A Multitrait–Multimethod Approach to Assessing Childhood Aggression and Related Constructs

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A Multitrait–Multimethod Approach to Assessing Childhood Aggression and Related Constructs

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Data were collected about 95 fourth-grade and fifth-grade children from three sources (teachers, parents, and children) on four constructs related to aggression (proactive aggression, reactive aggression, callous–unemotional traits, and anger dysregulation) by using a multitrait–multimethod design. Two goals were addressed through a correlated-trait–correlated-method analysis: (a) Investigate the overlap versus distinctiveness of proactive aggression, reactive aggression, callous–unemotional traits, and anger dysregulation by examining the correlations among their trait factors. (b) Investigate the extent to which the informant who assessed children's aggression was associated with the rating given. Moderate-to-strong trait factor correlations emerged among all pairs of latent trait factors, suggesting at best modest discriminant validity among the constructs. The informant played a significant role for almost all ratings; however, teachers' ratings were the most strongly linked to method variance, and children's ratings provided the most convergent validity with other sources. Findings are discussed in terms of enhanced assessment of childhood aggression.

Aggression has become the most common primary presenting concern for children referred for therapy and related services, because this behavior causes significant impairment across both home and school contexts (Armbruster, Sukhodolsky, & Michalsen, 2004; Nelson & Finch, 2000).

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Moreover, aggressive behavior has been linked to a host of negative outcomes, including delinquency, risky sexual behavior, school dropout, and depression (e.g., Huesmann, Eron, Lefkowitz, & Walder, 1984; Loeber et al., 1993; Moffitt, 1993). As a result, researchers have attempted to understand the origins, developmental trajectory, and types of aggression in an effort to better prevent and intervene with children’s aggressive behavior.

These efforts, however, have been hindered by two complexities related to the assessment of childhood aggression. First, aggressive behavior has evolved into a multidimensional construct with theories and assessments targeting a variety of different subconstructs, including proactive and reactive aggression, callous–unemotional (CU) traits, and anger dysregulation, making it difficult to determine the unique contribution of each subconstruct to our understanding of children’s overall aggressive behavior. Second, a variety of sources are often used by researchers to measure children’s aggression, including parents, teachers, and self-reports from children. The use of different informants across studies presents challenges when attempting to untangle the extent to which results translate across investigations and sources, as well as the degree to which findings are dependent on the source of information used to assess aggressive behavior. The purpose of the current study was to use a multitrait–multimethod (MT-MM) design and a correlated trait–correlated method (CT-CM) analytic approach to address each of these issues.

Data from MT-MM designs, in which multiple traits are measured through multiple informants, have historically been examined through correlation matrices to disentangle method from trait variance and to evaluate convergent and discriminate validity among the measured traits (Campbell & Fiske, 1959). However, more contemporary analytic approaches resulting from an MT-MM design operate within a latent variable modeling framework (Bauer et al., 2013; Eid, Lischetzke, Nussbeck, & Trierweiler, 2003; Eid et al., 2008; Lance, Noble, & Scullen, 2002) and are termed CT-CM analyses. These analytic approaches provide greater clarity with respect to the role of both methods and traits on ratings of children’s aggression.

In the current study, ratings were collected from parents, teachers, and children on the four constructs of proactive aggression, reactive aggression, CU traits, and anger dysregulation. Then, a model was constructed in which the observed ratings were used to create two sets of latent variables. First, latent variables representing each of the informants were created by using data from each of the constructs. Second, latent variables indexing each of the constructs were formed by using data from each of the informants. This analytic model provided robust measures of the four constructs that were purged of error variance in general and method variance attributable
to informant in particular. The approach also afforded a more robust means of gauging convergent and discriminant validity than did simple zero-order correlations.

**Childhood Aggression as a Multidimensional Construct**

The first issue to complicate the assessment of children’s aggressive behavior is that a variety of different constructs (or traits, as they are termed in the MT-MM approach) have emerged in this research area. However, these constructs have been examined in largely independent literatures by mostly separate groups of researchers. Thus, it is difficult to determine the extent of overlap of these constructs or the degree to which each construct contributes uniquely to our understanding of childhood aggression.

The first goal of the current study was to use an MT-MM design and a CT-CM analysis to examine the overlap versus distinctiveness of four constructs in the larger literature on children’s aggression: proactive aggression, reactive aggression, CU traits, and anger dysregulation. This goal was addressed by examining the correlations among the trait factors in the CT-CM analysis. The following subsections detail existing literature on theoretically related pairs of these four constructs.

**Proactive and reactive aggression.** A number of constructs have emerged that delineate subtypes of aggression along different dimensions (Crick & Grotpeter, 1996). One such important theoretical distinction is based on the function of aggression, categorizing aggressive behavior as either reactive or proactive (Dodge, 1991; Vitaro & Brendgen, 2005). Proactive aggression is typically unprovoked, calculated, strategic, perpetrated to achieve a specific goal, and involves an instrumental use of aggression to achieve material, territorial, or social gain. Conversely, reactive aggression is defensive and retaliatory, occurring when a child acts aggressively in response to real or perceived provocation (Crick & Dodge, 1996; Hubbard et al., 2002; Little, Brauner, Jones, Nock, & Hawley, 2003).

