Available online at www.sciencedirect.com
SCIENCE DIRECT
Applied Developmental Psychology 27 (2006) 241–253
Applied Developmental Psychology

Relational aggression in sibling and peer relationships during early childhood

Jamie M. Ostrov [a,*], Nicki R. Crick [b], Kirstin Stauffacher [c]

[a] Department of Psychology, University at Buffalo, The State University of New York, 214 Park Hall, Buffalo, NY 14260-4110, United States
[b] University of Minnesota, Twin Cities Campus, United States
[c] University at Buffalo, The State University of New York, United States

Available online 6 March 2006

Abstract

The role of siblings (N = 50) in the display of physical and relational aggression among peers during early childhood was explored. Specifically, sibling pairs' rates of physical and relational aggression were assessed in their independent social contexts. Findings indicated low to moderate levels of intercorrelation between physical and relational aggression and moderate levels of stability for both physical and relational aggression across an academic year. Observations revealed that older sisters were more relationally aggressive than older brothers, whereas older brothers were more physically aggressive than older sisters. Older siblings directed more aggressive behavior to same-sex peers than did their younger siblings. Older sibling's relational aggression predicted younger sibling's use of relational aggression towards peers. In addition, older sibling's physical aggression predicted younger sibling's physical aggression with peers. This study reveals the importance of a multi-contextual approach (i.e., school and family influences) in understanding the development of aggression and in providing a guide for future interventions.

Keywords: Relational aggression; Siblings; Peers; Early childhood; Observation; Longitudinal

1. Introduction

Recent investigations have demonstrated the necessity of assessing relational forms of aggression to understand the social development of girls (see Crick & Zahn-Waxler, 2003). Although great strides have been made in this area, relatively little attention has been given to the identification of factors such as family relationships, that contribute to the development and maintenance of children's relationally aggressive behavior patterns. The role of siblings has been particularly neglected (cf. Stauffacher & DeHart, 2005). Alternatively, although numerous studies have been conducted on the socializing influence of siblings for children's aggressive behavior, these studies have primarily focused on physical forms of aggression and the influence of brothers (e.g., Deater-Deckard, Dunn, & Lussier, 2002; Martin & Ross, 1995). Compounding these limitations, current prevailing theories of the development of aggression depict the behavioral problems of girls as low in frequency until the onset of adolescence (Keenan & Shaw, 1997; Silverthorn & Frick, 1999). Due to these empirical and theoretical shortcomings, we currently know little about aggressive girls, and we particularly lack knowledge of *young* girls' behavior problems. Given the negative risk status typically

* Corresponding author. Tel.: +1 716 645 3650x214.
E-mail address: jostrov@buffalo.edu (J.M. Ostrov).

0193-3973/$ - see front matter © 2006 Elsevier Inc. All rights reserved.
doi:10.1016/j.appdev.2006.02.005

associated with aggression and given the numerous advantages afforded by early intervention, this lack of knowledge is significant. These limitations are addressed in the present research through the systematic study of the influence of siblings on the promotion of both relational and physical forms of aggression among peers at school.

Researchers recently have begun to systematically identify and study the behavioral problems of girls. This work has been based on the premise that it is time to "suspend our acceptance of the mythology of more benign childhoods for girls" (Zahn-Waxler, 1993, p. 84) and instead strive for greater gender balance in our investigation and understanding of children's aggressive behavior problems (Crick & Rose, 2000). Consonant with this goal, relational forms of aggression have been identified recently that have been shown to be more characteristic of girls than the physical forms of aggression that have captured the majority of previous empirical and theoretical efforts (for a review see Crick et al., 1999). In contrast to physical aggression, in which physical damage or the threat of physical damage serves as the agent of harm, relational aggression includes behaviors in which damage to relationships or the threat of damage to relationships serves as the vehicle of harm (Crick & Grotpeter, 1995). Relational aggression includes both direct and indirect acts, such as threatening to end a friendship unless a friend complies with a request, using social exclusion (both verbally: "You can't play with us" or nonverbally: blocking entry to a playhouse) and the "silent treatment" as retaliatory behaviors or to gain a desired scarce resource, and spreading false rumors to encourage peers to reject a classmate. Findings from numerous studies provide evidence to support the harmful, damaging nature of relationally aggressive acts. Individuals of various ages (i.e., from preschool to young adulthood) describe relationally aggressive behaviors as hostile, hurtful, emotionally distressing, and often enacted in anger (Crick, 1995; Crick, Bigbee, & Howes, 1996; Crick, Ostrov, Appleyard, Jansen, & Casas, 2004; French, Jansen, & Pidada, 2002; Galen & Underwood, 1997; Morales, Crick, Werner, & Schellin, 2002). Additionally, studies of children and adolescents who are the frequent targets of relational aggression indicate that relational victimization is associated with serious concurrent and future social–psychological adjustment problems including peer rejection, symptoms of depression/anxiety, loneliness, and impulsivity (for a review see Crick et al., 2001). Taken together, these studies demonstrate that relational aggression is a highly salient and harmful aspect of many children's daily experiences, one that is both viewed and experienced by children as hurtful and "aggressive".

1.1. Siblings and physical aggression

Brothers and sisters are children's most frequent companions (McHale & Crouter, 1996) and, for many children, they provide the first opportunities to interact with others who are similar in age (Dunn, 1993). Siblings provide a rich context for socialization, one that has been shown to be distinct from that offered by parents. For example, in a series of studies, Bank and colleagues (e.g., Bank, Patterson, & Reid, 1996) have demonstrated that features of the sibling relationship significantly predict future sibling well-being even after the influence of parents has been taken into account. According to social learning and coercion theories, older siblings provide their younger brothers and sisters with modeling and "training" in the use of social behaviors, including aggression (Bandura, 1973; MacDonald & Parke, 1984; Parke, MacDonald, Beitel, & Bhavnagri, 1988; Patterson, 1986; Putallaz, 1987).

Evidence from numerous studies supports the premises of these theories by demonstrating the importance of the sibling context for the promotion of children's physically aggressive behavior. Research has shown that sibling interactions are often characterized by relatively high levels of physical aggression and conflict during childhood, which is not surprising given the closed field or involuntary nature of these close relationships (Abramovich, Corter, Peplar, & Stanhope, 1986; Aguilar, O'Brien, August, Aoun, & Hektner, 2001; Baskett & Johnson, 1982; Berndt & Bulliet, 1985; DeHart, 1999; Furman & Buhrmester, 1992). In fact, levels of conflict and aggression among siblings often exceed those found within the peer context (DeHart, 1999). Thus, sibling interactions may offer children frequent opportunities to observe and learn about aggression. Further, observational studies of sibling interactions have revealed that children who exhibit physical aggression are relatively likely to have brothers or sisters who also exhibit physically aggressive behaviors (e.g., Beardsall, 1986; Brody, Stoneman, & Burke, 1987; Dunn & Munn, 1986; Patterson, 1982; Pike, Reiss, Hetherington, and Plomin, 1996). Additionally, longitudinal research has documented that one sibling's use of physical aggression significantly predicts the other sibling's *future* use of physical aggression (e.g., Dunn & Munn, 1986) and that this association holds even over the course of a decade (Compton, Snyder, Schrepferman, Bank, & Shortt, 2003). These investigations provide substantial support for Patterson's (1986) view of sibling influences as a "training ground" for the learning of aggression.

