The Incremental Utility of Callous-Unemotional Traits and Conduct Problems in Predicting Aggression and Bullying in a Community Sample of Boys and Girls

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The current study tested whether callous-unemotional (CU) traits explained unique variance in measures of aggression and bullying, and in measures assessing cognitive and affective correlates to aggression, when controlling for conduct problem severity. In a sample of 284 ethnically diverse students (ages 9 to 14 years), a self-report measure of CU traits did not explain unique variance in self-report measures of reactive aggression but did interact with conduct problems in predicting proactive aggression, with conduct problems being more strongly related to proactive aggression in students high on CU traits. Conduct problems were also more strongly related to peer-reports of bullying in girls high on CU traits. Further, CU traits were negatively related to behaviors that defend victims of bullying, independent of conduct problem severity. Finally, conduct problems were more strongly related to anger dysregulation in students low on CU traits, and conduct problems were more strongly related to positive expectations for aggressive behavior in girls high on CU traits. These findings provide support for the proposal to include CU traits as a specifier for the diagnosis of conduct disorder.

Keywords: callous-unemotional traits, aggression, proactive, bullying, anger dysregulation

A major change being considered for the upcoming revision of the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM-5*; http://www.dsm5.org) for the diagnosis of conduct disorder (CD) is the addition of a specifier for children and adolescents who display CD with significant callous-unemotional (CU) traits (Frick & Moffitt, 2010). CU traits are characterized by a lack of guilt and empathy, lack of concern about performance, and a shallow or deficient affect (Frick, 2009). The rationale for including the specifier is that CU traits add important information on the course, outcome, treatment, and etiology of CD that is not provided by the symptoms of the disorder themselves (Frick & Nigg, 2012).

There is substantial empirical evidence to support this rationale for including this specifier. Specifically, children and adolescents with conduct problems who also show CU traits exhibit more severe and chronic conduct problems, as well as more severe aggression than those without CU traits (see Frick & Dickens, 2006; Frick & White, 2008, for reviews of this literature). Similarly, children and adolescents with conduct problems who show CU traits also seem to demonstrate different responses to treatment, such that they exhibit poorer response to behavioral parent training (Hawes & Dadds, 2005), and they experience longer lengths of stay in inpatient psychiatric hospitals (Stellwagen & Kerig, 2010) compared to youths with conduct problems but without elevated levels of CU traits. In a study of children (ages 7 to 12 years) with attention-deficit/hyperactivity disorder (ADHD) and conduct problems who participated in an outpatient summer treatment program, self-reported CU traits were associated (negatively) with nine of the 14 outcome measures (Haas et al., 2011). Although this research suggests that children with CU traits present as a treatment challenge, there is also evidence that they can respond positively to some intensive treatments (Kolko & Pardini, 2010).

Also in support of the *DSM-5* proposal to include CU traits in the definition of CD, children and adolescents with conduct problems who also exhibit elevated CU traits show a number of unique genetic, neurological, emotional, cognitive, personality, and social characteristics compared to other youths with conduct problems (see Frick, Blair, & Castellanos, in press; Frick & White, 2008, for reviews). For example, children with conduct problems and CU traits show a stronger genetic contribution to their conduct problems (Viding, Blair, Moffitt, & Plomin, 2005). Moreover, children and adolescents with conduct problems and CU traits demonstrate deficits in their amygdala response to emotional pictures (Marsh et al., 2008), in their emotional responses to others in distress

(Kimonis, Frick, Fazekas, & Loney, 2006; Kimonis et al., 2008), in their response to punishment (Fisher & Blair, 1998; O'Brien & Frick, 1996), and in their low levels of fear and anxiety compared to other youths with conduct problems (Frick, Lilienfeld, Ellis, Loney, & Silverthorn, 1999; Pardini, Lochman, & Powell, 2007).

One limitation in this research on antisocial youths with and without high levels of CU traits is that past studies have not consistently tested whether CU traits add to the prediction of outcomes over and above conduct problem severity. That is, if children with CU traits and CD show more severe conduct problems, could some of the differential outcomes and differential correlates be simply a function of their more severe behavioral disturbance? This is a critical question for evaluating the need for the specifier proposed in the *DSM-5*, in that this would indicate whether the specifier should focus on emotional and interpersonal characteristics (i.e., CU traits) or whether the unique subgroup could be adequately and more parsimoniously captured by a specifier focusing on the severity of the conduct problem behavior.

Some past research has provided important data on this issue. For example, in a large twin study, Viding et al. (2005) reported that the stronger heritability associated with conduct problems in children (age 7) with CU traits remained even controlling for conduct problem severity. Additionally, within an high risk sample of boys (average age of 10.7 years), CU traits predicted persistent, serious, and violent criminal behavior over a 2-year follow-up, controlling for symptoms ADHD, oppositional defiant disorder (ODD), and CD (Pardini & Fite, 2010). In one of the strongest tests of the incremental validity of CU traits, McMahon, Witkiewitz, Kotler, and The Conduct Problems Prevention Research Group (2010) reported that CU traits assessed in seventh grade predicted adult arrests, adult symptoms of antisocial personality disorder (APD), and an adult diagnosis of APD, even controlling for seventh-grade ADHD, ODD, CD, and childhood-onset of CD.

Thus, there is some evidence that CU traits predict important outcomes (e.g., criminal behavior and adult antisocial behavior), even controlling for conduct problem severity. However, their unique contribution to predicting other outcomes has not been extensively tested. For example, youths with conduct problems and CU traits show high rates of aggression (Frick & Dickens, 2006; Frick & White, 2008). Notably, not only are youths with CU traits at risk for more severe aggression and violence, but these youths are at risk for unique patterns of aggressive behaviors. Specifically, there is evidence to suggest that antisocial children and adolescents with CU traits are more likely to show both reactive (i.e., impulsive and in response to perceived provocation) and proactive (i.e., premeditated and for instrumental gain) aggression, whereas youths with conduct problems without CU traits tend to only show mild forms of reactive aggression (Fanti, Frick, & Georgiou, 2009; Frick, Cornell, Barry, Bodin, & Dane, 2003; Kruh, Frick, & Clements, 2005; Lawing, Frick, & Cruise, 2010). However, research to date has not documented whether this association with proactive aggression is independent of conduct problem severity.

The link between CU traits and proactive forms of aggression has been influential for many theories of how children with conduct problems, with and without CU traits, may differ in terms of the causal factors leading to their problem behavior (Blair, Mitchell, & Blair, 2005; Frick & Viding, 2009). Specifically, children with CU traits may have a specific social schema that make them

more likely act in a proactively aggressive manner, such as viewing aggression as an effective means for obtaining positive outcomes (Pardini, Lochman, & Frick, 2003), especially outcomes related to dominance and forced social respect (Pardini, 2011). In contrast, children with conduct problems without CU traits seem to have problems regulating their emotions, resulting in reactive aggression often in the context of high emotional arousal (e.g., during a fight; Frick & Morris, 2004; Frick & Viding, 2009). Thus, these findings suggest that CU traits may not only moderate the association between conduct problems and the different types of aggression, but they may also moderate the association between conduct problems and the emotional (e.g., anger dysregulation) and cognitive (e.g., positive expectations for aggression) characteristics related to the different forms of aggression.