These two aggressive subtypes have been linked to distinct developmental histories, social cognitive processes, social experiences, and behavioral and emotional outcomes. In terms of developmental precursors, proactive, but not reactive, aggression has been found to be associated with single-parent homes and substance-abusing parents (Raine et al., 2006), whereas reactive, but not proactive, aggression is related to deficits in maternal caregiving and physical abuse (Dodge, Lochman, Harnish, Bates, & Pettit, 1997; Raine et al., 2006).

In relation to social cognitions, proactive aggression is linked to self-efficacy for aggression, positive expectancies for aggression, and the
prioritization of instrumental goals over social goals, whereas reactive aggression is not (Crick & Dodge, 1996; Dodge et al., 1997; Smithmyer, Hubbard, & Simons, 2000). In contrast, reactive, but not proactive, aggression is linked to hostile attribution biases (Crick & Dodge, 1996; Dodge & Coie, 1987; Kempes, Matthys, Maassen, van Goozen, & van Engeland, 2006; Orobio de Castro et al., 2005; Schwartz et al., 1998), as well as difficulty encoding social cues and the tendency to generate aggressive responses to social problems (Dodge et al., 1997; Orobio de Castro et al., 2005).

In terms of social experiences, reactive aggression has been related to peer rejection, peer victimization, social anxiety, and lack of close friends (Boivin, Dodge, & Coie, 1995; Brendgen, Vitaro, Tremblay, & Lavoie, 2001; Dodge et al., 1997; Morrow, Hubbard, McAuliffe, Rubin, & Dearing, 2006; Raine et al., 2006; Schwartz et al., 1998). In contrast, proactive aggression has not been linked to these negative experiences with peers.

Finally, the two subtypes of aggression are associated with distinct behavioral and emotional outcomes. Proactive aggression has been linked to delinquency by using both concurrent and longitudinal designs, whereas reactive aggression has not (Crick & Dodge, 1996; Little et al., 2003; Raine et al., 2006; Vitaro, Brendgen, & Tremblay, 2002). In contrast, reactive aggression but not proactive aggression has been found to predict later dating violence (Brendgen et al., 2001; Raine et al., 2006). Finally, whereas reactive aggression has been associated with internalizing symptoms such as depression and anxiety, proactive aggression has not (Dodge et al., 1997; Morrow et al., 2006; Raine et al., 2006; Vitaro et al., 2002).

Although the differential precursors, correlates, and sequelae of reactive and proactive aggression are well established in the literature, questions remain regarding the extent and importance of the distinction between these two subtypes of aggression. Researchers initially hypothesized the presence of two distinct subpopulations of children: a reactive group and a proactive group (Dodge, 1991). However, a body of work has begun to emerge suggesting that the two types of aggression tend to co-occur in most aggressive children and that the constructs may be highly correlated (Hubbard, McAuliffe, Morrow, & Romano, 2010). In this conceptualization, reactive aggression and proactive aggression are best considered dimensional constructs that vary within each child, with children who display high levels of one subtype of aggression often tending to display the other subtype, as well. These findings have led some scholars to question the utility of the distinction between reactive aggression and proactive aggression (e.g., Bjørnebekk & Howard, 2012; Bushman & Anderson, 2001), whereas other researchers continue to argue that the distinction is central to our understanding and treatment of childhood aggression (e.g., Bezdjian, Tuvblad,
Raine, & Baker, 2011; Vitaro & Brendgen, 2005). The current study added to this literature and debate by assessing the distinctiveness versus convergence of proactive versus reactive aggression through an examination of the trait factor correlation between these two constructs within the MT-MM approach and the CT-CM analysis.

**Callous–unemotional traits vs. proactive aggression.** At the same time that this literature on reactive aggression and proactive aggression has emerged and grown, a parallel and largely separate literature has developed on CU traits. *CU traits* is a term applied to a set of personality traits thought to distinguish a subset of aggressive children who demonstrate a lack of empathy, guilt, and emotional expression (Christian, Frick, Hill, Tyler, & Frazer, 1997; Frick, Barry, & Bodin, 2000). CU traits co-occur with and predict serious aggressive behavior and delinquency and are relatively stable across childhood and adolescence (Frick, Blair, & Castellanos, 2013; Frick & Dickens, 2006). Furthermore, CU traits are linked especially to aggressive behaviors that are premeditated and instrumental in nature (Frick, Cornell, Barry, Bodin, & Dane, 2003; Frick, Kimonis, Dandreaux, & Farrell, 2003).

Children with CU traits typically display a pattern of emotional responding that differs from their peers without CU traits. These children evidence deficits in negative emotion processing that lead to lower levels of fearful inhibition and anxiety, as well as less reactivity to threatening stimuli (Kimonis, Frick, Fazekas, & Loney, 2006; Loney, Frick, Clements, Ellis, & Kerlin, 2003; Lynam et al., 2005). Moreover, CU traits have been related to increased thrill and adventure seeking (Frick, Cornell, Bodin, et al., 2003; Frick, Lilienfeld, Ellis, Loney, & Silverthorn, 1999). Children with CU traits are also less sensitive to punishment, particularly when a reward-oriented response set is primed (Barry et al., 2000; Fisher & Blair, 1998).