1.2. Siblings and relational aggression

Findings from four initial studies suggest that the assessment of the role of siblings in the learning of relational aggression may be a fruitful avenue of inquiry. In one study, relational aggression was observed to occur more often during the interactions of preschoolers and their siblings than preschoolers' interactions with their friends during two separate semi-structured home-based play sessions (Stauffacher & DeHart, 2005). In another study, school-aged children and their siblings were asked to describe, in an open-ended manner, the types of mean (i.e., aggressive) things they did to their brothers and sisters (O'Brien & Crick, 2003). Analyses revealed that relational aggression was cited significantly more often than other forms of common aggressive behaviors (e.g., physical aggression, verbal insults) as the hostile strategy of choice in sibling interactions. In the third study, school-aged (i.e., grades 3 to 6) boys' relational aggression with siblings, but not girls', was found to be predictive of children's peer status at school, beyond what was attributable to the child's peer-directed aggression alone (Lockwood, 2002). Finally, research with a large sample of adolescent sibling dyads revealed that relational aggression between the siblings was associated with key indices of relationship quality (i.e., intimacy and negativity; Updegraff, Thayer, Whiteman, Denning, & McHale, 2005). These initial studies have provided evidence that the sibling relationship may be a salient context for transmitting relational aggression in the home environment.

1.3. Transmission of aggression from sibling to peer relationships

One of the most serious consequences of sibling aggression is that children often carry these behaviors into new social contexts, particularly the peer group at school. According to prevailing theories of the role of family interactions in children's social development (i.e., social learning perspectives, attachment theory, coercion theory; Parke & Buriel, 1998; Patterson, 1982; Sroufe & Fleeson, 1986), children learn particular behaviors and relational styles within family relationships and then generalize what they have learned to friends and peers. Consistent with this perspective, relatively high levels of sibling physical aggression have been shown to significantly predict relatively high levels of physical aggression at school with classmates (e.g., Duncan, 1999; MacKinnon-Lewis, Starnes, Volling, & Johnson, 1997). This is highly problematic given that peer aggression has been shown in hundreds of studies to portend a variety of significant developmental risks for children starting at an early age (for a review see Coie & Dodge, 1998). Due to the seriousness of this issue and its implications for prevention and intervention efforts, studies of sibling influence on children's use of peer-directed aggression have increased significantly in the past decade. Despite great accomplishments in this area, one limitation has been the neglect of the role of siblings in peer-directed relational forms of aggression. That is, we currently do not understand why having an older aggressive sibling or how the sibling relationship may affect the display of aggressive behavior among peers at school. Research on this topic is sorely needed if we are to move beyond current studies of the correlates and consequences of relational aggression toward the development of theories and an empirical knowledge base of the etiology of relational aggression. Thus, the central purpose of the present study was to explore the association between sibling status and peer-directed relational aggression at school during early childhood. Given that the current study was an exploratory investigation, we compared relational and physical aggression in their separate peer contexts. Future research studies are needed to assess the amount of relational and physical aggression that occurs between siblings in the home environment and how that behavior may predict peer-directed behavior.

Although sibling studies have varied considerably in the age gap targeted between older and younger siblings, past studies have shown that siblings who are relatively close in age have significantly more influence on each others' aggressive behavior than siblings who are relatively distant in age (e.g., Felson & Russo, 1988). In addition, Aguilar et al. (2001) compared sibling pairs whose age differed by 1–3 years with siblings whose age differed by 4–6 years and found that those with closer birth spacing exhibited significantly higher levels of physical aggression and conflict in their semi-structured task. Based on this evidence, the sibling pairs in the present research were closely spaced in terms of age (i.e., 1–3 year age gap) to maximize the possibility of observing the association between older and younger sibling's relational aggression with their peers.

1.4. Relational aggression during early childhood

Preschoolers were targeted in the present research for several reasons. First, early childhood is the developmental period when sibling relationships have been shown to be particularly salient and influential (Deater-Deckard et al., 2002). Additionally, siblings' influence on physical aggression and other antisocial behaviors has been shown to begin

as early as the preschool years (Martin & Ross, 1995) and to have a long lasting effect (Compton et al., 2003). These findings suggest that early childhood may represent a period in children's lives when sibling influences on other forms of aggression, such as relational aggression, may be relatively salient and powerful.

Increasingly researchers are recognizing the importance of studying the development of relational aggression during early childhood (Ostrov & Crick, 2005). Past early childhood studies have documented that relational aggression is associated with children's language capacity, parenting behavior (e.g., psychological control), and children's social–psychological adjustment (e.g., peer rejection, depressed affect, loneliness; Bonica, Yershova, Arnold, Fisher, & Zeljo, 2003; Crick, Casas, & Mosher, 1997; Hart, Nelson, Robinson, Olsen, & McNeilly-Choque, 1998), Generally, girls have been found to be more relationally aggressive to peers (also more relationally aggressive to female peers than to male peers) than boys (Burr, Ostrov, Jansen, Cullerton-Sen, & Crick, 2005; Johnson & Foster, 2005; McNeilly-Choque, Hart, Robinson, & Olsen, 1996; Nelson, Robinson, & Hart, 2005; Ostrov & Keating, 2004; Ostrov, Woods, Jansen, Casas, & Crick, 2004; Russell, Hart, Robinson, & Olsen, 2003; Sebanc, 2003). Early childhood was also selected as the developmental period of choice because reliable and valid observational measures have been developed recently that adequately capture the relationally aggressive behaviors of preschoolers (Ostrov & Keating, 2004; Ostrov et al., 2004). The majority of past studies for samples ranging from preschool to adulthood have relied on peer, teacher, and self-reports of relational aggression methods, which may possibly suffer from certain biases in particular circumstances, such as gender stereotyped ratings (Crick et al., 2004; cf. McNeilly-Choque et al., 1996; McEvoy, Estrem, Rodriguez, & Olson, 2003; Pellegrini, 2001b). These biases may be especially problematic when, as is true in the present study, sex or gender is a factor of interest (Condry & Ross, 1985; Susser & Keating, 1990). Consequently, the development of these valid and reliable observational measures for young children for the assessment of relational aggression within peer contexts represents an empirical advance that creates the opportunity to examine sibling influences on peer-directed relational aggression in a relatively objective manner (Ostrov, Crick, & Keating, 2005; Pellegrini, 2001b).

