

Callous-unemotional features, behavioral inhibition, and parenting: independent predictors of aggression in a high-risk preschool sample

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Abstract A behaviorally-uninhibited temperament, callous-unemotional (CU) features, and harsh parenting have been associated with specific patterns of aggressive behavior in older children and adolescents. We tested the additive and interactive effects of these factors in predicting different types of aggressive behavior in a high-risk preschool sample. Forty-nine preschoolers and their parents registering for Head Start programs were recruited for participation. Behavioral inhibition, CU features, and attitudes toward various types of parenting were assessed through parent rating scales completed at the time of registration. Behavioral inhibition, CU features, and aggression were assessed by teacher ratings approximately six months later. Analyses revealed that behavioral inhibition, CU features, and harsh parental attitudes all contributed independently to the prediction of aggressive behavior. These associations were strongest for proactive types of aggression. Our results suggest that a behaviorally uninhibited temperament, CU features, and attitudes favoring harsh

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parenting are all important for understanding the development of aggression in preschool children.

Keywords Aggression · Preschool · Behavioral inhibition · Callous-unemotional · Parenting

Understanding the development of aggression in childhood has been an important focus of research because of its strong predictive relations with both violent and non-violent offending in adolescence (Broidy *et al.*, 2003). Although there have been a number of important findings from this research, two findings that are critical for both causal theory and intervention are (a) there appear to be distinct patterns of aggressive behavior in children that have different correlates and (b) the development of aggression is best understood by considering multiple causal processes that include both individual predispositions and contextual factors (Dodge & Pettit, 2003).

A growing body of research has suggested that aggressive behavior can be differentiated based on the function of the aggressive act (Dodge & Pettit, 2003; Little, Jones, Henrich, & Hawley, 2003; Poulin & Boivin, 2000). Specifically, proactive aggression is unprovoked behavior that is motivated to achieve a specific external reinforcement, whereas reactive aggression is largely retaliatory in response to real or perceived provocation or threat. Despite the relatively strong correlation between these two types of aggression in school-aged samples of youth (ranging from .40 to .90; Poulin & Boivin, 2000), research has documented several distinct correlates that could implicate different causal factors operating in the development of the two types of aggression.

Reactively aggressive children show higher rates of peer rejection (Poulin & Boivin, 2000; Waschbusch, Willoughby, & Pelham, 1998), and these social problems may be related to social-cognitive deficits, such as a tendency to attribute hostile intent to ambiguous provocations by peers (Crick & Dodge, 1996; Dodge, Price, Bachorowski, & Newman, 1990; Hubbard, Dodge, Cillessen, Coie, & Schwartz, 2001). Reactively aggressive children also show high rates of angry reactivity and low frustration tolerance (Hubbard *et al.*, 2002; Little *et al.*, 2003; Shields & Cicchetti, 1998; Vitaro, Brendgen, & Tremblay, 2002), suggesting that they may have problems in their ability to regulate their emotions (Frick & Morris, 2004). Further, reactively aggressive children are more likely to have family backgrounds that are characterized by harsh and abusive parenting, which are believed to contribute to both their social-cognitive deficits and their problems regulating their emotions (Dodge, Bates, & Pettit, 1990; Strassberg, Dodge, Pettit, & Bates, 1994).

In contrast, proactive aggression is less attributed to harsh and abusive parenting and children who are proactively aggressive are less rejected by peers (Poulin & Boivin, 2000; Schwartz *et al.*, 1998) and often show reduced levels of emotional reactivity to provocations (Hubbard *et al.*, 2002; Pitts, 1997). Further, this group of children tends to show a callous and unemotional (e.g., lacking guilt and empathy) response style (Frick, Cornell, Barry, Bodin, & Dane, 2003). This response style, in turn, has been linked to a number of important correlates (see Frick & Ellis, 1999; Frick & Marsee, 2006; Frick & Morris, 2004 for reviews), such as low levels of fearful inhibitions (Frick *et al.*, 2003; Frick, Lilienfeld, Ellis, Loney, & Silverthorn, 1999) and decreased sensitivity to punishment cues, especially when a reward-oriented response set is primed (Barry *et al.*, 2000; Fisher & Blair, 1998). Both of these characteristics are associated with a temperamental style that has been labeled low fearfulness (Rothbart & Bates, 1998) or low behavioral inhibition (Kagan & Snidman, 1991). Further, the conduct problems in children with callous-unemotional (CU) features have been less

strongly related to dysfunctional parenting practices (Oxford, Cavell, & Hughes, 2003; Wootton, Frick, Shelton, & Silverthorn, 1997).

