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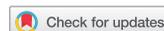


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Contributions of Maternal Attention-Deficit Hyperactivity and Oppositional Defiant Disorder Symptoms to Parenting

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SYNOPSIS

Objective. The goal of the current study was to examine the impact of maternal attention-deficit hyperactivity disorder and oppositional defiant disorder symptoms on several dimensions of parenting. **Design.** One-hundred seven mothers of young adolescents provided ratings of their own attention-deficit hyperactivity disorder, oppositional defiant disorder, depressive symptoms, and parenting behavior, as well as their adolescents' aggressive behaviors. **Results.** Hierarchical regression analyses examined the relative contributions of attention-deficit hyperactivity disorder and oppositional defiant disorder symptoms to parenting. Greater levels of maternal attention-deficit hyperactivity disorder symptomatology were associated with poorer monitoring, whereas more oppositional defiant disorder symptoms were associated with lower levels of parenting involvement and positive reinforcement and higher levels of overreactivity and use of corporal punishment. **Conclusions.** Maternal oppositional defiant disorder behaviors were particularly associated with negative, affective dimensions of parenting. Understanding the impact of maternal attention-deficit hyperactivity disorder symptoms on parenting may require consideration of concomitant maternal oppositional defiant disorder symptoms.

INTRODUCTION

Attention-deficit hyperactivity disorder (ADHD) is a prevalent, debilitating neurocognitive disorder characterized by patterns of inattentive, impulsive, and hyperactive behavior (American Psychiatric Association [APA], 2013a). Individuals with ADHD typically experience problems with self-regulation (Barkley, 2011; Barkley & Murphy, 2011; Sheils & Hawk, 2010), motivational impairments (Luman, Oosterlaan, & Sergeant, 2005), and diminished executive functioning (Willcutt, Doyle, Nigg, Faraone, & Pennington, 2005). Once considered a disorder primarily affecting children and adolescents, ADHD is now widely recognized as a lifespan prevalent disorder (Larsson, Chang, Onofrio, & Lichtenstein, 2014; Spencer, Biederman, & Mick, 2007). As many as 50 to 80% of childhood and adolescent cases of ADHD persist into adulthood (Barkley, Fischer, Smallish, & Fletcher, 2006), and approximately 2.5 to 4% of adults are diagnosed with ADHD (Caci, Morin, & Tran, 2014; Faraone & Biederman, 2005; Kessler et al., 2006; Simon, Czobor, Bálint, Mészáros, & Bitter, 2009). Adult ADHD is characterized by impairments in educational (Wolf, 2001), occupational (Barkley & Murphy, 2010; Barkley, Murphy, & Fischer, 2008; de Graf et al., 2008), and interpersonal domains (Able, Johnston, Adler, & Swindle, 2006; Johnston, 2002). The present article focuses on

a particularly important domain of interpersonal functioning affected by adult ADHD: parenting and parent-child relationships.

Johnston and colleagues discussed the likely connections between the characteristics of adult ADHD and disrupted parenting (Johnston, Miller, Mash, & Ninowski, 2012). For instance, symptoms of inattentiveness and impulsivity may impair a parent's ability to track child behavior and apply consistent standards. Problems in self-regulation, including difficulties in emotion regulation and motivation, may also make it difficult for parents with ADHD to manage their affect and respond calmly and consistently to their children. Additionally, parents with executive functioning problems characteristic of ADHD may become overwhelmed by child behavior and the simultaneous, competing demands of home management.

An emergent literature supports such theorized connections. For example, Murray and Johnston (2006) examined relations between maternal ADHD and parenting in a community sample of mothers who had a child with ADHD between the ages of 8-14. Because ADHD is heritable (Larsson et al., 2014), mothers were expected to display a greater range of ADHD symptoms than if they had been recruited from the general population. Results of this effort revealed that mothers who met criteria for ADHD reported more inconsistent discipline and lower levels of child monitoring than did mothers who did not meet criteria for ADHD. Furthermore, differences between groups persisted even after controlling for maternal depression and child externalizing behaviors.

Chronis-Tuscano and colleagues (2008) also found that mothers experiencing ADHD symptoms struggled with parenting dimensions reflecting abilities to track and respond consistently and appropriately to child behaviors. In this study, mothers of children with ADHD between the ages of 6-10 were recruited from the community. Chronis-Tuscano et al. (2008) used a dimensional rather than a group comparison approach in their analyses, examining associations between maternal self-reported ADHD symptom scores and parenting. Results indicated that maternal ADHD symptoms (inattentiveness, hyperactivity-impulsivity, and total) were correlated with greater inconsistent discipline, lower use of positive reinforcement techniques (e.g., praising children when they behaved appropriately), and lower involvement (e.g., fewer face-to-face mother-child interactions and less maternal presence in children's daily and special activities). The relations among maternal ADHD total symptoms, inconsistent discipline, and positive reinforcement persisted in subsequent multiple regression analyses which controlled for maternal depression, child oppositional defiant disorder (ODD) diagnosis, and child negative behaviors during observed mother-child interactions.