Through the utilization of sophisticated methodology, the present short-term longitudinal observational study builds on prior research exploring the relation between older and younger siblings' relational aggression in peer contexts at school. The present study has several methodological strengths including the use of an ecologically valid procedure, which permitted an assessment of children's aggression in their natural peer contexts. The use of reliable observations during free play contexts at school permits an assessment of a wider array of relationally aggressive behaviors (e.g., gossip, rumor spreading, social exclusion) that past sibling and peer measures, which relied on dyads or triads, may have been unable to explore or may have artificially reduced (Ostrov et al., 2004; Stauffacher & DeHart, 2005). In addition, unlike past dyadic assessments, we did not violate statistical assumptions of parametric tests, in that the behavior of each member of the dyad is truly independent. Thus, the present study is an important initial research step in defining the link between the sibling relationship and school-based peer relationally aggressive interactions.

In keeping with the main goals of the study, we first explored the stability and intercorrelations among the key variables. In keeping with past observational findings, we predicted low to moderate levels of intercorrelation between physical and relational aggression and moderate levels of stability across the year for both age groups (Crick et al., 2004). Next, we hypothesized that older siblings would display more relational and physical aggression with their peers than their younger siblings would. Third, we expected that in general boys would be more physically aggressive and girls more relationally aggressive. Fourth, we hypothesized that physical aggression would be directed at male peers more frequently than at female peers, and that relationally aggression would be more commonly displayed towards female peers than with male peers (Ostrov & Keating, 2004; Pellegrini, 2001a). Specifically, we anticipated that this effect would hold for both the older and younger sibling groups. Fifth, we hypothesized older siblings' peer-directed relational aggression at school would be associated with their younger siblings' use of peer-directed relational aggression at school. We predicted that these associations would be revealed, such that the sibling pairs would exhibit similar patterns of peer-directed relational aggression. In addition, we predicted similar findings for observed physical aggression (i.e., older children's peer-directed physical aggression was expected to be associated with their younger siblings' peer-directed physical aggression).

2. Method

2.1. Participants

A total of 50 children consisting of 25 sibling dyads (14 same-sex and 11 mixed-sex pairs) participated in the study. Specifically there were 13 older sisters and 12 older brothers (mean age of older siblings = 48.56 months; *SD* = 8.52;

range = 33–61 months) and 11 younger sisters and 14 younger brothers (mean age of younger siblings = 39.17 months; *SD* = 8.44; range = 27–61 months). All children were recruited from two nationally accredited, university affiliated preschools in a large Midwestern city as part of an ongoing longitudinal research study. Written parental consent was required for each child's participation. The sample was somewhat diverse: 4% were African American, 16% were Asian American, 72% were European American, and 8% were Latino. Based on school demographic information, families ranged from lower to upper-middle class, with the majority of families as upper-middle class.

In this short-term longitudinal study, each child in the present sample was observed at two different time points. The first assessment was conducted during the fall, while the second was during the spring of the same school year. At both time points the children were students in a multi-aged preschool classroom that served 3–5 year old children. All children stayed in the same classroom between the two assessments. This practice ensured that for each member of the sibling dyad, their peer behavior was assessed in the same school and within the same school contexts (in many cases the same classroom just 1 to 2 years later) as their sibling. Siblings were not in the same classroom so their peer behavior was displayed in independent, distinct social cohorts and never with each other at school.

2.2. Observations

At each time point, observers spent considerable time prior to data collection in each participating classroom and on the playground to facilitate children's acclimation to their presence (Pellegrini, 2004). To reduce reactivity, many of the observations in the classrooms were conducted from a visually shielded observation booth attached to the classroom. When observers were in the presence of the children they used a "minimally responsive manner" (Pellegrini, 2004) and were specifically trained in controlling their nonverbal behavior to further diminish possible reactivity. Assessments of reactivity (i.e., frequency of looks, comments, questions to the observer by the focal child) were noted by observers and found to be low to nonexistent over the course of the study (< than 5% of the time; Atlas & Pepler, 1998). The order of children observed was determined randomly within each day of observations, with the following caveats: the number of observations was similar for all children and no child was observed more than one time per day. Naturalistic observations were collected during each assessment period by a total of six trained graduate students/professional staff and 18 advanced undergraduate students. The observers rotated through different classrooms so each child was observed by multiple observers across the study. Both male and female graduate and undergraduate observers of diverse ethnic backgrounds participated at each assessment period.

2.2.1. Assessment of aggression

Naturalistic observations of children's relational and physical aggression were conducted during free-play using an adaptation of procedures developed by Ostrov & Keating (2004). Using a focal child approach, each child was observed for 10 min per assessment by a trained observer who was located in an unobtrusive position, but within earshot. During the 10-min session all relevant behaviors/events for that specific focal child were recorded on a standard observation form. Over an eight-week period, each child was observed 8 times (i.e., total of 80 min per child at each time point). In sum, 160 min of observation (2.66 h) was collected for each focal child at each time period. As in prior research, the manner in which the observations were collected was not amenable to kappa coefficient indices of reliability because observers did not specifically record intervals when the behaviors of interest were absent. The use of Intra-Class Correlations (ICC) has been suggested for such situations (McGraw & Wong, 1996) and has been used in similar past studies (e.g., Goldstein, Arnold, Rosenberg, Stowe, & Ortiz, 2001; NICHD ECCRN, 2004; Ostrov & Keating, 2004; Ostrov et al., 2004). Evidence for favorable interrater reliability of this observational measure has been demonstrated in past research (i.e., ICC's >.75 for physical aggression, >.82 for relational aggression, and >.78 for prosocial behavior; Ostrov & Keating, 2004; Ostrov, in press). This observational method has demonstrated acceptable validity in the past with moderate correlations between teachers and observers ranging from $r = .40$ to .50 for relational aggression and from $r = .45$ to .62 for physical aggression (Ostrov & Keating, 2004; Ostrov, in press).

In the present investigation, training consisted of readings, discussions with the trainer (first author) and coding of videotapes of children's aggressive and prosocial behavior from past studies (Ostrov & Keating, 2004; Ostrov et al., 2004). Observers were required to reach acceptable levels of interrater reliability with the videotapes (*ICC*'s >.80), pass a short written multiple choice/matching exam (with discussion for any incorrect answers), and conduct several live practice reliability observations in the classroom and on the playground with the trainer (with discussion for any errors). Assessments of reliability were conducted throughout the study to avoid observer drift problems (Pellegrini, 2004).

