

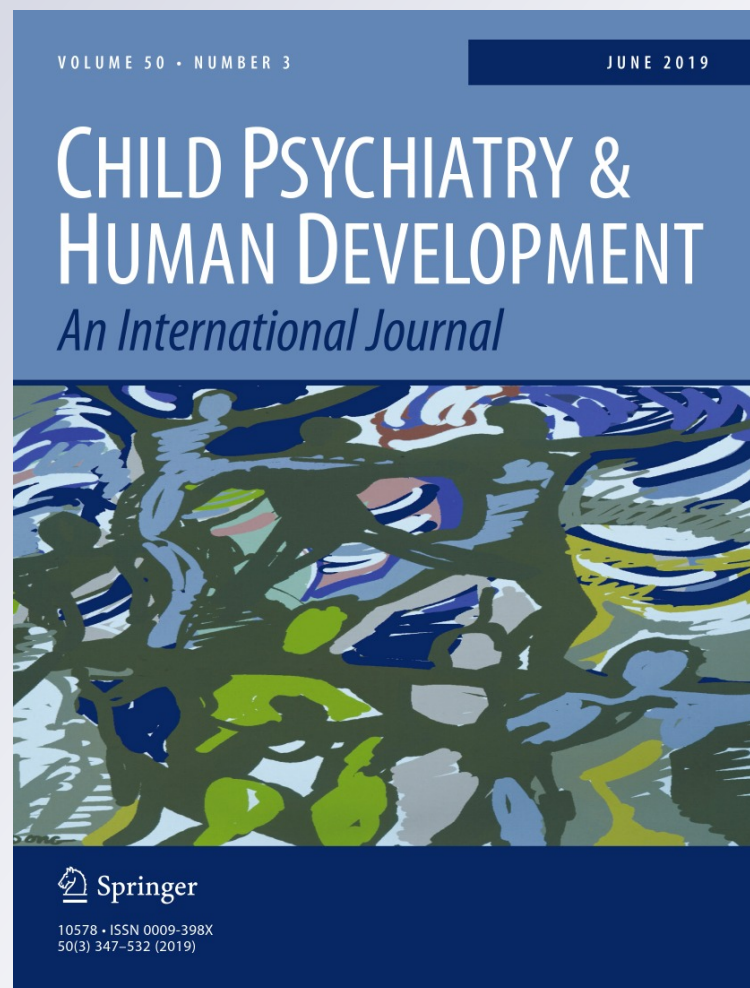
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The Influence of Friendships on Aggressive Behavior in Early Childhood: Examining the Interdependence of Aggression

Kimberly E. Kamper-DeMarco¹ · Jamie M. Ostrov²

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Abstract

The present short-term longitudinal study examined the stability and role of peer influence on both physical and relational aggression in early childhood using a dyadic data analytic framework. Following the peer-individual interaction model, forms of aggressive behavior (i.e., physical and relational) were observed in 43 dyads of close friendships in early childhood ($M = 47.37$ months, $SD = 7.56$) to better understand how friendships may maintain aggressive behavior over time. Friendship quality (FQ) was included as a moderator to explain how friendships may maintain aggression. The results provide evidence supporting the affiliation hypothesis for physical aggression with opposite findings for relational aggression. Negative FQ moderated associations with both relational and physical aggression over time whereas positive FQ moderated the dyadic influence with physical aggression over time. Limitations and future directions are discussed.

Keywords Relational Aggression · Physical Aggression · Friendship · Early Childhood

Aggressive behavior has long been identified as a risk factor for future psychopathology [1, 2] with the negative impact of aggressive behavior on development examined in samples as young as early childhood [3]. Even in young children—although aggression has been conceptualized as somewhat normative, with children engaging in aggressive behavior relatively frequently [4, 5]—early aggressive behavior has been linked to a number of negative outcomes [6, 7].

Aggressive behavior is commonly studied within the traditional physical aggression framework; however, the study of relational aggression has increased over the past 20 years, broadening the construct of aggressive behavior. Physical aggression has long been defined as the intent to hurt or harm someone through physical means (e.g., hitting, biting, kicking) [4, 8], whereas relational aggression is defined as aggressive behavior that uses the relationship or the threat of the removal of a relationship in order to hurt or harm another person [9]. Outcomes associated with relational aggression, above and beyond physical aggression, are numerous and

growing with research finding associations with disruptive behavior disorders [10], depression/anxiety [11, 12], anger and externalizing problems [13], and peer rejection [14]. However, given that aggressive behavior occurs within dyads and relationships, the need to understand the influence of peer relationships on both forms of aggression is crucial.

Friendships offer numerous social and emotional benefits during development by providing security, companionship and intimacy and placing children on positive developmental trajectories [15, 16]. Children view their friendships as unique reciprocated relationships that are not interchangeable with other relationships (or even other friendships), emphasizing the distinctive nature of these bonds and the likelihood of friendships strongly influencing development [17, 18]. Research has established that individuals who engage in either subtype of aggression are still able to develop important peer relationships and that these relationships can be established as young as early childhood; however little work has investigated how these friendships are characterized [19].