Several other research groups have reported similar associations between maternal ADHD symptoms and problems in day-to-day child management. For instance, Chen and Johnston (2007) assessed relations between maternal ADHD symptoms and parenting among mothers of boys 4- to 8-years-old. In this study, community mothers were recruited based on their concerns about child attention and impulse control. Significant associations between maternal ADHD symptoms and parenting were obtained in multiple regression analyses controlling for maternal depression and child conduct problems (e.g., aggressive, deviant, or oppositional behaviors). Whereas both maternal inattention and impulsivity predicted lower involvement, inattention predicted greater inconsistency in discipline, and impulsivity predicted lower use of positive reinforcement. Additional investigations, although not providing multivariate analyses, have revealed similar, small to moderate correlations between maternal total ADHD

symptoms and maternal inconsistent discipline and involvement (e.g., Ellis & Nigg, 2009; Mokrova, O'Brien, Calkins, & Keane, 2010).

To summarize to this point, findings from the extant literature, if not extensive, indicate that maternal ADHD symptoms are associated with greater disruption or ineffectiveness in important day-to-day child management behaviors (Johnston et al., 2012). Furthermore, such relations often remain statistically significant after including variables likely to co-occur with both maternal ADHD symptoms and problematic parenting (e.g., maternal depression, child disruptive behaviors). Although associations between maternal ADHD symptoms and parenting are typically attenuated once maternal depression and child externalizing are controlled, the fact that ADHD often remains a significant predictor is notable, given the importance of these covariates to parenting.

Maternal depression is a particularly important covariate to consider; about 18% of adults with ADHD also meet the diagnostic criteria for major depressive disorder (Kessler et al., 2006; Meinzer et al., 2013). The adverse effects of maternal depression on parenting have been well-documented (for meta-analysis, see Lovejoy, Graczyka, O'Hara, & Neuman, 2000). For instance, depression in mothers has been linked with greater levels of negative affect, hostility, and aggression during parenting interactions (Turney, 2011) as well as increased use of harsh or physical disciplinary practices (Cummings & Davies, 1994) and reduced parental warmth (Cummings, Keller, & Davies, 2005). Mothers experiencing depression also exhibit diminished involvement in school-related and other day-to-day activities of their children (Kiernan & Huerta, 2008; Kohl, Lengua, & McMahon, 2000), and they tend to engage in fewer positive interactions with their children than do non-depressed mothers (Cohn, Campbell, Matias, & Hopkins, 1990; Lovejoy et al., 2000). Because the effects of depression on parenting may be similar to those of ADHD symptoms, and because depression and ADHD may co-occur, it is important to assess the potentially unique effects of both problems in multivariate analyses.

Given that parenting is influenced by both parental and child characteristics (Belsky, 1984; Bornstein, 2016), child disruptive behavior is another crucial covariate to take into account. Relations between harsh, negative, and ineffective parenting practices and child externalizing behaviors have been reported in the wider socialization literature (Carrasco, Holgado, Rodriguez, & Del Barrio, 2009; Herenkohl, Hill, Hawkins, Chung, & Nagin, 2006; Hipwell et al., 2008; Laird, Pettit, Bates, & Dodge, 2003; Steeger & Gondoli, 2013) as well as in studies focused on mothers who experience ADHD symptoms (Chen & Johnston, 2007; Chronis-Tuscano et al., 2008; Ellis & Nigg, 2009). Relations between negative and ineffective parenting and child externalizing may be reciprocal, particularly during adolescence; while parenting predicts subsequent externalizing, externalizing predicts increases in parental negativity and decreases in parental awareness and monitoring of youth (Carrasco et al., 2009; Hipwell et al., 2008; Laird et al., 2003). Consequently, child externalizing behaviors, such as aggression, should be controlled in analyses examining maternal ADHD symptoms and parenting.

Maternal externalizing behaviors, including aggressive and oppositional behaviors, should also be considered in analyses predicting parenting from adult ADHD symptoms. To date, no study has considered parental oppositional and defiant symptoms as variables that also may predict parenting among mothers experiencing ADHD. The lack of attention to oppositional-defiant behaviors in the adult ADHD literature is striking, given that in childhood and adolescence ADHD and ODD co-occur in about 45–65% of

cases (Barkley, Edwards, Laneri, Fletcher, & Metevia, 2001). Although few studies have investigated the prevalence of ODD in adulthood, Murphy and Barkley (1996), in a study of comorbidity in adult ADHD, found that approximately 30% of adults with ADHD met the criteria for ODD. However, much like the diagnostic criteria for ADHD (Murphy & Barkley, 1996), the criteria used for diagnosis of ODD may be overly restrictive for adults; thus, actual prevalence rates of ODD among adults may be higher (Burke, Rowe, & Boylan, 2014).

ODD is a behavioral disorder characterized by frequent anger and irritability as well as argumentative, defiant, hostile, or vindictive behavior (APA, 2013b; Burke, Waldman, & Lahey, 2010; Nock, Kazdin, Hiripi, & Kessler, 2007). ODD is often conceptualized and diagnosed as a childhood disorder, and it was once widely considered a subtype of or prodrome to conduct disorder (CD); however, ODD has since been recognized as a clinically distinct disorder (Nock, Kazdin, Hiripi, & Kessler, 2006, 2007). CD often involves similar patterns of hostile, defiant behavior, but CD tends to involve more severe behavioral deviance (e.g., fighting, stealing) and is less common than ODD. CD is associated with poor outcomes in adulthood (Nock et al., 2006), but there is relatively little information about the effects of ODD across the lifespan. However, some research indicates that the problematic, hostile behaviors that characterize ODD do not disappear as children and adolescents mature (Kim-Cohen et al., 2003; Rowe, Costello, Angold, Copeland, & Maughan, 2010). Furthermore, Burke et al. (2014) found that impairments associated with a diagnosis of ODD in childhood or adolescence persisted in a sample of young adult males. At follow-up, men previously diagnosed with ODD still struggled with many of the issues associated with ODD. Notably, young men with higher ODD symptoms through childhood and adolescence had poorer relationship quality and fewer relationships and struggled more with work performance. Such patterns suggest that the interpersonal difficulties characteristic of ODD in adulthood might extend to parenting problems.

