measure; specifically, cognitive errors were associated with parental depressive symptoms as measured by the BDI ($r = -.25$, $p < .001$).

Data Analysis

We examined bivariate correlations to estimate the association between (a) parent ratings of ADHD problem domains (i.e., inattention, SCT, and impairment) and (b) parental factors (i.e., parental depressive and parental ADHD symptoms and parental cognitive errors). The main analyses consisted of estimating and testing path models with direct effects from parental ratings of both depressive and ADHD symptoms to parental ratings of ADHD problem domains, and with indirect effects through cognitive errors for each ADHD problem domain. ADHD problem domains were examined separately due to the distinct nature of each domain (Barkley, 2013; Carlson & Mann, 2002; Gordon et al., 2006), as well as varying levels of evidence regarding the role of each problem domain in the Depression-Distortion Hypothesis; however, each significant model was run covarying the other outcomes to ensure that the findings hold.

Modeling was conducted using Mplus version 7.4. The specification of paths in the model was based on the theoretical depression-distortion model, as described in the introduction. A simultaneous path model was estimated and tested using the MODEL INDIRECT statement in order to obtain accurate estimates of indirect effects and their standard errors as described by MacKinnon (2008, Chapter 4). Bootstrapping with 5000 replications was used to test the indirect effect. No data were excluded in the modeling; the distributions of variables and model residuals were examined and both were reasonably well-distributed without skew.

Given the theoretical support for the current hypotheses, all analyses were conducted with and without non-biological parents or caretakers and no differences arose; thus, all results reflect analyses run on the complete sample. Given the influential role of child age and gender in previous ADHD rating studies, the variables of child gender and age were

examined as covariates; because neither of these covariates was significantly related to outcome variables, our final analyses do not include them.

Results

Preliminary Analyses

The mean for parental depressive and ADHD symptoms fell well below the clinical cutoff. Forty of 199 parents displayed depression scores above the clinical cutoff and 14 of 199 parents displayed ADHD scores above the clinical cutoff. The mean parental cognitive error score was 4.24 out of 5 ($SD = 0.51$), with 5 representing the least severe cognitive errors consistent with internal, global, and stable thinking related to parent and child behaviors. Examination of correlations between parent factors indicates that parental depressive symptoms, parental ADHD symptoms, and parental cognitive errors all were significantly and positively associated (see Table 3). That is, higher parental depressive symptoms were related to higher parental ADHD symptoms, both of which were related to greater cognitive errors.

Inattention

Higher parental ratings of inattention were significantly associated with higher parental ADHD symptoms and higher cognitive errors, and marginally associated with higher depressive symptoms (see Table 3). In the Inattention Depression-Distortion Hypothesis path analytic model, we examined the relation between parental depressive and ADHD symptoms with parental ratings of inattention via cognitive errors (see Figure 1). Both higher parental depressive and higher parental ADHD symptoms significantly predicted greater parental cognitive errors ($p = .002$ and $p = .014$, respectively); higher parental cognitive errors, in turn, significantly predicted higher parental ratings of inattention ($p < .001$), thus providing evidence of the presence of statistical mediation. The test for the indirect effect of parental depressive symptoms on parental ratings of inattention via parental cognitive errors was significant for depression ($p = .035$), indicating full mediation of the relation between higher parental depression and higher parental ratings of inattention via higher cognitive errors. The test for the indirect effect of parental ADHD symptoms on parent-reported inattention via parental cognitive errors was marginally significant ($p = .076$), indicating partial mediation of the relation between higher parent ADHD and higher parental ratings of inattention via greater cognitive errors. The overall variance accounted for in the model was 10.7%. Given the significant correlation between outcome variables, we also ran the model covarying functional impairment and SCT, and overall findings remained the same. Figure 1 and Table 4 display the original model with the estimates of effects.

Functional Impairment

Parental ratings of impairment were not significantly associated with any parental psychopathology factors. In addition, the tests for the indirect effects were not significant, and thus fail to support a mediational process between parent factors and ratings of functional impairment via parental cognitive errors.