Another form of aggression that has been associated with CU traits is bullying (Fanti et al., 2009; Viding, Simmonds, Petrides, & Frederickson, 2009). *Bullying* is defined as repeated aggression toward another person who is perceived as weaker and less able to defend him or herself from the aggressor (Olweus, 1991). It is a highly prevalent form of aggression in schools (Nansel et al., 2001) that can lead to significant negative academic and mental health consequences, such as decreased school attendance and increased risk for emotional problems (Sourander et al., 2007; Storch, Masia-Warner, Crisp, & Stein, 2005). Of note, Viding et al. (2009) documented a positive association between CU traits and bullying that remained significant after controlling for conduct problem severity in a large sample ($n = 704$) of 11- to 13-year-old schoolchildren.

However, research has shown that in addition to the person who actually performs the bullying behavior, other classmates can play significant roles when witnessing bullying of another student (Gini, 2006; Gini, Albiero, Benelli, & Altoe, 2007; Salmivalli, Lagerspetz, Bjorkqvist, Osterman, & Kaukiainen, 1996). Salmivalli et al. (1996) used peer nominations to identify several participant roles that peers may play in situations involving bullying. Specifically, reinforcers are individuals who provide encouragement to the bully by laughing and encouraging people to watch while the peer is being victimized. Assistants are active participants in the bullying behaviors who will catch and hold the victim. Defenders are individuals who make an effort to stop the bullying behavior by taking up for the victim. These bystander roles are related to the rate and intensity of bullying behavior in schools (Hawkins, Pepler, & Craig, 2001; O'Connell & Pepler, 1999). Thus, it is important to understand what leads to these different bullying behaviors. In particular, it is critical to determine if CU traits are associated with broader definitions of bullying, which include these multiple roles and whether this relationship is independent of conduct problem severity.

A final issue in considering whether a specifier for the diagnosis of CD is warranted relates to whether CU traits add significant information to the prediction of important outcomes across sex and ethnic groups. Although there have been far fewer studies conducted with girls, several studies have shown that CU traits are associated with aggression in girls, including physical and relational (i.e., harming another's social relationships) aggression, similar to what has been reported for boys (Marsee & Frick, 2007; Penney & Moretti, 2007). However, these studies did not test whether CU traits were associated with aggression in girls independent of conduct problems. Viding et al. (2009) reported that

CU traits were significantly associated with bullying and, importantly, showed that this was independent of conduct problem severity for both boys and girls. Further, past research has suggested that, although the association between CU traits and severity of antisocial behavior is found in both Caucasian and ethnically diverse samples of youths, the strength of the association is often weaker in samples with high rates of ethnic minority youths (Edens, Campbell, & Weir, 2007). It should be noted, however, that most of the studies included in the Edens et al. (2007) review were adjudicated samples and, as a result, the strength of the association between CU traits and severity of antisocial behavior across different ethnic groups requires further testing in community samples.

Present Study

Based on this past research, the current study investigated several research questions critical for establishing the importance of adding a specifier to the diagnosis of CD involving the presence of CU traits. First, the present study tested the association between CU traits and aggression, both as a main effect controlling for conduct problem severity and as an interaction with conduct problems. Because research suggests that children with conduct problems with and without high levels of CU traits would show reactive forms of aggression, we predicted that conduct problems but not CU traits would be related to reactive aggression. In contrast, we predicted that CU traits would interact with conduct problem severity in the statistical prediction of proactive aggression and a cognitive schema often associated with this type of aggression: positive outcome expectations for aggressive behavior. Specifically, we predicted that conduct problems would be more strongly associated with proactive aggression and a related cognitive style (i.e., positive expectations for aggression) in those high on CU traits. However, we predicted that conduct problems would be more strongly associated with anger dysregulation in those low on CU traits. In these tests, we included both physical and relational forms of aggression, to represent the types of aggression that are most important for both boys and girls.

The second research question focused on the association between CU traits, again both as a main effect and as an interaction with conduct problem severity, in their association with another form aggression: bullying. Based on past research, we predicted that CU traits would show an independent association with peer reports of general bullying behaviors, which include the actual bullying, as well as other roles such as assisting or reinforcing bullying behavior. Additionally, we tested whether CU traits would be negatively associated with defending the victim of bullying, an influential role that students can play in reducing the level of bulling in schools (Salmivalli, Voeten, & Poskiparta, 2011).

Third, we tested whether the associations between CU traits and aggressive outcomes would be moderated by the child's sex and ethnicity. Based on past research, we predicted that the associations would not be moderated by sex (Viding et al., 2009) but that the associations would be weaker for ethnic minority students (Edens et al., 2007). It should be noted that these tests were conducted in a nonreferred sample of schoolchildren that was almost equally split between Caucasian and ethnic minority students. Thus, this nonreferred sample provides the ability to test potential ethnic differences in the associations with CU traits but

avoids potential referral biases for ethnic minority youths that may be present in clinic-referred samples or samples of adolescents in the juvenile justice system.

Importantly, all of the aforementioned research questions were addressed using two primary methods for defining conduct problem severity. First, we used number of symptoms of CD because this provided the most direct test of the proposed specifier of CU traits to the CD diagnosis and because this definition focused on the presence of only the most severe types of conduct problems. Second, we also used a more general measure of conduct problem severity which included symptoms of both ODD and CD, given evidence that the combined symptom list may provide a better overall index of conduct problem severity than either group of symptoms alone, especially in community samples where the base rate of CD symptoms tends to be low (Burke, Waldman, & Lahey, 2010). We did not have differential hypotheses across the two definitions of conduct problem severity.

Method

Participants

Participants were recruited from four schools in a semirural public school system in the southeastern United States. All of the participating schools were Title I schools, meaning at least 66% of the students receive free or reduced lunches. Students in special education classes were not included in the study. Parental consent was obtained from 349 (70%) of the approximate 500 eligible students. Of the 349 students, 65 students did not participate in data collection or did not complete the forms or complete them correctly, leaving the final sample of 284. Participants ranged in age from 9 to 14 years, with a mean age of 10.88 ($SD = 1.21$). Half of the sample identified their ethnicity as Caucasian (50.4%), 39.4% as African American, 3% as Hispanic American, 1% as Asian American, and the remaining individuals identified as other ethnicities. This ethnic composition was representative of the participating public schools based on data published by the school system. Girls comprised 54.2% of the sample.

Measures—Predictors

Conduct problems.   Conduct problems were assessed through two scales derived from 26 self-report items representing the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM–IV*; American Psychiatric Association, 1994) symptoms of CD and ODD from the Youth Symptom Inventory-4 (YI-4; Gadow & Sprafkin, 2000): a scale consisting of only CD symptoms and a more general conduct problem scale that included both CD and ODD symptoms. In a previous sample of 239 clinic-referred youths, ages 11 to 18, this list of CD and ODD symptom scores demonstrated acceptable reliability (αs = .66–.87), was highly correlated with the externalizing behavior, and distinguished between children with clinically diagnosed conduct disorders and children without conduct disorders (Gadow et al., 2002). In the current sample, the internal consistency of the CD symptom scores (α = .86) and the combined ODD/CD symptom scores (α = .85) on the YI-4 was excellent.