More specifically, the negative affect and behavior associated with ODD (APA, 2013b) is unlikely to promote optimal parenting. A substantial literature documents that higher levels of parental negative affect are associated with greater harsh, negative parenting and lower positive parenting (Dix, 1991; Rueger, Katz, Risser, & Lovejoy, 2011). A separate literature has also documented that parental agreeableness (a dimension of personality characterized by low antagonism and an empathic, forgiving, easy-going interpersonal style) is associated with greater parental warmth and autonomy support (Prinzle, Stams, Geart, Deković, & Belsky, 2009). Because symptoms of ODD include negative affectivity and an aggressive interpersonal style, it is reasonable to suggest that parental oppositional and defiant behaviors may disrupt appropriate parenting. Furthermore, the oppositional and provocative aspects of ODD are likely to contribute to coercive interchanges in the parent-child dyad, which may further undermine parenting (Patterson, 1982). To date, however, the associations between behaviors characteristic of ODD and parenting remain untested.

The present study

In the present investigation, we examined the relative contributions of several maternal and child factors to parenting. Consistent with prior models (Chen & Johnston, 2007; Chronis-Tuscano et al., 2008), relations between maternal ADHD symptoms and parenting were considered while controlling for maternal depression and

child aggression. Maternal ODD symptoms were then considered to determine whether they accounted for significant incremental variance in parenting beyond that explained by maternal ADHD, maternal depression, and child aggression.

Additionally, we focused on mothers of young adolescents. Most research in this area has focused on parents of children school-aged or younger (e.g., Banks, Ninowski, Mash, & Semple, 2008; Chen & Johnston, 2007; Chronis-Tuscano et al., 2008; Semple, Mash, Ninowski, & Benzies, 2011; Watkins & Mash, 2009). Nonetheless, adolescence is a significant developmental period, marked by notable challenges for parenting (Baumrind, 1991). Protracted and severe parent-adolescent conflict is not normative, but negotiating changing familial roles and a young adolescent's desire for increased independence present unique challenges for parents (Steinberg, 2001). Parenting during the adolescent period may be especially difficult for parents with ADHD symptoms and common comorbidities. Thus, it is imperative that we better understand the degree to which parental ADHD symptoms and co-occurring problems, such as depressive symptoms and ODD symptoms, affect parenting during adolescence.

We hypothesized that maternal ADHD symptoms would be associated with higher levels of inconsistent discipline and poor monitoring, as well as lower levels of involvement and positive reinforcement in parenting. We expected these relations to persist when relevant controls were introduced in multiple regression analyses. In addition, we hypothesized that maternal ODD symptoms would be associated with higher levels of negative, affective dimensions of parenting, including overreactivity, hostility, and corporal punishment. We also investigated whether ODD symptoms were related to other dimensions of parenting, such as use of positive reinforcement and involvement. Because no prior literature has examined the relative contribution of ODD symptoms to parenting, it was unclear whether any relations between ODD symptoms and parenting would remain over and above the contributions of ADHD and other relevant controls. Thus, no hypotheses concerning the relative contribution of ODD symptoms to parenting were made.

METHOD

Participants

The sample consisted of 107 mother-adolescent dyads residing in a medium-sized, Midwestern city and surrounding suburban and rural communities. The dyads were recruited from local schools via initial contact letters direct-mailed to students' home addresses. The letter described our interest in adolescents with an ADHD diagnosis and their mothers, who were instructed to contact our research office by phone. If a phone screening indicated that the adolescent had suspected ADHD and no autism spectrum disorder (ASD) diagnosis, the dyad was scheduled for visits to a university research laboratory. Adolescent ADHD diagnosis was subsequently confirmed with a structured interview administered in-person to mothers (C-DISC-IV; Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000). Given the heritability of the disorder, children with ADHD are likely to have at least one parent who experiences symptoms of ADHD (Biederman, Faraone, Mick, & Spencer, 1995; Larsson et al., 2014). Thus, we anticipated our sample of mothers would exhibit a broad range of ADHD symptoms. Our strategy of considering mothers with concerns about their children's attentional difficulties and

ADHD has been successfully utilized by other researchers examining parental ADHD and parenting (e.g., Chen & Johnston, 2007; Chronis-Tuscano et al., 2008).