SCT

Parental ratings of SCT were not significantly associated with any parental psychopathology factors. In addition, the tests for the indirect effects were not significant, failing to support a mediational process between parent factors and ratings of SCT via parental cognitive errors.

Discussion

Overall, in a large and well-characterized sample of children and families with ADHD-I, we demonstrated that higher levels of parental depressive and ADHD symptoms indirectly predicted parental ratings of inattention via parental cognitive errors. These findings, which appear unique in terms of the ADHD-I population, complement decades of research documenting an association between parental depression and inflated ratings of child psychopathology (as reviewed by De Los Reyes & Kazdin, 2005) including child ADHD-C (e.g., Chi & Hinshaw, 2002) and provide evidence that parents with higher rates of psychopathology hold more negative schemas for their child's behavior and subsequently report their child's psychopathology as more severe in a manner consistent with the key mechanisms specified by the Depression-Distortion Hypothesis (Richters, 1992). Additionally, despite early suggestions that alternative factors may contribute to cognitive errors alongside parental depression and thus should be included in investigations of the Depression-Distortion Hypothesis (e.g., Richters, 1992), this study is the first to the authors' knowledge to provide evidence that the relation between parental ADHD and parental ratings of child psychopathology is partially mediated by cognitive errors.

Specifically, as we predicted, parental depressive symptoms and parental ADHD symptoms were positively associated with cognitive errors, which subsequently were positively associated with higher parental ratings of inattention. Interestingly, cognitive errors fully mediated the association between parental depression and ratings of inattention and partially mediated the association between parental ADHD and ratings of inattention. This may suggest that cognitive errors play a distinct role in the association between parental ratings of child inattention with different domains of parental psychopathology (i.e., depression versus cognitive errors).

It is important to note that pathway results emerged in a sample of parents with subclinical levels of depression (i.e., only 40 of 199 parents scored above the clinical cut-off for moderate depression on the BDI) and ADHD (i.e., only 14 parents scored above the clinical cutoff on the CAARS)—and children with a less overtly behavioral form of ADHD (i.e., all children met criteria for ADHD-I and not ADHD-C). Thus, the Depression-Distortion Hypothesis appears to hold true even when parents are reporting mild levels of depressive and ADHD symptoms and children are experiencing less overt, behaviorally problematic forms of psychopathology such as ADHD-I.

No significant mediational pathways were demonstrated between parental depression or ADHD and ratings of either functional impairment or SCT via cognitive errors. The distinct associations and pathways between parental psychopathology, distortion, and child outcomes provide reassurance that results reflect a true depression-distortion process related to parental *perceptions* of child behavior rather than actual differences in child behavior

severity. Specifically, although it is possible that parents with higher psychopathology have children who display more severe inattention but not SCT or impairment, if this were the case, we would expect to see a direct association between parental psychopathology and ADHD with ratings of inattention, which was not supported in the current findings. Instead, it seems more logical that parents with higher rates of psychopathology (and particularly, depression) hold more negative schemas and subsequently are biased to over-report their child's ADHD symptoms (i.e., inattention). If this is indeed true, then ratings of SCT and impairment constructs may not be as prone to distortion on the part of depressed parents as are ratings of ADHD symptoms. Regardless, the distinct associations between parental factors with child outcomes add incremental support to the validity of impairment and SCT as unique constructs in ADHD assessment.

Limitations and Future Directions

Several limitations to the current study must be noted. To begin, although the current study supports a statistical, mediational pathway between parental factors and parental ratings of inattention via cognitive errors supporting the depression-distortion theoretical model, data were cross-sectional and thus true temporal mediation could not be established. Future research should examine this phenomenon with longitudinal data to examine whether the mediational relationship holds true over time. In addition, as mentioned above, it is possible that parent reports of child behavior may at least in part reflect the actual severity of child behavior. We attempted to address this possibility by examining discrepancies across several domains of child behavior functioning, and found no evidence for distortion pathways in parent reports of both SCT and functional impairment in comparison to reports of inattention. Future research should seek to replicate current results examining parent ratings compared to objective reports of child behavior such as blinded behavioral observations or school records to determine the role of actual child behavior severity in the depression-distortion hypothesis.

