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Impairment in Children With and Without ADHD: Contributions From Oppositional Defiant Disorder and Callous-Unemotional Traits

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Abstract

Objective: To ascertain the association of childhood ADHD and oppositional defiant disorder (ODD) on functional impairment and to test the moderating influence of callous-unemotional (CU) traits. **Method:** Ethnically diverse 6- to 9-year-old children with (n = 59) and without (n = 47) ADHD were ascertained using multiple methods (i.e., rating scales and structured interview) and informants (i.e., parent, teacher, and interviewer). **Results:** Using ratings of impairment that were independent of the diagnostic assessment of ADHD and ODD, the association between ADHD and impairment was significantly moderated by CU traits, such that CU traits positively predicted impairment at low and moderate levels of ADHD but not at high levels of ADHD. CU traits did not moderate the association of ODD and impairment. **Conclusion:** The authors discuss findings within the context of multiple pathways to and from negative outcomes and the utility of evaluating CU traits in studies of ADHD and conduct problems. (*J. of Att. Dis. 2011; XX(X) 1-XX*)

Keywords

ADHD, ODD, callous-unemotional traits, impairment

ADHD is characterized by an early onset of developmentally aberrant and impairing levels of inattention and/or hyperactivity (American Psychiatric Association [APA], 2000). A nationally representative study estimated that 8.7% of 8- to 15-year-old children met diagnostic criteria for ADHD (Froehlich et al., 2007). Early ADHD prospectively predicts negative outcomes, including comorbidity, academic problems, and social dysfunction (Fischer, Barkley, Edelbrock, & Smallish, 1990; Lee, Lahey, Owens, & Hinshaw, 2008). A meta-analysis estimated that children with ADHD were 11 times more likely to have comorbid oppositional defiant disorder (ODD) or conduct disorder (CD) than non-ADHD youth. ADHD youth were also 5.5 and 3 times more likely to be diagnosed with depression and anxiety, respectively, than youth without ADHD (Angold, Costello, & Erkanli, 1999). Thus, ADHD reliably disrupts important aspects of behavioral and social development.

In addition to frequent comorbidity, ADHD predicts problems in daily functioning across family, academic, and social domains. Mothers of hyperactive children reported elevated stress and difficulty coping with their children's behavior and a high likelihood of reacting negatively toward their children (DuPaul, McGoey, Eckert, & Van Brakle, 2001). Observational studies also suggest that interactions between mothers and children with ADHD are characterized by more frequent maternal commands, criticisms, and complaints as well as lower levels of positive parenting than families of control children (Anderson, Hinshaw, & Simmel, 1994; Barkley, Fischer, Edelbrock, & Smallish, 1991). Teachers also rated ADHD children as more disruptive, less on task, and less socially competent than controls (DuPaul et al., 2004). These difficulties are also apparent early in development, as preschool children with ADHD were less academically capable and displayed more negative behavior than children without ADHD (DuPaul et al., 2001; Lahey et al., 1998). Prospective studies also suggest that the social problems of children with ADHD persist into adolescence and adulthood (Fischer et al., 1990; Lee et al., 2008). Children with ADHD had fewer friends, paid less social attention during conversations with others, and overestimated their social competence relative to healthy controls (Hoza et al., 2005; Stroes, Alberts, & Van der Meere, 2003). Finally, previously unfamiliar peers developed negative and highly stable

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impressions of children with ADHD within hours of meeting them (Erhardt & Hinshaw, 1994). In fact, social dysfunction partially mediates long-term outcome in ADHD (Pelham, Fabiano, & Massetti, 2005).

