



## Forms and Functions of Aggression in Early Childhood

Spencer C. Evans, Andrew L. Frazer, Jennifer B. Blossom & Paula J. Fite

To cite this article: Spencer C. Evans, Andrew L. Frazer, Jennifer B. Blossom & Paula J. Fite (2018): Forms and Functions of Aggression in Early Childhood, Journal of Clinical Child & Adolescent Psychology, DOI: [10.1080/15374416.2018.1485104](https://doi.org/10.1080/15374416.2018.1485104)

To link to this article: <https://doi.org/10.1080/15374416.2018.1485104>



Published online: 27 Jul 2018.



Submit your article to this journal [↗](#)



View Crossmark data [↗](#)

---



# Forms and Functions of Aggression in Early Childhood

Spencer C. Evans

*Department of Psychology, Harvard University*

Andrew L. Frazer

*Clinical Child Psychology Program, University of Kansas*

Jennifer B. Blossom

*Department of Psychiatry and Behavioral Sciences, University of Washington School of Medicine*

Paula J. Fite

*Clinical Child Psychology Program, University of Kansas*

Evidence supports the distinctions between forms (relational vs. physical) and functions (proactive vs. reactive) of aggression; however, little research has investigated these two subtype frameworks simultaneously or by teacher-report in early childhood. We examined the factor structures, interrelations, and longitudinal associations of teacher-reported forms and functions of aggression in young children. Preschool and kindergarten students ( $N = 133$ ; ages 3–6 years; 58.6% male) were rated by their teachers during the spring semester and on two subsequent occasions over the following school year (a three-wave cross-sequential design). Bayesian confirmatory factor analyses and path models were estimated, controlling for covariates and cross-classification of students within classrooms. Correlated two-factor models showed acceptable measurement characteristics for both aggression frameworks. Within and between frameworks, aggression subtypes were highly correlated with one another. Physical aggression showed greater stability than, and was a precursor to, relational aggression, whereas both proactive and reactive aggression were stable and bidirectional. All subtypes—especially reactive and physical aggression—were robustly associated with peer rejection but not with academic performance or depressive symptoms. Results suggest that brief, teacher-reported rating scales can be used to measure forms and functions of aggression during early childhood. However, examination of one framework should elicit questions regarding the other (e.g., to what extent are measures of proactive and reactive aggression capturing physical aggression?), and research following a form-by-function approach may be particularly useful. Given their stability and outcomes, physical, reactive, and proactive aggression may be important targets for screening and intervention in early childhood settings.

## INTRODUCTION

Aggressive behavior can be understood with respect to its forms (methods) or functions (motivations). The forms of aggression are broadly conceptualized as either physical (e.g., punching) or relational (e.g., spreading rumors; Crick

& Grotjeter, 1995), whereas its functions can be proactive (i.e., goal oriented and planned) or reactive (i.e., responding to perceived threat; Dodge & Coie, 1987). Despite intrinsic overlap among the form and function subtypes, theory and evidence support each of these frameworks (e.g., Fite, Colder, & Pelham, 2006; Little, Henrich, Jones, & Hawley, 2003; Marsee et al., 2011; Ostrov & Crick, 2007; Vitaro & Brendgen, 2011). Most of this research comes from school-age and adolescent samples. Although aggression has been studied extensively in early childhood, less

---

Correspondence should be addressed to Spencer C. Evans, 1040 William James Hall, 33 Kirkland Street, Cambridge, MA 02138. E-mail: [sceevans@fas.harvard.edu](mailto:sceevans@fas.harvard.edu)

attention has been given to teacher-rated form and function subtypes during this period. Moreover, most research on aggression in young children has focused on preschool-only or school-age-only samples, with few studies including both age groups or following children across this important developmental transition.

Some aggression is normative in early childhood and generally declines during the transition into elementary school (Tremblay, 2000; Vitaro & Brendgen, 2011). Relational aggression, however, emerges later in early childhood and then remains somewhat stable (Crick et al., 2006; Fite & Pederson, *in press*). Children who are persistently aggressive in early childhood are at greater risk for outcomes such as academic and peer difficulties (Tremblay, 2000). For example, Campbell, Spieker, Burchinal, and Poe (2006) found that young children following moderate- and high-stable trajectories of physical aggression were likely to exhibit poor academic achievement, peer problems, and depressive symptoms.

These associations can be better understood by considering aggression subtypes. Work by Ostrov and colleagues has been instrumental in validating the forms and functions of early childhood aggression and clarifying their links with key adjustment outcomes (e.g., Hart & Ostrov, 2013; Kamper-DeMarco & Ostrov, 2017; Perry & Ostrov, 2017). For example, Ostrov, Kamper, Hart, Godleski, and Blakely-McClure (2014) and Ostrov, Murray-Close, Godleski, and Hart (2013) found that *proactive*-relational aggression predicted decreases in peer rejection and relational victimization and increases in emotion regulation skills, whereas *reactive*-relational aggression predicted increases in peer rejection and relational aggression and decreases in emotion regulation skills. Moreover, reactive-physical aggression predicted subsequent functional impairment (Hart & Ostrov, 2013). Generally, there is more research on aggression forms than functions during early childhood. In older youth samples, reactive aggression is more strongly linked to peer and internalizing problems, and proactive aggression to antisocial outcomes (Fite, Craig, Colder, Lochman, & Wells, 2016).