With the exception of adolescents' ADHD diagnosis, dyads in our sample were relatively low-risk (see Table 1 for descriptive statistics). Although low-income dyads participated in our study, most were from middle-class households with adequate resources. Most mothers were well-educated (52.33% held at least a 4-year college degree) and married (74.77%). Means and standard deviations (SDs) for maternal ADHD symptoms were consistent with those reported in prior studies with similar recruitment procedures (e.g., Chronis-Tuscano et al., 2008). The adolescents (69.16%

TABLE 1
Sample characteristics

Characteristic	<i>n</i>	%	<i>M</i> (<i>SD</i>)	<i>Min</i>	<i>Max</i>	<i>Possible Range</i>
Adolescent gender						
Male	74	69.16				
Female	33	30.84				
Mother age			42.47 (6.72)	28	64	
Adolescent age			12.57 (1.18)	11	15	
Mother education (Years)			15.50 (2.93)	10	25	
Mother ethnicity						
European American	103	96.26				
African American	2	1.87				
Asian American	1	0.93				
Multiethnic	1	0.93				
Mother marital status						
Married	80	74.77				
Separated	3	2.80				
Divorced	17	15.89				
Single	5	4.67				
Widowed	2	1.87				
Annual income			\$78,362 (\$55,753)	\$2,400	\$300,000	
Mother ADHD						
Inattentive			5.07 (4.90)	0	23	0-27
Hyperactive-impulsive			4.25 (3.90)	0	17	0-27
Total ADHD			9.31 (8.13)	0	40	0-54
Mother ODD			4.18 (2.61)	0	12	0-24
Mother depression			2.93 (3.54)	0	16	0-24
Adolescent aggression			8.46 (5.79)	0	28	0-36
Adolescent ADHD						
Inattentive			19.94 (5.32)	4	27	0-27
Hyperactive-impulsive			14.05 (6.73)	0	27	0-27
Total ADHD			33.99 (9.99)	11	54	0-54
Mother parenting						
Inconsistent discipline			13.69 (3.82)	6	26	6-30
Positive reinforcement			24.80 (3.44)	15	30	6-30
Involvement			40.07 (4.47)	25	49	10-50
Corporal punishment			4.15 (1.47)	3	8	3-15
Poor monitoring			15.15 (3.70)	10	28	10-50
Hostility			6.20 (3.13)	3	16	3-21
Overreactivity			17.85 (4.88)	9	29	5-35

male) ranged from 11- to 15-years-old, $M = 12.57$, $SD = 1.18$. Most mothers (96.26%) identified as European American.

Procedure

During laboratory visits, adolescents completed neuropsychological assessments while mothers completed measures to assess adolescent and maternal symptoms and functioning as well as maternal parenting practices. The present analyses focus on maternal self-reports. Dyads were compensated \$60 for their participation.

Measures

Maternal ADHD symptoms. Mothers completed the adult version of the Current Symptoms Scale (Barkley & Murphy, 2005). The scale included 18 items assessing typical inattentive (e.g., “[I] have difficulty sustaining my attention in tasks or fun activities.”) and hyperactive-impulsive (e.g., “[I] fidget with hands or feet or squirm in seat.”) symptoms. Responses ranged from 0 (*never or rarely*) to 3 (*very often*). Higher scores indicated greater symptoms. Cronbach’s alpha was .91 for the Inattentive subscale and .84 for the Hyperactive-Impulsive subscale.

Maternal ODD symptoms. The ODD symptoms subscale of the CSS (Barkley & Murphy, 2005) was used to measure maternal ODD. The scale consisted of eight items assessing aggressive and oppositional behaviors such as “[I] deliberately annoy people.” and “[I] am spiteful and vindictive.” Responses ranged from 0 (*never or rarely*) to 3 (*very often*). Higher scores indicated greater ODD symptoms. Cronbach’s alpha for the subscale was .76.

Maternal depression. Depressive symptoms were assessed with the Depression subscale of the Brief Symptoms Inventory (BSI; Derogatis & Fitzpatrick, 2004). The subscale consisted of six items relating to clinical criteria for depression (e.g., “Feeling hopeless about the future.”). Mothers rated each item from 0 (*not at all*) to 4 (*extremely*). Higher scores indicated greater depressive symptoms. Cronbach’s alpha for the subscale was .85.

Adolescent aggressive behaviors. Mothers completed the Aggressive Behavior subscale of the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001). The subscale included 18 items assessing adolescents’ aggressive behaviors such as “[My child] gets in many fights.” and “[My child has] temper tantrums or [a] hot temper.” Mothers rated each item on a scale ranging from 0 (*not true*) to 2 (*very true or often true*), with higher scores representing greater aggression. Cronbach’s alpha for the subscale was .88.

Parenting behavior. Mothers completed the Alabama Parenting Questionnaire (APQ; Shelton, Frick, & Wootton, 1996). The APQ included 5 subscales assessing inconsistent discipline (6 items such as “You threaten to punish your child and then do not actually punish him/her.”), positive reinforcement (6 items such as “You let your child know when he/she is doing a good job with something.”), involvement (10 items such as “You volunteer to help with special activities your child is involved in.”),

poor monitoring and supervision (10 items such as “Your child is at home without adult supervision.” and “Your child goes out without a set time to be home.”), and corporal punishment (3 items such as “You slap your child when he/she has done something wrong.”). Items were rated on a 5-point scale, ranging from 1 (*never*) to 5 (*always*). Higher scores indicated greater levels of the parenting dimension assessed. Cronbach’s alpha for the subscales ranged from .72 to .86.

Mothers also completed the Hostility and Overreactivity subscales of the Parenting Scale (PS; Arnold, O’Leary, Wolff, & Acker, 1993). The Hostility subscale included three items such as “When my child does something I don’t like, I insult my child, say mean things, or call my child names.” The Overreactivity subscale consisted of five items such as “When my child misbehaves, I raise my voice or yell.” Mothers rated each item on a 7-point scale with 1 representing low and 7 representing high levels of the parenting behavior. Higher scores indicated greater hostility and overreactive behavior. Cronbach alphas were .67 and .74 for the Overreactivity and Hostility subscales, respectively.