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Theoretical Model

The peer-individual interaction model (PIIM), which posits the importance of taking into account both individual characteristics of a child as well as the influence of their friend, emphasizes the socializing nature of relationships [20, 21]. The PIIM uses social learning theory to examine how friendship status might impact the independent behavior of the other individual within the dyad. Indeed, individuals within the dyad might globally influence the behavior of the other, such that friends with differing levels of a certain behavior (e.g., aggression) might influence the other individual within the dyad, causing their display of said behavior to become more similar over time. In sum, the PIIM proposes that children are more likely to reinforce behavior that is similar to their own [20]. As such, children engaging in these disruptive behaviors (i.e., aggression) will have friendships with individuals comparable to themselves and will likely display similar levels of aggressive behaviors. In line with Vitaro et al.'s [21] intervention study supporting the PIIM, we hypothesize that friend aggressive behavior will influence an individual's future aggressive behavior in early childhood due to the dyadic, interdependent nature of friendships [21].

Friendship Quality

As previously established, the positive developmental influence of friendships and their link to positive adjustment outcomes are well documented. However, friendships are comprised of both positive and negative friendship qualities. Positive features of friendships are often characterized by spending time together, feeling close or intimate with their peer and disclosing personal information and feelings whereas negative features often include conflict, exclusivity, and power asymmetry [22]. Berndt [22] proposed that these features represent different dimensions that could both be identified within a friendship [22]. Although research has shown that reciprocated friendships can help buffer against the negative effects of life experiences (e.g., peer victimization) [23], having a positive quality friendship is thought to add benefit above that of just having a friend [24]. Research has also begun to examine negative aspects of friendships and the effect they may have on development.

The direct effect of friendship quality (FQ) has significant implications for research on social developmental trajectories, however Berndt [22] hypothesized that if an individual within a high-quality friendship engages in a negative behavior, the other individual within that dyad

may engage in that same behavior at higher rates than if the quality of the friendship had not been high. However, little research exists that has tested this theory [22]. Thus, it is possible that positive FQ moderates the association between peer aggression and future child aggression such that we see increased socialization of negative behaviors [22]. Conversely, it could act as a buffer if children at risk for aggression learn to behave in more socially acceptable ways [24]. High levels of negative FQ are also important when thinking about how friendship may influence behavior or adjustment over time. Previous work has demonstrated the problematic effect of negative FQ on overall adjustment. For example, Kamper and Ostrov [12] found that conflict within the friendship places children engaging in relational aggression at risk of developing future psychopathology [12]. Relatedly, Ladd et al. [25] found that young children who endorsed high conflict within their friendships were more likely to have difficulties adjusting at school [25]. Thus, there is significant evidence for the maladaptive role that negative FQ plays in development.

Early childhood is an area with a paucity of research regarding FQ. Sebanc [26] is the only known study to examine the quality of one's peer relationships, finding significant association between different forms of aggressive behavior and variables of FQ [26]. By middle childhood and beyond, children engaging in these negative behaviors may have had a history of poor-quality friendship, which has inhibited them from learning positive friendship qualities that may help to inhibit their aggressive behaviors [27]. As such, an important first step is to understand the moderating role of positive or negative friendship features on aggressive behavior in early childhood. For the current study, we will examine both positive and negative FQ as moderators of the influencing effect of peer aggression.

Friendships in early childhood are more likely to be established due to shared activities, affect and time spent together so less emphasis is placed on positive friendship qualities like intimacy and complex qualities like self-disclosure and supportiveness [28]. Thus, in early childhood, relational aggression is likely associated with both higher levels of positive FQ due to spending significant time together; however, these friendships will also likely be characterized by high levels of negative friendship qualities, such as exclusivity and conflict. Thus, having high levels of positive FQ may strengthen the influence of peer relational aggression on focal child relational aggression whereas high levels of negative FQ would lessen this association. On the other hand, physical aggression, although somewhat normative, increasingly becomes viewed negatively during this developmental period [29]. As such, physical aggression will likely be associated with low levels of positive friendship qualities and high levels of negative friendship qualities, above and beyond that of relational aggression. Thus, high levels

of negative FQ may strength the association between peer physical aggression and subsequent child physical aggression whereas positive FQ likely will not play a role.

Gender

Gender has been an important variable when examining both aggression as well as peer relations [30, 31]. Specifically, girls tend to spend more of their time interacting in dyadic friendships rather than large group interactions [32]. Girls are more likely to engage in social provisions such as intimacy and self-disclosure within their friendships, even from an early age [15, 26]. In sum, gender may play an important role in examining the peer influence of aggression in dyadic relationships and thus, will be examined in all analyses.

The Present Study

The current study examined the association between FQ and aggressive behavior in early childhood over time. The first goal of the current study is to examine whether peers affect relational and physical aggression trajectories over the course of the school year within friendship dyads. We predict that peers will have a significant effect on the aggressive behavior displayed by the focal child over time. Specifically, we hypothesize that partner initial levels of aggressive behavior will lead to increases in aggressive behavior in the focal child (partner effect).

The second goal of the study is to demonstrate how positive and negative FQ moderate the aforementioned partner effect. We hypothesize that FQ will moderate aggression over time such that there will be an interaction between positive and negative FQ and aggressive behavior to predict actor and partner effects of later aggressive behavior. Specifically, initial relational aggression but not physical aggression will lead to increased aggression over time when the friendship is characterized by high levels of positive FQ. On the other hand, negative FQ will lead to less relational and physical aggression over time (a relationship quality-moderated effect).