With few exceptions, CU traits have not typically been studied in conjunction with proactive aggression. Nonetheless, the constructs are conceptually linked in a number of ways. Theoretically, both constructs describe the use of aggression to achieve instrumental goals and are linked to the later development of delinquency and psychopathy (Frick & Ellis, 1999; Thornton, Frick, Crapanzano, & Terranova, 2013). Children with CU traits share some of the strongest correlates of proactive aggression, such as positive expectancies for aggression (Pardini, Lochman, & Frick, 2003). In a trial of stimulant medication aimed at reducing impulsivity-linked aggression in children, both CU traits and proactive aggression predicted decreased medication efficacy, suggesting that the type of aggression related to both of these constructs was not attributable to impulsivity (Blader et al., 2013).
Moreover, empirical work has demonstrated a direct link between the constructs of proactive aggression and CU traits, with Frick and colleagues finding a strong correlation between CU traits and proactive aggression across several studies (Fanti, Frick, & Georgiou, 2009; Frick, Cornell, Barry, et al., 2003). Finally, in a 2013 investigation, CU traits moderated the relation between conduct problems and proactive aggression, such that children high on CU traits with conduct problems were more likely to demonstrate high levels of proactive, but not reactive, aggression (Thornton et al., 2013).

Anger dysregulation vs. reactive aggression. A smaller, largely independent body of work on children’s anger dysregulation has also developed simultaneously to the literatures on proactive and reactive aggression and CU traits. The construct of anger regulation refers to attempts to control and modify the experience and expression of anger, and thus children high on anger dysregulation struggle with this task.

Deficits in anger regulation have been linked to higher rates of aggression in children across development in both concurrent and longitudinal investigations (Hubbard et al., 2002; Röll, Koglin, & Petermann, 2012). Furthermore, children who struggle with anger regulation also show decreased social and academic competence (Eisenberg et al., 1995; Gumora & Arsenio, 2002). Additional empirical work on anger dysregulation suggests that it shares similar correlates to reactive aggression, including the developmental precursor of physical abuse, the social cognitive deficit of hostile attributional biases, and the emotional correlates of depression and anxiety (Brendgen et al., 2001; Lemire & Arsenio, 2000; Lochman & Wells, 2002; Orobio de Castro et al., 2005; Raine et al., 2006).

Empirical work suggests a direct relation between reactive aggression and anger dysregulation. Orobio de Castro and colleagues (2005) found positive correlations between reactive aggression and both momentary anger and anger dysregulation. Furthermore, two studies have demonstrated that deficits in anger regulation are uniquely related to reactive aggression but unrelated to proactive aggression (Hubbard et al., 2002; White & Turner, 2014). Finally, reactive but not proactive aggression has also been linked to negative emotionality and impulsivity, two constructs closely related to anger dysregulation (Atkins, Stoff, Osborne, & Brown, 1993; Raine et al., 2006; Vitaro, Barker, Boivin, Brendgen, & Tremblay, 2006).

Thus, similar to the connection between proactive aggression and CU traits, strong theoretical and empirical ties exist between reactive aggression and anger dysregulation, and these links lead to questions regarding the distinctiveness of these constructs. While the constructs’ names suggest a differential focus on emotion (anger dysregulation) versus behavior (reactive
aggression), it remains unclear whether the constructs are truly empirically distinct or represent one underlying phenomenon. Understanding the overlap and distinctiveness of anger dysregulation from reactive aggression, as well as CU traits from proactive aggression, has important implications for a more detailed understanding of social processes in peer groups. For these reasons, the current study evaluated the extent to which the constructs of anger dysregulation and reactive aggression were associated through a modeling approach that accounted for the multi-informant manner in which measures of these traits were obtained.

Multiple Methods of Assessing Childhood Aggression

The measurement of children’s aggression typically involves the use of informant-based systems of assessment where individuals familiar with the child rate his or her observed behaviors in the context in which they most frequently interact. For example, teachers might rate behaviors observed in the school, and parents might be relied upon to evaluate behaviors outside the school. Teachers and parents (and even self-reports) can be considered structurally different informant types because their observations and ratings may differ as a function of their role with the child and the situations in which they have the opportunity to observe the child (Eid et al., 2008). Multi-informant–based assessments are considered best practice in evaluations that involve the collection of questionnaire ratings in the measurement process (Bauer et al., 2013). In fact, the role of the informant has been found to be pronounced for the measurement of both child behaviors (Konold & Pianta, 2007) and adolescent behaviors (Konold & Glutting, 2008) that are likely to persist over time (Grimm, Pianta, & Konold, 2009; Rajmil, Lopez, Lopez-Aquila, & Alonso, 2013; Van der Ende, Verhulst, & Tiemeier, 2012). However, because of the time and effort required to collect data from multiple sources, most researchers of childhood aggression employ only a single rater (Achenbach, McConaughy, & Howell, 1987; Clemans, Musci, Leoutsakos, & Ialong, 2014). Reliance on a single rater (i.e., monomethodism) makes it difficult to compare findings across studies, doesn’t provide a mechanism by which method (e.g., informant bias) and trait (e.g., aggression) variance can be disentangled, and can lead to overestimation of effect sizes (Cole, Martin, Powers, & Truglio, 1996).