During each 10-min assessment interval, observers recorded a full description of the focal child's engagement (including the sex of the child involved) in each of the following behaviors: a) physical aggression (e.g., hitting, shoving, pulling, taking objects), and b) relational aggression (e.g., excluding from an activity, using friendship withdrawal as a threat; covering ears to signal ignoring). Behaviors were recorded as separate behaviors based on temporal breaks in the interactions during the observation. Each child was observed on eight separate occasions and behaviors noted during observations were summed to yield total behavior scores for each time period. The average instances of relational and physical aggression per 10-min session were calculated for each child at each time point. Interrater reliability was assessed (based on the entire sample from the larger project) at each time point on 10–15% of observations across the eight-week observation period. Reliability was acceptable at each time point for relational aggression (ICC's ranged from .77 to .91) and for physical aggression (ICC's ranged from .86 to .92).

3. Results

Our goals for the present study were to first explore and replicate in this sample of siblings the low to moderate levels of intercorrelation between physical and relational aggression that have been observed in peer interactions. Second, we examined the relationship between age and the various aggression variables given the range of ages for each cohort using correlational analyses. Third, we tested the stability of the observational data across observation points. To test our main hypotheses concerning age and sex differences in aggression we first conducted an ANOVA to explore time (Fall, Spring), recipient peer sex, focal child sex, and cohort differences between older and younger siblings. Next, bivariate and partial correlations were computed to examine the relationship between older siblings' observed aggression and younger siblings' observed aggression.

3.1. Intercorrelations and stability of aggression

When the full sample was considered ($N = 50$), physical and relational aggression at time 1 were not significantly associated, $r = .14$, *ns.* However, at time 2 physical and relational aggression were moderately associated, $r = .52$, $p < .001$.

Relational aggression was stable from time 1 to 2, $r = .59$, $p < .001$. Consistent with prior findings with peers, physical aggression was also stable over time for this sample ($n = 49$), $r = .41$, $p < .001$. Attrition in this on-going longitudinal study was due to children moving on to kindergarten or moving out of the area.

3.2. Associations between age and subtypes of aggression

Given the range of ages for each cohort we conducted bivariate correlations to explore if age should be included as a covariate in subsequent analyses. The findings, presented in Table 1, demonstrate that there were no significant relations between age and relational or physical aggression at time 1 or 2 for either the older sibling or the younger sibling cohorts. Therefore, age was not included as a covariate in subsequent analyses.

3.3. Child sex and time differences for relational aggression

The mean (and *SD*) relational aggression and physical aggression scores are presented in Table 2 for each focal child by time of measurement, sex of the peer targeted by the aggression, and sibling age group (the child was an older sibling child about 4 1/2 years old or a younger child about 3 1/4 years old). A 2 (Time) × 2 (Recipient peer sex: male or

Table 1
Relation between child age at time 1 and relational and physical aggression for older and younger sibling cohorts at time 1 and 2

	Physical aggression time 1	Relational aggression time 1	Physical aggression time 2	Relational aggression time 2
Older sibling cohort				
Age at time 1	−.19	.31	.14	.38*
Younger sibling cohort				
Age at time 1	.35	.20	−.29	.03

*$p < .06$.

Table 2
Descriptive statistics for relational and physical aggression by focal child sex collapsed across time

Age of sibling, focal child sex, and type of aggression						
Older sibling cohort						
Recipient sex	Focal boys			Focal girls		
	Mean	*SD*	Range	Mean	*SD*	Range
Relational aggression						
Male	.34	.47	0–1.63	.33	.69	0–1.75
Female	.07	.08	0–.25	.69	.72	0–2.38
Physical aggression						
Male	1.00	1.15	0–3.25	.13	.29	0–1.00
Female	.23	.39	0–1.38	.15	.20	0–.61
Younger sibling cohort						
	Focal boys			Focal girls		
	Mean	*SD*	Range	Mean	*SD*	Range
Relational aggression						
Male	.13	.14	0–.50	.06	.12	0–.38
Female	.05	.08	0–.26	.19	.31	0–1.00
Physical aggression						
Male	.35	.38	0–1.13	.06	.12	0–.38
Female	.16	.19	0–.63	.06	.09	0–.25

Note. Means were converted by dividing the total behavior frequency by the total number of sessions completed (i.e., typically 8 sessions) and collapsed across the two time points.

female) ×2 (Age group: older sibling or younger sibling) ×2 (Older sibling sex) ×2 (Younger sibling sex) ANOVA with repeated measures on the first 2 factors was conducted on relational aggression scores. A main effect for age group was found, $F(1, 20) = 7.36$, $p < .01$, $\eta^2 = .27$. Specifically, the older children ($M = .18$; $SD = .05$) were more relationally aggressive than their younger siblings ($M = .05$; $SD = .01$). This effect was qualified by a recipient peer sex by older sibling sex interaction effect, $F(1, 20) = 7.32$, $p < .01$, $\eta^2 = .27$, and a three-way interaction involving age group, sex of the older sibling and sex of the recipient peer, $F(1, 20) = 4.40$, $p < .05$, $\eta^2 = .18$. No other significant effects emerged.

To decompose the three-way interaction between recipient peer sex, sibling age group, and sex of the older sibling, simple effects tests were conducted for older sibling age group and for the younger sibling age group. The first two-way interaction between sex of the recipient peer and sex of the older sibling was significant when relational aggression by older siblings was analyzed, $F(1, 23) = 8.86$, $p < .01$, $\eta^2 = .28$, but not when younger siblings were considered, $F(1, 22) = .28$, $p = .60$. Simple effects tests revealed that for older siblings a significant sex difference was found for relational aggression to a female, $F(1, 23) = 8.58$, $p < .01$, $\eta^2 = .27$, which indicated that older sisters were more relationally aggressive to female peers than older brothers were. No other effects were significant (see Table 2 for descriptive statistics). The second two-way interaction between age group and older sibling sex was significant for female recipient peer sex, $F(1, 22) = 4.96$, $p < .05$, $\eta^2 = .18$, but not for male recipient peer sex, $F(1, 22) = .13$, $p = .73$. To further break down this two-way simple effects tests were conducted and revealed a significant effect emerged for girls only, $F(1, 12) = 6.61$, $p < .05$, $\eta^2 = .36$. Specifically, older sisters were more relationally aggressive to female peers than were their younger sisters (see Table 2 for descriptive statistics). No other significant effects emerged.

In summary, older siblings were more relationally aggressive with their peers than their younger siblings were. However, the sex of the older sibling played an important role. Older *sisters* were more relationally aggressive to female peers than were older *brothers*. In addition, *older* sisters were more relationally aggressive to female peers than were *younger* sisters.