Methods

Participants and Procedure

The current study was included as part of a larger study that was exempt from review by the University Institutional Review Board. It was determined that the study posed no greater than minimal risks for participants and involved normal educational practices. We recruited 104 children

between 30 and 60 months of age enrolled in five NAEYC accredited preschool programs in the northeast as part of a larger study. Active written consent was obtained from parents with approximately 79% of parents consenting to their child participating in the study [33]. Verbal assent was also required for participants before the friendship interview process began. Teachers also provided written consent for completion of the aforementioned instruments. From these 104 children, 43 dyads (86 children) were formed through mutual identification of a close friend (see below). These children did not significantly differ from those who did not have a mutual friend on gender, age, or relational and physical aggression. Eighteen children were excluded from the study due to not having a mutual friendship. Within the study, children in these multi-age classrooms were approximately 47 months old ($M=47.37$ months, $SD=7.56$) and included 38 males (48 females). For the current study, the population was fairly diverse: 7% Asian/Pacific Islander/Indian, 7% African American, 5% Hispanic/Latino, 12% multi-racial, 1% other/unknown, and 68% Caucasian.

The current, short-term, longitudinal study required participation from children over the course of the school year. Observations and interviews were conducted within the classrooms over a 2-month period during the fall semester (Time 1). After observations and interviews concluded for the fall semester, teachers were asked to complete a packet of paper-and-pencil questionnaires for each participant. Observations and teacher reports were again collected in the spring semester during a similar 2-month period (Time 2). Teachers were paid proportionally for questionnaire completion (\$5 per completed packet).

Measures

Observations of Physical and Relational Aggression

Systematic, naturalistic observations were conducted to assess participants' engagement in both relational and physical aggression. Following the Early Childhood Observation System [30, 34], focal child sampling with continuous recording was used to assess aggression. Consistent with past procedures [35], each child within the study was observed for 10-min assessments at 8 different times each semester, totaling approximately 360 min across the school year. Observers documented instances in which the focal child engaged in a number of behaviors including relational or physical aggression towards any other peer in the classroom. In order to assess for reliability, two observers conducted observations on the same child during the same 10-min period for 15% of observations. Intra-class correlations with absolute agreement above 0.70 were found in the fall (Time 1) and spring (Time 2) for both physical (ICCs = 0.82 and 0.74, respectively) and relational

aggression (ICC's = 0.72 and 0.80, respectively) indicating acceptable reliability.

Teacher Report of Relational and Physical Aggression

Teachers from each classroom completed the *Preschool Social Behavior Scale—Teacher Form* (PSBS-TF) to assess for teacher's perceptions of aggressive behavior for validity purposes [36]. The PSBS-TF includes six items that measure relationally aggressive behavior (e.g., "This child tells a peer that s/he won't play with that peer or be that peer's friend unless s/he does what this child asks") and six items that measure physically aggressive behavior (e.g., "This child verbally threatens to hit or beat up other children"). The measure uses a 5-point Likert scale ranging from 1 (Never or almost never true) to 5 (Always or almost always true). Previous research has shown good psychometric properties for the measure [30]. For the current study, the PSBS-TF relational and physical aggression subscales also demonstrated appropriate reliability at Time 1 and Time 2 (Cronbach's α 's > 0.90). Teacher-reported relational and physical aggression were used as a validity check within the current study to ensure the observations are valid. At Time 1 and Time 2, there were significant associations between physical aggression across informant ($r = 0.62, p < .01$; $r = 0.45, p < .01$, respectively). However, for relational aggression, there was a significant correlation at Time 2 ($r = 0.33, p < .01$), but only a nonsignificant trend at Time 1 ($r = 0.18, p = .08$).

Peer Ratings of Friendship Status

Assessment of friendship status was conducted using sociometric rating procedures [19, 37]. Pictures of each participant posing with a neutral facial expression were taken at the beginning of the school year [19]. Children were taken aside during observations to conduct a short interview with an experienced graduate student. During the interview, the focal child was asked to rate different items and individuals into three different categories (see below). First, age-appropriate and gender stereotypical practice items (e.g., teddy bear, toy hammer, camera) were used to demonstrate procedural understanding [19, 38]. The focal child was asked whether they like the item. If the child stated that they did not like the item, it was placed in a "no" box with a frowning face on it; however, if the child endorsed liking the item, the child was asked whether they liked the toy "a little or a lot." The item was then placed in the box with those corresponding responses (demonstrated through images such as a large smiling face for "yes a lot" or a slight smile for "yes a little"). After children practiced and demonstrated understanding with the gender stereotyped items, each child was presented with a picture of each consented student in the class. The focal child was first asked to name that child

and then asked whether s/he like to play with that child or considered him/her a friend. If the focal child indicated a positive response, the interviewer followed up with "yes, a little or yes a lot?" This interview yielded a three-point scale ranging from 0 ("no") to 2 ("yes, a lot"). The child then placed each picture into the corresponding response box. Each response box had a cartoon picture of a face that corresponds to his/her response [19, 30, 39–41].