Additionally, although previous research has failed to document a relation between parental sociocultural variables (e.g., ethnicity, SES) and parental ratings of ADHD (e.g., Chi & Hinshaw, 2002), such research may be limited as a result of research samples truncated in ethnic and socioeconomic diversity. Indeed, participants in the current study parallel research samples in representing disproportionately Caucasian, middle-class families. We thus were unable to examine sociocultural variables as potential predictors or covariates due to a lack of sample variability in these factors. We also did not examine potential confounds or precursors to parental depression, such as parental stress, as recommended by Richters (1992). Future research with more diverse samples and measures of potential confounding variables should examine whether constructs such as sociocultural background and/or parental stress, contribute to the phenomenon of parental depressive distortion.

Conclusions, Implications, and Recommendations

Several clinical and empirical implications/recommendations can be drawn from the current study. First, given findings supporting the presence of the Depression-Distortion Hypothesis for inattention in parents of children with ADHD-I, investigators and clinicians alike should avoid relying solely on parental reports of child ADHD symptomatology. Integration of

parent-report data with more objective ratings and with alternate-informant measures (e.g., teacher-report data) clearly appears to be warranted, especially with parents who may be experiencing even subclinical levels of depression and ADHD. Although the recommendation for multi-informant assessment is not new to ADHD researchers and clinicians, it seems particularly relevant in the context of an ADHD-I population, given the likelihood that inattentive symptoms are less obvious and thus subsequently more difficult to assess or recall with accuracy than symptoms of hyperactivity/impulsivity.

Additionally, given the lack of associations or mediational pathways found between parental factors and ratings of SCT or functional impairment, these constructs may be less subject to depressive distortion compared to ADHD symptoms (and consequently, of increased importance in the context of assessment and/or treatment). Indeed, ADHD symptom rating scales have been criticized for inherent characteristics that make them difficult for parents to complete, such as limited instructions/guidance for raters and relatively subjective/ ambiguous items (Johnston et al., 2014). It may be that measures of SCT and impairment minimize some of these problems, leaving them less susceptible to differences in interpretation and subsequently, rater bias. Indeed, although no investigations have been completed examining rater bias in SCT, previous research with functional impairment suggests that it is a construct less susceptible to other types of bias (i.e., cultural bias) relative to ADHD symptom ratings (e.g., Gerdes et al., 2013). Ultimately, integrating parental reports of inattention with objective ratings and ratings of less bias-prone constructs may reduce the incidence of inaccurate ADHD diagnoses, which contribute both to the negative public perception (and possible reality) that ADHD is "over-diagnosed" and to unnecessary treatments for those who do not actually meet criteria for the disorder. Analyses minimizing biased reports of inattention also can lead to more accurate conclusions regarding which treatments for ADHD-I work best and for whom. Further, it may be helpful to review ADHD symptom rating scales with parents in both research and practice contexts in order to follow-up and confirm their perception of the frequency and severity of their child's behavior (Johnston et al., 2014).

Finally, several clinical implications can be made from results suggesting that parental depressive and ADHD symptoms are associated with maladaptive cognitive errors, which in turn are associated with parental ratings of inattention. To begin, emphasis on correcting cognitive errors in psychosocial family-based treatment for ADHD-I may be useful, especially for parents with higher (but not necessarily clinical-level) rates of depression and ADHD. Thus, although the predominant mode of empirically-supported family-based treatment is behavioral, therapists also experienced and comfortable with cognitive therapy skills may be particularly qualified to work with families of children with ADHD (Anastopoulos & Farley, 2003). In addition, dedicating a portion or entire session to correcting cognitive errors for child misbehavior and family functioning may be warranted in family therapy for children with ADHD-I. Indeed, the Child Life and Attention Skills (CLAS; Pfiffner et al., 2014) intervention for children with ADHD-I provides parents with a session on correcting internal/global/stable attributions for child misbehavior, described in parent-friendly language as "helpful and unhelpful thoughts." Ultimately, teaching parents to correct cognitive errors related to negative attributions for child behavior and family functioning may reduce the impact of any depressive distortion in parents of children with

ADHD-I by helping them to view their child in a more realistic and positive light, encouraging more positive parent-child interactions, facilitating more neutral appraisals of their child's behaviors, and ultimately promoting more positive outcomes for children with ADHD-I and their families.