Callous-unemotional traits.   CU traits were measured using the six-item Callous-Unemotional subscale of the self-report ver-

sion of the Antisocial Process Screening Device (APSD; Frick, & Hare, 2001). The Callous-Unemotional subscale includes items such as, "I feel guilty or bad when I do something wrong" (reverse scored), which are scored as 0 (*Not at all true*), 1 (*Sometimes true*), or 2 (*Definitely true*). This scale has been widely used in research to assess CU traits (see Frick, 2009, and Muñoz & Frick, 2007, for reviews). Internal consistency of the scores in this sample was $\alpha = .60$, which is modest but consistent with past research (e.g., alphas ranging from .50 to .68; Muñoz & Frick, 2007). Despite this modest internal consistency, self-report scores on the CU subscale have been found to be relatively stable over a 3-year period and have been associated with greater aggression and violence in community samples of youths (Muñoz & Frick, 2007).

Measures—Dependent Variables

Aggression. Self-report of aggression was measured by the Peer Conflict Scale (PCS; Marsee & Frick, 2007). The PCS is a 40-item measure, which assesses several types of aggressive behaviors through four 10-item scales. The two reactive subscales, Reactive Physical (e.g., "If others make me mad, I hurt them") and Reactive Relational (e.g., "If others make me mad, I tell their secrets") have items worded such that the individual was clearly provoked, and the reaction is either to hurt or fight the other person (physical) or to harm their social relationships (relational). In contrast the Proactive Physical subscale (e.g., "I carefully plan out how to hurt others") also involves hurting others or fighting, but in a way that is clearly planned or for gain. Similarly, the Proactive Relational subscale (e.g., "I deliberately exclude others from my group, even if they haven't done anything to me") involves hurting others socially but again in a way that is clearly not in reaction to a perceived provocation. The factor structure of the PCS has been supported in a large sample of older children and adolescents ($N = 855$; age range = 12–18; Marsee et al., 2011). Confirmatory factor analysis (CFA) showed that a hierarchical four-factor model fit the data better than a one-factor model (i.e., general aggression factor), a two-factor model (i.e., physical and relational factors), and a four-uncorrelated factor model. In this sample the internal consistency for the four aggression subscales ranged from $\alpha = .76$ to $\alpha = .88$.

In support of the validity of PCS subscales, the reactive and proactive physical aggression scales were positively associated with a self-report of the number of violent acts (Kimonis et al., 2008), and the aggression scales were correlated with a laboratory measure of aggressive behavior, with the reactive and proactive subtypes showing different responses to provocation (e.g., reactive aggression being associated with aggressive responses to low provocation) in a sample of detained boys (Muñoz, Frick, Kimonis, & Aucoin, 2008). In a detained sample of girls, the reactive and proactive subscales for both relational and physical aggression showed differential correlations with important external criteria (i.e., reactive being correlated with measures of emotional dysregulation and proactive being correlated with measures of CU traits and positive outcome expectations for aggression; Marsee & Frick, 2007). In the current sample, the internal consistency for the four aggression scales was excellent, with $\alpha = .85$ for the reactive relational, proactive relational, and proactive physical aggression scales and $\alpha = .88$ for the reactive physical aggression scale.

Bullying roles. Peer reports of bullying and associated bullying roles (i.e., assistant, reinforcer, and defender) were assessed using the procedure designed by Sutton and Smith (1999) and used in several past studies (Solberg, Owleus, & Endresen, 2007; Sourander et al., 2007). The scale includes Sutton and Smith's (1999) bully ($n = 4$; e.g., "How often does this classmate bully others?"), assistant ($n = 2$; e.g., "How often does this student help bullies pick on classmates, maybe by catching or holding the target?"), and defender ($n = 5$; e.g., "How often does this classmate try to make the bullies stop when they see a classmate being bullied?") items. However, two items—"Is usually there, even if not doing anything" and "Gets others to watch"—from the original reinforcer scale were excluded, because they did not seem to fit the theoretical construct for reinforcing, leaving three remaining reinforcer items (e.g., "How often does this classmate laugh when he or she sees [witnesses] others being bullied"). A general bullying composite was created summing the bully, reinforcer, and assistant scales. This was based on previous research indicating that these scales are highly correlated and that items from these scales do not form distinct factors (Crapanzano, Frick, Childs, & Terranova, 2011). Further, the scales were highly correlated in the current sample (rs = .86–.91) and leading to very high internal consistency estimates for both the bullying composite scale ($\alpha = .97$) and the defender scale ($\alpha = .91$) within the current sample. Further, the correlations with key study variables were similar across the different bullying dimensions. Thus, this bullying composite and the separate defender subscale were used in all analyses.

Prior to the administration of the participant roles scale, the students were read the following definition of bullying based on the description provided by Olweus (2001):

> Bullying is when a student is mean to another student over and over again. The student who is being bullied is usually at a disadvantage, such as being smaller, outnumbered, or having fewer friends. Bullying includes hitting, calling people names, telling stories about people, and ignoring people. (pp. 5–6)

After the definition was read, the students were asked to rate each of the classmates who were also participating in the study and were in the student's home room on a scale of 1 (*Never*) to 3 (*Often*) on the bullying questions. To form the bullying composite and defender scores, mean ratings were calculated for each item from all the peer ratings. The number of peer raters for each child ranged from 4 to 18 ($M = 12.26$; $SD = 4.19$).

Anger dysregulation. An anger dysregulation scale was constructed from a three-item anger dysregulation subscale (e.g., "I attack whatever it is that makes me mad") and a reverse coded four-item anger inhibition subscale (e.g., "I get mad inside but don't show it") from the Children's Emotion Management Scale (Zeman, Shipman, & Penza-Clyve, 2001). This combined scale was supported in a factor analysis conducted on a community sample of 227 fourth and fifth graders (Zeman et al., 2001). The internal consistency for the anger dysregulation scale in this sample was modest with $\alpha = .58$.

Positive expectations of aggression. Two subscales from the Attitudes and Beliefs toward Aggression self-report measure were combined in the current study to create an assessment of positive expectations toward aggression (Vernberg, Jacobs, & Hershberger, 1999). Specifically, the seven-item Aggression Legitimate scale (e.g., beliefs that aggression is acceptable and victims deserve it)

and the four-item Aggression Pays scale (e.g., beliefs that aggression gets you what you desire) were combined for analyses (Vernberg et al., 1999). The Aggression Legitimate and Aggression Pays subscales have been previously associated with aggressive behaviors and negative affect in the expected directions (Dill, Vernberg, Fongay, Twemlow, & Gamm, 2004; Vernberg et al., 1999). In the current study the combined scales for Anger Dysregulation (Aggression Legitimate and Aggression Pays subscales) had an internal consistency of α = .78.