Aggression consists of diverse behaviors that harm the rights or property of others or violate accepted norms or rules (Dishion & Patterson, 2006). Disruptive behavior in youth constituted the most-frequent referral for mental health services from 1976 to 1989 (Achenbach & Howell, 1993; Kazdin, 1995). More recently, over a 7-year period, the economic cost (i.e., general and mental health, juvenile justice, and schooling) of a child with CD was US$70,000 more than a child without CD (Foster, Jones, & the Conduct Problems Prevention Research Group, 2005). ODD, which typically has an early onset (5-8 years; Lahey, Loeber, Quay, Frick, & Grimm, 1992) and frequently accompanies ADHD (Hinshaw, Lahey, & Hart, 1993), is characterized by impairing levels of persistent negativity, hostility, and defiance, whereas CD is defined by more severe aggression that violates rules and the rights of others and typically has a later onset (Lahey et al., 1992). Relative to controls, children with ODD received lower scores of adaptive functioning and came from families with lower cohesion and higher conflict, even after controlling for comorbid conditions (Greene et al., 2002). In addition, mothers of aggressive children behaved more negatively toward their children compared with mothers of control youth (Dumas & LaFreniere, 1993). Children with ODD/CD demonstrated higher rates of school failure and verbal deficits than controls, although this may be attributable to comorbid ADHD (Frick et al., 1991; Loney, Frick, Ellis, & McCoy, 1998). In addition to experiencing more peer rejection, aggressive children exhibited deficits in social cognition, including hostile attribution biases (Dodge & Frame, 1982; Milich & Landau, 1984). Overall, ODD, particularly when it appears early in development, significantly disturbs daily functioning and crucial areas of competence.

Impairment is defined as distress in at least one important area of functioning (APA, 2000). Although impairment is required for every mental disorder, studies have largely examined symptoms and disorders rather than impairment per se, despite the fact that impairment is the principle motivation for families to seek child mental health services and partially mediates predictions of outcomes from child behavior problems (Pelham et al., 2005). That is, symptoms are not identical to impairment (i.e., few symptoms may be as impairing as many symptoms). For example, young children often display behavior problems that exceed symptom thresholds for disorders, but they may not be impaired (Lahey et al., 2004). A focus on impairment also provides the opportunity to characterize children who fall below symptom thresholds, but who still demonstrate problems with daily functioning. For instance, ADHD was more persistent into adulthood when subthreshold levels were included rather than formal diagnostic criteria (Faraone, Biederman, & Mick, 2005). Despite the clinical significance of functional impairment, far less research has been conducted on empirically rigorous approaches to its measurement relative to psychopathology (Pelham et al., 2005), although a new compendium of normed measures of impairment was recently published (Barkley, 2011). However, reflecting the absence of a gold-standard definition of impairment, previous studies have adopted rational, yet ultimately arbitrary and sample-specific definitions of impairment (Lee et al., 2008). Thus, impairment richly characterizes individual differences neglected by disorder-based methods.

Defined as individual differences in empathy, remorse, and guilt (Dadds, Fraser, Frost, & Hawes, 2005), callous-unemotional (CU) traits are a defining feature of psychopathy and aggressive youth (Frick, Cornell, Barry, Bodin, & Dane, 2003; Frick & White, 2008). For example, the heritability of conduct problems (CP) in children with CU traits was substantially higher than in children without CU traits (Viding, Blair, Moffitt, & Plomin, 2005). CU traits positively predicted persistent and chronic CP across development (Christian, Frick, Hill, Tyler, & Frazer, 1997; Frick, Stickle, Dandreaux, Farrell, & Kimonis, 2005), and children with CP and CU traits were more delinquent than children without CU traits at a 1-year follow-up (Frick, Cornell, et al., 2003). Furthermore, CU traits also moderated the influence of ineffective parenting on CP, such that ineffective parenting positively predicted CP at low levels of CU traits, but high CU traits predicted more CP independent of ineffective parenting (Wootton, Frick, Shelton, & Silverthorn, 1997). Finally, CU traits predicted differential response to intervention such that children with elevated CU traits and CP were less responsive to treatment than children without CU traits (Hawes & Dadds, 2005). Thus, across naturalistic and intervention designs, there is strong evidence that CU traits potentially designate an empirically distinct subgroup of children relative to typically developing youth and children with CP and that these traits should be further interrogated in the context of predictors of competence and negative outcomes.