Once each child completed sorting the pictures, those pictures of children placed in the "yes, a lot" box were reused for more specific friendship nominations. All children that were endorsed as being liked a lot were then spread out and the focal child was asked again whether s/he liked to play with these children a lot. They were then asked whether one of these children is their "best friend." Similar nomination procedures have been used and validated in previous research [26, 36, 42]. A shortened, limited nomination procedure was then used such that children were asked to nominate up to 3 individuals as their best friend. From this interview, reciprocal friendships were identified from those individuals sorted into the "best friend" category as in previous literature [37, 43] or "yes, a lot" to maximize friendships and increase power. In cases where two mutual friendships were identified, those friendships identified first as a "best friend" was retained. Previous research has demonstrated the reliability and validity of sociometric rating procedures in assessing friendship in early childhood, [19, 44] suggesting that these nominations are likely a reliable and valid measure of friendships in this sample. Gender differences were not found on key variables when examining both within and between dyad gender. Friendship status was identified using sampling without replacement such that no individual was involved in more than one friend dyad.

Teacher Report of FQ

Sebanic [26] first established a measure of FQ, the *Friendship Features Questionnaire* (FFQ), in early childhood using items from a number of different FQ measures used during later developmental periods [26]. The measure was created to be able to assess teacher's perceptions of young children's FQ using developmentally appropriate items. The FFQ contains 36 items that assess a wide range of different friendship provisions (e.g., help and guidance, conflict and betrayal, exclusivity, and asymmetry) [26]. The items were assessed on a five-point Likert scale ranging from 0 (not at all true) to 4 (really true).

Teachers were given the FFQ with the names of each mutually identified friendship after the interview had been conducted with each participant and friendship dyads were identified. Internal consistency was found across all subscales in previous research (Cronbach's α 's > 0.87) [26]. FQ was assessed at the dyad level providing one overall score

of FQ per dyad. Given the hypotheses of the current study, a principal components analysis was conducted extracting two factors [eigenvalues: 3.75 for factor 1 (i.e., positive FQ), 1.97 for factor 2 (i.e., negative FQ)]. Positive FQ can be seen in subscales such as *help and guidance* (6 items), *validation and caring* (3 items), *companionship* (5 items), and *conflict resolution* (2 items), whereas negative FQ was shown to come from *conflict* (7 items), *exclusivity* (6 items), and *power* (5 items). Intimacy loaded almost equally onto both factors and as such was excluded from either factor. The factor scores for positive and negative quality were created using unweighted means of the aforementioned variables. Internal consistency was adequate for both positive (Cronbach's $\alpha=0.87$) and negative FQ (Cronbach's $\alpha=0.72$).

Data Analytic Plan

The main goals of the current study were to examine how close friends affect the development and maintenance of aggressive behavior over time using dyadic data analytic techniques and to determine whether FQ moderated this effect. Because of the dyadic nature of the hypotheses and the data, the actor-partner interdependence model (APIM) was used [45]. This model captures the interdependence that exists between friends and provides independent tests of the focal child's initial level of relational and physical aggression on his/her own future use of those behaviors (i.e., temporal stability) and the effect of his/her friend's relational and/or physical aggression on his/her own future use of those behaviors (friend influence). In the current study, APIM using multilevel modeling (MLM) was estimated in SPSS 24 (IBM SPSS, New York). Separate models were conducted predicting relational and physical aggression. Models were then used to examine the effect of initial physical aggression and FQ on future physical aggression versus

the effect of relational aggression and FQ on later relational aggression. These models were also used to determine the effects of positive FQ and negative FQ on outcome variables.

Results

Data Cleaning and Entry

During data collection, teachers and research assistants were encouraged to complete all of the measurement scales ensuring that missing data was minimal [46]. MLM techniques (outlined below) accounted for any other missing data at Time 2. Of the aforementioned 86 participants included within initial data collection, 82 (95.3%) were present throughout the course of the school year. Attrition analyses were conducted and revealed no significant differences on relational or physical aggression over time. Maximum likelihood procedures were used in subsequent analyses in order to address the problem of missing data.

Preliminary Analyses: Descriptive Statistics and Bivariate Correlations

Descriptive statistics were assessed to examine the normality of the data. The means and standard deviations for all variables included within the current study can be found in Table 1. Skew (−0.01 to 2.06) and kurtosis (−0.71 to 3.80) were within normal limits for all study variables. Both forms of aggressive behavior were included within the models in order to examine the unique contribution of each subtype of aggression. As shown in Table 1, gender was not significantly correlated with the outcome variables of interest; however, given theory and empirical evidence of significant associations between gender and both aggressive behaviors

Table 1 Descriptive statistics and bivariate correlations

	2. PAGG T1	3. RAGG T1	4. POS FQ T1	5. NEG FQ T1	7. PAGG T2	8. RAGG T2
1. Gender	−0.11	0.18	0.15	−0.04	−0.15	0.17
2. PAGG T1	X	0.38**	−0.09	0.35**	0.36**	0.13
3. RAGG T1		X	0.04	0.13	0.04	0.22*
4. POS FQ			X	0.22 ⁺	−0.26*	0.06
5. NEG FQ				X	0.05	0.15
7. PAGG T2					X	0.20 ⁺
8. RAGG T2						X
Mean (SD)	1.79 (2.06)	0.79 (1.21)	1.82 (0.72)	1.41 (0.64)	1.14 (1.41)	0.71 (0.91)
Range	0.00–8.00	0.00–4.98	0.29–3.63	0.19–2.83	0.00–5.58	0.00–3.48

Gender is coded as boy=0, girl=1

PAGG physical aggression, RAGG relational aggression, POS FQ positive friendship quality, NEG FQ negative friendship quality, T1 Time 1, T2 Time 2

⁺ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$

[31] and friendship variables [15], between-dyad gender was included as a covariate within the model.