3.4. Child sex and time differences for physical aggression

A 2 (Time) ×2 (Recipient peer sex: male or female) ×2 (Age group: older sibling or younger sibling) ×2 (Older sibling sex) ×2 (Younger sibling sex) ANOVA with repeated measures on the first 2 factors was conducted on physical

aggression scores. The main effect for sibling age group was not significant, $F(1, 20) = 4.16$, $p < .06$, $\eta^2 = .17$, suggesting no difference between older siblings' ($M = .17$; $SD = .05$) display of physical aggression with their peers compared with their younger siblings ($M = .08$; $SD = .02$). A main effect for sex of the recipient of the aggression was revealed, $F(1, 20) = 5.34$, $p < .05$, $\eta^2 = .24$, which indicated that children were more physically aggressive towards male peers ($M = .19$; $SD = .05$) than towards female peers ($M = .06$; $SD = .01$). A two-way interaction between sex of the recipient peer and sex of the older sibling was found, $F(1, 20) = 5.34$, $p < .05$, $\eta^2 = .21$. This two-way interaction was qualified by a significant three-way interaction involving sibling age group, sex of the recipient peer, and sex of the older sibling, $F(1, 20) = 6.35$, $p < .05$, $\eta^2 = .24$.

To break down the three-way interaction simple effects were examined. The first two-way interaction between recipient peer sex and older sibling sex was significant when physical aggression by older siblings was analyzed, $F(1, 23) = 6.24$, $p < .05$, $\eta^2 = .21$, but not for younger siblings' physical aggression, $F(1, 22) = .001$, $p = .98$. Simple effects tests revealed that a significant sex difference emerged for older sibling physical aggression to male peers, $F(1, 23) = 7.08$, $p < .01$, $\eta^2 = .24$, which revealed that older brothers showed more physical aggression towards male peers than older sisters did. The second two-way interaction emerged between age group and older sex was significant only for male recipient sex, $F(1, 22) = 4.90$, $p < .05$, $\eta^2 = .20$, and not for female recipient peer sex, $F(1, 22) = 1.54$, $p = .23$. Specifically, the simple effects test revealed an effect for age group for boys only, $F(1, 10) = 4.90$, $p < .05$, $\eta^2 = .33$, indicating that older brothers directed more physical aggression to male peers than did their younger brothers (see Table 2 for descriptive statistics). No other effects were significant.

In summary, children were significantly more physically aggressive to male peers than they were to female peers, but this did not hold true across all groups. Older brothers were more physically aggressive than older sisters were to male peers. Older brothers also directed more physical aggression to male peers than their younger brothers directed to male peers.

3.5. Association between older and younger siblings' aggressive behavior

The next analyses were designed to probe if siblings' peer directed relational aggression were associated. Observed relational aggression with peers was not significantly associated for the two siblings at either time 1, $r = .25$, *ns*, or time 2, $r = .20$, *ns*. Next, by controlling for initial levels, we tested if older siblings' relational aggression scores predicted an increase in their younger siblings' use of relational aggression. A partial correlation was significant between time 1 older sibling relational aggression scores and time 2 younger sibling, while controlling for time 1 relational aggression of the younger sibling, $r = .43$, $p < .05$[1].

Pearson's product moment correlation coefficients were computed to examine the association between siblings' observed physical aggression with peers at each time point. Older siblings' physical aggression scores at time 1 were significantly associated with their younger siblings' time 1 scores for physical aggression, $r = .56$, $p < .01$. At time 2, the physical aggression of the older sibling was not significantly associated with those of the younger sibling, $r = .37$, $p < .07$. A partial correlation controlling for the younger siblings' time 1 physical aggression indicated that older siblings' physical aggression scores at time 1 did not significantly predict time 2 younger siblings' aggression, $r = -.23$, *ns*[1].

4. Discussion

This study was designed to build on the past literature in several novel ways. This research adds to our current understanding of the relation between child sex, sibling relationships, and aggression among peers. Moreover, this investigation was the first study to explore the link between older siblings' physical and relational aggression at school as a predictor of a younger siblings' future physical and relational aggression with peers. This research was also the first known investigation of the role of both younger and older siblings' on peer directed relational aggression during early childhood. The use of observational and short-term longitudinal methods were important design advantages that add further strength to the study. We replicated past findings (e.g., Ostrov & Keating, 2004; Ostrov et al., 2004) by demonstrating that our observations of physical and relational aggression revealed low to moderate levels of

[1] Age of both siblings at time 1 was controlled in a series of partial correlations. The findings were virtually identical to those of the analyses presented in the text.

association and moderate levels of stability across an academic year. The low to moderate correlations between observed physical and relational aggression are most likely due to the lack of shared method variance that may be inflating teacher and self-report correlations in past studies (for review see Crick et al., 2004). In the present study multiple observers were used for the observations of each child and observations were collected over a number of days, which allowed these constructs to be evaluated in a less biased manner with less shared method variance concerns. These findings provide further evidence for the utility of these observational methods for exploring subtypes of aggression during early childhood.

In keeping with predictions, we found that older sisters were more relationally aggressive to female peers than older brothers were, whereas older brothers were more physically aggressive to male peers than were older sisters. In addition, older sisters were more relationally aggressive to female peers than were their younger sisters, whereas older brothers were more physically aggression to male peers relative to their younger brothers. These findings further indicate the importance of identifying the sex of the recipient (i.e., recipient peer sex) when examining aggression among peers (Ostrov & Crick, submitted for publication; Pellegrini, 2001a). That is, it appears that most of the relational aggression is directed toward female peers and physically aggression is directed toward male peers. Finally, this study revealed that observed physical and relational aggression of the older sibling predicted the future observed physical and relational aggression of the younger sibling, respectively. These findings add to the physical aggression literature (e.g., Dunn & Munn, 1986), documenting similar links between the home and school context and further demonstrates the potential transmission of relational aggression from older siblings to younger children (Stauffacher & DeHart, 2005). In general, these findings reveal the importance of studying relational aggression in addition to physical aggression for understanding how social behavior between peers may be at least partially due to the nature of the sibling relationship during early childhood.

A few unexpected findings emerged that deserve attention in future studies. We anticipated that relational aggression of the older sibling would be associated with the younger siblings' relational aggression at each of the two time points. These correlations were in the predicted direction, but may not have reached significance due to inadequate power. We anticipated that child age would be significantly associated with relational aggression; however, for both cohorts in the present study it was not. Again, future studies with larger sample sizes are needed to replicate these findings.