Acknowledgments

References

Abramson, LY.Metalsky, GI., Alloy, LB., editors. Social cognition and clinical psychology: A synthesis. New York: Guilford Press; 1988.

American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders, 5th Edition: DSM-5. 5. Washington, D.C: American Psychiatric Publishing; 2013.

Anastopoulos, A., Farley, S. A cognitive-behavioral training program for parents of children with attention-deficit/hyperactivity disorder. In: Weisz, AKJ., editor. Evidence-based psychotherapies for children and adolescents. New York, NY: Guilford Press; 2003.

Banks T, Ninowski JE, Mash EJ, Semple DL. Parenting Behavior and Cognitions in a Community Sample of Mothers with and without Symptoms of Attention-deficit/Hyperactivity Disorder. Journal of Child & Family Studies. 2008; 17(1):28–43. http://doi.org/10.1007/s10826-007-9139-0.

Barkley RA. Distinguishing Sluggish Cognitive Tempo From ADHD in Children and Adolescents: Executive Functioning, Impairment, and Comorbidity. Journal of Clinical Child & Adolescent Psychology. 2013; 42(2):161–173. http://doi.org/10.1080/15374416.2012.734259. [PubMed: 23094604]

Beck AT, Mock JJ, Ward CH, Mendelson MM. An inventory for measuring depression. Archives of General Psychiatry. 1961; 4(6):561–571. http://doi.org/10.1001/archpsyc.1961.01710120031004. [PubMed: 13688369]

Beck AT, Steer RA, Carbin MG. Psychometric properties of the Beck Depression Inventory: Twenty-five years of evaluation. Clinical Psychology Review. 1988; 8(1):77–100. http://doi.org/10.1016/0272-7358(88)90050-5.

Bolton C, Calam R, Barrowclough C, Peters S, Roberts J, Wearden A, Morris J. Expressed emotion, attributions and depression in mothers of children with problem behaviour. Journal of Child Psychology and Psychiatry. 2003; 44(2):242–254. [PubMed: 12587860]

Carlson CL, Mann M. Sluggish cognitive tempo predicts a different pattern of impairment in the attention deficit hyperactivity disorder, predominantly inattentive type. Journal of Clinical Child & Adolescent Psychology. 2002; 31(1):123–129. http://doi.org/10.1207/S15374424JCCP3101_14. [PubMed: 11845644]

Chi TC, Hinshaw SP. Mother–child relationships of children with ADHD: The role of maternal depressive symptoms and depression-related distortions. Journal of Abnormal Child Psychology. 2002; 30(4):387–400. http://doi.org/10.1023/A:1015770025043. [PubMed: 12109489]

Conners, CK., Erhardt, D., Sparrow, E. Conners' Adult ADHD Rating Scales:(CAARS). Toronto: MHS; 1999.

Cunningham CE, Benness BB, Siegel LS. Family functioning, time allocation, and parental depression in the families of normal and ADHD children. Journal of Clinical Child Psychology. 1988; 17(2):169–177. http://doi.org/10.1207/s15374424jccp1702_10.

De Los Reyes A, Kazdin AE. Informant discrepancies in the assessment of childhood psychopathology: A critical review, theoretical framework, and recommendations for further study. Psychological Bulletin. 2005; 131(4):483–509. http://doi.org/10.1037/0033-2909.131.4.483. [PubMed: 16060799]

Fabiano GA, Pelham WE Jr, Waschbusch DA, Gnagy EM, Lahey BB, Chronis AM, … Burrows-MacLean L. A Practical Measure of Impairment: Psychometric Properties of the Impairment

Rating Scale in Samples of Children With Attention Deficit Hyperactivity Disorder and Two School-Based Samples. Journal of Clinical Child & Adolescent Psychology. 2006; 35(3):369–385. http://doi.org/10.1207/s15374424jccp3503_3. [PubMed: 16836475]