The second overarching goal of the present study was to investigate the extent to which the informant used to assess children’s aggression was associated with the rating given. The MT-MM design and CT-CM analysis provide four important pieces of information about the link between informants and ratings, which correspond to our four aims within this larger goal.
The first aim was to examine the loadings on the three method factors to obtain an estimate of the role of each informant in the ratings they gave. The second aim was to compare the loadings on the four trait factors across the three informants to get an estimate of the relative association between each rater and each construct. The third aim was to compare whether ratings were more closely related to trait (the construct being rated) or method (the person completing the rating) through comparison of the trait factor loadings and method factor loadings for each variable. The fourth aim was to examine the correlations among the latent method factors to assess the amount of overlap across sources of information. Thus, the MT-MM approach and the CT-CM analysis allowed us to address the extent to which the informant is linked to the data obtained when measuring children’s aggressive behavior.

Method

Participants were 95 boys and girls in 43 fourth-grade and fifth-grade classrooms. For each child, data were collected from three reporters on reactive aggression, proactive aggression, anger dysregulation, and CU traits. Child-report and teacher-report data were collected during classroom visits, and parent-report data were collected by using an online questionnaire.

Participants

Children were recruited through parental permission letters sent home from school in 43 fourth-grade and fifth-grade classrooms in a mid-Atlantic urban–suburban school district. Given permission to participate were 845 children (78%). Classroom permission rates ranged 50%–100% (M = 79.2%). Prior to data collection, the experimenter began by reading an assent form aloud and giving children an opportunity to grant or decline assent. Of the children with parental permission, 21 (2.5%) declined assent, and an additional 53 (6.3%) were absent on the day of their classroom data collection. Thus, our final sample for teacher-report and child-report measures included 771 children (415 girls).

Soon after permission letters were gathered, parents were e-mailed about online parent data collection. Only parents who granted consent for their children to participate in the study, and who provided their e-mail address on the permission form, were contacted. Parents who chose to participate clicked on a link in the e-mail message and were directed to an online questionnaire. Two follow-up e-mails were sent to parents who did not complete the survey (2 and 4 weeks after the initial e-mail). Parents who
completed the survey were compensated by entry into a raffle to win one of three prizes ($500, $250, or $100). Despite these reminders and incentives, the parents of only 175 children (23%) completed the questionnaire.

Children with and without parent data did not differ on any teacher-reported or child-reported measures of the four constructs in terms of means, variances, minimums, or maximums. They also did not differ by gender or age. However, children with and without parent data did differ by race or ethnicity, $\chi^2(5) = 20.64, p < .001$. More specifically, the parents of European American children (27% with parent data) were more likely than the parents of Latino American children (13% with parent data) to complete the online questionnaire, $\chi^2(1) = 12.74, p < .001$; the parents of Mixed children (36% with parent data) were more likely than the parents of Latino American children to complete the online survey, $\chi^2(1) = 9.27, p < .01$; and the parents of Mixed children were more likely than the parents of Asian American children (11% with parent data) to complete the online questionnaire, $\chi^2(1) = 4.91, p < .05$. African American participants did not differ from other participants in terms of likelihood of parental participation.

Of the 175 children with parent-report data, 95 had complete data from all three sources (i.e., teacher, child, and parent). In the sample of 175 with parent-report data, as well as in the larger sample of 771 children with teacher-report or self-report data, children with and without complete data did not differ on any teacher-reported, child-reported, or parent-reported measure of aggression in terms of means, variances, minimums, or maximums or on any demographic variable (age, gender, or race or ethnicity).

The final sample included 95 children (55% girls) with complete data at the item level. The racial–ethnic breakdown was 65% European American, 14% Latino American, 10% African American, 8% Mixed, and 3% Asian American. Children were on average 10.71 years old.

Procedure

An experimenter and approximately four undergraduate assistants conducted 1-hour visits to each of the 43 classrooms to collect child-report and teacher-report data. The experimenter group-administered paper-and-pencil measures to participating children. Children received a manila folder to stand upright on their desk as a “privacy shield.” Undergraduate assistants circulated throughout the room to ensure that children stayed on track, to answer children’s questions, and to maintain privacy. In addition, other assistants worked individually and privately with any children who required reading assistance to complete the measures validly, as determined beforehand through consultation with the teacher and/or as needed.
During each classroom visit, teachers were given a packet of measures to complete about each participating child. A staff member returned 2 weeks later to pick up completed measures and to compensate teachers with $100 to be used for classroom supplies. Parent data collection was conducted online by using the procedure already described.

**Measures**

*Reactive aggression and proactive aggression.* Reactive and proactive aggression were assessed by using items from a measure developed by Little and colleagues (Little, Brauner, et al., 2003; Little, Jones, Henrich, & Hawley, 2003). The original measure is a self-report form that assesses two forms (overt and relational) and two functions (reactive and proactive) of aggression. In the current study, children completed the six reactive overt and six proactive overt items through self-report. We included only the overt items, and not the relational items, because assessment of both forms and functions of aggression was beyond the scope of the current study.

The psychometric quality of these scales is supported by several investigations conducted on two large samples of fifth- through 10th-grade German adolescents (Little, Jones, et al., 2003). In both samples, a model with two forms and two functions of aggression demonstrated better fit than did competing models, and internal consistency estimates were good. Similar results were obtained when replications were performed across age and gender groups. Furthermore, in terms of criterion validity, reactive aggression was positively related to hostility and frustration intolerance, whereas proactive aggression was unrelated to the first construct and negatively related to the second construct.