4.1. Applied implications

The main findings from this study highlight the importance of a multi-contextual approach (i.e., school and family influences) in understanding the development of aggression and in providing a guide for future interventions. Most current intervention approaches for aggressive behavior occur at school and neglect the role of family relationships (e.g., Olweus, 1994; cf. Conduct Problems Prevention Research Group, 1992). The findings of the current study suggest that as researchers continue to develop intervention programs for both physical and relational aggression during early childhood, they should recognize the potential role that siblings may play in the reinforcement and transmission of these behaviors. Because the sibling relationship may serve as a "training ground" for deviancy and aggression via social learning processes (Bandura, 1973; MacDonald & Parke, 1984; Parke et al., 1988; Patterson, 1986; Putallaz, 1987), it is important for applied scholars and practitioners to consider how to alter the behaviors of older siblings so that siblings can model more socially appropriate (i.e., prosocial behavior) strategies instead. In addition interventionists will need to consider the timing of their programs. The present study reveals that these behavioral patterns are well developed by the end of preschool, suggesting that these programs should be initiated prior to age three. Finally, the present evidence would indicate that an early intervention, addressing both physical and relational aggression, should be developed for both girls and boys.

4.2. Future directions

Several untested questions remain that should be addressed by future research. The main question that must be addressed by scholars in subsequent work concerns the degree to which relational and physical aggression between siblings predicts future relational and physical aggression directed at peers in school contexts. A multi-contextual analysis may reveal dynamic interactions between the home and school context, which would help to further understand the processes by which both involuntary (i.e., sibling) and voluntary (i.e., peer) relationships may impact

one another in transmitting aggressive behavior. Additional questions include assessing how parents respond to both physical and relational aggression between young siblings in the home (see Updegraff et al., 2005). Some research suggests that this is moderated by the sex and/or gender constellation of the children (Martin & Ross, 1995), perhaps such that physical aggression among boys and relational aggression among girls is tolerated and reinforced. Researchers have also shown that the relationship quality between siblings influences the transmission of many social behaviors (e.g., Deater-Deckard et al., 2002), suggesting that siblings' risk for learning their siblings' relationally aggressive behaviors may also depend on the quality of their relationship with their sibling. Moreover, does the family context (e.g., divorced, remarried families) influence the effects for relational aggression, as is the case with the physical aggression literature (e.g., Deater-Deckard et al., 2002)? Does aggression between siblings predict physical and relational aggression with non-school (i.e., neighborhood) peers and friends across time? Finally, research should explore the extent to which the findings documented in the current study might transfer into middle childhood and early adolescence. This may prove to be a salient developmental period for exploring the role of sibling relationship in predicting relational aggression (Updegraff et al., 2005), as has been the case with peer relationships (Cillessen & Mayeux, 2004; Pellegrini & Long, 2002; Rose, Swenson, & Waller, 2004).

4.3. Limitations

Despite the significance of the present study there were a few limitations that should be acknowledged and addressed in subsequent work. Similar to past studies that used relatively unbiased and time intensive observational methods (i.e., 160 min of observation per child, 8000 total minutes of observation), we were only able to include two time points of data for each member of the dyad. More time points would have permitted a better understanding of the transmission process. Moreover, given the short-term longitudinal and observational design we were restricted to a moderate sample size, which resulted in diminished power for testing some of our effects. Certainly replication of the present findings with a larger sample is warranted and the present findings should be interpreted with some caution. The present study had a relatively large age range and future works needs to address the potential for variability in the nature of relational aggression between a 30-month-old and a 60-month-old. Although past research has found that 36 month olds are capable of spreading malicious secrets (see Ostrov et al., 2004) there may be a qualitative difference in the types of relationally aggressive behavior that is displayed between young and old preschool-aged children. In addition, future research should explore the display of aggression between siblings at home as well as among peers at school. Finally, the findings of the current study may not generalize to all populations, as the present sample tended to be of higher SES and primarily European-American backgrounds.

4.4. Conclusions

In conclusion, this observational and short-term longitudinal study was the first to test the relation between older and younger siblings relational and physical aggression with their peers. We replicated and extended past studies by documenting the utility of the observational methods and providing evidence for the stability of relational and physical aggression during early childhood. Most importantly we documented that older sibling's relational aggression was predictive of future peer-directed relational aggression by the younger sibling. These findings, as well as important child sex and age group differences, provide support for the notion that children experience relationally aggressive problems during early childhood, which may be facilitated by family factors, such as siblings' aggression. Moreover, the current study documented an important potential developmental link between the home and school context for understanding the transmission of both physical and relational aggression.

Acknowledgment

The first author was funded in part by a NIMH traineeship (MH-15755) to the Institute of Child Development, University of Minnesota. This study was funded by a grant (BCS-0126521) from the NSF to the second author. Preparation of this manuscript was facilitated in part by grants from NIMH (MH63684) and NICHD (HD046629) to the second author. We thank the entire Preschool PALS Project staff and special thanks to Alison Eudeikis for her assistance with the coordination of this project and to Peter Ralston for assistance with this manuscript. We thank the participating parents, children, teachers and directors for their assistance and support of our research.

References

Abramovich, R., Corter, C., Peplar, D. J., & Stanhope, L. (1986). Sibling and peer interaction: A final follow-up and comparison. *Child Development*, *57*, 217−229.

Aguilar, B., O'Brien, K. M., August, G. J., Aoun, S. L., & Hektner, J. M. (2001). Relationship quality of aggressive children and their siblings: A multi-informant, multi-measure investigation. *Journal of Abnormal Child Psychology*, *29*, 479−489.

Atlas, R. S., & Pepler, D. J. (1998). Observations of bullying in the classroom. *Journal of Educational Research*, *92*, 86−99.

Bandura, A. (1973). *Aggression: A social learning theory analysis.* Englewood Cliffs, NJ: Prentice Hall.

Bank, L., Patterson, G. R., & Reid, J. B. (1996). Negative sibling interaction patterns as predictors of later adjustment problems in adolescent and young adult males. In G. H. Brody (Ed.), *Sibling relationships: Their causes and consequences* (pp. 197−229). Norwood, NJ: Ablex.

Baskett, L. M., & Johnson, S. M. (1982). The young child's interactions with parents versus siblings: A behavioral analysis. *Child Development*, *53*, 643−650.

Beardsall, L. (1986). Sibling conflict in middle childhood. Unpublished doctoral dissertation. University of Cambridge, U.K.

Berndt, T. J., & Bulliet, T. N. (1985). Effects of sibling relationships on preschoolers' behavior at home and at school. *Developmental Psychology*, *21*, 761−767.

Bonica, C., Yeshova, K., Arnold, D. H., Fisher, P. H., & Zeljo, A. (2003). Relational aggression and language development in preschoolers. *Social Development*, *12*, 551−561.

Brody, G. H., Stoneman, Z., & Burke, M. (1987). Child temperaments, maternal differential behavior, and sibling relationships. *Developmental Psychology*, *23*, 354−362.

Burr, J. E., Ostrov, J. M., Jansen, E. A., Cullerton-Sen, C., & Crick, N. R. (2005). Relational aggression and friendship during early childhood: "I won't be your friend unless…". *Early Education and Development*, *16*, 162−183.