Faraone SV, Monuteaux MC, Biederman J, Cohan SL, Mick E. Does parental ADHD bias maternal reports of ADHD symptoms in children? Journal of Consulting and Clinical Psychology. 2003; 71:168. [PubMed: 12602437]

Fergusson DM, Lynskey MT, Horwood LJ. The effect of maternal depression on maternal ratings of child behavior. Journal of Abnormal Child Psychology. 1993; 21(3):245–269. http://doi.org/10.1007/BF00917534. [PubMed: 8335763]

Gadow, KD., Sprafkin, J. Child Symptom Inventory. Stony Brook, NY: Checkmate Plus; 1994.

Gerdes AC, Lawton KE, Haack LM, Hurtado GD. Assessing ADHD in Latino families: evidence for moving beyond symptomatology. Journal of Attention Disorders. 2013; 17:128–140. [PubMed: 22100735]

Gordon M, Antshel K, Faraone S, Barkley R, Lewandowski L, Hudziak JJ, … Cunningham C. Symptoms versus impairment the case for respecting DSM-IV's criterion D. Journal of Attention Disorders. 2006; 9(3):465–475. http://doi.org/10.1177/1087054705283881. [PubMed: 16481663]

Johnston C, Mash E. Families of children with attention-deficit/hyperactivity disorder: Review and recommendations for future research. Clinical Child and Family Psychology Review. 2001; 4(3): 183–207. [PubMed: 11783738]

Johnston C, Weiss MD, Murray C, Miller NV. The Effects of Instructions on Mothers' Ratings of Attention-Deficit/Hyperactivity Disorder Symptoms in Referred Children. Journal of Abnormal Child Psychology. 2014; 42(3):479–488. http://doi.org/10.1007/s10802-013-9789-x. [PubMed: 23963544]

Kaiser, NM., Pfiffner, LJ. Unpublished rating scale. University of California; San Francisco: 2010. Parent Cognitive Error Questionnaire.

Kaufman J, Birmaher B, Brent D, Rao UMA, Flynn C, Moreci P, … Ryan. Schedule for affective disorders and schizophrenia for school-age children-present and lifetime version (K-SADS-PL): initial reliability and validity data. Journal of the American Academy of Child & Adolescent Psychiatry. 1997; 36(7):980–988. [PubMed: 9204677]

Langberg JM, Epstein JN, Simon JO, Loren REA, Arnold LE, Hechtman L, … Wigal T. Parent agreement on ratings of children's attention deficit/hyperactivity disorder and broadband externalizing behaviors. Journal of Emotional and Behavioral Disorders. 2010; 18(1):41–50. http://doi.org/10.1177/1063426608330792. [PubMed: 21691457]

Lefebvre MF. Cognitive distortion and cognitive errors in depressed psychiatric and low back pain patients. Journal of Consulting and Clinical Psychology. 1981; 49(4):517–525. [PubMed: 6455451]

Leitenberg H, Yost LW, Carroll-Wilson M. Negative cognitive errors in children: Questionnaire development, normative data, and comparisons between children with and without self-reported symptoms of depression, low self-esteem, and evaluation anxiety. Journal of Consulting and Clinical Psychology. 1986; 54(4):528–536. http://doi.org/10.1037/0022-006X.54.4.528. [PubMed: 3745607]

Leung DW, Slep AMS. Predicting inept discipline: The role of parental depressive symptoms, anger, and attributions. Journal of Consulting and Clinical Psychology. 2006; 74(3):524–534. [PubMed: 16822109]

McBurnett, K., Pfiffner, LJ. Unpublished rating scale. University of California; San Francisco: 2007. 17-item Sluggish cognitive tempo scale.

McBurnett K, Pfiffner LJ, Frick PJ. Symptom properties as a function of ADHD type: An argument for continued study of sluggish cognitive tempo. Journal of Abnormal Child Psychology. 2001; 29(3): 207–213. [PubMed: 11411783]

McBurnett K, Villodas M, Burns GL, Hinshaw SP, Beaulieu A, Pfiffner LJ. Structure and validity of sluggish cognitive tempo using an expanded item pool in children with attention-deficit/hyperactivity disorder. Journal of Abnormal Child Psychology. 2014; 42(1) http://doi.org/10.1007/s10802-013-9801-5.