Taken together, this research suggests that childhood aggression may be distinguished by reactive and proactive patterns of aggressive behavior and the two types of aggression may be differentially related to temperamental (e.g., behavioral inhibition), moral-emotional (e.g., CU features), and family contextual (e.g., harsh parental attitudes) factors. The existing research has focused largely on older children and adolescents. This is unfortunate because aggressive behavior in childhood often has its roots in the preschool years (Shaw, Gilliom, Ingoldsby, & Nagin, 2003), and this may be a time in development when preventive interventions may be particularly successful (Dodge & Pettit, 2003). Further, while parenting correlates of preschool aggression have been studied extensively (e.g., Bates, Dodge, Petit, & Ridge, 1998; Campbell, Pierce, Moore, & Marakovitz, 1996; Shaw *et al.*, 1998), few studies have considered potential differences in correlates for the specific subtypes of aggression, nor have they considered parenting in relation to dispositional characteristics of the preschool child. In one notable exception, Shaw *et al.* (2003) reported that fearlessness and rejecting parenting both contributed independently to the prediction of a chronic pattern of aggression from ages 2 to 8 in a sample of boys from low income families.

One final issue for extending research on dispositional correlates to aggression in preschool children is that it is not clear when problems in moral development, such as the development of CU features, can be distinguished from normative variations in conscience development (Kochanska & Thompson, 1997). As a result, it is important to establish how early pathological variants of moral development that predict problems in adjustment can be distinguished from normative variations.

Based on these considerations, in this study we attempted to extend existing research by investigating temperamental, moral, and familial correlates of different types of aggression in a sample of preschool children. The sample was recruited from low-income families because rates of aggression are generally higher in families experiencing economic stressors (Shaw *et al.*, 2003). Thus, focusing on these families enhances the range of aggression that is likely to be found in the sample, and it provides information that could be useful for developing preventive interventions for an at-risk group. Based on research with school-aged samples, it was predicted that low behavioral inhibition, CU features, and family dysfunction would all be predictors of aggressive behavior in this high-risk preschool sample. However, based on past research, low behavioral inhibition and CU features were predicted to be more strongly associated with proactive forms of aggression, whereas family dysfunction was predicted to be more strongly associated with reactive forms of aggression.

Method

Subjects

Participants were 49 children (21 boys, 27 girls and 1 unidentified gender, due to errors in data collection) who were enrolled in Head Start programs in a large metropolitan area in the Southeastern United States and their primary female caregiver. The children were predominantly African-American (76%), with other ethnicities including Caucasian (16%) and Hispanic (6%), based on caregiver report. One caregiver (2%) endorsed “Other” for the child’s ethnicity. The age range of the sample was 2–5 years (*Mean* = 3.10, *SD* = .68) with the majority of the sample (82%) being either 3 or 4 years of age. Twenty-six (53%) of the caregivers were single and never married, 16 (33%) were currently married, 3 (6%) divorced,

and 4 (8%) separated. Twenty (41%) caregivers had not completed the 12th grade and 27 (55%) were not working, while 9 (18%) worked part-time and 13 (27%) worked full-time. Thirty-three (67%) children had either never attended daycare or had attended for less than one year, and 20 (41%) had at least one sibling under the age of 6 living in the home. A significant proportion (35%) of the sample had a total income equal to or less than \$3,000 a year, 22% ranged in income from above \$12,000 to \$30,000, and only 6% of the sample reported an income greater than \$30,000.