Assessment of forms and functions of aggression during early childhood raises important methodological considerations. Complex observational coding methods (e.g., Ostrov & Crick, 2007; Ostrov & Keating, 2004) have strong evidence for validity and reliability but also tend to be costly and time-intensive, limiting their utility. Brief survey measures offer one promising alternative for measuring aggression subtypes in young children. Indeed, teacher-report rating scales could be useful for research and clinical applications, as early childhood is a key period for assessment, prevention, and intervention. Teachers represent an important source of information regarding children's behavior as they are able to observe behavior across a number of contexts (e.g., schoolwork, play, peer interactions). Although teachers might not have complete knowledge of all the occurrences and varied manifestations of children's aggression, teachers are ideally situated to

identify children with elevated aggressive behavior and refer them for services. Teacher-report rating scales are now commonly used to measure both forms (e.g., Crick, Casas, & Mosher, 1997) and functions (e.g., Dodge & Coie, 1987) of aggression in older youths but are rarely used in early childhood. The preschool observational studies just noted offer some evidence for teacher-rated aggression subtypes in terms of moderate correspondence with observer ratings, superiority to peer ratings, and differential associations with social-emotional adjustment (Crick et al., 2006; Ostrov et al., 2014; Ostrov & Keating, 2004). Although these findings are promising, further research is needed to advance the teacher-rated measurement of aggression in early childhood.

A few scales have been developed to concurrently measure *both forms and functions* of youth aggression (reactive-physical, proactive-relational, etc.; Little et al., 2003; Marsee et al., 2011; Ostrov & Crick, 2007). Although such form-by-function approaches have demonstrated utility, validity, and reliability, most research on aggression subtypes has used, and continues to use, measures of *either forms or functions* (e.g., Crick et al., 1997; Dodge & Coie, 1987; Raine et al., 2006). To inform the interpretation of existing research and to guide future research, it is important to understand the properties of these nonorthogonal scales within the same early-childhood sample. Scales that focus on only one subtype framework obfuscate exactly what is being measured. For example, because children's physically aggressive behaviors are more directly observable and require immediate adult attention, teacher-report measures of proactive and reactive aggression likely capture more variance associated with physical aggression than relational. This is an important limitation of extant research, requiring further investigation.

The present three-wave longitudinal study examined teacher-rated forms and functions of aggression in early childhood. Specifically, we investigated the factor structure, stability, correlates, and prospective associations of proactive/reactive and relational/physical aggression.

## METHODS

Data were drawn from a larger school-based study (see, e.g., Evans & Fite, 2018), which has been continuously approved by the researchers' Institutional Review Board. For these analyses, participants were teachers ( $n = 17$ ) who rated the children in their classrooms on at least one of three occasions (five to 19 students per teacher/occasion). At Time 1 (T1), children ( $n = 133$ ; ages 3–6; 58.6% male) included 73 kindergarteners and 60 preschoolers (35 in K–1, 25 in K–2). Multi-informant and person-level sociodemographic data were unavailable. Concurrent census survey estimates for the city (for which this school was the only public elementary/prekindergarten education facility) characterize the population as 83.0% White/Caucasian, 5.0% Black/African American, 5.6% American Indian, 2.2% Asian, 1.1% other/

multiethnic, and 3.2% Hispanic/Latino (total = 100.1% due to rounding), with a median household income of \$56,766. Ratings were collected in spring 2015 (T1;  $n = 10$  teachers) and again the following fall and spring (T2/T3;  $n = 16$ ). Measures were administered toward the end of each semester via a deidentified online survey. Children who had been retained or placed in special education were excluded. Only cases with data at all three occasions were utilized to facilitate comparability of models among the same sample over time. At each wave, teachers were consented and compensated \$50–\$65 for their participation.

## Measures

All variables were assessed via teacher-report, with prior evidence supporting each measure's validity and reliability in the larger school sample (Evans et al., 2016). Aggressive behavior was measured using two brief, nonorthogonal measures, each with a scale from 1 (*never*) to 5 (*almost always*). Functions of aggression were assessed using Dodge and Coie's (1987) measure of proactive (three items; e.g., threatens or bullies others to get his or her way) and reactive aggression (three items; e.g., when teased or threatened, gets angry easily and strikes back). Similarly, forms of aggression were assessed using three-item scales for physical (e.g., hits, kicks, punches others) and relational aggression (e.g., when mad at a person, ignores them or stops talking to them). These scales were derived from Crick and colleagues' various measures of physical/relational aggression/victimization (Crick, 1996; Crick & Bigbee, 1998; Crick et al., 1997), adapted for brevity and correspondence across aggression/victimization and teacher-report/self-report in the larger research project (self-report not available for these younger grades).

Items from the Teacher Report Form (Achenbach & Rescorla, 2001), rated from 1 (*not true*) to 3 (*very/often true*), were used to measure peer rejection (four items related to teasing and social problems;  $\alpha = .80-.83$ ) and depressive symptoms (eight-item Withdrawn/Depressed scale;  $\alpha = .82-.84$ ). Last, academic performance (three items;  $\alpha = .96-.98$ ) was rated (a) relative to other students; (b) overall across classes; and (c) in terms of a letter grade, on a response scale from 1 (*well below average/F*) to 5 (*well above average/A*).

## Analyses

First, descriptive statistics, confirmatory factor analyses, and bivariate correlations were estimated to examine measurement characteristics of aggression subtypes. All confirmatory factor analysis models consisted of two correlated factors, each defined by three items. Internal consistency was assessed using alpha and omega, the latter being more robust to violations of classical test theory and normality assumptions (Dunn, Baguley, & Brunson, 2014). Second,

concurrent and prospective associations were examined through path models controlling for gender and grade, with all applicable covariance and stability paths. Models examined subtypes simultaneously to account for their covariance (e.g., effects of reactive aggression controlling for proactive, and vice versa). Longitudinally, paths were estimated across all possible intervals to examine shorter and longer term lags (about six months vs. about twelve months) and those spanning the same and different academic years/classrooms (fall-to-spring vs. spring-to-spring).