Milich R, Balentine AC, Lynam DR. ADHD combined type and ADHD predominately inattentive type are distinct and unrelated disorders. Clinical Psychology: Science and Practice. 2001; 8:463–488.

MTA Cooperative Group. A 14-month randomized clinical trial of treatment strategies for attention-deficit/hyperactivity disorder. Archives of General Psychiatry. 1999; 56:1073–1086. [PubMed: 10591283]

Mueller AK, Tucha L, Koerts J, Groen Y, Lange KW. Sluggish cognitive tempo and its neurocognitive, social and emotive correlates: a systematic review of the current literature. Journal of Molecular Psychiatry. 2014; 2(5)

Nigg, JT. What causes ADHD?: Understanding what goes wrong and why. New York, NY: Guilford Press; 2006.

NIMH. Clinical Global Impressions Scale. Psychopharmacology Bulletin. 1985; 21(4):839–843.

Owens JS, Goldfine ME, Evangelista NM, Hoza B, Kaiser NM. A Critical Review of Self-perceptions and the Positive Illusory Bias in Children with ADHD. Clinical Child and Family Psychology Review. 2007; 10(4):335–351. http://doi.org/10.1007/s10567-007-0027-3. [PubMed: 17902055]

Pelham J, William E, Fabiano G, Massetti G. Evidence-based assessment of attention deficit hyperactivity disorder in children and adolescents. Journal of Clinical Child and Adolescent Psychology. 2005; 34(3):449–476. [PubMed: 16026214]

Pfiffner, LJ. Attention Deficit Hyperactivity Disorders: Concepts, Controversies, New Directions. Vol. 1–0. Informa Healthcare; 2007. More Rewards or More Punishment?; p. 291-300.Retrieved from http://informahealthcare.com/doi/abs/10.3109/9781420017144.026

Pfiffner, LJ., Hinshaw, SP., Owens, E., Zalecki, C., Kaiser, NM., Villodas, M., McBurnett, K. A Two-Site Randomized Clinical Trial of Integrated Psychosocial Treatment for ADHD-Inattentive Type. Journal of Consulting and Clinical Psychology. 2014. http://doi.org/10.1037/a0036887

Reynolds, CR., Kamphaus, RW. BASC-2: Behavior assessment system for children (2nd ed): Manual. 2. Circle Pines, MN: AGS Printing; 2004.

Richters JE. Depressed mothers as informants about their children: A critical review of the evidence for distortion. Psychological Bulletin. 1992; 112(3):485–499. http://doi.org/10.1037/0033-2909.112.3.485. [PubMed: 1438639]

Solanto, MV., Alvir, J. Reliability of DSM-IV Symptom Ratings of ADHD: Implications for DSM-V. Journal of Attention Disorders. 2009. http://doi.org/10.1177/1087054708322994

Sweeney PD, Anderson K, Bailey S. Attributional style in depression: A meta-analytic review. Journal of Personality and Social Psychology. 1986; 50(5):974–991. http://doi.org/10.1037/0022-3514.50.5.974. [PubMed: 3712233]

Willcutt EG. The prevalence of DSM-IV attention-deficit/hyperactivity disorder: A meta-analytic review. Neurotherapeutics. 2012; 9:490–499. [PubMed: 22976615]

Willcutt EG, Nigg JT, Pennington BF, Solanto MV, Rohde LA, Tannock R, … Lahey BB. Validity of DSM-IV attention deficit/hyperactivity disorder symptom dimensions and subtypes. Journal of Abnormal Psychology. 2012; 121(4):991–1010. http://doi.org/10.1037/a0027347. [PubMed: 22612200]

Wolraich M, Lambert EW, Bickman L, Simmons T, Doffing MA, Worley KA. Assessing the impact of parent and teacher agreement on diagnosing attention-deficit hyperactivity disorder. Journal of Developmental & Behavioral Pediatrics. 2004; 25(1):41–47. [PubMed: 14767355]