Procedure

Over a period of one month during the summer, participants were recruited at four Head Start registration locations. Participants were recruited while caregivers were waiting to register their child for Head Start. Caregivers were asked to complete the parent-completed measures while they were waiting to register. Measures were read orally to all participants in a one-on-one interview format in a private interviewing area at the registration site. As part of the consent procedure, caregivers, who were all parents and/or legal guardians, agreed to allow the child's Head Start teacher to be contacted during the ensuing school year. Over the next six to nine months, the teachers of all children who were determined to be eligible for Head Start services and who actually attended Head Start were asked to complete rating scales after the child had been in their class for at least three months ($M = 6.02$, $SD = .26$).

Measures

Antisocial Process Screening Device (APSD; Frick & Hare, 2001)

The APSD is a 20-item behavior rating scale that was designed to assess features associated with severe antisocial and aggressive behavior. Informants rate behaviors on a 3-point Likert scale from 0 (Not at all true) to 2 (Definitely true). Although the APSD has three subscales (e.g., narcissism, impulsivity, and callous-unemotional features), only the six-item callous-unemotional (CU) subscale was used in the current study (e.g., “Feels bad or guilty when he/she does something wrong”), with a possible range of 0–12. This was due to the fact that this scale has factor analytic support in both at-risk and community samples of children (Frick, Bodin, & Barry, 2000). Also, scores on this scale have designated a particularly severe and aggressive group of preadolescent children with conduct problems in both clinic-referred (Christian, Frick, Hill, Tyler, & Frazer, 1997) and school-based samples (Frick, Cornell, Bodin *et al.*, 2003).

This study combined parent and teacher ratings of CU features using a pre-school modification of the APSD. In this version, three of the 20 items were modified to make the language more appropriate for young samples, including one item from the callous-unemotional scale used in the current study (i.e., “He/ she is concerned about schoolwork” was changed to “He/ she seems motivated to do his/her best in structured activities”). There is evidence for the validity of the pre-kindergarten version of the APSD. This modified scale was used in a community sample of 1359 children between the ages of 4 and 9. In this sample, there was factor analytic support for the callous-unemotional scale and these features predicted antisocial behavior (i.e., DSM-IV symptoms of conduct disorder and oppositional defiant disorder) in boys 12-months later (Dadds, Fraser, Frost, & Hawes, 2005), assessed by the Diagnostic Interview Schedule for Children, Adolescents, and Parents (Holland & Dadds, 1997). Informant from parents and teachers was combined by taking the higher rating from either informant for each item, as recommended by Piacentini, Cohen, and Cohen (1992)

and in the manual of the APSD (Frick & Hare, 2001). The coefficient alpha for the combined parent and teacher ratings of CU in the current sample was 0.54, which is somewhat low but likely due to the small number ($n = 6$) of low-base rate items on the scale. Item statistics revealed that the deletion of any item did not substantially increase the reliability of the scale. Also, all items were positively related to the total score with an average item-total correlation of .30.

Behavioral Inhibition Scale (BIS)

This measure was constructed using items from several scales assessing fearfulness and behavioral inhibition. Items from the Thrill and Adventure Seeking subscale of the Sensation Seeking Scale for Children (SSS-C; Russo, Stokes, & Lahey, 1993) were used, as well as items from the Fearfulness subscale of Rothbart's Child Behavior Questionnaire (Rothbart, Ahadi, & Hershey, 1994) and items assessing behaviors that have been critical for defining behavioral inhibition in past research (Kagan & Snidman, 1991; Kagan, Snidman, & Arcus, 1993). Redundant items were eliminated and the wording of items was modified so that they were applicable for preschoolers. On this twenty-item questionnaire, the parent or teacher chose between a pair of statements to indicate which was more true of the child. One statement (e.g., "Your child likes to jump out of a swing while it is high off of the ground") describes uninhibited behaviors while the other statement describes a preference against uninhibited behaviors (e.g., "Your child likes to wait until a swing slows down or stops before getting off"). The scale also asks the rater to identify how well the chosen behavior describes the child by selecting either "sort of describes my child" or "describes my child well." This format results in a four-point Likert scale for each item. The behavioral inhibition scale has a possible range of 0 to 60, with low scores indicating a behaviorally uninhibited temperament.