Procedures

Prior to data collection, institutional review board approval was obtained for all study procedures. Students were contacted through letters that were sent home with attached consent forms for parents. Students were asked to provide assent before completing the questionnaires. Those who did not provide assent or consent from the parents were asked to do an alternative activity. The questionnaires were administered to small groups of students during portions of the day that conflicted minimally with instruction (e.g., guidance counseling time, study period). Questionnaires were read aloud to the students to control for reading ability. To protect their answers, students were provided a cover sheet and seated separately to make it difficult to see others' answers.

Results

Descriptive Analyses

The distributions of the variables used in the current study are provided in Table 1. The distributions indicated that the variables were relatively normally distributed, with the exception of the CD symptoms and the two (relational and physical) proactive aggression scales, which all showed a strong positive skewness. Because this distribution is what is expected from past samples (Marsee et al., 2011) and seems to reflect the true distribution of these variables, these items were not transformed for the primary analyses.

Table 2 provides the zero-order correlations among the variables used in the multiple regression analyses and their associations with key demographic variables (i.e., sex, age, and ethnicity). As indicated in this table, sex (coded male = 1 and female = 0) was positively related to all of the variables except the defender role, meaning that girls tended to have higher defender scores. CU traits were not significantly related to ethnicity. However, being a minority student (Caucasian = 0 and ethnic minority = 1) was positively associated with other predictor and dependent variables except the defender role, which showed a negative association. Further, both CU traits and conduct problems (both CD and combined ODD/CD symptoms) were positively associated with all of the dependent variables except for the defender role, to which both CU traits and conduct problems were negatively related.

Multiple Regression Analyses

The primary analyses involved a series of hierarchical multiple regression analyses to examine the main and interactive effects of CU traits and conduct problems in predicting scores on the measures of aggression, bullying roles, anger dysregulation, and positive expectations for aggression. Prior to all analyses, the predictors (i.e., conduct problems and CU traits) were centered by subtracting the sample means. For the first series of hierarchical multiple regression analyses sex, ethnicity, CD symptoms and CU traits were entered in Step 1, the interaction term for CD symptoms and CU traits (CD × CU) in Step 2, two-way interactions for sex with CD symptoms and CU traits (CD × Sex and CU × Sex) in Step 3, and the three-way interaction term between CD symptoms, CU traits, and sex in Step 4 (CD × CU × Sex). Steps 3 and 4 were then repeated using the interactions with ethnicity. All analyses were then

Table 1
Distributions of Study Variables

Variable	M	SD	Min–Max	S	K
Predictors					
Conduct disorder symptoms	16.89	4.13	14–43	3.56	16.47
ODD and CD symptoms	41.72	10.20	26–88	1.28	2.74
Callous-unemotional traits	1.84	1.73	0–8	1.35	1.99
Aggression					
Physical proactive	11.66	3.33	10–33	3.30	13.00
Physical reactive	15.16	5.63	10–37	1.32	1.52
Relational proactive	12.28	3.49	10–34	3.07	12.46
Relational reactive	13.88	4.43	10–38	1.86	4.54
Bullying roles					
Bullying	13.48	3.31	9–22	0.63	−0.60
Defender	7.73	1.49	4–11	0.41	−0.71
Emotional and cognitive correlates					
Anger dysregulation	13.68	2.96	7–21	0.13	−0.28
Positive expectations	29.43	7.47	16–64	1.22	2.25

Note. S = skewness; K = kurtosis; CD = conduct disorder; ODD = oppositional defiant disorder.

Table 2
Zero-Order Pearson Correlations of Main Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
						Demographic variables								
1. Sex	—	**.04**	**−.09**	.22	.16	.12	.18	.22	**.11**	**.02**	.14	−.14	**.02**	.13
2. Age		—	.20	.25	.20	.15	.24	.22	.19	.13	.40	−.56	.16	.19
3. Ethnicity			—	.17	.22	**.06**	.15	.25	.13	.15	.29	−.09	.17	.16
						Predictor variables								
4. CD symptoms				—	.77	.24	.75	.60	.66	.61	.43	−.25	.19	.50
5. ODD/CD symptoms					—	.21	.64	.71	.64	.68	.46	−.23	.36	.56
6. CU traits						—	.30	.24	.26	.23	.20	−.20	.21	**.10**
						Dependent variables								
7. Physical proactive aggression							—	.71	.84	.71	.44	−.25	.26	.54
8. Physical reactive aggression								—	.69	.69	.48	−.28	.47	.54
9. Relational proactive aggression									—	.83	.43	−.20	.26	.51
10. Relational reactive aggression										—	.42	−.22	.31	.54
						Bullying roles								
11. Bullying											—	−.61	.23	.40
12. Defender												—	−.20	−.24
						Emotional and cognitive correlates								
13. Anger dysregulation													—	.29
14. Positive expectations for aggression														—

Note. CD = conduct disorder; ODD = oppositional defiant disorder; CU = callous-unemotional. Bold correlations were not statistically significant. All other correlations were statistically significant at the $p \leq .05$ level.

repeated using the composite of ODD and CD symptoms as the measure of conduct problems.

Based on tables provided by (Jaccard, Turrisi, & Wan, 1990), the sample size of the current study was sufficient to detect interactions with even small effect sizes (i.e., those that account for 2% or more of the variance in the dependent variable). When significant interactions were found, the forms of these interactions were explored using the post hoc probing procedures recommended by Holmbeck (2002). In this procedure, the

regression equation from the sample is used to calculate predicted values of the dependent variable of interest at high (1 *SD* above the mean) and low levels (1 *SD* below the mean) of the two predictors.

Aggression. The results of the analyses with the four aggression subscales as dependent variables and CD symptoms as the measure of conduct problem severity are summarized in Table 3. For all four forms of aggression, there were significant main effects for CD symptoms. In addition, CU traits showed

Table 3
Multiple Regression Analyses Testing the Main and Interactive Effects of Callous-Unemotional (CU) Traits and Conduct Disorder (CD) Symptoms

	Standardized beta						
Variable	Sex	Ethnicity	CD	CU	CD × CU	R^2	F
Physical proactive	.02	.02	.61***	.13***	.20***[a]	.61	83.93
Physical reactive	.10*	.16**	.52***	.11*	.01	.40	35.65
Relational proactive	−.05	−.01	.59***	.10*	.10	.45	44.12
Relational reactive	−.13**	.01	.62***	.09	−.02	.39	34.77
Bullying	.07	.24***	.35***	.11*	−.02[b]	.25	18.22
Defender	−.08	−.05	−.19**	−.18**	.01	.10	6.10
Anger dysregulation	−.04	.12	.21**	.17**	−.14*	.10	5.76
Positive expectations	.02	.07	.50***	−.02	−.03[c]	.26	18.65

Note. CD = conduct disorder; CU = callous-unemotional. All *F* values had (5,271) degrees of freedom, and were statistically significant at the $p < .001$ level.
[a] There was a significant three-way interaction between CD, CU, and sex; $\Delta R^2 = .01$, $\Delta F(1, 268) = 6.62$, $p = .011$. [b] There was a significant three-way interaction between CD, CU, and sex; $\Delta R^2 = .01$, $\Delta F(1, 268) = 5.15$, $p = .024$. [c] There was a significant three-way interaction between CD, CU, and sex; $\Delta R^2 = .02$, $\Delta F(1, 268) = 5.77$, $p = .017$.
* $p < .05$. ** $p < .01$. *** $p < .001$.

significant independent contributions in the prediction of both physical reactive and relational proactive aggression. Importantly, the predicted interaction between CD and CU traits was found in analyses using physical proactive aggression, $\Delta R^2 = .03$, $F(1, 271) = 19.27$, $p < .001$, as the dependent variable. However, this interaction was further modified by a significant three-way interaction with sex, $\Delta R^2 = .01$, $F(1, 268) = 6.62$, $p < .05$.