Models were estimated in Mplus Version 7 (Muthén & Muthén, 2012) using Bayesian cross-classified estimation to control for students being nested within classrooms that changed from T1 to T2/T3. Bayesian estimation utilizes the Markov Chain Monte Carlo algorithm to sequentially estimate posterior values accounting for each preceding estimate until changes are ignorable, producing estimates similar to maximum likelihood robust estimation (MLR; Muthén & Asparouhov, 2012; Zyphur & Oswald, 2015). Models specified noninformative priors, stipulating no a priori expectations. Results were evaluated based on 95% credible intervals (CIs) of posterior estimates and pathways of interest (at two-tailed  $p < .05$ ). Muthén and Asparouhov (2012) suggested that a posterior predictive  $p$  value (PPP) of about .50 is excellent ( $> .05$  adequate), and 95% CIs for the difference should include zero. To obtain fit statistics, models were reestimated using MLR (not incorporating cross-classification), with fit considered acceptable at approximately root mean square error of approximation (RMSEA)/standardized root mean square residual (SRMR)  $\leq .08$  and comparative fit index (CFI)/Tucker–Lewis index (TLI)  $\geq .95$  (Kline, 2016). Bayesian and MLR are both robust to moderate non-normality (Muthén & Muthén, 2012; Zyphur & Oswald, 2015).

## RESULTS

The six-item, two-dimension scales for aggression subtypes showed reasonable fit to the data across all waves (Table 1). For both scales, modification indices suggested that model fit could be improved by estimating a residual covariance term for one or two item pairs. Generally, these pairs differed across occasions and occurred within (not across) scales, suggesting that these are not systematic measurement problems and would likely be ameliorated in larger samples. When residual terms were allowed to covary, models showed adequate fit for both forms and functions of aggressions at all occasions (Bayesian PPPs  $> .09$ , 95% CIs include 0; MLR RMSEAs  $< 10$ , CFIs  $> .96$ , TLIs  $> .92$ ), with significant improvements in model fit (MLR-adjusted chi-square difference  $ps < .002$ ). Internal consistency was generally good: reactive ( $\alpha = .93-.95$ ;  $\omega = .96-.97$ ), proactive ( $\alpha = .72-.91$ ;  $\omega = .85-.95$ ), physical ( $\alpha = .79-.86$ ;  $\omega = .93-.96$ ), and relational

TABLE 1  
Confirmatory Factor Analyses of Forms and Functions of Aggression at All Occasions

Model	Correl. Residuals (Item No.)	Bayesian Estimation			Maximum Likelihood Robust Estimation						
		PPP	95% CI for Difference		$\chi^2$	df	p	RMSEA (90% CI)	CFI	TLI	SRMR
Form_t1	—	.243	-28.2	62.4	19.88	8	.011	.106 [.05, .17]	.932	.872	.050
Form_t1_cr	2 & 5	.399	-38.4	51.1	7.76	7	.354	.029 [.00, .11]	.996	.991	.042
Form_t2	—	.042	-4.3	92.1	36.70	8	< .001	.164 [.11, .22]	.883	.780	.111
Form_t2_cr	1 & 2, 4 & 5	.333	-39.1	57.1	8.01	6	.237	.050 [.00, .13]	.992	.979	.013
Form_t3	—	.009	7.4	102.4	32.65	8	< .001	.152 [.10, .21]	.907	.825	.103
Form_t3_cr	1 & 2	.095	-16.7	80.1	16.07	7	.025	.099 [.03, .16]	.966	.926	.031
Func_t1	—	.035	-4.4	91.5	35.51	8	< .001	.161 [.11, .22]	.908	.828	.055
Func_t1_cr	4 & 6	.092	-15.9	80.6	15.41	7	.031	.095 [.03, .16]	.972	.940	.031
Func_t2	—	.161	-22.9	72.0	17.64	8	.024	.095 [.03, .16]	.971	.945	.049
Func_t3	—	.045	-6.2	86.3	49.96	8	< .001	.198 [.15, .25]	.886	.787	.057
Func_t3_cr	2 & 3, 4 & 6	.430	-41.4	50.8	2.08	6	.912	.000 [.00, .04]	1.000	1.027	.004

Note: PPP = posterior predictive *p* value; CI = credible intervals in Bayesian models and confidence intervals in MLR models; RMSEA = root mean square error of approximation; CFI = comparative fit index; TLI = Tucker–Lewis index; SRMR = standardized root mean square residual; Form = physical and relational forms of aggression; Func = proactive and reactive functions of aggression; t = data collection occasion; cr = correlated residuals.

(except at T1,  $\alpha = .62$ ;  $\omega = .86$ ; T2/T3  $\alpha_s = .89$ –.90;  $\omega_s = .94$ –.95).

As shown in Table 2, proactive and reactive aggression were highly correlated at all occasions ( $r_s = .72$ –.75), whereas physical and relational aggression were moderately correlated ( $r_s = .41$ –.59). Cross-framework correlations were consistently high: proactive-relational ( $r_s = .63$ –.81), proactive-physical ( $r_s = .71$ –.87), reactive-relational ( $r_s = .55$ –.69), and reactive-physical ( $r_s = .71$ –.77). At all occasions, peer rejection was moderately/strongly associated with all aggression subtypes ( $r_s = .47$ –.78), whereas academic performance was unassociated with relational aggression but showed small negative associations with all other subtypes ( $r_s = -.18$ –.32). Depressive symptoms showed little association with all aggression subtypes at T1 ( $r_s = .06$ –.14) and T2 ( $r_s = .13$ –.18); however, at T3, all four subtypes were correlated with depressive symptoms ( $r_s = .18$ –.25). All subtypes of aggression were less common among girls ( $r_s = -.18$ –.37) except for relational aggression, which was uncorrelated with gender. Grade was unassociated with any aggression subtype on any occasion, except relational aggression at T3 only. Peer rejection was less common among girls on all occasions ( $r_s = -.22$ –.31) but was unassociated with grade. Depressive symptoms were unassociated with gender and negatively associated with grade at T1 but not T2/T3. Last, academic performance was correlated with gender at T2 but not T1/T3 and was correlated with grade at T1 and T2 but not T3.