Although assessment of behavioral inhibition has been based primarily on behavioral observations (i.e., Kagan & Snidman, 1991), there is evidence to suggest that it can be assessed validly through parent and teacher ratings. For example, Bishop, Spence, and McDonald (2003) found that during a simulated stranger interaction task, children who were rated as highly behaviorally inhibited by mothers and teachers took longer to initiate contact with a stranger, spoke less often and for shorter periods of time, and required more prompting to elicit speech, compared with children who were rated low on behavioral inhibition. Also, a study by Cornell (2004) provides additional support for the validity of informant ratings on child temperament in a preschool sample. This study found a strong relationship between parent-reported temperament and teacher nominated temperament ($F = 29.48, p < .001, \eta^2 = .26$), providing evidence for the convergence between teacher nominations and parent ratings of behavioral inhibition. The ratings from parents and teachers were combined by taking the higher score of either rating for each item, as described previously for the APSD. The combined ratings yielded an alpha coefficient of 0.64 in the present sample.

Adolescent-Adult Parenting Inventory (AAPI; Bavolek, 1984)

The AAPI is a 32-item rating scale that is designed to assess current parenting beliefs and practices. It assesses the degree to which the child's primary caregiver agrees or disagrees with various parenting patterns by having him or her rate each item on a 5-point Likert scale from Strongly Agree to Strongly Disagree. The AAPI was specifically designed to assess the parenting and child-rearing attitudes of parents at-risk for practicing abusive and neglectful parenting behaviors. The AAPI consists of four subscales, including

inappropriate developmental expectations of children (6 items; e.g., “Children should be expected to verbally express themselves before the age of one”), lack of empathic awareness of children’s needs (8 items; e.g., “Parents who are sensitive to their children’s feelings and moods often spoil their children”), reversing family roles (8 items; e.g., “Young children should be expected to comfort the mother when she is feeling blue”), and strong parental beliefs in the use of corporal punishment (10 items; e.g., “Children learn good behavior through the use of physical punishment”). For each scale, low scores indicate attitudes favoring more inappropriate parenting attitudes. Only the attitude towards corporal punishment scale was used in the current study, with a possible range of 0–50. This measure was selected for use in the current study because items are written at a fifth grade reading level, it can be administered orally to non-readers, and it has been used in at-risk samples of primarily African-American parents (Smyke, Boris, & Alexander, 2002). Bavolek (1990) determined that the subscales had good internal consistency and a one-week test-retest reliability of .76. In the current sample, the internal consistency for the four scales ranged from .61 to .84, with $\alpha = .79$ for the attitude towards corporal punishment scale.

Aggressive Behavior Rating Scale (ABRS; Brown, Atkins, Osborne, & Milnamow, 1996)

The Aggressive Behavior Rating Scale was developed specifically to obtain teacher ratings of reactive and proactive forms of aggression that might be observed in a mainstream academic setting. Although the scale was originally developed to assess behaviors in elementary school-aged samples, the items are appropriate for the pre-school setting, as well. Informants rate a list of twenty-eight behaviors on a 3-point Likert scale from 0 (Never) to 2 (Very often) to indicate how well each behavior describes the child. Brown and colleagues (1996) isolated a 10-item proactive aggression factor (i.e., “Hurts others to win a game or contest”) and a 6-item reactive aggression factor (i.e., “Gets mad when doesn’t get his/her way”) in a sample of 186 community children in grades 3 through 5. The present study used the subscales obtained by Brown *et al.* (1996). However, two items with low inter-item correlations were removed from the reactive aggression scale (i.e., “gets mad when corrected” and “won’t admit that anything is ever his/her fault”) to increase the internal consistency of the measure in the current sample. The coefficient alphas for the proactive aggression, reactive aggression, and total aggression scales in this sample were .78, .67, and .83, respectively.