Yurica, C., DiTomasso, RA. Encyclopedia of Cognitive Behavior Therapy. Springer; 2005. Cognitive Distortions; p. 117-122.
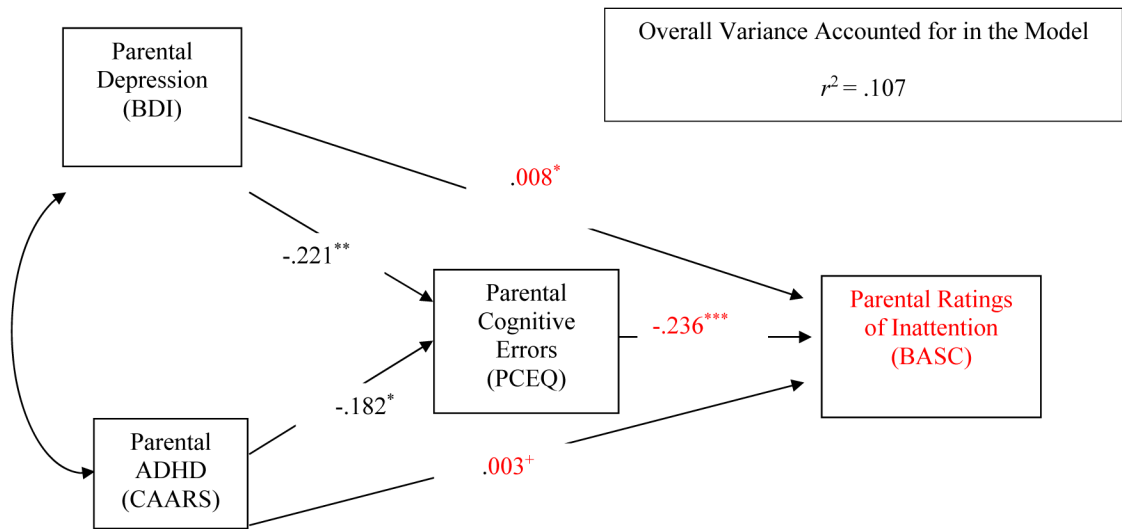
Figure 1. Parental Cognitive Errors as a Mediator of Parental Depression and ADHD with Parental Ratings of Inattention

Note. $^+ p < .10$ $^* p < .05$; $^{**} p < .01$; $^{***} p < .001$. Coefficients in the model are standardized. Higher ratings on the BDI reflect higher depressive symptoms. Higher ratings on the CAARS reflect higher ADHD symptoms. Higher ratings on the PCEQ reflect lower cognitive errors. Higher ratings on the BASC reflect higher inattention ratings.

Table 1

Parent and Child Demographics

Parent		Child	
			M (SD)
Education	*n* (%)	Age	8.64 (1.16)
Graduated high school/GED	4 (2)		
Some college	33 (16.6)	Gender	*n* (%)
College graduate	79 (39.7)	Female	83 (41.7)
Graduate or professional degree	81 (40.7)	Male	116 (58.3)
Income [*]	*n* (%)	Grade	*n* (%)
$40,000 or less	16 (8.4)	2nd – 3rd	113 (56.8)
$40,001–60,000	17 (8.5)	4th – 5th	86 (43.2)
$60,001–80,000	25 (12.6)		
$80,000–100,000	23 (11.6)	Race/Ethnicity	*n* (%)
$100,001–150,000	55 (27.6)	Caucasian	107 (53.8)
More than $150,000	55 (27.6)	Hispanic/Latino	33 (16.6)
		Asian	16 (8)
Family Structure	*n* (%)	African American	10 (5)
Biological parent	182 (91.5)	Mixed Race/other	33 (16.6)
Nonbiological parent/caretaker	17 (8.5)		
Single parent home	25 (12.6)	Number of ADHD Symptoms [+]	*M* (SD)
Two-parent home	174 (87.4)	Inattentive	7.6 (1.1)
		Hyperactive/Impulsive	1.2 (1.2)

Note: N = 199,

[*] indicates missing data for some participants.