However, there is far less research on the nature of CU traits in children with ADHD, despite the frequent comorbidity between ADHD and CP and the role that ADHD plays in fueling an early onset of CP (Hinshaw et al., 1993). Among 154 children, teacher ratings of ADHD and CU predicted more peer rejection, disciplinary interactions, and adventure-seeking behavior than ADHD alone (Barry et al., 2000). In a separate study, 25 children with CU traits and CP revealed that children with ADHD were less aggressive than children with CU traits and CP only (i.e., no ADHD; Frick, Cornell, et al., 2003). Alternatively, the presence of CU traits significantly moderated the efficacy of multimodal interventions such that children with ADHD, CP,

and CU traits responded less favorably to behavior therapy alone than children with ADHD and CP only (Waschbusch, Carrey, Willoughby, King, & Andrade, 2007). Thus, there is emerging evidence that CU traits meaningfully change the developmental course of children with ADHD and CP.

Thus, a focus on the potential moderating role of CU traits on the association of ADHD and ODD on impairment is both timely and important. Specifically, we explored the associations of ADHD, ODD, and CU traits on multi-informant ratings of impairment in an ethnically diverse sample of 6- to 9-year-old children. We additionally tested the moderating role of CU traits. We hypothesized that ADHD and ODD would significantly predict impairment and that each association would be stronger at higher levels of CU traits.

Method

Participants

In all, 106 ethnically diverse (49% White) 6- to 9-year old (M = 7.4, SD = 1.9) children with (n = 59) and without ADHD (n = 47) were recruited using advertisements at local schools, flyers posted in public locations, and referrals from local mental health service providers and pediatric offices (see Table 1). Participants were required to live with at least one biological parent at least half time, be enrolled in school full-time, and be fluent in English. Exclusion criteria for all participants included a Full Scale IQ < 70, an autism spectrum or seizure disorder, or any neurological impairment that prevented full participation. ADHD proband status was based on a positive diagnosis according to a structured diagnostic interview (see below) that ascertained all relevant criteria, including age of onset, cross-situational impairment, and duration. Among the probands, 29 were diagnosed with the inattentive type, 4 as hyperactive type, and 26 as combined type. To avoid recruiting a sample of improbably high-functioning youth, control children who met diagnostic criteria for any disorder other than ADHD on the Diagnostic Interview Schedule for Children–Fourth Edition (DISC-IV) were included. All participants were recruited, screened, and assessed using identical procedures.

Procedures

Families who contacted the study completed a telephone screener to determine their eligibility based on the inclusion and exclusion criteria listed above. We mailed packets of rating scales to parents, and families were invited to our research laboratory for in-person assessments. Following signed consent and assent procedures for the parent and child, respectively, clinical psychology graduate students or BA-level trained staff assessed children using tests of cognitive ability, academic achievement, and neuropsychological functioning. We interviewed parents about their child's psychopathology, family functioning, parenting, and life stress. All interviewers were blind to the child's diagnostic status. Parallel rating scales of child behavior were completed by the child's teacher. Parents and teachers were asked to rate each child based on his or her unmedicated behavior. The institutional review board approved all study procedures.