Results

The distributions of all variables and the correlations between the main study variables and demographic variables are reported in Table 1. All correlations presented are Pearson product-moment correlations. There were very few significant correlations with age, race, and income. Gender was significantly correlated with CU features ($r = -.31, p < .05$), behavioral inhibition ($r = .38, p < .01$), reactive aggression ($r = -.37, p < .05$), and total aggression ($r = -.34, p < .05$). This pattern of results indicated that girls tended to score lower on CU features, reactive aggression, and total aggression, and higher on behavioral inhibition. Importantly, the distribution of the main study variables did not differ significantly from normality using the Kolmogorov-Smirnov Test of Normality. However, as would be expected in a normal sample, proactive and total aggression, and corporal punishment scores showed skewed distributions with most children scoring at the lower end of the distribution.

Table 1 Distributions and correlations with demographic characteristics for main study variables

	Mean (<i>SD</i>)	Range	Skewness	Kurtosis	Age	Race	Gender	Income
Callous-Unemotional Behavioral Inhibition	5.65 (2.20)	1–10	-.06	-.23	-.03	-.31*	-.31*	-.11
Proactive Aggression	37.79 (7.73)	22–57	.02	-.42	.07	.13	.38**	-.24
Reactive Aggression	3.03 (3.07)	0–14	1.43	2.60	-.01	-.13	-.28	.04
Total Aggression	2.12 (1.73)	0–6	.36	-.73	-.06	-.18	-.37*	.00
Inappropriate Expectations	5.15 (4.39)	0–19	.85	.64	-.03	-.16	-.34*	.03
Empathic Awareness	22.51 (3.36)	14–29	-.16	-.02	-.38**	.07	-.09	-.18
Corporal Punishment	27.12 (5.79)	15–39	-.19	-.64	-.14	.13	-.01	-.14
Role Reversal	32.02 (6.57)	11–44	-1.02	1.75	-.16	.07	.04	-.17
	24.37 (5.95)	14–40	.66	.53	-.17	.17	.01	-.28

Note: Ethnicity was coded as 1 = Caucasian, 2 = African-American, and 3 = Hispanic; Gender was coded as 1 = boys and 2 = girls.

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

In Table 2, the correlations among the main study variables are provided. As expected from past research, CU features were correlated with both proactive and total aggression ($r = .35, p < .05$; and $r = .34, p < .05$; respectively), whereas CU features were not significantly correlated with reactive aggression. Further, behavioral inhibition was significantly negatively correlated with reactive aggression ($r = -.32, p < .05$), proactive aggression ($r = -.36, p < .05$), and total aggression ($r = -.38, p < .01$). An attitude favoring corporal punishment was the only measure of parenting that was significantly associated with aggression. Contrary to predictions, however, it was significantly correlated with proactive aggression ($r = -.37, p < .01$) and total aggression ($r = -.35, p < .01$) but not reactive aggression ($r = -.24, p = n.s.$), such that the presence of such attitudes indicated more proactive and total aggression in the child.

The partial correlations showing the associations with each type of aggression, controlling for the other type of aggression, are also provided in Table 2. These correlations

Table 2 Associations among behavioral inhibition, callous-unemotional features, parenting, and aggression

	Reactive aggression <i>R</i> / partial <i>R</i>	Proactive aggression <i>R</i> / partial <i>R</i>	Total aggression <i>R</i>
Behavioral Inhibition	-.32*/-.13	-.36*/-.21	-.38**
Callous-unemotional features	.25/.04	.35*/.25	.34*
Inappropriate expectations	.01/.01	-.01/-.01	.00
Empathic awareness	-.22/-.13	-.18/-.06	-.21
Corporal punishment	-.24/-.01	-.37**/-.28	-.35*
Role reversal	-.09/.04	-.18/-.16	-.16

Note: * $p < .05$. ** $p < .01$.