[+] Symptom presence based on the K-SADS-PL interview with parent (Kaufman et al., 1997)

Table 2

Descriptive Statistics of Parenting Factors and Problem Behavior Ratings

	Mean (SD) in Current Sample	Clinical Cutoff[*]	# Exceeding Clinical Cutoff
Parental Factors			
Parental Depressive symptoms (BDI) Sum	6.16 (6.54)	10	40
Parental ADHD symptoms (CAARS)	42.47 (12.67)	66	14
Parental Cognitive Errors (PCEQ)	4.24 (0.51)	N/A	N/A

	Mean (SD) in Current Sample		
ADHD Problem Behavior Ratings			
Parental Rating of Inattention Severity (BASC)	66.22 (6.11)		
Parental Rating of Functional Impairment (CGI)	4.46 (0.82)		
Parental Rating of SCT (KSCT)	0.93 (0.50)		

Note.

[*] Sum 10 is the cut-off for "mild to moderate depression" on the BDI (Beck et al., 1988). T-score 66 is the cut-off for "moderately atypical" on the CAARS (Conners, Erhardt, & Sparrow; 1999).

Higher ratings on the BDI reflect higher depressive symptoms. Higher ratings on the CAARS reflect higher ADHD symptoms. Higher ratings on the PCEQ reflect lower cognitive errors. Higher ratings on the BASC reflect higher inattention ratings. Higher ratings on the CGI reflect higher impairment levels. Higher ratings on the KSCT reflect higher SCT symptoms

Table 3

Bivariate Correlations between Parental Factors and Problem Behavior Ratings

	1	2	3	4	5	6
1. Parental Depression Symptoms (BDI)	1					
2. Parental ADHD symptoms (CAARS)	.31 ***	1				
3. Parental Cognitive Errors (PCEQ)	−.25 **	−.25 ***	1			
4. Parental Rating of Inattention (BASC)	.13 +	.17 *	−.23 **	1		
5. Parental Rating of Impairment (CGI)	.48 ***	−.02	−.09	.32 ***	1	
6. Parental Rating of SCT (KSCT)	−.01	.08	−.08	.03	−.02	1

Note.

$+$ $p < .10;$

$*$ $p < .05;$

$**$ $p < .01;$

$***$ $p < .001$

Higher ratings on the BDI reflect higher depressive symptoms. Higher ratings on the CAARS reflect higher ADHD symptoms. Higher ratings on the PCEQ reflect lower cognitive errors. Higher ratings on the BASC reflect higher inattention ratings. Higher ratings on the CGI reflect higher impairment levels. Higher ratings on the KSCT reflect higher SCT symptoms.

Table 4

Parental Cognitive Errors as a Mediator of Parental Depression and ADHD with Parental Ratings of Inattention

Direct Mediational Pathway

	St. Coeff.	St. Error	Z-Score	p-value	95% C.I.
Parental Depression (BDI) - Cognitive Errors (PCEQ)	−0.221	0.066	−3.363	0.001	−0.329 – −0.113
Parental ADHD (CAARS) - Cognitive Errors	−0.182	0.073	−2.499	0.012	−0.301 – −0.062
Parental Depression – Inattention Ratings (BASC)	0.025	0.072	0.345	0.73	−0.094 – 0.144
Parental ADHD – Inattention Ratings	0.114	0.065	1.760	0.078	0.007 – 0.220
Cognitive Errors –Inattention Ratings	−0.236	0.069	−3.435	0.001	−0.349 – −0.123

Indirect Mediational Pathway

	St. Coeff.	St. Error	Z-Score	p-value	95% CI.
Parental Depression – Inattention Ratings via Cognitive Errors	0.008	0.004	2.166	0.030	0.002 – 0.014
Parental ADHD – Inattention Ratings via Cognitive Errors	0.003	0.002	1.864	0.062	0.000 – 0.006

Note: Higher ratings on the BDI reflect higher depressive symptoms. Higher ratings on the CAARS reflect higher ADHD symptoms. Higher ratings on the PCEQ reflect lower cognitive errors. Higher ratings on the BASC reflect higher inattention ratings.