Logistic regression was conducted to determine whether the different subtypes of aggression were significantly associated with having a best friend or not having a best friend. This test found no significant difference in aggressive behavior on having a friend or not [$\chi^2(2)=0.40, p=.82$]. Specifically, physical aggression did not differ among those who did not have a reciprocated friendship and those that did have a reciprocated friendship [$B=-0.07, OR=.93, CI\ 95\% 0.64-1.37, p=.73$]. Similarly, relational aggression was not significantly different in those individuals with and without friendship [$B=0.08, OR=1.09, CI\ 95\% 0.83-1.44, p=.55$].

Actor-Partner Interdependence Models

APIM analyses were used to determine whether similarity within a dyad in the use of aggressive behavior at Time 1 is associated with increases in aggression at Time 2. Snijders and Bosker (1999) have proposed that samples of 30 or more are large for these types of models [47]. In the present analyses, we examined the data as individuals nested within groups. As such, an individual within a dyad was the lower-level unit (i.e., Level 1) while the dyad was the upper-level unit (i.e., Level 2). Relational aggression and physical aggression were assessed as lower-level variables. FQ was assessed as an upper-level variable. APIM analyses were conducted using the linear mixed modeling program in SPSS with correlation compound symmetry. Both *actor* (i.e., stability) and *partner* (i.e., socialization) effects were

determined using a random intercept multilevel model. All predictor variables were grand mean centered for ease of interpretation of the data.

In order to address our first hypothesis, the APIM model was run for both physical and relational aggression with the covariates (i.e., gender, the other form of aggression) in the model. For relational aggression (see Table 2, model 1), there was significant temporal stability of relational aggression ($b=0.20, p=.04$) when controlling for gender and physical aggression. There was also a significant negative effect of partner relational aggression ($b=-0.21, p=.04$) suggesting that having a friend who is relationally aggressive may decrease the focal child's relational aggression over time. There was also a nonsignificant trend for partner physical aggression ($b=0.12, p=.07$). Interestingly, there was a significant effect of gender ($b=0.48, p=.05$) indicating that dyads made up of girls were more likely to engage in increasing relational aggression over the school year.

To address our second hypothesis, FQ variables were examined as moderators to the aforementioned models. First, positive FQ was examined by adding the variable independently and in an interaction with relational aggression to the APIM (see Table 2, model 2). As such, two interaction terms (i.e., actor relational aggression x positive FQ and partner relational aggression x positive FQ) were added to the model. The model was run with all covariates (i.e., actor and partner physical aggression and gender) within the model. Findings from the previous model were replicated with a significant actor effect of relational aggression on future relational aggression ($b=0.24, p=.03$) and

Table 2 Actor-partner interdependence models

Fixed effects	Model 1: RAGG (Just covariates included)		Model 2: RAGG (positive FQ)		Model 3: RAGG (negative FQ)		Model 4: PAGG (Just covariates included)		Model 5: PAGG (positive FQ)		Model 6: PAGG (negative FQ)	
	<i>b</i>	SE	<i>b</i>	SE	<i>b</i>	SE	<i>b</i>	SE	<i>b</i>	SE	<i>b</i>	SE
Intercept	0.54**	0.17	0.56**	0.17	0.58**	0.18	1.15**	0.24	1.06**	0.21	1.04**	0.24
Gender (between-dyads)	0.48*	0.24	0.50*	0.24	0.51 ⁺	0.26	-0.11	0.34	0.09	0.30	0.18	0.27
Actor RAGG	0.20*	0.10	0.24*	0.11	0.18 ⁺	0.09	0.03	0.15	0.04	0.14	0.01	0.14
Actor PAGG	0.10	0.06	0.09	0.07	0.08	0.08	0.19*	0.10	0.16 ⁺	0.09	0.44*	0.13
Partner RAGG	-0.21*	0.10	-0.22*	0.11	-0.20*	0.09	-0.21	0.15	-0.19	0.14	-0.37**	0.14
Partner PAGG	0.12 ⁺	0.06	0.11 ⁺	0.06	0.20*	0.08	0.27**	0.10	0.35*	0.09	0.32*	0.13
Positive FQ (between-dyads)			-0.28 ⁺	0.15					-0.38*	0.19		
Actor IV × Positive FQ			0.05	0.10					-0.05	0.11		
Partner IV × Positive FQ			0.12	0.10					-0.24*	0.11		
Negative FQ (between-dyads)					-0.20	0.23					-0.75**	0.23
Actor IV × Negative FQ					0.20	0.19					-0.42**	0.13
Partner IV × Negative FQ					-0.41*	0.20					-0.10	0.13

Outcome variables are actor and partner relational and physical aggression at Time 2. For gender, 0=boy dyads, 1=girl dyads

FQ friendship quality, IV independent variable (i.e., relational aggression or physical aggression)

⁺ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$

a significant negative effect of partner relational aggression ($b = -0.22, p = .05$). Dyad gender significantly predicted increased relational aggression ($b = 0.50, p = .05$) suggesting that girls having same-sex friendships are more likely to engage in more relational aggression over the school year. Again, there was a nonsignificant trend for partner physical aggression ($b = 0.11, p = .10$). There were no significant findings regarding positive FQ, although there was a nonsignificant trend of positive FQ negatively predicting increased relational aggression ($b = -0.28, p = .07$).