Cillessen, A. H. N., & Mayeux, L. (2004). From censure to reinforcement: Developmental changes in the association between aggression and social status. *Child Development*, *75*, 147−163.

Coie, J. D., & Dodge, K. A. (1998). The development of aggression and antisocial behavior. In W. Damon (Series Ed.) & N. Eisenberg (Vol. Ed.), *Handbook of child psychology: Vol. 3. Social, emotional, and personality development* (5th ed., pp. 779–862). New York: Wiley.

Compton, K., Snyder, J., Scherpferman, L., Bank, L., & Shortt, J. W. (2003). The contribution of parents and siblings in antisocial and depressive behavior in adolescents: A double jeopardy coercion model. *Development and Psychopathology*, *15*, 163−182.

Conduct Problems Prevention Research Group. (1992). A developmental and clinical model for the prevention of conduct disorder: The FAST track program. *Development and Psychopathology*, *4*, 509−527.

Condry, J. C., & Ross, D. F. (1985). Sex and aggression: The influence of gender label on the perception of aggression in children. *Child Development*, *56*, 225−233.

Crick, N. R. (1995). Relational aggression: The role of intent attributions, feelings of distress, and provocation type. *Development and Psychopathology*, *7*, 313−320.

Crick, N. R., Bigbee, M. A., & Howes, C. (1996). Gender differences in children's normative beliefs about aggression: How do I hurt thee? Let me count the ways. *Child Development*, *67*, 1003−1014.

Crick, N. R., Casas, J. F., & Mosher, M. (1997). Relational and overt aggression in preschool. *Developmental Psychology*, *33*, 579−588.

Crick, N. R., & Grotpeter, J. K. (1995). Relational aggression, gender, and social–psychological adjustment. *Child Development*, *66*, 710−722.

Crick, N. R., Nelson, D. A., Morales, J. R., Cullerton-Sen, C., Casas, J. F., & Hickman, S. (2001). Relational victimization in childhood and adolescence: I hurt you through the grapevine. In J. Juvonen & S. Graham (Eds.), *School-based peer harassment: The plight of the vulnerable and victimized* (pp. 196−214). New York: Guildford Press.

Crick, N. R., Ostrov, J. M., Appleyard, K., Jansen, E. A., & Casas, J. F. (2004). Relational aggression in early childhood: "You can't come to my birthday party unless…". In M. Putallaz & K.L. Bierman (Eds.), *Aggression, antisocial behavior, and violence among girls: A developmental perspective* (pp. 71−89). New York: Guilford.

Crick, N. R., & Rose, A. J. (2000). Toward a gender-balanced approach to the study of social–emotional development. In P. H. Miller & E. Scholnick (Eds.), *Toward a feminist developmental psychology* (pp. 153−168). London: Routledge Press.

Crick, N. R., Werner, N. E., Casas, J. F., O'Brien, K., Nelson, D. A., Grotpeter, J. K., et al. (1999). Childhood aggression and gender: A new look at an old problem. In D. Bernstein (Ed.), *Nebraska symposium on motivation* (pp. 75−141). Lincoln: University of Nebraska Press.

Crick, N. R., & Zahn-Waxler, C. (2003). Gender and developmental psychopathology: Current progress and future challenges. *Development and Psychopathology*, *15*, 719−742.

Deater-Deckard, K., Dunn, J., & Lussier, G. (2002). Sibling relationships and social–emotional adjustment to different family contexts. *Social Development*, *11*, 571−590.

DeHart, G. (1999). Conflict and averted conflict in preschoolers' interactions with siblings and friends. In W. A. Collin & B. Laursen (Eds.), *Relationships in developmental contexts: The Minnesota symposia on child development* (Vol. 30, pp. 281–303). Mahwah, NJ: Erlbaum.

Duncan, R. D. (1999). Peer and sibling aggression: An investigation of intra- and extra-familial bullying. *Journal of Interpersonal Violence*, *14*, 871−886.

Dunn, J. (1993). *Young children's close relationships: Beyond attachment.* Newbury Park, CA: Sage Publications.

Dunn, J., & Munn, P. (1986). Sibling quarrels and maternal intervention: Individual understanding and aggression. *Journal of Child Psychology and Psychiatry*, *27*, 583−595.

Felson, R. B., & Russo, N. J. (1988). Parental punishment and sibling aggression. *Social Psychology Quarterly*, *51*, 11−18.

French, D. C., Jansen, E. A., & Pidada, S. (2002). United States and Indonesian children's and adolescents' reports of relational aggression by disliked peers. *Child Development*, *73*, 1143−1150.

Furman, W., & Buhrmester, D. (1992). Age and sex differences in perceptions of networks of personal relationships. *Child Development*, *63*, 103−115.

Galen, B. R., & Underwood, M. (1997). A developmental investigation of social aggression among children. *Developmental Psychology*, *33*, 589−599.

Goldstein, N. E., Arnold, D. H., Rosenberg, J. L., Stowe, R. M., & Ortiz, C. (2001). Contagion of aggression in day care classrooms as a function of peer and teacher responses. *Journal of Educational Psychology*, *93*, 708−719.

Hart, C. H., Nelson, D. A., Robinson, C. C., Olsen, S. F., & McNeilly-Choque, M. K. (1998). Overt and relational aggression in Russian nursery-school-age children: Parenting style and marital linkages. *Developmental Psychology*, *34*, 687−697.

Johnson, D. R., & Foster, S. L. (2005). The relationship between relational aggression in kindergarten children and friendship stability, mutuality, and peer liking. *Early Education and Development*, *16*, 141−160.

Keenan, K., & Shaw, D. (1997). Developmental and social influences on young girls' early problem behavior. *Psychological Bulletin*, *121*, 95−113.

Lockwood, R. L. (2002). Examination of siblings' aggression styles: Do sisters show more relational aggression than brothers? *Dissertation Abstracts International: Section B: The Sciences and Engineering*, *63*(5-B), 2621.

MacDonald, K., & Parke, R. D. (1984). Bridging the gap: Parent–child play interaction and peer interactive competence. *Child Development*, *55*, 1265−1277.

MacKinnon-Lewis, C., Starnes, R., Volling, B., & Johnson, S. (1997). Perceptions of parenting as predictors of boys' sibling and peer relations. *Developmental Psychology*, *33*, 1024−1031.

Martin, J. L., & Ross, H. S. (1995). The development of aggression within sibling conflict. *Early Education and Development*, *6*, 335−358.

McEvoy, M. A., Estrem, T. L., Rodriguez, M. C., & Olson, M. L. (2003). Assessing relational and physical aggression among preschool children: Inter-method agreement. *Topics in Early Childhood Special Education*, *23*, 53−63.