Teachers and parents completed the same 12 items as the children, with a wording change from “I” to “This student” or “My child” for each item. Previous studies have revealed teacher and/or parent reports to be successful in differentiating reactive aggression and proactive aggression in young children (Boivin et al., 1995; Dodge & Coie, 1987; Hubbard, Dodge, Cillessen, Coie, & Schwartz, 2001; Price & Dodge, 1989). All three informants used a response scale of 1 = *not at all true* to 4 = *completely true*. The current study represents the first assessment of the psychometric properties of parent and teacher forms of this measure.

This approach resulted in six final variables (Teacher-Reported Reactive Aggression, Teacher-Reported Proactive Aggression, Parent-Reported Reactive Aggression, Parent-Reported Proactive Aggression, Child-Reported Reactive Aggression, and Child-Reported Proactive
Aggression) averaged across items. Internal consistency for the reactive items was .94, .81, and .84, and internal consistency for the proactive items was .94, .64, and .87, for teachers, parents, and children, respectively.

Callous–unemotional traits. CU traits were assessed by using the 24-item Inventory of Callous–Unemotional (ICU) Traits developed by Kimonis et al. (2008). As has been done in previous studies, identical versions of this measure were administered to children, teachers, and parents, with the wording changed from “I” in the self-report measure to “This student” or “My child” in the teacher-report and parent-report forms. All three informants used a response scale of 1 = not at all true to 4 = definitely true.

The ICU contains three subscales (Callousness, Uncaring, and Unemotional) that can be combined to form an overall assessment of CU (Dandreaux & Frick, 2009; Kimonis, Frick, Muñoz, & Aucoin, 2007; Lawing, Frick, & Cruise, 2010; Marsee et al., 2011). The predictive utility of this scale has been supported through associations with the severity of aggression, delinquency, and antisocial behavior; and these associations have maintained across a variety of samples, including both juvenile offenders and community samples (e.g., Dandreaux & Frick, 2009; Essau, Sasagawa & Frick, 2006; Kimonis et al., 2008; Lawing et al., 2010).

This approach resulted in three final variables (Teacher-Reported CU Traits, Parent-Reported CU Traits, and Child-Reported CU Traits) averaged across items and reverse-scored when needed. Internal consistency was .92, .85, and .86 for the teacher-report, parent-report, and child-report measures, respectively.

Anger dysregulation. Anger dysregulation was assessed using the 7-item Children’s Anger Management Scale developed by Zeman and colleagues. Evidence of the scale’s psychometric quality for use with children has been demonstrated in relation to external behavioral and emotional criteria (Pensa-Clyve, Zeman, & Shipman, 1999; Sim, Zeman, & Shipman, 1999; Zeman, Shipman, & Pensa-Clyve, 2001; Zeman, Shipman, Suveg, & Stegall, 2001), and for parent-report and teacher-report versions, through investigations of construct and convergent validity studies (Cassano, Perry-Parrish, & Zeman, 2007; Cassano & Zeman, 2010). Identical versions of the measure for children, parents, and teachers have been developed, which differ only in their use of “I,” “My child,” or “This student” at the beginning of each item. All three informants used a response scale of 1 = never to 5 = almost always. To aid in interpretation, each child’s score was multiplied by −1 so that higher scores represented increased anger dysregulation.

This approach resulted in three final variables (Teacher-Reported Anger Dysregulation, Parent-Reported Anger Dysregulation, and Child-Reported
Anger Dysregulation) averaged across items and reverse-scored when needed. Internal consistency was .86, .85, and .80 for the teacher-report, parent-report, and child-report measures, respectively.

**Data Analysis**

A CT-CM analysis was conducted on the MT-MM design. Estimated components included four trait factors and three method factors. There are also 12 residual terms containing other sources of variance in the observed variables that were not captured by the trait and method factors. Each measured variable served as an indicator of one trait factor and one method factor. High trait factor loadings are taken as evidence of convergent validity, and high method factor loadings imply that the rater was strongly associated with the rating given (Kline, 1998).

Following recommended practice for estimating CT-CM models, all trait factor correlations and method factor correlations were freely estimated. Trait factors were assumed to be independent of method factors (i.e., uncorrelated), and all factors were standardized with unit variances (Bollen, 1989; Lance et al., 2002; Maruyama, 1998). Scaling of the latent trait and method factors was obtained by fixing their respective variances to one (Kline, 2011). Low correlations among trait factors suggest discriminate validity, whereas high trait factor correlations indicate convergence across constructs (Kline, 1998). High correlations among method factors reveal potentially common sources of method effects.