The same APIM was then conducted with negative FQ as a moderator (see Table 2, model 3). Models were identical to the above with negative FQ interaction terms instead of positive. Interestingly, when negative FQ was added to the model, gender ($b = 0.51, p = .06$) and our actor effect of relational aggression ($b = 0.18, p = .06$) became nonsignificant; however, our partner effect of relational aggression remained ($b = -0.20, p = .04$). Partner physical aggression significantly predicted increased relational aggression ($b = 0.20, p = .01$). Although there was not a significant main effect of negative FQ, the interaction between partner relational aggression and negative FQ significantly predicted relational aggression at Time 2 ($b = -0.41, p = .04$). Post hoc analyses were conducted to probe simple effects. We found that at low levels of negative FQ, partner relational aggression significantly predicted decreases in relational aggression at Time 2 ($b = -0.46, p < .01$) but this association did not remain significant at high levels of negative FQ ($b = 0.07, p = .67$). Thus, when friendships are characterized by low levels of conflict, betrayal, and power imbalances, the use of relational aggression by the peer predicts decreased relational aggression in an individual (see Fig. 1).

Models were then replicated using physical aggression as the outcome variables. For the initial model predicting physical aggression at Time 2, the actor effect was significant ($b = 0.19, p = .05$) even when controlling for gender and relational aggression at Time 1 (see Table 2, model 4). There was also a significant positive partner effect ($b = 0.27, p < .01$), suggesting that having a friend who engages in physical aggression leads to higher levels of physical

aggression over time, even when controlling for one's initial levels of physical aggression. When positive FQ was added as a moderator to the model (see Table 2, model 5), the actor effect (i.e., stability) of physical aggression became a nonsignificant trend ($b = 0.016, p = .08$); however, the partner effect on physical aggression at Time 2 remained significant ($b = 0.35, p < .01$). Thus, friend physical aggression at Time 1 significantly increased focal child physical aggression at Time 2 when controlling for positive FQ. Interestingly, we also found a significant effect of positive FQ on decreases in physical aggression ($b = -0.38, p = .05$), suggesting that those friendships characterized by high positive friendship qualities display less physical aggression overall. There was also a significant interaction between partner physical aggression and positive FQ ($b = -0.24, p = .04$) leading to the examination of simple slopes (see Fig. 2). Specifically, we found that at high levels of positive FQ, partner physical aggression significantly predicted increases in physical aggression over the course of the year ($b = 0.53, p < .01$). There was a nonsignificant trend at low levels of positive FQ ($b = 0.18, p = .08$) suggesting that individuals are more likely to be socialized by their peer's physical aggression when the friendship is characterized by high levels of positive friendship qualities.

Negative FQ was also added to the original model in place of positive FQ (see Table 2, model 6). As there was in the original model, we found a significant actor ($b = 0.44, p < .01$) and partner ($b = 0.32, p = .01$) effect for physical aggression indicating both temporal stability and peer influence. Similarly, there was a significant negative effect of partner relational aggression on the model ($b = -0.37, p = .01$) suggesting that friends' display of relational aggression is associated with decreases in focal child physical aggression over the school year. For this model, negative FQ significantly predicted decreases in physical aggression over time ($b = -0.75, p < .01$) and there was a significant interaction between the actor effect of physical aggression and negative FQ ($b = -0.42, p < .01$). Post hoc analyses were again conducted to probe simple effects, finding a statistically significant simple effect of high levels of negative FQ on increases in physical aggression at Time 2 ($b = 0.71,$