When associations were reexamined in cross-sectional regression models controlling for covariates (Table 3), only proactive aggression remained associated with concurrent depressive symptoms, and only at T3. In contrast, all four aggression subtypes were concurrently linked to peer rejection at nearly all occasions (one exception: aggression

at T3). Zero-order associations between aggression subtypes and academic performance were mostly attenuated to non-significance in path models, although physical aggression at T1 and T2 and reactive aggression at T3 remained robustly associated with poorer academic performance.

Longitudinal results, controlling for covariates, are presented in Table 4. Physical, reactive, and proactive aggression were stable from one occasion to each subsequent occasion. In contrast, relational aggression at T1 was unassociated with relational aggression at T2/T3; however, from T2 to T3, relational aggression was significantly stable. Physical aggression predicted increases in relational aggression at all subsequent occasions; however, relational aggression did not predict any increases in physical aggression. Bidirectional associations were found between the functions of aggression, with reactive aggression predicting increases in proactive aggression across two out of three lags, and proactive aggression predicting increases in reactive aggression across three out of three lags. Physical and reactive aggression both consistently predicted increases in peer rejection, whereas relational and proactive aggression only predicted peer rejection across one out of three lags. With only one exception (T2 proactive aggression predicting T3 depressive symptoms), aggression subtypes did not predict later academic performance or depressive symptoms.

## DISCUSSION

This study found evidence for the measurement structure and reliability of brief teacher-reported measures of proactive/reactive and physical/relational aggression on three occasions in preschool through first grade. Further, cross-

TABLE 2  
Correlations and Descriptive Statistics

	<i>Forms</i>		<i>Functions</i>		<i>Correlates</i>			<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>	<i>Skew</i>	<i>Kurt</i>
	<i>Phy</i>	<i>Rel</i>	<i>Rea</i>	<i>Pro</i>	<i>Dep</i>	<i>Rej</i>	<i>Aca</i>						
Time 1													
Phy	1.00							1.32	0.61	1.00	4.33	2.50	6.89
Rel	.41**	1.00						1.28	0.45	1.00	3.00	1.88	3.41
Rea	.71**	.71**	1.00					1.92	1.12	1.00	5.00	1.13	0.31
Pro	.63**	.63**	.72**	1.00				1.31	0.55	1.00	3.67	2.11	4.36
Dep	.11	.06	.06	.14	1.00			1.17	0.27	1.00	2.38	1.97	4.01
Rej	.69**	.56**	.65**	.71**	.30**	1.00		1.18	0.36	1.00	2.75	2.23	4.66
Aca	-.28**	-.12	-.32**	-.31**	-.40**	-.25**	1.00	3.57	1.15	1.00	5.00	-0.42	-0.75
Fem	-.36**	-.03	-.28**	-.18*	-.12	-.23**	.15						
Grd	-.00	-.02	.05	-.01	-.23**	.08	.37**						
Time 2													
Phy	1.00							1.27	0.52	1.00	3.33	2.14	4.05
Rel	.57**	1.00						1.34	0.69	1.00	4.33	2.40	5.37
Rea	.71**	.77**	1.00					1.90	1.21	1.00	5.00	1.30	0.55
Pro	.69**	.81**	.73**	1.00				1.27	0.61	1.00	4.00	2.63	6.96
Dep	.18*	.14	.13	.14	1.00			1.17	0.31	1.00	2.88	2.87	10.12
Rej	.68**	.51**	.69**	.66**	.33**	1.00		1.13	0.31	1.00	2.50	3.03	9.26
Aca	-.27**	-.15	-.29**	-.20*	-.22*	-.23**	1.00	3.33	1.13	1.00	5.00	-0.24	-0.77
Fem	-.35**	-.03	-.33**	-.19*	-.01	-.22**	.19*						
Grd	-.07	.06	-.07	.03	-.17	-.07	.18*						
Time 3													
Phy	1.00							1.36	0.67	1.00	3.67	1.99	3.13
Rel	.59**	1.00						1.38	0.70	1.00	4.00	2.11	3.80
Rea	.77**	.87**	1.00					1.97	1.28	1.00	5.00	1.12	-0.14
Pro	.55**	.76**	.75**	1.00				1.38	0.82	1.00	5.00	2.49	6.00
Dep	.24**	.22*	.18*	.25**	1.00			1.15	0.27	1.00	2.75	2.85	10.66
Rej	.78**	.47**	.77**	.74**	.33**	1.00		1.18	0.39	1.00	2.75	2.27	4.38
Aca	-.23**	-.09	-.29**	-.18*	-.11	-.20*	1.00	3.44	1.10	1.00	5.00	-0.45	-0.54
Fem	-.37**	-.03	-.33**	-.23**	-.15	-.31**	.17						
Grd	.02	.18*	.05	.13	-.14	.06	.13						

Note: Phy = physical; Rel = relational; Rea = reactive; Pro = proactive; Dep = depressive symptoms; Rej = peer rejection; Aca = academic performance; Skew = skewness; Kurt = kurtosis; Fem = female; Grd = grade.

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

sectional and prospective analyses support the validity of these variables while elucidating their course and outcomes during early childhood. Physical aggression appears to be more stable than, and a precursor to, relational aggression; however, relational aggression did not predict physical aggression and was stable only within the same classroom or school year. Conversely, proactive and reactive aggression were stable and bidirectional. All subtypes were associated with peer rejection, with reactive and physical aggression showing persistent longitudinal effects; however, there were few unique associations with academic performance or depressive symptoms.

Both subtype frameworks showed acceptable measurement characteristics, supporting their use in early childhood samples. The correlated two-factor models fit similarly well for forms and functions at all occasions. Within-framework correlations of aggression subtypes were high, consistent with meta-analytic estimates (e.g., Card & Little, 2006; Polman, De Castro, Koops, Van Boxtel, & Merk, 2007).