Numerous measures of fit exist for evaluating the quality of measurement models (Browne & Cudeck, 1993; Hu & Bentler, 1995), and it is generally recommended that multiple measures be considered (Tanaka, 1993) to capture different aspects of fit. Chi-square ($\chi^2$) tests of stand-alone model fit are often overpowered and result in the rejection of reasonably specified models (Hu & Bentler, 1995; Kaplan, 1990); however, the chi-square ratio ($\chi^2/df$) tends to be less sensitive to sample size, and values smaller than 3 denote acceptable fit (Kline, 1998). In addition, the goodness of fit index (GFI), adjusted goodness of fit index (AGFI), Tucker–Lewis index (TLI), comparative fit index (CFI), and root mean square error of approximation (RMSEA) were reported for the model. The first four measures generally range between 0 and 1.0, with larger values reflecting better fit. Alternatively, smaller RMSEA values support better outcomes, with values of .05 or less indicating good fit (Browne & Cudeck, 1993). All models were estimated with the analysis of moment structures (AMOS; Arbuckle & Wothke, 1999) program using maximum likelihood estimation on covariance matrices.
Results

Descriptive statistics for the four measured variables (Reactive Aggression, Proactive Aggression, CU Traits, and Anger Dysregulation) from all three sources (teachers, parents, and children) are presented in Table 1. This table also provides zero-order correlations among the observed variables.

Estimation of the CT-CM model described earlier resulted in a negative residual variance for Parent-Reported Anger Dysregulation. Inspection of the confidence interval surrounding this estimate revealed that it captured zero. Consequently, the residual estimate was fixed to zero. All measures of model fit for this revised CT-CM model were favorable: GFI = .94, AGFI = .85, TLI = .97, CFI = .98, and RMSEA = .05. The chi-square statistic was not statistically significant: \( \chi^2(34) = 41.00, p = .19 \), and the \( \chi^2/df = 1.21 \) was below 3. Thus, results suggest that the CT-CM model provides a reasonable approximation of the data.

Completely standardized trait and method factor loadings that estimate the role of the latent trait factors and informants on the observed behavior scales are shown in Table 2. Correlations among the trait and method factors are shown in Table 3.

The first goal of the current study was to investigate the overlap versus distinctiveness of proactive aggression, reactive aggression, CU traits, and anger dysregulation. Correlations among these four trait factors are shown in the first three columns of Table 3. All correlations among trait factors were moderate to large and in the expected direction, suggesting only modest discriminant validity among the constructs. The strongest correlations emerged between the trait factors for Reactive Aggression, Proactive Aggression, and CU Traits, with somewhat weaker correlations emerging between the trait factor for Anger Dysregulation and each of the other three constructs.

The second overarching goal of the current study was to investigate the extent to which the informant used to assess children’s aggression was associated with the rating given; this goal was addressed through four related aims. For the first aim, we examined the method factor loadings so as to estimate the role each informant played in the ratings they gave (see Table 2). These loadings indicated that a substantial portion of method variance entered into observed measures of children’s aggression. All method factor loadings were significant with the exception of the parent factor loading for CU traits, suggesting substantial association between informant and rating on 11 of the 12 ratings. In addition, teacher factor loadings were higher than parent factor or child factor loadings across each of the four observed measures of aggression. The coefficients presented in Table 2 are in completely
Table 1. Zero-order correlations, means, and standard deviations for four aggression measures rated by three informants

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<td>.64****</td>
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</table>

M       | 1.36 | 1.18 | 1.78 | 1.12 | 1.38 | 1.04 | 1.59 | 1.54 | 1.63 | 1.09 | 1.77 | 1.59 |
SD      | .61  | .44  | .52  | .86  | .38  | .12  | .31  | .72  | .63  | .25  | .39  | .81  |

Note. CU = callous–unemotional.

*p < .05.

"p < .01.

***p < .001.

****p < .0001.
### Table 2. Correlated trait-correlated method model with completely standardized factor loadings

<table>
<thead>
<tr>
<th>Latent variables</th>
<th>Trait factors</th>
<th>Method factors</th>
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<tr>
<td>Anger dysregulation</td>
<td>.62*</td>
<td>.57*</td>
</tr>
</tbody>
</table>

Note. CU = callous–unemotional.

* Indicates factor loadings that are statistically different from zero ($p < .05$).

Italicized values reflect statistically significant ($p < .05$) differences between trait and method factor loadings on a given observed variable.

### Table 3. Correlated trait-correlated method model latent variable correlations

<table>
<thead>
<tr>
<th>Latent variables</th>
<th>Trait factors</th>
<th>Method factors</th>
</tr>
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<tbody>
<tr>
<td></td>
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<td>Teacher</td>
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</table>

Note. CU = callous–unemotional.

* $p < .05$. 

$p < .05$. 

Note. CU = callous–unemotional.
standardized form and can be interpreted as measures of effect size in the sense that they represent the proportion of a 1 standard deviation change in the observed variable that would be expected with a commensurate change in the latent factor. For example, the teacher method factor loading of .90 on reactive aggression indicates that a .90 standard deviation increase in the teachers’ method factor would result in a .90 standard deviation increase in their ratings of reactive aggression. All statistically significant values in Table 2 yielded meaningful (> .25) effect sizes.

For the second aim, each observed measure of aggression was modeled to be related to the trait it was presumed to measure. Evaluation of the trait factor loadings across informants (see Table 2) revealed that (a) all three sources were sensitive to the trait factors for Reactive Aggression and CU Traits; (b) parents’ and children’s ratings were sensitive to the trait factor for Anger Dysregulation, whereas teachers’ ratings were not; and (c) only children’s ratings were sensitive to the trait factor for Proactive Aggression.