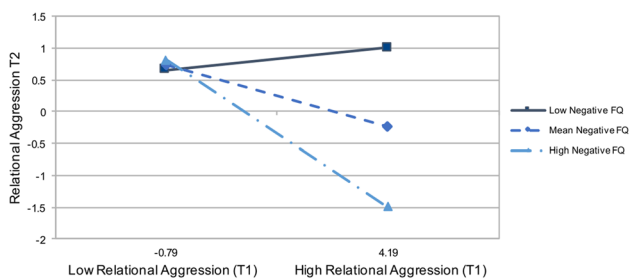


Fig. 1 Simple slopes of the relational aggression and negative FQ interaction

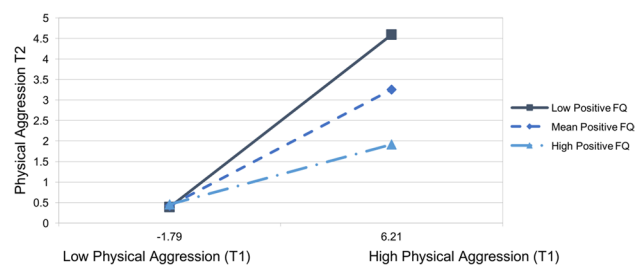


Fig. 2 Simple slopes of the physical aggression and positive FQ interaction

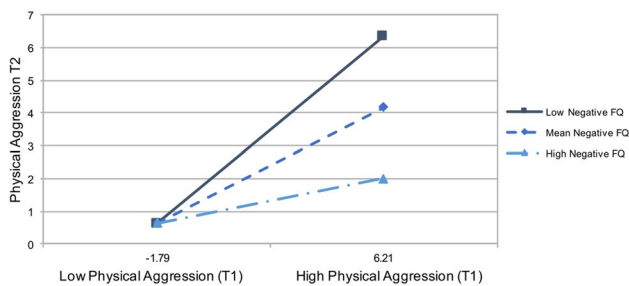


Fig. 3 Simple slopes of the physical aggression and negative FQ interaction

$p < .01$; see Fig. 3). There was a nonsignificant trend at one standard deviation below the mean ($b = 0.17$, $p = .09$). Thus, individuals who have friendships characterized by high negative FQ within their friendship tended to be more likely to engage in increased physical aggression over the course of the school year.

Discussion

Previous research has examined how aggressive behavior is maintained over time and its significant association with both negative and positive peer factors [48], however rarely is aggression studied from a dyadic perspective to better understand its development [28, 49]. Given well-documented theory, a dyadic perspective to examine how friendship may influence aggressive behavior over time is particularly relevant. Unique to the present study is the examination of the PIIM within a dyadic framework in early childhood. Often peer relationships in early childhood are underemphasized due to a focus on cognitive learning that is occurring at that time and the increased visibility of friendships in later development [50]. However, it is well known that this is a developmental period in which exploration and successful formation of peer relationships is a vital developmental milestone [16, 51]. Although we know much about friendship processes and their importance in later developmental periods, early childhood is an important area for new research focused on understanding how children initially learn to make and maintain friendships. As such, the current study examined the role a friend may have on changes in both physical and relational aggression over the course of the school year and the role that FQ plays in the maintenance of aggression over time.

Relational Aggression and Friendships

To address our first hypothesis, that partner initial aggressive behavior would lead to aggressive behavior in the focal child, we used separate APIM models to examine the forms

of aggression (i.e., relational and physical). Although initial correlations suggested relatively low levels of stability for relational aggression ($r = 0.22$, $p = .04$), this stability held within the model even when controlling for gender, peer relational aggression, and both focal (i.e., actor) and peer (i.e., partner) physical aggression. Unexpectedly, we found that peer relational aggression was associated with decreases in focal child relational aggression over the course of the school year. This finding suggests that having a close peer during early childhood that engages in high levels of relational aggression may lead a child to engage in less relational aggression over time. Future work may be able to shed light on this finding by examining whether relational aggression displayed by the peer is directed at the focal child or whether this behavior is displayed towards others outside of the friendship. There was also a significant effect of gender, suggesting that girl dyads are more likely to increase use of relational aggression over the course of the school year. This is consistent with the notion that when socialization is gender-specific, like in same-sex dyads, aggression that tends to be gender-linked (i.e., girls engaging in relational aggression) may be more reinforced and prevalent [15, 31].

Friendship factors (i.e., positive and negative features) were added to the model to address our second study goal. We initially hypothesized that relational aggression would lead to increases in relational aggression over time when friendships were characterized by positive FQ; however, we found no significant effect of positive FQ. There was a nonsignificant trend suggesting that those with higher positive features in their friendships may be less likely to engage in relational aggression over the course of the year; however more research is needed to validate this finding. Indeed, we did find a significant interaction between relational aggression and negative FQ such that when friendships were characterized by minimal conflict (i.e., low levels of negative features), relational aggression by a peer was significantly associated with decreases in focal relational aggression over time. This better explains the aforementioned effect of partner relational aggression by highlighting that when friends have relationships characterized by little conflict and exclusivity and feel relatively equal, children are less likely to engage in relational aggression over time, even if their peers engage in that behavior. However, when negative FQ was included in the model, partner physical aggression was predictive of increases in relational aggression, suggesting that it may be that more visible forms of aggression increase overall aggression, whereas relational aggression by peers may be subtle enough to not have a socializing effect.

Physical Aggression and Friendships

When examining physical aggression in our APIM models, our first hypothesis was supported. Physical aggression had

temporal stability even when controlling for gender of the dyad as well as relational aggression of both individuals within the friendship dyad. There was also a significant partner effect, suggesting that the physical aggression displayed by a close friend is likely to influence increases in physical aggression later in the school year. Although not surprising, these results emphasize the influence of friendships on social behaviors such as physical aggression even as early as 3 and 4 years old [20, 21].