McGraw, K. O., & Wong, S. P. (1996). Forming inferences about some intraclass correlation coefficients. *Psychological Methods*, *1*, 30−46.

McHale, S., & Crouter, A. C. (1996). The family contexts of children's sibling relationships. In G. H. Brody (Ed.), *Sibling relationships: Their causes and consequences* (pp. 173−195). Norwood, NJ: Ablex Publishing Corporation.

McNeilly-Choque, M. K., Hart, C. H., Robinson, C. C., Nelson, L., & Olsen, S. F. (1996). Overt and relational aggression on the playground: Correspondence among different informants. *Journal of Research in Childhood Education*, *11*, 47−67.

Morales, J. R., Crick, N. R., Werner, N.E., & Schellin, H. (2002). Adolescents' normative beliefs about aggression. Manuscript in preparation.

Nelson, D. A., Robinson, C. C., & Hart, C. H. (2005). Relational and physical aggression of preschool-age children: Peer status linkages across informants. *Early Education and Development*, *16*, 115−140.

NICHD, Early Child Care Research Network (2004). Trajectories of physical aggression from toddlerhood to middle childhood. *Monographs of the Society for Research in Child Development*, *69* (4, Serial No. 278).

O'Brien, K. M., & Crick, N. R. (2003). *Relational and physical aggression in sibling relationships: From hitting and kicking to ignoring and excluding, siblings do it all.* Unpublished manuscript, University of Minnesota, Minneapolis, MN.

Olweus, D. (1994). Annotation: Bullying at school: Basic facts and effects of a school based Intervention program. *Journal of Child Psychology and Psychiatry*, *35*, 1171−1190.

Ostrov, J.M. (in press). Deception and subtypes of aggression in early childhood. *Journal of Experimental Child Psychology.*

Ostrov, J. M., & Crick, N. R. (2005). Current directions in the study of relational aggression during early childhood. *Early Education and Development*, *16*, 109−113.

Ostrov, J. M., & Crick, N. R. (submitted for publication). Forms and functions of aggression during early childhood.

Ostrov, J. M., Crick, N. R., & Keating, C. F. (2005). Gender biased perceptions of preschoolers' behavior: How much is aggression and prosocial behavior in the eye of the beholder? *Sex Roles*, *52*, 393−398.

Ostrov, J. M., & Keating, C. F. (2004). Gender differences in preschool aggression during free play and structured interactions: An observational study. *Social Development*, *13*, 255−277.

Ostrov, J. M., Woods, K. E., Jansen, E. A., Casas, J. F., & Crick, N. R. (2004). An observational study of delivered and received aggression, gender, and social psychological adjustment in preschool: "This white crayon doesn't work...". *Early Childhood Research Quarterly*, *19*, 355−371.

Parke, R. D., & Buriel, R. (1998). Socialization in the family: Ethnic and ecological perspectives. In W. Damon (Series Ed.) & N. Eisenberg (Vol. Ed.), *Handbook of child psychology: Vol. 3. Social, emotional, and personality development* (5th ed., pp. 463−552). New York: John Wiley and Sons.

Parke, R. D., MacDonald, K. B., Bietel, A., & Bhavnagri, N. (1988). The role of the family in the development of peer relationships. In R. D. Peters & R.J. McMahon (Eds.), *Social learning and systems approaches to marriage and the family* (pp. 17−44). New York: Brunner/Mazel Publishers.

Patterson, G. R. (1982). *Coercive family processes.* Eugene, OR: Castalia.

Patterson, G. R. (1986). The contribution of siblings to training for fighting: A microsocial analysis. In D. Olweus, J. Block, & M. Radke-Yarrow (Eds.), *Development of antisocial and prosocial behavior: Research, theories, and issues* (pp. 235−261). New York: Academic Press.

Pellegrini, A. D. (2001a). A longitudinal study of heterosexual relationships, aggression, and sexual harassment during the transition from primary through middle school. *Journal of Applied Developmental Psychology*, *22*, 119−133.

Pellegrini, A. D. (2001b). Sampling instances of victimization in middle school: A methodological comparison. In J. Juvonen & S. Graham (Eds.), *Peer harassment in school: The plight of the vulnerable and victimized* (pp. 125−146). New York: The Guilford Press.

Pellegrini, A. D. (2004). *Observing children in their natural worlds: A methodological primer* (2nd Edition). Mahwah, NJ: Erlbaum.

Pellegrini, A. D., & Long, J. D. (2002). A longitudinal study of bullying, dominance, and victimization during the transition from primary school through secondary school. *British Journal of Developmental Psychology*, *20*, 259−280.

Pike, A., Reiss, D., Hetherington, E. M., & Plomin, R. (1996). Using MZ differences in the search for nonshared environmental effects. *Journal of Child Psychology and Psychiatry*, *37*, 695−704.

Putallaz, M. (1987). Maternal behavior and children's sociometric status. *Child Development*, *54*, 417−426.

Rose, A. J., Swenson, L. P., & Waller, E. M. (2004). Overt and relational aggression and perceived popularity: Developmental differences in concurrent and prospective relations. *Developmental Psychology*, *40*, 378−387.

Russell, A., Hart, C. H., Robinson, C., & Olsen, S. F. (2003). Children's sociable and aggressive behavior with peers: A comparison of the U.S. and Australia, and contributions of temperament and parenting styles. *International Journal of Behavioral Development*, *27*, 74−86.

Sebanc, A. M. (2003). The friendship features of preschool children: Links with prosocial behavior and aggression. *Social Development*, *12*, 249−268.

Silverthorn, P., & Frick, P. (1999). Developmental pathways to antisocial behavior: The delayed-onset pathway in girls. *Development and Psychopathology*, *11*, 101−126.

Sroufe, L. A., & Fleeson, J. (1986). Attachment and the construction of relationships. In W. W. Hartup & Z. Rubin (Eds.), *Relationships and development* (pp. 51−71). Hillsdale, NJ: Erlbaum.

Stauffacher, K., & DeHart, G. B. (2005). Preschoolers' relational aggression with siblings and with friends. *Early Education and Development*, *16*, 185−206.

Susser, S. A., & Keating, C. F. (1990). Adult sex role orientation and perceptions of aggressive interactions between boys and girls. *Sex Roles*, *23*, 147−155.

Updegraff, K. A., Thayer, S. M., Whiteman, S. D., Denning, D. J., & McHale, S. M. (2005). Relational aggression in adolescents' sibling relationships: Links to sibling and parent–adolescent relationship quality. *Family Relations: Interdisciplinary Journal of Applied Family Studies*, *54*, 373−385.

Zahn-Waxler, C. (1993). Warriors and worriers: Gender and psychopathology. *Development and Psychopathology*, *5*, 79−89.