RESULTS

Preliminary analyses

Correlations among the independent variables are reported in Table 2. Maternal inattentive and hyperactive-impulsive symptoms were correlated, $r(105) = .70$, $p < .001$; thus, as has been the practice in previous studies (e.g., Chronis-Tuscano et al., 2008), we created a total ADHD symptoms score by adding scores on inattentive and hyperactive-impulsive symptoms. Correlations among the other independent variables were small to moderate.

Correlations between the independent and dependent (i.e., parenting) variables are presented in Table 3. Bivariate relations were small to moderate, and were generally in accord with previous findings and current hypotheses. Maternal inattentive symptoms were positively associated with inconsistent discipline and poor monitoring and negatively associated with involvement. Maternal total ADHD was positively associated with poor monitoring and supervision and negatively associated with involvement. Maternal ODD symptoms were associated with higher levels of overreactivity, hostility, and corporal punishment. Maternal ODD symptoms were also negatively associated with positive reinforcement and involvement. As expected from prior research,

TABLE 2
Correlations among independent variables

	1	2	3	4	5	6
1. Mother inattentive	–					
2. Mother hyperactive-impulsive	.70***	–				
3. Mother total ADHD	.94***	.90***	–			
4. Mother ODD	.42***	.38***	.43***	–		
5. Mother depression	.23*	.17	.22*	.41***	–	
6. Adolescent aggression	.05	.04	.05	.06	.22*	–

Notes. Ns ranged from 105 to 107 due to missing values.

* $p < .05$, *** $p < .001$.

TABLE 3
Correlations between independent and dependent variables

	Mother inattentive	Mother hyperactive-impulsive	Mother total ADHD	Mother ODD	Mother depression	Adolescent aggression
Inconsistent discipline	.18	.10	.15	.18	.33**	.17
Positive reinforcement	-.09	-.01	-.06	-.23*	-.01	.17
Involvement	-.24*	-.09	-.19	-.31**	-.31**	-.17
Poor monitoring	.19	.26**	.24*	.14	.16	.13
Overreactivity	.02	-.06	-.02	.34***	.35***	.17
Hostility	.08	.06	.08	.25*	.35***	.20*
Corporal punishment	.10	.01	.07	.30**	.23*	.29**

Notes. Ns ranged from 105 to 107 due to missing values.
* $p < .05$, ** $p < .01$, *** $p < .001$.

TABLE 4
Correlations among dependent variables

	1	2	3	4	5	6	7
1. Inconsistent discipline	-						
2. Positive reinforcement	-.06	-					
3. Involvement	-.30**	.57***	-				
4. Poor monitoring	.26**	-.09	-.28**	-			
5. Corporal punishment	.14	-.07	-.20*	.19	-		
6. Hostility	.23*	.08	-.16	.16	.61***	-	
7. Overreactivity	.33***	-.14	-.25**	.18	.32**	.45**	-

Notes. Ns ranged from 106 to 107 due to missing values.
* $p < .05$, ** $p < .01$, *** $p < .001$.

maternal depression and adolescent aggression were associated with several parenting variables in the anticipated directions. Correlations among dependent variables were generally small to moderate (see Table 4).

Primary regression analyses

We conducted hierarchical regression analyses to examine relations among maternal total ADHD symptoms, ODD symptoms, and parenting variables. Control variables (i.e., maternal depression, adolescent aggression) and maternal total ADHD symptoms were entered at step 1. Maternal ODD symptoms was entered at step 2. Significant change in R^2 at step 2 indicated that maternal ODD symptoms accounted for variance above and beyond the influence of control variables and maternal total ADHD symptoms. Coefficients reported for step 2 of each regression analysis represent a full model with all predictors present. Following the initial multiple regression analyses for each dependent variable, plotted residuals were examined to screen for potential heteroscedasticity. Additionally, we formally tested analyses for heteroscedasticity using the Breusch-Pagan test (Kramer, Sonnberger, Maurer, & Havlik, 1985) and found that

only the regression analysis predicting corporal punishment exhibited significant heteroscedasticity, $\chi^2 = 15.38$, $df = 4$, $p = .004$. Regression with ordinary least squares (OLS) assumes homoscedasticity; thus, violation of this assumption may bias estimates of variance and significance. To correct for heteroscedasticity in the multiple regression analysis considering corporal punishment, we repeated the analysis using robust standard errors generated in the “sandwich” package in R (Lumley & Zeileis, 2015). The implementation of bias-corrected standard errors was expected to yield more accurate tests of significance than would the standard errors generated in OLS regression. Below, we present results for corporal punishment based on robust standard errors. OLS regression methods were used for all other dependent variables.

Inconsistent discipline. Variables entered on step 1 accounted for significant variance in inconsistent discipline, $R^2 = .12$, $F(3, 101) = 4.58$, $p = .005$. Maternal depression was associated with greater inconsistency, $\beta = .29$, $p = .004$. Contrary to hypothesis, maternal ADHD symptoms did not account for unique variance in inconsistent discipline. At step 2, maternal ODD symptoms failed to account for additional unique variance in inconsistent discipline, $\Delta R^2 = .00$, $\Delta F(1, 100) = 0.05$, $p = .825$. The full model (i.e., with all independent variables entered) was significant, $R^2 = .12$, $F(4, 100) = 3.42$, $p = .012$, although this result was driven primarily by the contribution of maternal depression (see Table 5).