Cross-framework correlations were also high, suggesting that proactive and reactive aggression items pull more strongly for physical than relational aggression. Indeed, physical aggression was similarly strongly correlated with reactive, proactive, and relational aggression at all occasions, suggesting that this facet of aggression is most directly observed by teachers, and the measurement of any other facet is likely to be influenced by physically aggressive acts. Nevertheless, the present factor-analytic and differential outcome results add to a large literature supporting these frameworks. In other words, findings provide direction for future research while providing a lens through which to interpret the extant literature. Evidence regarding teacher-rated functions of aggression should generate questions about what form of aggression is being measured, as it is likely more physical than relational. Conversely, relationally and physically aggressive acts might both be used to serve a proactive function, whereas reactive aggression tends to be more often physical than relational.

TABLE 3  
Concurrent Associations

	<i>Depressive Symptoms</i>	<i>Peer Rejection</i>	<i>Academic Performance</i>
Time 1			
Forms			
Physical Aggression	.03 (.05)	.34 (.04)**	-.57 (.18)**
Relational Aggression	-.03 (.06)	.23 (.06)**	.19 (.23)
Female	-.05 (.05)	-.01 (.05)	.11 (.19)
Grade	-.07 (.05)	.03 (.04)	.52 (.18)**
<i>R</i> <sup>2</sup>	.086	.562	.233
Functions			
Reactive Aggression	-.02 (.04)	.11 (.03)**	-.16 (.14)
Proactive Aggression	.05 (.06)	.30 (.06)**	-.30 (.26)
Female	-.07 (.05)	-.04 (.05)	.19 (.19)
Grade	-.06 (.05)	.01 (.05)	.56 (.18)**
<i>R</i> <sup>2</sup>	.087	.559	.242
Time 2			
Forms			
Physical Aggression	.10 (.08)	.36 (.06)**	-.53 (.26)*
Relational Aggression	-.03 (.07)	.11 (.05)*	-.05 (.22)
Female	.01 (.06)	-.01 (.04)	.25 (.21)
Grade	-.07 (.05)	-.02 (.04)	.22 (.19)
<i>R</i> <sup>2</sup>	.077	.520	.130
Functions			
Reactive Aggression	.02 (.04)	.12 (.03)**	-.20 (.13)
Proactive Aggression	.00 (.08)	.20 (.05)**	-.11 (.26)
Female	-.02 (.06)	.00 (.04)	.27 (.20)
Grade	-.07 (.05)	-.02 (.04)	.20 (.18)
<i>R</i> <sup>2</sup>	.064	.555	.129
Time 3			
Forms			
Physical Aggression	.04 (.05)	.43 (.05)**	-.27 (.20)
Relational Aggression	.08 (.05)	.04 (.05)	-.09 (.22)
Female	-.07 (.05)	-.03 (.05)	.25 (.21)
Grade	-.05 (.04)	.02 (.04)	.15 (.16)
<i>R</i> <sup>2</sup>	.119	.614	.091
Functions			
Reactive Aggression	-.04 (.03)	.14 (.03)**	-.27 (.13)*
Proactive Aggression	.13 (.05)**	.21 (.04)**	.08 (.20)
Female	-.08 (.05)	-.04 (.04)	.15 (.21)
Grade	-.05 (.04)	.00 (.04)	.20 (.17)
<i>R</i> <sup>2</sup>	.138	.671	.118

Note: Predictors listed in left column, outcomes listed in top row. Estimates are unstandardized coefficients with standard deviations in parentheses. Covariances were estimated between concurrent aggression subtypes and between concurrent outcomes but not reported here. Models were estimated separately for forms versus functions of aggression.

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

Regarding concurrent associations, all aggression subtypes were uniquely linked to peer rejection, and these associations were generally robust after controlling for gender, grade, and subtypes. This is consistent with previous research documenting the negative outcomes of aggression in early childhood (e.g., Campbell et al., 2006), although the nature, magnitude, and even direction of these effects can vary across subtypes, methodologies, developmental age, and gender (e.g., Ettekal & Ladd, 2015; Fite et al., 2016; Ostrov et al., 2014; Vitaro & Brendgen, 2011). Cross-sectional results were mixed for academic performance, with

only physical and reactive aggression showing significant associations at only some occasions in the regression models. It may be that relational aggression requires more advanced verbal or cognitive abilities, or takes time to develop within a social environment (Bonica, Arnold, Fisher, Zeljo, & Yershova, 2003; Kuppens, Grietens, Onghena, Michiels, & Subramanian, 2008). Other types of aggression appear to be more physical in nature and may be more disruptive to academic functioning. Only proactive aggression was found to predict depressive symptoms concurrently at T3, and from one semester prior. This pattern of