Table 1. Mean (and *SD*) of Demographic Information

Variable	ADHD (n = 59)	Non-ADHD (n = 47)	T / χ^2
Age	7.37 (1.14)	7.43 (1.04)	0.25
% male	74.5	25.5	5.09*
% White	46.2	50	8.94
Full scale IQ	102.79 (13.23)	109.12 (18.03)	1.89
ADHD symptoms	12.51 (3.20)	3.00 (2.90)	–15.84**
% ODD diagnosis	39.0	14.9	7.48**
ODD symptoms	2.83 (2.39)	1.26 (1.76)	–3.90**
% anxiety diagnosis[a]	35.6	34.0	0.028
CU traits	0.08 (.29)	–0.08 (.25)	–2.94**
Parent CGAS	63.50 (14.96)	76.20 (14.14)	4.38**
Interviewer CGAS	56.78 (12.00)	75.30 (14.35)	7.24**
Parent IRS	3.19 (1.40)	1.54 (1.61)	–5.40**
Teacher IRS	3.67 (1.69)	2.29 (1.90)	–3.16**

Note: ODD = oppositional defiant disorder; CU = callous-unemotional; CGAS = Children's Global Assessment Scale; IRS = Impairment Rating Scale.
[a]The majority of children with anxiety met diagnostic criteria for Specific Phobia.
*p < .05. **p ≤ .01.

Measures

ADHD and ODD. We administered ADHD, ODD, CD, anxiety, and mood disorder modules from the DISC-IV (Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000) to each child's parent. The DISC-IV is extensively validated and psychometrically sound. In the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM-IV*; APA, 2000) field trials, test–retest reliability for ADHD from the DISC ranged from .51 to .64 (Lahey et al., 1994). Given that the predictive validity of dimensional ratings of ADHD and ODD was superior to disorder-based comparisons (Fergusson & Horwood, 1995), we used ADHD and ODD symptom counts. The Cronbach's alpha was .92 for ADHD and .83 for ODD.

CU traits. Parents completed the Antisocial Process Screening Device (APSD; Frick & Hare, 2001), a 20-item measure of psychopathic traits in children. The APSD consists of three factors: CU traits, narcissism, and impulsivity (Frick, Bodin, & Barry, 2000). We focused on the CU-traits factor, which was the mean of six items: "Is concerned about how well he or she does at school/work" (R), "Is good at keeping promises" (R), "Feels bad or guilty when he or she does something wrong" (R), "Is concerned about the

feelings of others" (R), "Does not show feelings or emotions," and "Keeps the same friends" (R). All but one item was reverse scored (R). CU traits were stable in multiple samples, with adequate reliability between parent and teacher ratings ($r = .38$, $p < .01$; Frick et al., 2000). The CU-traits scale had a Cronbach's alpha of .67 in this sample.

Impairment. Parents and interviewers separately completed the Children's Global Assessment Scale (CGAS; Bird et al., 1996). The CGAS is a thermometer-like rating where each child is rated according to his or her lowest level of overall functioning during the past 6 months on a scale of 0 (*lowest*) to 100 (*highest*). Raters were asked to consider the child's emotional and behavioral functioning at home, at school, with friends, and during leisure time. The CGAS has meaningfully discriminated children with behavior disorders from healthy controls in previous studies (Lahey et al., 1998; Setterberg, Bird, & Gould, 1992).

Parents and teachers completed parallel versions of the Impairment Rating Scale (IRS; Fabiano et al., 2006). Parents used a 7-point scale to rate their child's need for treatment due to problems in relationships with playmates, siblings, academic progress, self-esteem, and family in general. Teachers completed a nearly identical form, except that items on the child's need for treatment according to classroom behavior and the child's relationship with the teacher replaced items regarding siblings, parents, and family. Items were averaged to form an overall measure of impairment. The Cronbach's alpha of the parent and teacher scales was .90 and .87, respectively. Previous studies reported adequate 1-year, test–retest stability with different teachers ($r = .39$-$.63$) and acceptable concurrent validity with other impairment scales (Fabiano et al., 2006).