For the third aim, each observed measure of aggression was modeled to be associated with both the informant used to obtain the rating and the trait it was presumed to measure. A statistical comparison of method factor loadings and trait factor loadings indicated that six of the 12 variables were differentially related to method and trait factors (see Table 2). Four of these six variables were more sensitive to their method factor than their trait factor (ps < .05), with three of these four being teacher ratings.

For the fourth aim, correlations among the latent method factors reveal the degree of overlap in non-trait-related variance across informants. These correlations are shown in the final two columns of Table 3. These latent method factor associations are uncontaminated by trait variance, meaning that these correlations describe the amount of overlap between sources of information independent of the four constructs. The strongest correlation emerged between the parent and child method factors (r = .82), suggesting considerable overlap between these two sources of information. Conversely, correlations between the teacher method factor and each of the other two method factors were much weaker (r = .19 and .23), indicating more unique perspectives.

**Discussion**

Research on childhood aggression has been hindered by two complications. First, a variety of different constructs have emerged around the study of children’s aggressive behavior, but these constructs have been examined in largely independent literatures, making it challenging to determine the degree of overlap versus the unique contribution of each construct to our
Childhood Aggression and Related Constructs

understanding of childhood aggression. Second, when studies differ in the sources of information they use to assess children’s aggressive behavior, it is difficult to disentangle the extent to which results translate across studies and informants versus the degree to which findings are dependent on the source of information employed. The current study examined data from a MT-MM design that included three sources (teachers, parents, and children) and four constructs related to childhood aggression (proactive aggression, reactive aggression, CU traits, and anger dysregulation). Through a CT-CM analysis, we tackled two goals, with the first being to examine the overlap versus distinctiveness of the four constructs indexing childhood aggression and the second being to investigate the extent to which the informant used to assess children’s aggression was associated with the rating provided.

Overlap Versus Distinctiveness of Childhood Aggression Constructs

We addressed the first goal by examining the correlations among trait factors in the CT-CM analysis. Because method variance was removed from the latent trait factor scores, this approach allowed for a rigorous evaluation of the discriminant versus convergent validity of these four constructs. Moderate-to-strong correlations emerged among all pairs of trait factors. The strongest correlations (.79–.87) were among reactive aggression, proactive aggression, and CU traits. Correlations were still quite strong (.67–.69) between anger dysregulation and both reactive aggression and CU traits, while the weakest correlation (.46) emerged between proactive aggression and anger dysregulation. This pattern of findings suggests less discriminant validity between the constructs than perhaps has been presumed in previous theoretical and empirical work.

The strong correlation between the trait factors for reactive aggression and proactive aggression provides important data for the ongoing debate about the usefulness of this distinction to the study of childhood aggression. Some have argued that strong correlations of this magnitude reflect little practical utility in distinguishing between these subtypes of aggression (Bjørnebekk & Howard, 2012; Bushman & Anderson, 2001), an argument that is supported by the current study in which strong associations were observed following the removal of method variance. On the other hand, other researchers have argued that the distinction maintains its utility for understanding and treating aggression even if most children score similarly high or low on both subtypes of aggression (Bezdjian et al., 2011; Hubbard et al., 2010; Vitaro & Brendgen, 2005).

An important aspect of this argument centers around the meaning of a high correlation between two variables: Does a high correlation mean that
the variables represent inseparable constructs or distinct but co-occurring constructs, and how do researchers distinguish between these two possibilities? Such issues have plagued researchers of many intertwined constructs (e.g., depression and anxiety) and will surely continue to worry investigators of childhood aggression for years to come. Two types of evidence may be particularly useful in this debate. The first centers around whether the two subtypes of aggression have differential precursors, correlates, and outcomes. As reviewed in the introduction, fairly strong and consistent evidence suggests that reactive aggression and proactive aggression are related to distinct antecedents, correlates, and sequelae.

The second type of evidence concerns whether a meaningful minority of children can be identified who engage in primarily reactive or proactive aggression, even if a majority of aggressive children engage in both subtypes of aggression. Across many studies, researchers have parsed aggressive children into these groups by using median splits or cutoffs (1 SD, 60%, etc.; Chan, Fung, & Gerstein, 2013; Crick & Dodge, 1996; Day, Bream, & Pal, 1992; Dodge & Coie, 1987; Dodge et al., 1997; Fanti et al., 2009; Kempes et al., 2006; Law & Fung, 2013; Little, Jones, et al., 2003; Waschbusch, Willoughby, & Pelham, 1998). Much more convincing evidence emerges, however, when cluster or profile analysis is used to determine empirically the groups that emerge when children are considered in terms of their levels of reactive aggression and proactive aggression. Among the studies to date that have taken a cluster or profile approach to this question, researchers have consistently found that three groups emerge: a group that is low on both subtypes of aggression, a group that is high on both subtypes of aggression, and a group that is high on reactive aggression only (Crapanzano, Frick, & Terranova, 2010; Marsee et al., 2014; Muñoz, Frick, Kimonis, & Aucoin, 2008; Pang, Ang, Kom, Tan, & Chiang, 2013; Smeets et al., 2017). Thus far, no studies have emerged to suggest that a proactive-only group emerges when profile or cluster analysis is used, compared to a less-rigorous cutoff-score approach. These findings provide partial but certainly not full support for the idea that the subtypes of aggression represent meaningful phenomena.