Friendship features were then added to address our second hypothesis: negative FQ will lead to less physical aggression over time. Specifically, we found that negative FQ was also negatively associated with physical aggression, suggesting that having friendships, even those characterized by negative qualities such as conflict and power asymmetry, can be protective against the development and maintenance of aggressive behavior. We also found a significant interaction between focal child physical aggression and negative FQ in which physical aggression by the focal child is significantly associated with increases in aggression over time when the friendship is characterized by negative friendship features. Thus, when young children have friendships with high levels of conflict, conflict resolution skills may not be well developed or learned and physical aggression may be reinforced, leading to increases over time. Lastly, friend relational aggression at Time 1 negatively predicted an individual's physical aggression at Time 2, which may support the previous suggestion that having a friend who engages in relational aggression may have a buffering effect on physical aggression or may lead to replacing previous physically aggressive behaviors with more covert or sophisticated forms of aggression.

Although no specific hypothesis was made for positive FQ in regard to physical aggression, the model was included for consistency. As with negative FQ, we found that positive FQ was associated with less physical aggression over time. Taken with the nonsignificant trend found in the relational aggression model, these findings suggest that having friendships characterized by validation, guidance, and companionship may buffer against the development of aggression in an early age. However, there was also a significant interaction between peer physical aggression and positive FQ in which friendship characterized by high positive FQ where a peer also engages in physical aggression may lead to increased physical aggression by the focal child over time. Thus, the influence of peer physical aggression on focal child physical aggression may be stronger if the dyad has a positive relationship.

In sum, there was significant support as well as some evidence against the proposed hypotheses. It appears that individuals engaging in negative behaviors such as relational and physical aggression in early childhood are still able to form meaningful friendships [26] and that these friendships

may be protective against aggression in some cases [52] but exacerbate aggression in others [53]. Specifically, physical aggression appeared to be socialized by peers in early childhood whereas peer relational aggression may actually lead to decreases in relational aggression over time. We speculate that this may be because of the more nuanced and advanced nature of the latter form of aggression leading to less of a clear socializing effect. With regard to friendship features, we find that negative FQ seems to affect both physical and relational aggression, with friendships characterized by lower levels of negative friendship features being better off than those characterized by high levels of negative friendship features. Interestingly, positive friendship features may place children at risk for engaging in physical aggression when they have a peer who engages in this behavior.

Implications

The influencing role of friendship in young children has been largely overlooked in the peer relations literature [54]; however the present results highlight the importance of understanding the nature of friendships early on in order to address behavior such as aggression. Given the influencing effects of friendships on aggressive behavior in this developmental period, it may be of increased importance to highlight the negative consequences that occur when engaging in aggression. In particular, when children see the consequences of relational aggression in action (whether against them or not), it may decrease their use of it. Interventions focused on promoting positive aspects of friendship as well as encouraging conflict resolution may be beneficial for young children in these initial stages of friendship formation. However, most importantly, when focusing on the prevention of aggressive behavior in young children, researchers and clinicians need to take into consideration the role that friendships may play in exacerbating the behavior and focus on more dyadic or group level approaches rather than targeted individual interventions [52].

Limitations and Future Directions

Although novel, these results should be read with an accurate understanding of the limitations of the current study. The sample size for the current study was relatively small. In their review of studies using dyads as the unit of analysis, Kenny et al. (2006) suggest approximately 80 dyads as sufficient to examine a small to medium effect size [45]. Snijders and Bosker (1999) note that a sample size of 30 is sufficient for MLM [47]. For the current study, longitudinal studies using the aforementioned complex observational coding system tend to have smaller sample sizes given the intense, time-consuming nature of the observations [55]. Thus, although substantial research suggests the

present sample size was adequate to detect effects, a larger sample size would more adequately power this study and may allow us to more accurately identify how aggression is maintained and still be able to sufficiently control for the number of covariates within the study.

The reliability and validity of the measurement of friendship in early childhood within this study should be discussed. Although there is moderate stability in reciprocated friendships in early childhood [19], the measurement of friendship in early childhood is challenging given some difficulty identifying valid friendships. It may be beneficial to examine multiple close friendships during this age to better understand what influences aggressive behavior. Using the Social Relations Model or approaches such as the “one-with-many” design may offer advanced statistical techniques to better account for the influence of peers on aggressive behavior in early childhood [45].

The measure of FQ produces some limitations as well. Principal component analyses were conducted to ensure valid factors within the measure; however, this measure has not previously been examined using a two-factor approach, signifying the need for more work to confirm the use of this measure to effectively identify negative and positive qualities of friendships.

Summary

Peer influence has been studied extensively in the context of aggressive behavior in later developmental periods [56, 57]; however, rarely is this influence examined in such a young age when the impact of others is particularly salient. Similarly, close friendships are often overlooked during this developmental period. In early childhood, we found both individual and friend level influences on relational and physical aggression over time. We also found that negative FQ has significant effects on both relational and physical aggression over time suggesting the importance of understanding conflict and other negative features in friendships even as early as preschool. Few results directly supporting our hypotheses regarding relational aggression were found. It may be that a more overt and easily viewed behavior such as physical aggression is more likely to draw the attention of young children and have more of a negative impact than relational forms of aggression.

In conclusion, these findings partially support the PIIM such that friend aggression significantly affects the development of an individual's aggressive behavior over time. A novel contribution of this study is the examination of aggressive behavior within a dyadic framework in early childhood and the role that negative and positive friendship qualities play within these early relationships.

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