Results

Data Analytic Plan

We performed hierarchical linear regression to test the independent contributions of ADHD, ODD, and CU traits on impairment (parent and interviewer CGAS; parent and teacher IRS). All predictors were centered using the sample mean, and interactions were probed at the grand mean as well as plus and minus one standard deviation (Aiken & West, 1991). The child's age, sex, and IQ were considered as potential covariates, but none were correlated with the outcome, so they were not retained. At Step 1, we entered the main effects for ADHD, ODD, and CU traits. At Step 2, we entered separate ADHD × CU traits and ODD × CU traits interaction terms. When an interaction was not significant, we removed it from the model. Although some predictors were correlated (Table 2), our approach to testing the contributions of ADHD, ODD, and CU traits was significantly driven by the theoretical considerations outlined above.

Table 2. Intercorrelations Among Predictors and Outcome Variables

Measure	1	2	3	4	5	6	7
ADHD symptoms	—	.52**	.52**	–.53**	–.72**	.59**	.49**
ODD symptoms		—	.38**	–.51**	–.61**	–.43**	.32**
CU traits			—	–.33**	–.46**	.43**	.41**
Parent CGAS				—	.61**	–.63**	–.24
Interviewer CGAS					—	–.66**	–.53**
Parent IRS						—	.56**
Teacher IRS							—

Note: ADHD symptoms = total symptoms endorsed for ADHD on the Diagnostic Interview Schedule for Children–Fourth Edition (DISC-IV); ODD symptoms = total symptoms endorsed for oppositional defiant disorder on the DISC-IV; CU traits = mean of all parent-rated items on Antisocial Process Screening Device (APSD) that load on callous-unemotional traits factor; Parent CGAS = parent-rated Children's Global Assessment Scale; Interviewer CGAS = interviewer-rated Children's Global Assessment Scale; Parent IRS = mean of all items on parent-rated Impairment Rating Scale; Teacher IRS = mean of all items on teacher-rated Impairment Rating Scale.
*$p < .05$. **$p \leq .01$.

Table 3. Summary of Hierarchal Regression Analyses Predicting Impairment From Children's Global Assessment Scale

Predictor	ΔR^{2a}	β^b	p^c
Parent report[d]			
Step 1	.36		.00**
ADHD symptoms		–.38	.00**
ODD symptoms		–.30	.00**
CU traits		–.001	.99
Step 2			
ADHD × CU traits	.00	.01	.89
Interviewer report[d]			
Step 1	.60		.00**
ADHD symptoms		–.52	.00**
ODD symptoms		–.31	.00**
CU traits		–.07	.33
Step 2			
ADHD × CU traits	.02	.15	.02*

Note: ODD = oppositional defiant disorder; CU = callous-unemotional.
[a]Change in R^2 associated with each predictor with control of all preceding variables.
[b]β reflects association with outcome with simultaneous control of previous variables.
[c]Significance level associated with predictor.
[d]Results reflect the model with nonsignificant two-way interactions between ODD × CU removed.
$p < .05$. **$p \leq .01$.

Predicting Global Impairment From ADHD and ODD

The results of the hierarchal regressions with ADHD, ODD, and CU traits for impairment are presented in Tables 3 and 4. ADHD ($\beta = –.38$, $p = .00$) and ODD ($\beta = –.30$, $p = .00$) positively predicted the parent CGAS (lower score

Table 4. Summary of Hierarchal Regression Analyses Predicting Impairment Rating Scale

Predictor	ΔR^{2a}	β^b	p^c
Parent report[d]			
Step 1	.38		.00**
ADHD symptoms		.42	.00**
ODD symptoms		.14	.19
CU traits		.16	.10
Step 2			
ADHD × CU traits	.03	–.20	.03*
Teacher report[d]			
Step 1	.31		.00**
ADHD symptoms		.31	.02*
ODD symptoms		.12	.35
CU traits		.26	.03*
Step 2			
ADHD × CU traits	.07	–.30	.01**

Note: ODD = oppositional defiant disorder; CU = callous-unemotional.
[a]Change in R^2 associated with each predictor with control of all preceding variables.
[b]β reflects association with outcome with simultaneous control of previous variables.
[c]Significance level associated with predictor.
[d]Results reflect the model with nonsignificant two-way interactions between ODD × CU removed.
*$p < .05$. **$p \leq .01$.