Strong correlations also emerged within the MT-MM design between proactive aggression and CU traits, as well as between reactive aggression and anger dysregulation. These correlations suggest that the subtype of aggression and the emotional trait in question are closely linked, especially because the CT-CM analysis removed the informant variance from the trait factor correlation. Thus, CU traits may be thought of as a driving force behind proactive aggression, and anger dysregulation may be considered a mechanism that propels children to engage in reactive aggression. It may
well be that each subtype of aggression is dependent on its corresponding emotional (or unemotional) process. However, of note, the items indexing reactive aggression and proactive aggression assessed those types of aggressive behaviors, whereas the items assessing CU traits or anger dysregulation measured emotional processes, not behavior per se. For this reason, it may be that these pairs of constructs also should be considered as co-occurring, as opposed to truly inseparable.

Finally, and quite interestingly, it should be noted that the remaining three pairs of trait factor correlations were all in the moderate-to-strong range, as well, even though these pairs of constructs are not ones that have been theoretically or empirically linked (reactive aggression and CU traits, proactive aggression and anger dysregulation, and CU traits and anger dysregulation). This pattern of findings may point to the inherent difficulty in disentangling any of these constructs from one another and may suggest that researchers are better off sticking to broader constructs such as childhood aggression. It is also possible that the emergence of these correlations is actually a reflection of the strong link between reactive and proactive aggression, since each pair consisted of either reactive aggression or its close correlate and proactive aggression or its close correlate.

**Associations Between Informants and Ratings of Childhood Aggression**

With respect to the second goal, findings converged to suggest substantial informant variance in the assessment of children’s aggressive behavior. In fact, statistically significant method factor loadings emerged for 11 of 12 ratings. These results provide strong evidence that the rater of children’s aggressive behavior plays a strong role on the rating given, that a portion of their observed measures are unique and unrelated to the target construct, and that comparison of results across studies using different informants may be problematic. This finding is particularly worrisome when considering that most studies only use a single source of information to assess children’s aggression. However, this investment may be worth the additional time, expense, and effort if the role of the informant is as prominent as the results of the current study suggest.

Results further indicated that teachers’ ratings of children’s aggression may be more strongly associated with method variance than are parents’ or children’s ratings. For each of the four constructs, the teacher method factor loading was higher than the parent or child method factor loading. Furthermore, for three of the four teacher ratings, the method factor loading was significantly greater than the trait factor loading, a pattern that
emerged for only one child rating and no parent ratings. These findings suggest that researchers may want to be particularly careful about using teachers as a sole source of information about children’s aggression, an especially common practice, since it is commonly thought that parents and children themselves may be less likely than teachers to recognize problems with aggressive behavior. On the other hand, researchers may find it useful to include teachers as one source of information in a multi-informant design, because they may provide a unique and likely important perspective on children’s aggression (Konold & Pianta, 2007), since parents do not see their children at school. In addition, it may be particularly problematic to have teachers attempt to make fine-grained distinctions about subphenomena in children’s aggressive behavior, such as the distinction between reactive aggression and proactive aggression, although they are strong informants of children’s overall aggressive behavior at school. Our findings suggest that teachers may form an overarching opinion of each child’s aggressiveness and rate the child accordingly, without attending to the subtleties between constructs that researchers are hoping to assess.

In contrast, the current findings indicate that children may be a more useful source of information about their own aggressive behavior than researchers sometimes assume. Children were the only raters to show sensitivity to all four constructs, meaning that their ratings were the only ones to load significantly onto all four trait factors. Of course, these findings should not be generalized beyond the fourth-grade and fifth-grade sample used here; younger children likely would rate their own aggression with less validity. However, these findings do suggest that children of this age may be able to rate their own aggressive behavior with a certain degree of accuracy and that this accuracy may extend to the fine-grained distinctions that researchers attempt to make between aggressive phenomena.

Conclusions and Limitations

An important limitation of this work is that only teacher, child, and parent ratings were obtained. Two additional sources of information about children’s aggression are peer reports and observations. In many respects, peer reports and observations are considered the gold standard in assessment of childhood aggression because of their use of multiple raters and objective data, respectively. Future researchers should strive to include peer-report and observational measures both in their general study of childhood aggression and in future investigations of the role that source of information may play on the assessment of childhood aggression.
In addition to the limitations already noted, the present study was marked by two additional limitations. First, results should not be generalized beyond the four constructs assessed here. Other important constructs indexing children’s aggression, such as relational aggression, that were not examined might have produced different results if included in this design and analysis. Second, the findings cannot be generalized beyond the measures used to assess the four constructs. Other psychometrically strong measures of several of these constructs exist, and the pattern of finding may look quite different if other measures had been selected.

In summary, the current study used an MT-MM design and a CT-CM analysis to further our understanding of the assessment of children’s aggressive behavior. Results for the first study goal indicated moderate-to-strong trait factor correlations among all pairs of latent trait factors, suggesting at best modest discriminant validity among the constructs. Results for the second study goal suggested that method variance plays a substantial role in the measurement of aggression and related constructs, with teachers’ ratings being most susceptible to informant effects and children’s ratings loading most strongly onto the trait factors. It is hoped that researchers will continue to work toward understanding more about the limits of our measurement of children’s aggression and developing advances to address those limitations.

References


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