TABLE 4  
Prospective Associations

	<i>Depressive Symptoms</i>	<i>Peer Rejection</i>	<i>Academic Performance</i>	<i>Physical/ Reactive</i>	<i>Relational/ Proactive</i>
Time 1 to Time 2					
Forms					
Physical	-.06 (.05)	.16 (.06)**	-.08 (.14)	.52 (.07)**	.40 (.09)**
Relational	.08 (.07)	.03 (.07)	-.14 (.18)	.07 (.09)	.17 (.12)
Female	-.02 (.06)	-.04 (.05)	.10 (.15)	-.14 (.07)	.11 (.10)
Grade	-.05 (.05)	-.03 (.04)	-.14 (.15)	-.05 (.06)	.03 (.13)
Stability	.38 (.10)**	.21 (.08)*	.80 (.07)**	—	—
R <sup>2</sup>	.158	.312	.583	.504	.265
Functions					
Reactive	.03 (.04)	.08 (.04)*	-.19 (.11)	.56 (.12)**	.18 (.07)*
Proactive	-.01 (.08)	.19 (.07)**	.06 (.20)	.55 (.21)*	.30 (.12)*
Female	.02 (.06)	-.04 (.05)	.05 (.15)	-.36 (.15)*	-.08 (.09)
Grade	-.05 (.05)	-.04 (.04)	-.12 (.15)	-.17 (.16)	-.02 (.09)
Stability	.33 (.11)**	.09 (.08)	.75 (.07)**	—	—
R <sup>2</sup>	.132	.404	.585	.563	.348
Time 2 to Time 3					
Forms					
Physical	.01 (.05)	.24 (.07)**	.03 (.14)	.90 (.10)**	.26 (.11)*
Relational	.05 (.04)	-.01 (.05)	.06 (.12)	.12 (.09)	.60 (.09)**
Female	-.07 (.04)	-.06 (.05)	.00 (.12)	-.16 (.08)*	.08 (.09)
Grade	-.01 (.04)	.05 (.04)	-.04 (.11)	.07 (.07)	.16 (.14)
Stability	.61 (.06)**	.64 (.08)**	.87 (.05)**	—	—
R <sup>2</sup>	.557	.645	.764	.636	.551
Functions					
Reactive	-.04 (.02)	.10 (.03)**	.01 (.07)	.76 (.08)**	.06 (.07)
Proactive	.12 (.05)*	.05 (.06)	.00 (.14)	.41 (.17)*	.94 (.13)**
Female	-.07 (.04)*	-.06 (.05)	-.01 (.11)	-.17 (.13)	-.09 (.11)
Grade	-.01 (.04)	.05 (.04)	-.04 (.11)	.17 (.14)	.13 (.11)
Stability	.62 (.06)**	.59 (.08)**	.86 (.05)**	—	—
R <sup>2</sup>	.569	.654	.756	.746	.593
Time 1 to Time 3					
Forms					
Physical	-.03 (.05)	.19 (.07)**	-.03 (.14)	.51 (.09)**	.33 (.10)**
Relational	.05 (.06)	.22 (.08)**	-.18 (.18)	.22 (.13)	.16 (.13)
Female	-.08 (.05)	-.14 (.06)*	.06 (.15)	-.29 (.10)**	.07 (.11)
Grade	-.02 (.04)	.03 (.05)	-.25 (.15)	.04 (.08)	.17 (.14)
Stability	.35 (.09)**	.09 (.09)	.79 (.07)**	—	—
R <sup>2</sup>	.177	.371	.581	.419	.223
Functions					
Reactive	.04 (.04)	.15 (.05)**	-.08 (.11)	.54 (.14)**	.21 (.10)*
Proactive	-.03 (.06)	.12 (.08)	-.04 (.19)	.52 (.25)*	.39 (.17)*
Female	-.05 (.05)	-.12 (.06)	.04 (.15)	-.50 (.18)**	-.18 (.13)
Grade	-.02 (.05)	.02 (.05)	-.25 (.15)	.10 (.19)	.12 (.13)
Stability	.32 (.09)**	.11 (.09)	.77 (.07)**	—	—
R <sup>2</sup>	.168	.427	.581	.502	.330

Note: Predictors listed in left column, outcomes in top row. Estimates for physical and relational aggression are reported under forms. Estimates for reactive and proactive aggression are reported under functions. Estimates are unstandardized coefficients with standard deviations in parentheses. Covariances between concurrent variables were estimated but not reported here. Models were estimated separately for forms versus functions of aggression, and for T1 → T2 → T3 versus T1 → T3.

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

results differs from evidence in later childhood/adolescence, when proactive aggression can show little or positive associations with psychosocial functioning (e.g., Evans & Fite, 2018; Fite et al., 2016). It may be that at this young age, children have not yet acquired the self-regulation and social learning needed to commit “successful” acts of proactive

aggression; as a result, these early proactively aggressive behaviors show unique associations with depressive symptoms and peer rejection, which are not observed at older ages. Here, further research is needed.

While physical, reactive, and proactive aggression were generally stable over time, relational aggression showed



less stability. Relational aggression in school-age youth appears to be more stable (e.g., Zimmer-Gembeck, Geiger, & Crick, 2005), even when transitioning across classes/grades. The present results suggest that young children who were relationally aggressive in one classroom might not exhibit these behaviors in the next (or vice versa). Perhaps relational aggression, more than other subtypes, develops as a characteristic of the social ecology, not just the individual, as suggested by multilevel school research (e.g., Kuppens et al., 2008). In contrast, early physical aggression was highly stable and predicted increases in relational aggression. Following a different pattern, proactive and reactive aggression both demonstrated stability and bidirectional associations with one another. Other evidence shows modest stability of forms and functions of aggression in early childhood (Crick et al., 2006; Murray-Close & Ostrov, 2009; Ostrov & Crick, 2007), with higher stability emerging later in childhood and adolescence (Fite & Pederson, *in press*).

Physical and reactive aggression both consistently predicted increases in peer rejection, whereas relational and proactive aggression usually did not. These aggression subtypes may be more bothersome to peers than proactive and relational aggression, which can be linked to better peer functioning on some indices (Fite et al., 2016). Nevertheless, general findings are equivocal. For example, Kamper-DeMarco and Ostrov (2017) found that preschool relational aggression predicted decreased prosocial behavior and increased deception, whereas physical aggression was a more salient predictor of victimization. With few exceptions, we found very little evidence for early aggression subtypes predicting subsequent academic performance or depressive symptoms. This finding conflicts with evidence from older samples, where reactive and physical aggression are often linked to poorer academic and emotional outcomes (Fite et al., 2016; Vitaro & Brendgen, 2011), and from younger samples, where research has found shared associations between internalizing problems broadly and a higher-order externalizing dimension that included relational forms of both proactive and reactive aggression (Perry & Ostrov, 2017). During early childhood, some aggressive behaviors are still developmentally normative. To the extent that aggression might contribute to emotional and functional problems over time, such changes may occur later or over a longer developmental period.