The form of this three-way interaction is provided in Figure 1. As shown in this figure, there was a different pattern present for boys and girls. The predicted interaction was significant for boys, Figure 1b. $\Delta R^2 = .05$, $F(1, 122) = 15.66$, $p < .001$, but not for girls, Figure 1a. $\Delta R^2 = .003$, $F(1, 147) = 0.86$, $p = .354$.
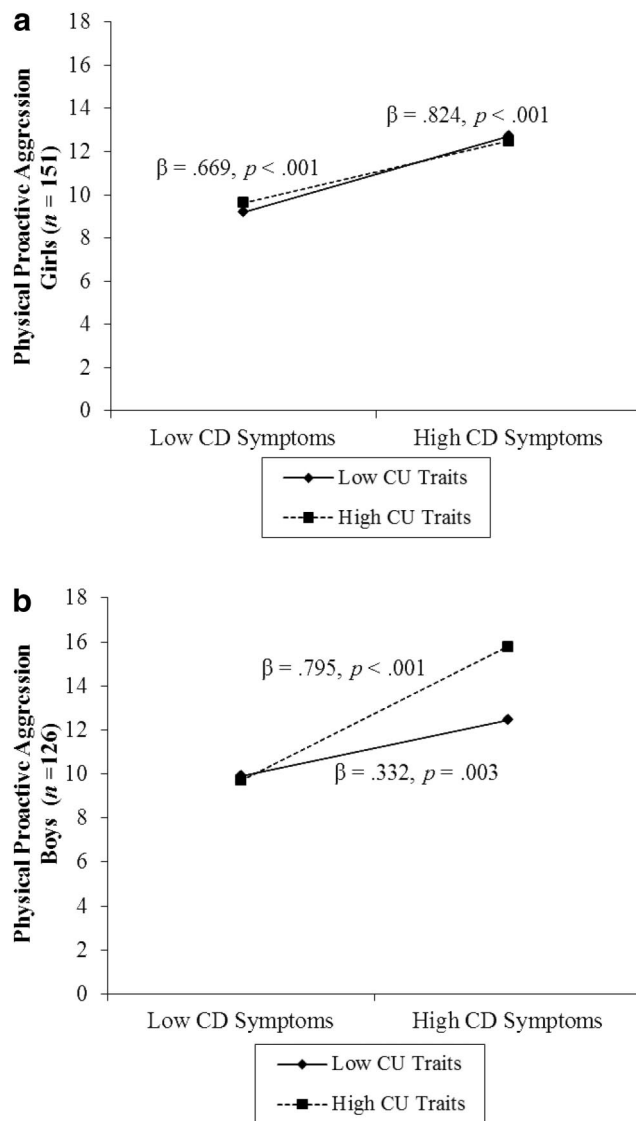

Figure 1. Figures illustrate the three-way interaction between callous-unemotional (CU) traits, conduct disorder (CD) symptoms, and sex in predicting proactive physical aggression. As illustrated by the figure, CU traits interacted with CD symptoms in predicting proactive physical aggression for boys (b) but not girls (a).

Specifically, as predicted, CD symptoms and physical proactive aggression were more strongly associated in those high on CU traits ($\beta = .795$, $p < .001$) than those low on CU traits ($\beta = .332$, $p < .01$) for boys. In contrast, only CD symptoms ($\beta = .746$, $p < .001$) showed a significant main effect for girls.

The results of the regression analyses using ODD and CD symptoms as the measure of conduct problems in the prediction of aggression are summarized in Table 4. The results were very similar to those using CD symptoms with the exception that the predicted CU × ODD/CD interaction reached significance for relational proactive aggression, $\Delta R^2 = .01$, $F(1, 278) = 6.54$, $p < .05$. Post hoc probing revealed that, as predicted, ODD/CD symptoms were more strongly associated with relational proactive aggression for those high on CU traits ($\beta = .690$, $p < .001$) than for those low on CU traits ($\beta = .449$, $p < .001$), and this was not moderated by either sex or ethnicity.

Bullying. The results of the analyses using the peer-reported bullying composite and defending behavior as dependent variables and CD symptoms as the measure of conduct problem severity are summarized in Table 3. In these analyses, CD symptoms were positively associated with bullying and negatively associated with defending behaviors. CU traits contributed uniquely in the prediction of both bullying and defending behaviors, as well. Interestingly, the independent contributions to defending behavior were very similar for CD symptoms ($\beta = -.19$, $p < 01$) and CU traits ($\beta = -.18$, $p < .01$).

Further, there was a significant three-way interaction between CD symptoms, CU traits, and sex in the prediction of peer-reported bullying composite, $\Delta R^2 = .01$, $F(1, 268) = 5.15$, $p = .024$. The form of this interaction is provided in Figure 2. There was a significant CD symptoms by CU traits interaction for girls, Figure 2a. $\Delta R^2 = .03$, $F(1, 147) = 6.12$, $p = .015$, but not for boys, Figure 2b. $\Delta R^2 = .004$, $F(1, 122) = 0.54$, $p = .465$. Specifically, for girls CD symptoms were more highly associated with bullying in those high on CU traits ($\beta = .635$, $p < .001$) compared to those low on CU traits ($\beta = .111$, $p = .461$). However, in boys, only CD symptoms ($\beta = .414$, $p < .001$) showed a significant main effect.

The results from the analyses utilizing ODD/CD symptoms as the measure of conduct problem severity are summarized in Table 4. The results were basically unchanged from those reported above using CD symptoms as the measure of conduct problem severity.