Table 3 Multiple regression analyses predicting aggression from CU features, behavioral inhibition, and harsh parenting attitudes, controlling for gender

	Total aggression	Proactive aggression	Reactive aggression
Gender	-.03	.05 (.12)	-.15 (-.18)
Callous-Unemotional	.44**	.47** (.34**)	.29 (.03)
Behavioral Inhibition	-.45**	-.46** (-.31*)	-.33* (-.07)
Corporal Punishment	-.26*	-.28* (-.20)	-.18 (-.02)
R^2	.44***	.43*** (.57***)	.29** (.47***)

Note: Statistics provided in the body of the table are the Standardized Betas from the regression equation with all main effects entered simultaneously, except for the model R^2 and statistics in parentheses, which are standardized betas controlling for the overlap between reactive and proactive aggression; Gender was coded as 1 = boy and 2 = girl.

* $p < .05$. ** $p < .01$. *** $p < .001$.

determine if the association between aggression measures ($r = .64$; $p < .001$) may have obscured differential associations. As illustrated by the partial correlations, when controlling for the overlap in types of aggression, partial correlations dropped in significance but remained in the same general direction. For example, the correlation between behavioral inhibition and proactive aggression, after controlling for reactive aggression, dropped from $r = -.36$ ($p < .05$) to *partial* $r = -.21$ ($p = \text{n.s.}$), and the correlation between CU features and proactive aggression dropped from $r = .35$ ($p < .05$) to *partial* $r = .25$ ($p = \text{n.s.}$), after controlling for reactive aggression.

To test for the additive and interactive effects of behavioral inhibition, CU features, and parenting attitudes in predicting aggression, a series of hierarchical regression analyses were performed. Since an attitude favoring corporal punishment was the only parenting variable with a significant zero-order correlation with the aggression variables, only this parenting variable was entered into the analyses. In the first step of these analyses, all variables were entered simultaneously with gender. In the second step, parameters for all two-way interactions between predictors were entered and the change in R^2 between this step and the previous step with only main effects, was tested for significance (Jaccard, Turrissi, & Wan, 1990). In the third step, the three-way interaction was added to the equation and the change in R^2 associated with the addition of this parameter was again tested for significance. In no case did the second and third steps of this hierarchical regression lead to significant increases in the amount of variance explained (R^2). As a result, only the results of the first step with main effects are reported in Table 3.

As indicated in Table 3, gender, behavioral inhibition, CU features, and attitudes favoring corporal punishment explained a significant proportion of the variance in the total aggression ($R^2 = .44$, $p < .001$) and proactive aggression ($R^2 = .43$, $p < .001$) measures. The amount of explained variance, while still significant, was much lower for reactive aggression ($R^2 = .29$, $p < .01$). More importantly, behavioral inhibition, CU features, and an attitude favoring the use of corporal punishment each accounted for unique variance in predicting both total aggression and proactive aggression. The unique prediction of proactive aggression remained significant for behavioral inhibition (Std. Beta = $-.31$, $p < .05$) and CU features (Std. Beta = $.34$, $p < .05$), even after controlling for the effects of reactive aggression. In contrast, only behavioral inhibition accounted for significant unique variance in the measure of reactive aggression (Std. Beta = $-.33$, $p < .05$) and this association was eliminated when controlling for the effects of proactive aggression.

Discussion

The main goal of our study was to determine whether behavioral inhibition, CU features, and harsh parenting were associated with aggression in a sample of pre-school children, and whether these associations differed across types of aggressive behavior. The findings can be summarized by two main points. First, low behavioral inhibition (i.e., fearlessness), CU features, and parental attitudes favoring corporal punishment all provided unique information in the prediction of teacher ratings of aggression. Second, these variables showed the strongest prediction of proactive aggression in this high-risk preschool sample.

Many previous studies have investigated the role of harsh parental attitudes and behavior in predicting aggression in pre-school samples (Bates *et al.*, 1998; Campbell *et al.*, 1996; Shaw *et al.*, 1998). However, our results support the findings of Shaw *et al.* (2003) in implicating the importance of considering temperament, in particular a fearless temperament, in predicting the development of aggression. Several developmental theories have been proposed as to how low levels of fearful inhibitions may place a child at risk for becoming aggressive (see Frick & Morris, 2004 for a review). For example, children low in behavioral inhibition may lack normal emotional reactivity to the distress cues of others and, thus, may be less attuned to and affected by the negative consequences of their aggressive behavior on others (Blair, 1995).