indicates greater impairment) but CU traits (β = –.001, p = .99) and its interaction with ADHD and ODD did not. Similar patterns were observed for the interviewer CGAS: ADHD (β = –.52, p = .00), ODD (β = –.31, p = .00), and CU traits (β = –.07, p = .33). However, we did observe evidence of an interaction between ADHD and CU traits (β = .15, p = .02) with post hoc analyses that suggested an effect of CU traits on the interviewer CGAS at moderate levels of ADHD (β = –.46, p = .00) but not at low (β = –.21, p = .32) or high levels of ADHD (β = .04, p = .88; Figure 1).

We repeated the same analyses as above with the parent IRS (Table 4). ADHD was strongly associated with impairment (β = .42, p = .00) but ODD (β = .14, p = .19) and CU traits (β = .16, p = .10) were not. Once again, CU traits moderated the association between ADHD and impairment (β = –.20, p = .03), such that CU traits correlated with impairment at moderate levels of ADHD (β = .45, p = .00) but not at low (β = .23, p = .29) or high levels of ADHD (β = –.05, p = .84; Figure 2). Finally, we observed significant main effects for ADHD (β = .31, p = .02) and CU traits (β = .26, p = .03) on the teacher IRS but not for ODD (β = .12, p = .36). A significant interaction was detected between ADHD and CU traits (β = –.30, p = .01), such that CU traits correlated with impairment in children with low (β = .56, p = .02) and moderate levels of ADHD (β = .42, p = .00) but not in children with high levels of ADHD (β = –.05, p = .88; Figure 3).

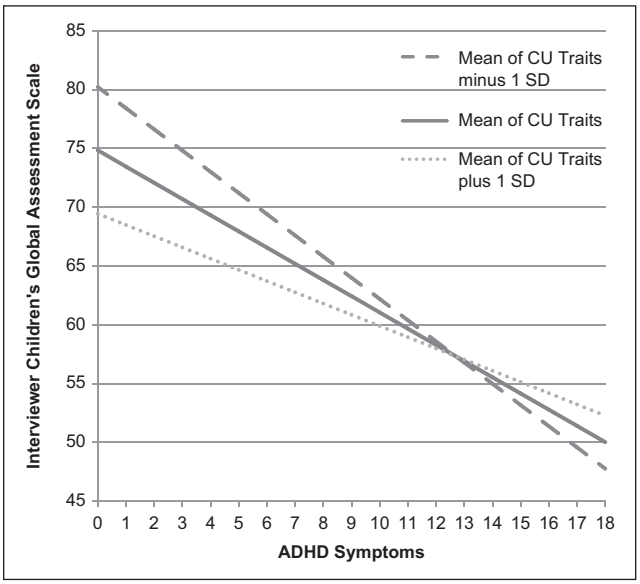

Figure 1. Predicted interviewer CGAS from ADHD symptoms and CU-traits interaction
Note: CGAS = Children's Global Assessment Scale; CU = callous-unemotional. Figure presents predicted values based on a regression model, including ADHD symptoms, oppositional defiant disorder (ODD) symptoms, and CU traits, holding ODD symptoms at the group mean.