Positive reinforcement. Variables entered on step 1 failed to account for significant variance in positive reinforcement, $R^2 = .04$, $F(3, 101) = 1.21$, $p = .311$. No variables, including maternal ADHD symptoms, were significant predictors of positive reinforcement in parenting at step 1. However, at step 2, maternal ODD symptoms accounted for unique variance in this dimension of parenting, $\Delta R^2 = .06$, $\Delta F(1, 100) = 6.36$, $p = .013$. Higher maternal ODD symptoms were associated with lower levels of positive reinforcement, $\beta = -.29$, $p = .013$. The full model was significant, $R^2 = .09$, $F(4, 100) = 2.54$, $p = .044$ (see Table 5).

TABLE 5
Hierarchical regression for inconsistent discipline, positive reinforcement, and involvement

Predictors	Inconsistent Discipline				Positive Reinforcement				Involvement			
	ΔF	ΔR^2	β	SE B	ΔF	ΔR^2	β	SE B	ΔF	ΔR^2	β	SE B
Step 1	4.58**	.12			1.21	.04			4.39**	.12		
Mother ADHD			.09	.05			-.06	.04			-.13	.05
Mother depression			.29**	.11			-.04	.10			-.25*	.12
Adolescent aggression			.09	.06			.18	.06			-.10	.07
Step 2	0.05	.00			6.36*	.06			3.34	.03		
Mother ADHD			.08	.05			.05	.05			-.06	.06
Mother depression			.28*	.11			.06	.10			-.18	.13
Adolescent aggression			.09	.06			.17	.06			-.10	.07
Mother ODD			.03	.16			-.29*	.15			-.20	.19

Notes. * $p < .05$, ** $p < .01$.

Involvement. Variables entered on step 1 accounted for significant variance in involvement, $R^2 = .12$, $F(3, 101) = 4.39$, $p = .006$. Contrary to prediction, greater levels of maternal ADHD symptoms were not associated with reduced involvement; however, greater maternal depression was associated with reduced involvement, $\beta = -.25$, $p = .012$. At step 2, maternal ODD symptoms did not account for significant unique variance in involvement, $\Delta R^2 = .03$, $\Delta F(1, 100) = 3.34$, $p = .071$. The full model was significant, $R^2 = .14$, $F(4, 100) = 4.20$, $p = .003$, reflecting the influence of maternal depression and the weaker impact of maternal ODD symptoms (see Table 5).

Poor monitoring and supervision. Variables on step 1 accounted for significant variance in poor monitoring and supervision, $R^2 = .08$, $F(3, 101) = 2.78$, $p = .045$. As hypothesized, maternal ADHD was associated with higher levels of poor monitoring and supervision, $\beta = .21$, $p = .032$. At step 2, maternal ODD symptoms did not account for any additional variance in this dimension of parenting, $\Delta R^2 = .00$, $\Delta F(1, 100) = 0.01$, $p = .932$. The full model was not significant, $R^2 = .08$, $F(4, 100) = 2.06$, $p = .091$ (see Table 6).

Corporal punishment. As previously described, the initial OLS regression predicting corporal punishment exhibited significant heteroscedasticity. To generate bias-corrected estimates, we repeated the analysis using robust standard errors. Variables on step 1 accounted for significant variance in mothers' use of corporal punishment, $R^2 = .11$, $F(3, 101) = 4.09$, $p = .009$. Adolescent aggression was associated with greater corporal punishment, $\beta = .25$, $p = .028$, whereas maternal ADHD symptoms was not uniquely associated with this dimension of parenting. At step 2, maternal ODD symptoms accounted for significant unique variance in corporal punishment above and beyond the influence of adolescent aggression, $\Delta R^2 = .06$, $\Delta F(1, 100) = 7.65$, $p = .007$. As expected, higher ODD symptoms were associated with greater use of corporal punishment, $\beta = .30$, $p = .016$. The full model was significant, $R^2 = .17$, $F(4, 100) = 5.18$, $p = .001$ (see Table 6).

TABLE 6
Hierarchical regression for poor monitoring and corporal punishment

Predictors	Poor Monitoring				Corporal Punishment			
	ΔF	ΔR^2	β	<i>SE B</i>	ΔF	ΔR^2	β	<i>SE B</i>
Step 1	2.78*	.08			4.09**	.11		
Mother ADHD			.21*	.05			.02	.02
Mother depression			.09	.10			.17	.05
Adolescent aggression			.09	.06			.25*	.03
Step 2	.01	.00			7.65**	.06		
Mother ADHD			.21	.05			-.09	.02
Mother depression			.09	.11			.07	.06
Adolescent aggression			.09	.06			.26*	.03
Mother ODD			.01	.16			.30*	.07

Notes. Robust standard errors and associated estimates of significance are reported for the regression predicting corporal punishment.

* $p < .05$, ** $p < .01$.

TABLE 7
Hierarchical regression for hostility and overreactivity

Predictors	Hostility				Overreactivity			
	ΔF	ΔR^2	β	<i>SE B</i>	ΔF	ΔR^2	β	<i>SE B</i>
Step 1	5.34**	.14			5.83**	.15		
Mother ADHD			.00	.04			-.10	.06
Mother depression			.32**	.09			.35**	.13
Adolescent aggression			.13	.05			.11	.08
Step 2	1.86	.02			9.57**	.07		
Mother ADHD			-.05	.04			-.22*	.06
Mother depression			.27*	.09			.24*	.13
Adolescent aggression			.14	.05			.12	.08
Mother ODD			.15	.13			.33**	.19

Notes. * $p < .05$, ** $p < .01$.