This was one of the first studies to consider the association between CU features and aggression in a pre-school sample. As found in older samples, these features were associated with more aggression overall and with greater proactive aggression specifically (Frick, Cornell, Barry, *et al.*, 2003; Kruh, Frick, & Clements, 2005). This suggests that even as young as age 3 and 4, individual differences in guilt and empathy are associated with problem behavior (Hastings, Zahn-Waxler, Usher, Robinson, & Bridges, 2000). This study does not address how stable these features may be in young children nor does it address their predictive utility (e.g., predicting aggression later in childhood and adolescence). However, it does suggest that these features may be important for explaining variations in aggressive behavior even in very young children. Thus, they should be considered in interventions for aggressive preschool children (Frick, 2001).

An interesting aspect of this study was that, as predicted from research on school-aged children (Frick & Ellis, 1999; Frick & Morris, 2004), low behavioral inhibition and CU features were more strongly associated with proactive forms of aggression than reactive forms of aggression. Also, any associations with reactive aggression were eliminated when controlling for the correlation between reactive and proactive aggression. These findings support the distinction between the two types of aggression in a pre-school sample. However, it is important to note that in contrast to research finding that corporal punishment is more strongly associated with reactive aggression (Dodge *et al.*, 1990; Strassberg *et al.*, 1994), the current study found that attitudes favoring harsh parenting were actually associated with proactive aggression. This makes an alternative interpretation of these results possible. Specifically, aggression that is in response to real or perceived provocation from others may be more normative in pre-school samples and it is only aggression that is used for instrumental gain (e.g., to get a toy; to achieve social status) that is indicative of problems in development.

The findings of the current study need to be interpreted in the context of several limitations. First, the sample size was relatively small, which may have reduced the power for finding significant associations. This may have been especially important in explaining the failure to find any significant interactions among predictors. The small sample size also prevented the use of causal modeling techniques for predicting associations. Second, because this

was a correlational study, specifying the temporal ordering of variables is not possible. For example, it is possible that harsh parenting may model aggressive ways of handling conflict situations and lead the child to be more aggressive at school. However, it is also possible that children who show aggressive behavior at school show more aggressive behavior at home and their behavior leads their parents to use more harsh approaches to discipline. Third, it is important to note that the parenting measure that was associated with aggression in the current study explicitly focused on attitudes favoring the use of corporal punishment (e.g., children should be spanked when they misbehave) and did not assess whether such discipline was actually used in the home. Fourth, behavioral inhibition and CU features were assessed using both parent and teacher reports to avoid relying on any single informant. However, such ratings are still susceptible to biases in reporting and would have been enhanced with the inclusion of observational measures.

Given these limitations, these results require replication before conclusive statements about clinical implications can be made. However, these results are compatible with a model suggesting that temperament and CU features contribute to aggression in pre-school children. Thus, focusing on any single risk factor is likely to be limited in explaining the development of aggression (Dodge & Pettit, 2003). Further, focusing on any single risk factor in interventions for aggressive children is also likely to have limited effectiveness and comprehensive approaches to treatment that target multiple risk factors are optimal (Frick, 1998; 2001).

By far the most common intervention for reducing aggression in young children, and the one for which there is the most empirical support, is to enhance parenting practices in families of aggressive or at-risk preschoolers (Jamila, Webster-Stratton, & Baydar, 2004). The current study suggests that the effectiveness of such parenting interventions may be enhanced if they target children who may be at risk for problems due to temperamental predispositions (e.g., fearlessness) or emerging problems in moral development (e.g., lacking guilt and empathy). Further, the current findings suggest that these interventions could also be enhanced by considering parenting strategies that may be optimal for children with different temperaments (Kochanska, 1993) and by including interventions that foster the development of empathy (Chi-Ming, Greenberg, & Walls, 2003). Given the stability of aggression from pre-school to later childhood, enhancing intervention programs to more effectively reduce aggressive behavior early in development is critical.

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