Study limitations include reliance on teacher-report and a relatively small and nondiverse sample. Future research should utilize converging measures, particularly naturalistic behavioral observation systems and multi-informant (teachers, caregivers, peers, self) data (e.g., Ostrov & Keating, 2004). Similarly, studies are needed among samples with greater sociodemographic diversity and higher levels of indicated risk for aggressive behavior and associated outcomes. Although we controlled for gender, we did not examine differences between boys and girls in terms of measurement invariance, mean

differences, or moderation of effects; all of these are important directions for future research. In addition, this study possesses one of the key limitations that we are attempting to help elucidate: the overlap between forms and functions of aggression. The high degree of shared variance across frameworks suggests that orthogonal form-by-function approaches (e.g., Little et al., 2003; Marsee et al., 2011; Ostrov & Crick, 2007) should be used in future research. For example, Dodge and Coie's (1987) proactive/reactive aggression measure likely pulls more for physical aggression than relational, including one proactive aggression item specifically assessing acts/threats of physical force. Finally, although brief subscale mean scores offer utility for applied contexts, these measures are imperfect (e.g., correlated residuals, low internal consistency of relational aggression at T1), and some applications would benefit from more comprehensive measurement techniques.

Despite these limitations, this study suggests that forms and functions of aggression can be assessed in early childhood using brief teacher-report measures. Findings also demonstrate the developmental significance of these aggression subtypes across early periods (preschool/kindergarten to kindergarten/first grade), which are often artificially separated in educational settings and research samples. Results offer important practical implications. First, teachers could help identify children exhibiting aggressive behavior, thereby facilitating early intervention and possibly preventing the development of later related problems (e.g., peer rejection). Second, brief teacher-report rating scales show promise for this purpose, striking a balance between psychometric and pragmatic considerations. Finally, these findings support further refinement of research and applied efforts to target specific aggression subtypes. In particular, physical, reactive, and proactive aggression—given their patterns of stability, bidirectionality, and robust associations with peer rejection—appear to be important targets for screening and intervention in early childhood.

## FUNDING

This work was supported by the American Psychological Foundation (Elizabeth Munsterberg Koppitz Child Psychology Graduate Student Fellowship) and the University of Kansas (Lillian Jacobey Baur Early Childhood Fellowship).

## REFERENCES

- Achenbach, T. M., & Rescorla, L. A. (2001). *Manual for the ASEBA School-Age Forms & Profiles*. Burlington, VT: University of Vermont, Research Center for Children, Youth, & Families