Hostility. Variables on step 1 significantly accounted for variance in hostility, $R^2 = .14$, $F(3, 101) = 5.34$, $p = .002$. Maternal depression was significantly associated with the dimension, $\beta = .32$, $p = .001$. Contrary to our hypothesis, at step 2, maternal ODD symptoms failed to account for significant unique variance in hostility, $\Delta R^2 = .02$, $\Delta F(1, 100) = 1.86$, $p = .18$. However, perhaps driven by the relatively strong relation between maternal depression and hostility, the full model was significant, $R^2 = .15$, $F(4, 100) = 4.51$, $p = .002$ (see Table 7).

Overreactivity. Variables entered on step 1 accounted for significant variance in overreactivity, $R^2 = .15$, $F(3, 101) = 5.83$, $p = .001$. At step 1, maternal depression was significantly associated with greater overreactivity, $\beta = .35$, $p < .001$. At step 2, as was hypothesized, maternal ODD symptoms accounted for significant unique variance in overreactivity, $\Delta R^2 = .07$, $\Delta F(1, 100) = 9.57$, $p = .001$. Higher maternal ODD symptoms were associated with greater overreactivity, $\beta = .33$, $p = .003$. The full model was significant, $R^2 = .22$, $F(4, 100) = 7.13$, $p = .001$ (see Table 7).

DISCUSSION

The current study investigated the relative contributions of maternal ADHD and ODD symptoms to parenting. As hypothesized, maternal ADHD symptoms were associated with lower day-to-day parental involvement and monitoring. Parents who experience inattentiveness and hyperactive and impulsive behaviors may find it difficult to engage consistently and track the ebb and flow of their children's behaviors and activities. Such difficulties may be especially likely as children transition to adolescence. Emergent adolescence is characterized by increasing child autonomy and a decrease in direct parental supervision (Collins, Madsen, & Susman-Stillman, 2002). However, adolescents still benefit from parental guidance and monitoring (Holmbeck, Paikoff, & Brooks-Gunn, 1995). Parents of adolescents must, therefore, provide relatively distal monitoring, while allowing appropriate independence (Blodgett-Salafia, Gondoli, &

Grundy, 2009; Bornstein, Jager, & Steinberg, 2012). Changes in the social world of adolescence also require parents to strike a balance between autonomy and connection (Silverberg & Gondoli, 1996). Given the complexities in the provision of appropriate involvement and monitoring to adolescents, it is not surprising that mothers who experience ADHD symptoms would be likely to experience difficulties in these parenting dimensions.

We note that the correlations observed between ADHD symptoms and multiple dimensions of parenting in the present study were less robust in some cases than those reported in some prior studies (Banks et al., 2008; Chen & Johnston, 2007; Chronis-Tuscano et al., 2008). One explanation for this divergence is that these studies utilized the Conners' Adult ADHD Rating Scales (CAARS; Conners, Erhardt, & Sparrow, 1999) to assess maternal ADHD. The CAARS includes items capturing broader symptoms and impairments associated with adult ADHD, beyond inattention and hyperactive-impulsive behaviors, including emotional lability and diminished self-concept. In contrast, the measure we employed (Barkley & Murphy, 2005) assesses only count and severity of inattentive and hyperactive-impulsive symptoms. It is possible that associations between the CAARS and parenting may be more consistent because the CAARS includes items reflecting poor emotion regulation and diminished self-esteem; such dimensions of functioning are likely to be correlated with parenting.

Other studies utilizing more narrowly defined core symptoms to assess ADHD, as we did, have revealed similarly modest bivariate associations between parental ADHD symptoms and parenting (e.g., Ellis & Nigg, 2009). To help clarify the impact of parental ADHD on parenting, future efforts might explore patterns of relations when multiple measures of ADHD are used (Chronis-Tuscano et al., 2008). To the extent that measures of ADHD assess both symptoms (i.e., inattentiveness and hyperactive and impulsive behaviors) and what could be considered impairments of such symptoms (e.g., lowered self-esteem), we might reasonably expect robust relations between measures of ADHD and parenting. Too, given that ADHD is frequently comorbid with other disorders including depression (Kessler et al., 2006), future studies will benefit from measurement capable of indicating the unique and overlapping contributions of ADHD and various comorbid conditions to parenting.

One such difficulty frequently concomitant with ADHD is ODD. We found that maternal ODD symptoms was a comparatively powerful predictor of several dimensions of parenting. Prior studies have revealed that ODD in adulthood is associated with difficulties in social and romantic relationships (Burke et al., 2014), but the impact of ODD symptoms on parenting has not previously been explored. In the present study, we found that mothers who reported more ODD symptoms tended to engage in fewer positive parenting behaviors, used harsher disciplinary practices, and were more likely to overreact during interactions with their adolescents. Future studies of ADHD and parenting should continue to assess parental ADHD and ODD, so that the relative contributions of these problems to parenting may be described.