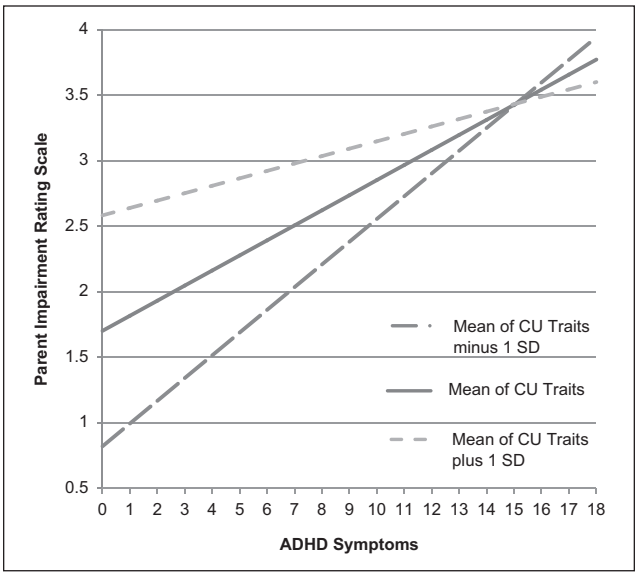

Figure 2. Predicted parent IRS from ADHD symptoms and CU-traits interaction
Note: IRS = Impairment Rating Scale; CU = callous-unemotional. Figure presents predicted values based on a regression model, including ADHD symptoms, oppositional defiant disorder (ODD) symptoms, and CU traits, holding ODD symptoms at the group mean.

Discussion

We hypothesized that ADHD and ODD would positively predict impairment in a sample of 6- to 9-year-old children

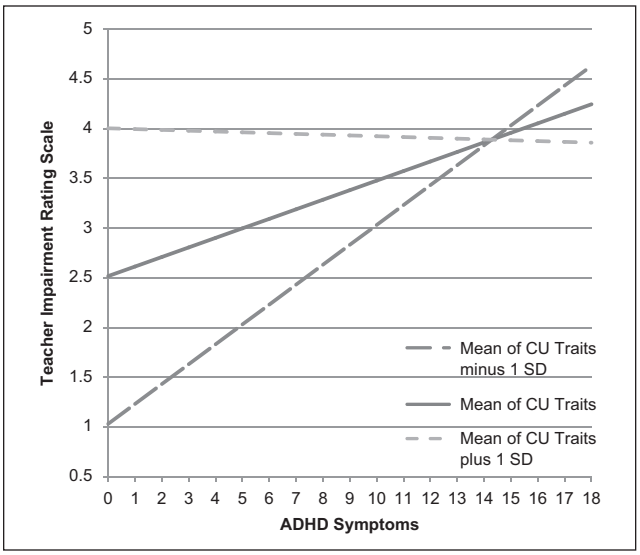

Figure 3. Predicted teacher IRS from ADHD symptoms and CU-traits interaction

Note: IRS = Impairment Rating Scale; CU = callous-unemotional. Figure presents predicted values based on a regression model, including ADHD symptoms, oppositional defiant disorder (ODD) symptoms, and CU traits, holding ODD symptoms at the group mean.

and that these associations would be significantly moderated by CU traits. Based on impairment measures that were unrelated to diagnostic ascertainment, ADHD was associated with impairment across all measures and informants whereas their association with ODD was limited to parent- and interviewer-rated global impairment (i.e., CGAS). We emphasize the importance that findings were evident across multiple informants. Next, CU traits were only associated with teacher-rated impairment. Finally, contrary to our hypothesis, CU traits were associated with impairment only at moderate levels of ADHD, and CU traits did not moderate the association of ODD with impairment.

Our results are generally consistent with Waschbusch and Willoughby (2008) and similar to Frick, Cornell, et al. (2003), although we used multimethod/informant ratings of ADHD, ODD, CU traits, and impairment. This pattern of stronger predictions of outcome at low/moderate levels of ADHD was previously reported in a 5-year study of school-aged boys with and without ADHD, where early covert antisocial behavior prospectively predicted adolescent-delinquency severity more robustly in controls than in ADHD youth (Lee & Hinshaw, 2004). Similarly, in a study of more than 200 school-aged girls, social information processing biases were more strongly related to aggression in controls than in girls with ADHD (Mikami, Lee, Hinshaw, & Mullin, 2008). Our results suggest that CU traits disrupted day-to-day living at relatively modest levels of ADHD perhaps because ADHD accounted for a significantly higher proportion of variance in functional impairment than individual differences in callousness, remorse, and empathy.