- Bonica, C., Arnold, D. H., Fisher, P. H., Zeljo, A., & Yershova, K. (2003). Relational aggression, relational victimization, and language development in preschoolers. *Social Development, 12*, 551–562. doi:10.1111/sode.2003.12.issue-4
- Campbell, S. B., Spieker, S., Burchinal, M., & Poe, M. D.; the NICHD Early Child Care Research Network. (2006). Trajectories of aggression from toddlerhood to age 9 predict academic and social functioning through age 12. *Journal of Child Psychology and Psychiatry, 47*, 791–800. doi:10.1111/j.1469-7610.2006.01636.x
- Card, N. A., & Little, T. D. (2006). Proactive and reactive aggression in childhood and adolescence: A meta-analysis of differential relations with psychosocial adjustment. *International Journal of Behavioral Development, 30*(5), 466–480.
- Crick, N. R. (1996). The role of overt aggression, relational aggression, and prosocial behavior in the prediction of children's future social adjustment. *Child Development, 67*, 2317–2327. doi:10.2307/1131625
- Crick, N. R., & Bigbee, M. A. (1998). Relational and overt forms of peer victimization: A multiinformant approach. *Journal of Consulting and Clinical Psychology, 66*, 337. doi:10.1037/0022-006X.66.2.337
- Crick, N. R., Casas, J. F., & Mosher, M. (1997). Relational and overt aggression in preschool. *Developmental Psychology, 33*, 579–588. doi:10.1037/0012-1649.33.4.579
- Crick, N. R., & Grotpeter, J. K. (1995). Relational aggression, gender, and social psychological adjustment. *Child Development, 66*, 710–722. doi:10.2307/1131945
- Crick, N. R., Ostrov, J. M., Burr, J. E., Cullerton-Sen, C., Jansen-Yeh, E., & Ralston, P. (2006). A longitudinal study of relational and physical aggression in preschool. *Journal of Applied Developmental Psychology, 27*, 254–268. doi:10.1016/j.appdev.2006.02.006
- Dodge, K. A., & Coie, J. D. (1987). Social-information-processing factors in reactive and proactive aggression in children's peer groups. *Journal of Personality and Social Psychology, 53*, 1146–1158. doi:10.1037/0022-3514.53.6.1146
- Dunn, T. J., Baguley, T., & Brunson, V. (2014). From alpha to omega: A practical solution to the pervasive problem of internal consistency estimation. *British Journal of Psychology, 105*, 399–412. doi:10.1111/bjop.12046
- Ettetal, I., & Ladd, G. W. (2015). Costs and benefits of children's physical and relational aggression trajectories on peer rejection, acceptance, and friendships: Variations by aggression subtypes, gender, and age. *Developmental Psychology, 51*(12), 1756–1770. doi:10.1037/dev0000057
- Evans, S. C., & Fite, P. J. (2018). Dual pathways from reactive aggression to depressive symptoms in children: Further examination of the failure model. Manuscript accepted for publication. *Journal of Abnormal Child Psychology*. doi:10.1007/s10802-018-0426-6
- Evans, S. C., Pederson, C. A., Fite, P. J., Blossom, J. B., & Cooley, J. L. (2016). Teacher-reported irritable and defiant dimensions of Oppositional Defiant Disorder: Social, behavioral, and academic correlates. *School Mental Health, 8*, 292–304. doi:10.1007/s12310-015-9163-y
- Fite, P. J., Colder, C. R., & Pelham, W. E. (2006). A factor analytic approach to distinguish pure and co-occurring dimensions of proactive and reactive aggression. *Journal of Clinical Child and Adolescent Psychology, 35*, 578–582. doi:10.1207/s15374424jccp3504\_9
- Fite, P. J., Craig, J., Colder, C. R., Lochman, J. E., & Wells, K. C. (2016). Proactive and reactive aggression. In R. J. R. Levesque (Ed.), *Encyclopedia of Adolescence*. Cham, Switzerland: Springer International Publishing.
- Fite, P. J., & Pederson, C. A. (in press). Developmental Trajectories of Relational Aggression. In S. Coyne & J. Ostrov (Eds.), *The Development of Relational Aggression*. New York, NY: Oxford University Press.
- Hart, E. J., & Ostrov, J. M. (2013). Functions of aggressive behavior and future functional impairment. *Early Childhood Research Quarterly, 28*, 683–691. doi:10.1016/j.ecresq.2013.05.005
- Kamper-DeMarco, K. E., & Ostrov, J. M. (2017). Prospective associations between peer victimization and social-psychological adjustment problems in early childhood. *Aggressive Behavior*. doi:10.1002/ab.21705
- Kline, R. B. (2016). *Principles and Practice of Structural Equation Modeling* (4th ed.). New York, NY: Guilford.
- Kuppens, S., Grietens, H., Onghena, P., Michiels, D., & Subramanian, S. V. (2008). Individual and classroom variables associated with relational aggression in elementary-school aged children: A multilevel analysis. *Journal of School Psychology, 46*, 639–660. doi:10.1016/j.jsp.2008.06.005
- Little, T., Henrich, C., Jones, S., & Hawley, P. (2003). Disentangling the “whys” from the “whats” of aggressive behaviour. *International Journal of Behavioral Development, 27*, 122–133. doi:10.1080/01650250244000128
- Marsee, M. A., Barry, C. T., Childs, K. K., Frick, P. J., Kimonis, E. R., Muñoz, L. C., ... Lau, K. S. (2011). Assessing the forms and functions of aggression using self-report: Factor structure and invariance of the Peer Conflict Scale in youths. *Psychological Assessment, 23*, 792. doi:10.1017/S0954579414000339
- Murray-Close, D., & Ostrov, J. M. (2009). A longitudinal study of forms and functions of aggressive behavior in early childhood. *Child Development, 80*, 828–842. doi:10.1111/j.1467-8624.2009.01300.x
- Muthén, B., & Asparouhov, T. (2012). Bayesian structural equation modeling: A more flexible representation of substantive theory. *Psychological Methods, 17*, 313–335. doi:10.1037/a0026802
- Muthén, L. K., & Muthén, B. O. (2012). *Mplus User's Guide* (7th ed.). Los Angeles, CA: Muthén & Muthén.
- Ostrov, J. M., & Crick, N. R. (2007). Forms and functions of aggression in early childhood: A short-term longitudinal study. *School Psychology Review, 36*(3), 22–43.
- Ostrov, J. M., Kamper, K. E., Hart, E. J., Godleski, S. A., & Blakely-McClure, S. J. (2014). A gender-balanced approach to the study of peer victimization and aggression subtypes in early childhood. *Development and Psychopathology, 26*, 575–587. doi:10.1017/S0954579414000248
- Ostrov, J. M., & Keating, C. F. (2004). Gender differences in preschool aggression during free play and structured interactions. *Social Development, 13*, 255–277. doi:10.1111/j.1467-9507.2004.000266.x
- Ostrov, J. M., Murray-Close, D., Godleski, S. A., & Hart, E. J. (2013). Prospective associations between forms and functions of aggression and social and affective processes during early childhood. *Journal of Experimental Psychology, 116*, 19–36. doi:10.1016/j.jecp.2012.12.009
- Perry, K. J., & Ostrov, J. M. (2017). Testing a higher order model of internalizing and externalizing behavior: The role of aggression subtypes. *Child Psychiatry & Human Development, 1–13*. doi:10.1007/s10578-017-0725-0
- Polman, H., De Castro, B. O., Koops, W., Van Boxtel, H. W., & Merk, W. W. (2007). A meta-analysis of the distinction between reactive and proactive aggression in children and adolescents. *Journal of Abnormal Child Psychology, 35*, 522–535. doi:10.1007/s10802-007-9109-4
- Raine, A., Dodge, K., Loeber, R., Gatzke-Kopp, L., Lynam, D., Reynolds, C., ... Liu, J. (2006). The reactive-Proactive aggression questionnaire: Differential correlates of reactive and proactive aggression in adolescent boys. *Aggressive Behavior, 32*, 159–171. doi:10.1002/ab.20115
- Tremblay, R. E. (2000). The development of aggressive behavior during childhood: What have we learned in the past century?. *International Journal of Behavioral Development, 24*, 129–141. doi:10.1080/016502500383232
- Vitaro, F., & Brendgen, M. (2011). Subtypes of aggressive behaviors: Etiologies, development and consequences. In T. Bliesnder, A. Beelman, & M. Stemmler (Eds.), *Antisocial behavior and crime: Contributions of theory and evaluation research to prevention and intervention*. Goettingen, Germany: Hogrefe.
- Zimmer-Gembeck, M. J., Geiger, T. C., & Crick, N. R. (2005). Relational and physical aggression, prosocial behavior, and peer relations: Gender moderation and bidirectional associations. *The Journal of Early Adolescence, 25*, 421–452. doi:10.1177/0272431605279841
- Zyphur, M. J., & Oswald, F. L. (2015). Bayesian estimation and inference: A user's guide. *Journal of Management, 41*, 390–420. doi:10.1177/0149206313501200