Emotional and cognitive correlates to aggression. The last series of multiple regression analyses were conducted using anger dysregulation and positive expectations for aggressive behavior as dependent variables. The results of these analyses utilizing CD symptoms as the measure of conduct problem severity are provided in Table 3. For anger dysregulation, the predicted significant interaction between CU traits and CD symptoms, $\Delta R^2 = .01$, $F(1, 271) = 4.03$, $p = .046$, emerged. Post hoc probing indicated that CD symptoms were more strongly associated with anger dysregulation for those low on CU traits ($\beta = .373$, $p = .002$) than for those high on CU traits ($\beta = .085$, $p = .205$), as predicted. For positive expectations for aggression, there was a significant three-way interaction between CU traits, CD symptoms, and sex, $\Delta R^2 = .02$, $\Delta F(1, 268) = 5.77$, $p = .017$, and the form of this interaction is provided in Figure 3. The predicted CU traits by CD symptoms interaction was found for girls, Figure 3a. $\Delta R^2 = .02$, $F(1,$

Table 4

Multiple Regression Analyses Testing the Main and Interactive Effects of Callous-Unemotional (CU) Traits and Oppositional Defiant Disorder and Conduct Disorder Symptoms (ODD/CD)

Variable	Standardized beta					R^2	F
	Sex	Ethnicity	ODD/CD	CU	ODD/CD $\times$ CU		
Physical proactive	.06	.02	.52***	.20***	.22***[a]	.49	53.84
Physical reactive	.12**	.11**	.64***	.08	.02	.53	63.65
Relational proactive	−.02	−.01	.58***	.15**	.12*	.44	42.93
Relational reactive	−.10*	−.02	.68***	.10*	.02	.48	51.77
Bullying	.08	.21***	.35***	.11*	.08[b]	.27	20.46
Defender	−.10	−.06	−.14*	−.16**	−.09	.10	5.79
Anger dysregulation	−.04	.08	.36**	.12*	−.12*[c]	.17	11.42
Positive expectations	.04	.04	.55***	−.03	.00[d]	.32	26.03

Note. CD = conduct disorder; ODD = oppositional defiant disorder; CU = callous-unemotional. All F values had (5,278) degrees of freedom and were statistically significant at the $p < .001$ level.
[a] There was a significant three-way interaction between ODD/CD, CU, and Sex; $\Delta R^2 = .01$, $\Delta F(1, 275) = 8.22$, $p = .004$. [b] There was a trend for a three-way interaction between ODD/CD, CU, and Sex; $\Delta R^2 = .01$, $\Delta F(1, 275) = 3.58$, $p = .060$. [c] There was a significant three-way interaction between ODD/CD, CU, and Ethnicity; $\Delta R^2 = .01$, $\Delta F(1, 275) = 4.27$, $p = .040$. This interaction was only exhibited by Caucasians and African Americans, $n = 255$ $\Delta R^2 = .02$, $\Delta F(1, 251) = 7.10$, $p = .008$, but not for other minorities (Asian/Pacific Islander, Hispanic/Latino, American Indian, $N = 29$ $\Delta R^2 = .04$, $\Delta F(1, 25) = 1.23$, $p = .277$. [d] There was a significant three-way interaction between ODD/CD, CU, and sex; $\Delta R^2 = .01$, $\Delta F(1, 275) = 4.21$, $p = .041$.
* $p < .05$. ** $p < .01$. *** $p < .001$.

147) $= 4.33$, $p = .039$, but not for boys, Figure 3b. $\Delta R^2 = .01$, $F(1, 122) = 2.46$, $p = .119$. Specifically, in girls CD symptoms were more highly associated with positive expectations for aggression in those high on CU traits ($\beta = .562$, $p < .001$) compared to those low on CU traits ($\beta = .097$, $p = .461$). However, in boys, only CD symptoms ($\beta = .642$, $p < .001$) showed a significant main effect.

The results of the analyses utilizing ODD/CD symptoms as the measure of conduct problems are summarized in Table 4. The one difference using this measure of conduct problem severity was that there was a three-way interaction between ODD/CD symptoms, CU traits, and ethnicity in the prediction of anger dysregulation, $\Delta R^2 = .01$, $F(1, 275) = 4.27$, $p = .040$. The form of this interaction is provided in Figure 4. As indicated by this figure, the significant interaction between ODD/CD symptoms and CU traits, Figure 4a. $\Delta R^2 = .02$, $\Delta F(1, 251) = 7.10$, $p = .008$, in the direction predicted by past research was only found for the African American and Caucasian students only. That is, ODD/CD symptoms were more strongly associated with problems in anger dysregulation in those low on CU traits ($\beta = .527$, $p < .001$) than in those high on CU traits ($\beta = .229$, $p < .01$). In contrast, the interaction was not significant in other ethnic minority youth, Figure 4b. $\Delta R^2 = .04$, $F(1, 25) = 1.23$, $p = .277$.[1]

Follow-Up Analyses

Several post hoc analyses were conducted to clarify the main analyses reported above. Analyses were conducted after the proactive physical and proactive relational aggression scales were log transformed to correct for their skewed distributions. The results were very similar using the transformed scores. The one exception was that the three-way interactions between conduct problem severity (both using CD symptoms and ODD/CD symptoms), CU traits, and sex in predicting proactive physical aggression were no longer significant, although two-way interactions between conduct problem severity and CU

traits were still found. This suggests that the failure to find the predicted interaction in girls may have been due to the highly skewed distribution of the proactive physical aggression variable.

Another issue of concern with the primary analyses is that the conduct problem measures include aggression items (e.g., "I threaten to hurt people," "I start physical fights," "I try to physically hurt people"). Thus, the association between conduct problem severity and aggression may have been inflated due to item overlap. The primary analyses retained this overlap because this provided the most conservative test of the incremental contribution of CU traits in the prediction of aggression, relative to the symptoms currently included in the diagnostic criteria for ODD and CD. However, to explore the effects of this methodology, the hierarchical multiple regression analyses using the ODD/CD composite were repeated after removing all aggression items. The results were similar to those reported in Tables 3 and 4. That is, the nonaggression ODD/CD symptoms added to the prediction of all four forms of aggression; the three-way interaction between ODD/CD symptoms, CU traits, and sex remained significant for predicting proactive physical aggression; and the two-way interaction between ODD/CD symptoms and CU traits remained significant for predicting proactive relational aggression. The only differences in results were that CU traits had stronger unique effects for predicting aggression when utilizing only the nonaggression ODD/CD symptoms.