It may also be the case that CU traits are not a robust predictor of impairment. However, it is also possible that the influence of CU traits may be developmentally sensitive. CU traits are stable from late childhood through early adolescence and into adulthood (Frick, Kimonis, Dandreaux, & Farrell, 2003; Loney, Taylor, Butler, & Iacono, 2007), but they are less stable in young children. Among 4- to 8-year-old boys with CP, CU traits decreased in a subgroup of children following a parenting intervention (Hawes & Dadds, 2007). Next, across three cohorts of children in first, fourth, and seventh grade, CU traits predicted delinquency in seventh graders only after controlling for hyperactivity, inattention, and CP (Pardini, Obradovrić, & Loeber, 2006). Consistent with our formulation, recent efforts have been made to assess CU traits early in development, including a preschool version of the APSD (Hawes & Dadds, 2007; Kimonis et al., 2006). Prospective studies are necessary to adequately investigate developmental changes in CU traits and their association with psychopathology and impairment. Future studies may show that as CU traits become more stable, their predictive validity and interaction with ADHD may also change. Similarly, future studies should also test mediators of predictors of impairment for different subgroups (i.e., different factors may explain the effect of ADHD on impairment at low versus high levels of CU traits). For example, deviant peer affiliation mediated the influence of ADHD on substance use/abuse in children with CP but not in children without CP (Marshal & Molina, 2006). CU traits were also linked to specific domains of impairment, such as social (e.g., bullying and poor identification of fearful faces) and academic functioning (Essau, Sasagawa, & Frick, 2006; Muńoz, 2009; Viding, Simmonds, Petrides, & Frederickson, 2009). These associations lend credibility to the idea that future studies must identify the mechanisms that govern predictor-outcome associations for different subgroups of youth.

Future studies must balance the utility of global measures of impairment with the need for more specific measures of functioning to test hypotheses about particular disorders. We appreciate a recent effort by Barkley (2011) to organize a compendium of developmentally sensitive measures of functional impairment that will provide more uniform criteria to be used across diverse populations, settings, and contexts. We contend that the selection of appropriate impairment measures should be influenced by the nature of the clinical or research question. For example, monitoring impairment within the context of targeted treatment may benefit from a more specific assessment of impairment (e.g., social impairment for an intervention targeting social skills), whereas global impairment may be useful to evaluate the validity of diagnostic designations. Overall, there must be greater effort at studying impairment to accompany the significant advances made in studies of psychopathology (Barkley, 2011; Pelham et al., 2005).

We note several limitations of this study. First, there was a significant degree of overlap between CU traits with ADHD and ODD, which likely contributed to the relatively modest role CU traits played with respect to improving predictions of functional impairment (e.g., multicollinearity). However, we examined these predictors based on previous theory and the relative absence of research on this specific question (e.g., CU traits and ADHD are largely studied within the context of antisocial behavior rather than functional impairment). Second, the cross-sectional design prevented inferences about developmental aspects of ADHD, ODD, CU traits, and impairment. Third, the relatively limited number of girls in this study prevented an examination of sex differences. Although we statistically controlled for sex in our models, there was significant variation in the proportion of boys and girls among probands and controls, which may have introduced additional confounds. Fourth, although we assessed impairment using multiple informants, global measures may have masked important differences in patterns of association across family, academic, and social domains. Overall, we used a well-characterized sample of boys and girls with and without ADHD and found that CU traits only predicted impairment at moderate levels of ADHD, and they did not moderate the effect of ODD on impairment. However, given that *DSM-V* is considering adopting CU traits as a specifier of CD, future studies must adopt developmentally sensitive approaches to CU traits if they meaningfully predict trajectories of disorder and impairment.

Authors' Note

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Declaration of Conflicting Interests

The authors declared no potential conflicts of interests with respect to the authorship and/or the publication of this article.

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