To help account for children's impact on parenting in our analyses, we controlled for adolescent aggression. We found consistent small correlations between adolescent aggression and parenting; however, multivariate analyses revealed that adolescent aggression accounted for substantial unique variance in only one parenting dimension: corporal punishment. Although it is sensible that both adolescent and maternal aggression would contribute to coercive, power-assertive discipline, the lack of widespread unique relations between adolescent aggression and parenting is somewhat surprising.

Within the ADHD and parenting literature, parenting difficulties are often ultimately attributed to disruptive child behavior (Deault, 2010), without consideration of parental characteristics that also may contribute to poor parenting. Our findings suggest that, to assess the unique impact of child aggression and other externalizing behaviors on parenting, the contribution of negative parental characteristics should be considered as well.

Our findings could be further expanded by assessment of fathers' parenting. As do most researchers in this area, we focused on mothers. Our analysis of maternal parenting allowed for comparison to previous research, and this choice was appropriate to the extent that mothers typically have primary day-to-day responsibility for children. However, given that ADHD and ODD are more prevalent among males (Nock et al., 2007), future efforts should also examine the impact of ADHD and ODD symptoms on fathers' parenting. In addition, the potential impact of shared method variance might be reduced by incorporation of the perspectives of multiple raters in analyses, including mothers, fathers, children, and observers.

Furthermore, our sample was not representative of the wider population of U.S. parents. The present sample was primarily composed of European American participants. Although ethnicity does not appear to be a factor in ADHD incidence and related impairments, to improve generalizability, our findings should be replicated in more diverse samples. Future replications should also determine whether the presence of significant risk factors, such as low socioeconomic status, exacerbate the parenting problems associated with ADHD and ODD, as our sample predominantly consisted of middle-class, married women residing in low-risk neighborhoods. Additionally, selection bias may have operated in our sample. Similar to the samples obtained in previous efforts (e.g., Chen & Johnston, 2007; Chronis-Tuscano et al., 2008; Ellis & Nigg, 2009), mothers in the present study were aware of their adolescent's ADHD symptoms. Such awareness may affect responses on parenting measures. Researchers might counter this potential bias by recruiting large samples from the population, and assessing parenting, as well as multiple dimensions of parental functioning, including ADHD and ODD symptoms. The continued development of reliable and valid brief questionnaire assessments of parental symptoms (e.g., Barkley & Murphy, 2005) would facilitate such an approach.

Future research also can expand on our preliminary findings by incorporation of key methodological and design elements. The current study was cross-sectional, examining associations between ADHD and ODD symptoms and parenting at a single time point. Longitudinal studies could provide insight into the effects of such difficulties on parenting over time. Moreover, studies on adult ODD have focused predominantly on males, but Burke et al. (2014) reported some evidence that female ODD may follow a more steeply declining trajectory in adulthood than male ODD. Longitudinal examination of ODD symptoms among parents may, therefore, also provide an opportunity to examine such trajectories among both men and women. In addition, because we relied on mothers' reports for all variables, shared source variance was present in our data. Future efforts can broaden results by including collateral ratings of symptomatology and parenting, from both adult co-parents and children. Finally, future studies with behavioral genetic designs can assess the gene-environment correlations accounting for parent and child contributions to parenting. Although beyond the scope of the current study, such approaches can contribute to understanding of individual and

environmental determinants of parenting within the family context generally (Cheung, Harden, & Tucker-Drob, 2016), and the context of familial ADHD specifically (Martel et al., 2011).

Limitations notwithstanding, the present study makes several notable contributions. First, ours is the first study to provide evidence that maternal ODD symptoms predict parenting. Our findings suggest that ODD may be an understudied factor that could influence parenting in those affected by ADHD. Second, on a broader level, our findings corroborate other research in the burgeoning literature on adult ODD (e.g., Burke et al., 2014; Leadbeater, Thompson, & Gruppuso, 2012), which suggests that the disorder and associated difficulties with social functioning and relationships may continue into adulthood for many individuals. Like Burke et al. (2014), we conclude that the impact, diagnosis, and treatment of adult ODD symptoms and impairments, while understudied, are areas that warrant future empirical investigation. Finally, ours is among the few studies to examine the impact of parental ADHD on the parenting of mothers of adolescents. The majority of studies in this area are focused on the provision of parenting to much younger children. Nevertheless, understanding the scope of parenting challenges and strengths among adults with ADHD requires consideration of all child and family developmental periods, from infancy through later adolescence.

IMPLICATIONS FOR PRACTICE, APPLICATION, THEORY, AND POLICY

Our study suggests that theorized connections between adult ADHD and parenting may be incomplete without considering concomitant ODD symptoms. Furthermore, our findings contribute to understanding the potential widespread impact of adult ODD, suggesting that its effects extend to difficulties in parenting. The present findings also have implications for family-focused treatment of ADHD, particularly Behavioral Parent Training (BPT). ADHD-focused BPT programs aim to bolster parenting skills that have been diminished by the occurrence of ADHD in children or parents (e.g., Babinski, Waxmonsky, & Pelham, 2014). Recent BPT programs have combined parenting intervention with additional treatments intended to address parental ADHD symptoms (Chronis-Tuscano, Wang, Strickland, Almirall, & Stein, 2016) and common ADHD comorbidities such as depression (Chronis-Tuscano et al., 2013), an approach consistent with current recommendations for personalized mental health treatment (National Advisory Mental Health Workgroup Report, 2010). Our findings suggest that ADHD-focused BPT might be made more potent by also screening for and addressing parental ODD symptoms in the family context.

ADDRESSES AND AFFILIATIONS

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