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[1] Ethnicity was coded as Caucasian = 0 and ethnic minority = 1 for the main analyses. However, to explore the three-way interaction, the effects were explored for Caucasian, African American, and other ethnic groups separately. Since the findings were similar for Caucasian and African American students, these groups were collapsed in the probing of the interaction reported in Figure 4.
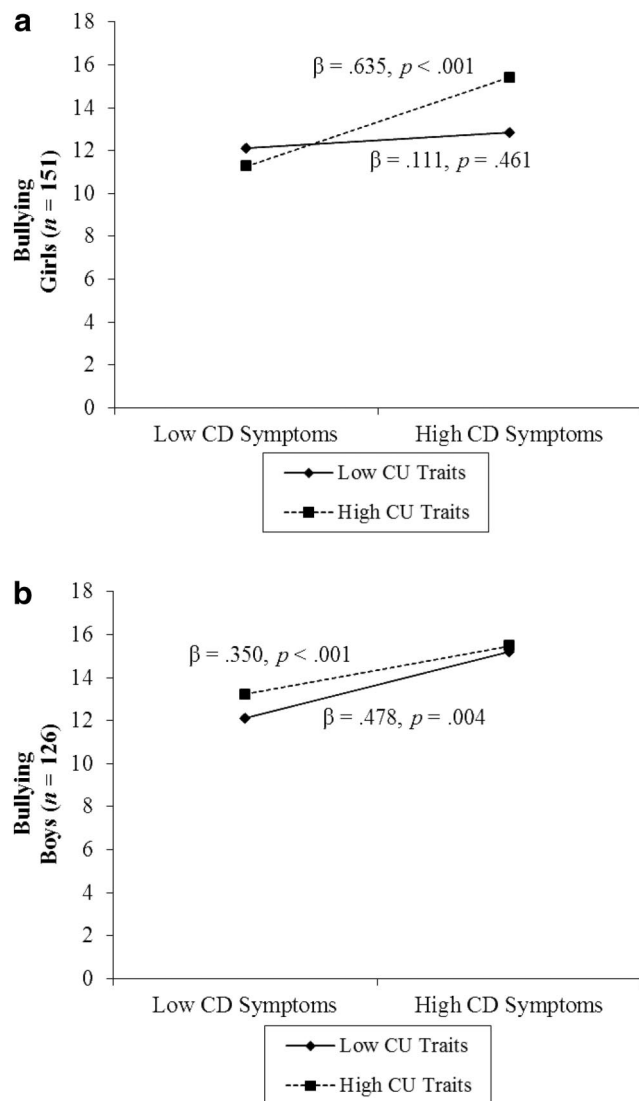
Figure 2. Figures illustrate the three-way interaction between callous-unemotional (CU) traits, conduct disorder (CD) symptoms, and sex in predicting bullying. As illustrated by the figure, CU traits interacted with CD symptoms in predicting bullying for girls (a) but not boys (b).

Discussion

Several of the current findings support the proposal being considered to revise the diagnostic criteria for CD by adding a specifier to designate those with the disorder who also show significant levels of CU traits. The findings related to the different forms of aggression were most consistent with past research and study predictions in that the association between conduct problems and aggression depended on both the form of the aggression studied and the presence of CU traits. Specifically, conduct problems (i.e., both CD symptoms and combined ODD and CD symptoms) were highly associated with reactive forms of aggression and CU traits did not explain much incremental variance. In contrast, CU traits interacted with conduct problems in the prediction of proactive aggression, with con-

duct problems being more highly associated with proactive aggression in those with elevated levels of CU traits.

These findings are consistent with a significant amount of past research (Fanti et al., 2009; Frick et al., 2003; Kruh et al., 2005; Lawing et al., 2010) and provide some of the strongest support for the proposed specifier. It should be noted that these findings were not modified by the ethnicity of child, which is somewhat inconsistent with the results of past studies finding that the association between CU traits and aggression or violence is often weaker in ethnic minority samples (Edens et al., 2007). However, past research has often relied on youths in the juvenile justice system, and there is evidence that at many points in the juvenile justice system there can be tendency to formally process (e.g., arrest, detain, convict) ethnic minority youths for less severe crimes (Piquero & Brame, 2008), which could lead to a biased sample for testing ethnic differences. The current study, which utilized a nonreferred sample of school-children with significant ethnic diversity, could provide a more accurate test of the influence of ethnicity on the association between CU traits and aggression.

There were, however, some differences in the interaction between CU traits and conduct problem severity across sex. That is, for physical proactive aggression, the interaction between CU traits and conduct problem severity was found for boys but not girls. One possible explanation for these findings, which is consistent with previous research on gender differences in forms of aggression (Archer, 2004; Crick, 1997; Smith, Rose, & Schwartz-Mette, 2010), is that mean levels of proactive physical aggression were lower in girls, and this more restricted range and resulting skewed distribution may have influenced the results. This would be consistent with follow-up analyses in which there was no three-way interaction, and only the predicted two-way interaction between conduct problem severity and CU traits, when a transformed variable was used. This possibility would also be consistent with the finding that for predicting relational proactive aggression, which had a higher mean level and less restricted in range for girls, ODD/CD symptoms interacted with CU traits for both boys and girls.

CU traits also proved to be important for moderating the association between conduct problems and bullying in girls. Specifically, conduct problems were more highly associated with bullying in girls high on CU traits (see Figure 2a), whereas conduct problem severity was significantly associated with bullying without a significant unique contribution of CU traits in boys. Moreover, CU traits were associated with unique variance in peer reports of defending behaviors (i.e., helping the victim of the bullying) for both boys and girls. Thus, CU traits could help in understanding some of the bystander roles, which have shown to influence the level of bullying that takes place in the classroom (Salmivalli et al., 2011). Past research suggests that these "defenders" make up about 20% of schoolchildren (Menesini, Melan, & Pignatti, 2000; Monks, Smith, & Swettenham, 2003; Sutton & Smith, 1999) and several school-based interventions for reducing bullying support the potential use of such prosocial defenders in school-based bullying interventions (Frey, Hirschstein, Edstrom, & Snell, 2009; Olweus, 1991; Salmivalli, 2010).

The results also supported the potential role of CU traits in moderating the association between cognitive and emotional
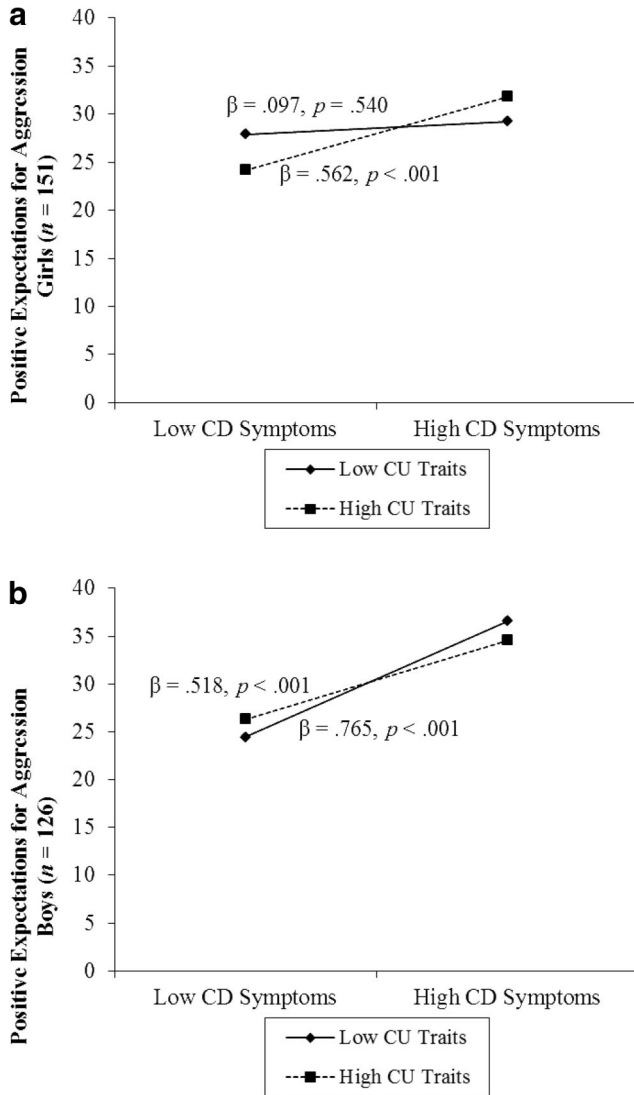
β = .097, p = .540

β = .562, p < .001

—◆— Low CU Traits

--■-- High CU Traits

β = .518, p < .001

β = .765, p < .001

—◆— Low CU Traits

--■-- High CU Traits

Figure 3. Figures illustrate the three-way interaction between callous-unemotional (CU) traits, conduct disorder (CD) symptoms, and sex in predicting positive expectations for aggression. As illustrated by the figure, CU traits interacted with CD symptoms in predicting positive expectations for aggression for girls (a) but not for boys (b).

correlates to aggressive behavior. Consistent with past work (Frick & Morris, 2004; Frick & Viding, 2009), CU traits moderated the association between CD symptoms and anger dysregulation as predicted, with CD symptoms being more strongly associated with problems in anger dysregulation in those low on CU traits. The pattern of the interaction is important in that it suggests that the combination of CU traits and conduct problems is not always associated with more or more severe risk factors but, in some cases, with different risk factors. Importantly, when utilizing the combination of ODD and CD symptoms as a predictor, the interaction was only found for Caucasian and African American students (Figure 4a) and not for other ethnic minority students (Figure 4b). This finding needs to be replicated in other samples, given the low number of stu-

dents who were in the other minority group (*n* = 29), but it could suggest that causal models for aggressive behavior which include these cognitive correlates may need to consider the generalizability of their models across various ethnic groups (Dodge & Petit, 2003).

Also consistent with past research (Pardini, 2011; Pardini et al., 2003), conduct problems were related to positive expectations for aggressive behavior and CU traits moderated this association. However, the expected interaction was only found for girls, with conduct problems being more highly associated with positive expectations to aggression in girls high on CU traits (see Figure 3a). For boys, conduct problems were highly
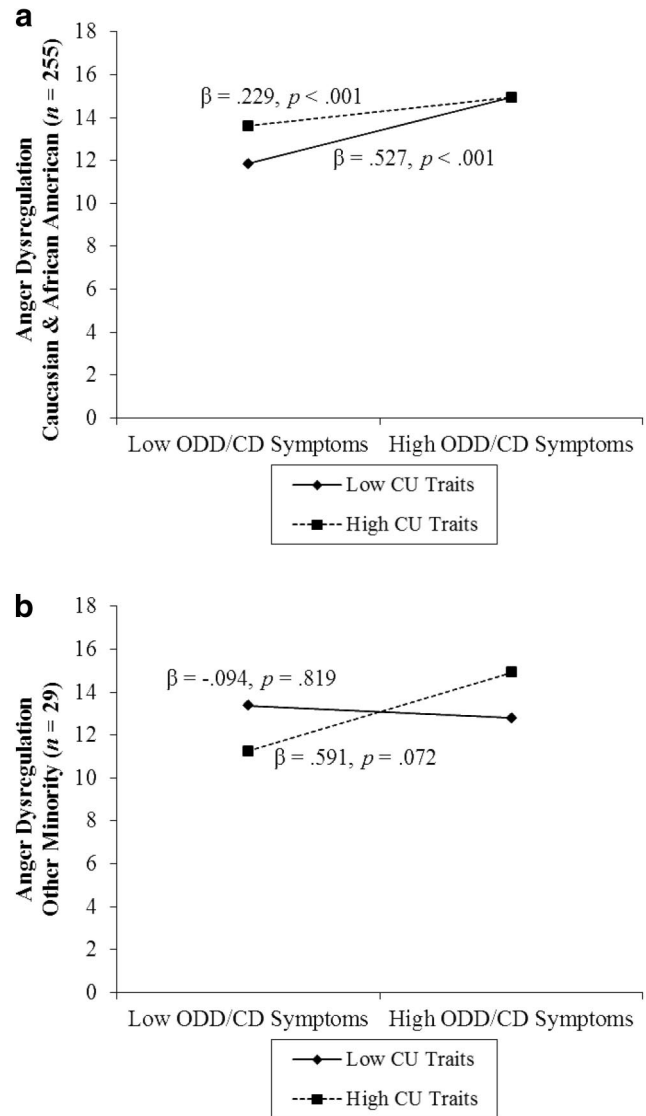

β = .229, p < .001

β = .527, p < .001

—◆— Low CU Traits

--■-- High CU Traits

β = -.094, p = .819

β = .591, p = .072

—◆— Low CU Traits

--■-- High CU Traits

Figure 4. Figures illustrate the three-way interaction between callous-unemotional (CU) traits, oppositional defiant disorder (ODD) and conduct disorder (CD) symptoms, and ethnicity in predicting anger dysregulation. As illustrated by the figure, CU traits interacted with ODD/CD symptoms in predicting anger dysregulation for Caucasian and African American students (a) but not other minority students (b).

associated with positive expectations for aggression, and this was not moderated by the level of CU traits.

All of these findings need to be interpreted in light of several limitations. First, with the exception of the measure of bullying and bullying roles, which were based on peer report, most of the measures were self-report, which could have inflated some of the associations due to shared method variance. Second, this was a voluntary study and many of the most aggressive individuals may have been left out of the study because they did not return parental consent. However, the participation rate in the current study is consistent with the rate of active parental consent found in research conducted in other schools characterized by a high rate of poverty (Esbensen, Melde, Taylor, & Peterson, 2008). Also, a large study of 13,195 students from 143 high schools did not find that participation rates differed based on the level of students' aggressive behavior (Eaton, Lowry, Brener, Grunbaum, & Kann, 2004). Third, it is important to note that this sample consisted of ethnically diverse students in a semirural public school system. Thus, it is not clear how well the current findings would replicate to more urban school systems. Finally, this study was cross-sectional and, as a result, temporal and causal relations among variables cannot be determined by these results. For example, while it is possible that CU traits can make a child more likely to act in an aggressive manner, it is also possible that frequent acts of aggression could lead a child to become more callous toward others.

With these cautions in mind, these results provide support for the inclusion of CU traits as a specifier for the diagnosis of CD, as currently proposed for the *DSM-5*. Specifically, CD symptoms in the presence of CU traits appear to be more highly related to proactive aggression and bullying (for girls only) and are less related to problems in anger dysregulation. Thus, children with severe conduct problems in the presence of CU traits appear to have a more severe behavioral disturbance, but they also show distinct characteristics that may require a different approach to treatment. Specifically, potential treatments may need to focus less on problems with anger control but instead focus on motivating the child through reward-oriented strategies or through interventions that specifically focus on the deficits in empathy (Frick, 2009). Further, CU traits were negatively associated with defending victims of bullying, which may be important for designing school-based interventions that attempt to increase bystanders' role in defending the victim (Frey et al., 2009; Olweus, 1991; Salmivalli, 2010).

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