

# A gender-balanced approach to the study of peer victimization and aggression subtypes in early childhood

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## Abstract

A short-term longitudinal study during early childhood ( $N = 301$ ; 155 girls;  $M = 44.76$  months old,  $SD = 8.20$ ) investigated the prospective associations between peer victimization and aggression subtypes. Specifically, observations of relational and physical victimization as well as teacher reports of the forms (i.e., relational and physical) and functions (i.e., proactive and reactive) of aggression were collected at two time points during an academic year. Within- and between-group gender differences were examined as part of the preliminary analyses. In order to address key study questions, both directions of effect between peer victimization and aggression subtypes were examined. We found that teacher-reported proactive relational aggression predicted decreases in observed relational victimization over time, whereas reactive relational aggression predicted increases in observed relational victimization over time. Ways in which these and other findings extend the literature are discussed.

In 1996, Nicki R. Crick and Jennifer K. Grotpeter introduced a new subtype of peer victimization in their seminal research published in *Development and Psychopathology*. This work introduced the construct of relational victimization, which is the receipt of relational aggression from peers. Relational aggression is a construct Crick and Grotpeter (1995) coined to describe aggressive behavior (i.e., acts intended to hurt, harm, or injure another; Dodge, Coie, & Lynam, 2006) that uses the relationship or the threat of the removal of the relationship as the means or vehicle of harm. Prototypical exemplars of relational aggression include friendship withdrawal threats (e.g., “I won’t be your friend anymore”), social exclusion (e.g., “You can’t come to my birthday party”), spreading malicious rumor/gossip/lies, and giving someone the silent treatment (Crick, Ostrov, & Kawabata, 2007). The present study will expand on this seminal work to further examine the prospective associations between relational aggression and relational victimization.

Unlike other nonphysical forms of aggression such as indirect aggression (Lagerspetz, Björkqvist, & Peltonen, 1988),

relational aggression may manifest in both overt and covert ways, and may be displayed as both verbal and nonverbal behaviors (Crick et al., 2007). In addition, there are documented developmental differences in the expression of relational aggression. For example, in early childhood (ages 3–5 years old) children may display relatively sophisticated forms of relational aggression (e.g., malicious secret spreading), but these behaviors tend to be rather direct such that the identity of the aggressor is known to the victim and the aggression is based on the here and now or recent events (Ostrov, Woods, Jansen, Casas, & Crick, 2004). In contrast, in later developmental periods, relational aggression may be more covert or indirect in nature (Crick et al., 2007).

## Relational Victimization, Maladjustment, and Gender

Crick and colleagues initially demonstrated that both relational victimization and relational aggression added uniquely in the prediction of maladjustment (e.g., Crick, 1996; Crick, Ostrov, & Werner, 2006). For example, relational victimization predicts internalizing symptomatology, such as depressed affect (e.g., Crick & Bigbee, 1998; Prinstein, Boergers, & Vernberg, 2001). Moreover, failure to include assessments of relational aggression results in situations in which large percentages of aggressive girls are not identified (Crick, Ostrov, & Werner, 2006; Henington, Hughes, Cavell, & Thompson, 1998). The potential for these large percentages of unidentified aggressors is a concern given associations between relational aggression/victimization and several psychological and adjustment problems (e.g., depressive symptoms, eating pathology, personality pathology, conduct problems, attention

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problems, substance disorders, and peer rejection; Crick, 1996; Crick, Ostrov, & Werner, 2006; Murray-Close, Ostrov, & Crick, 2007; Sullivan, Farrell, & Kliewer, 2006). Given these and other findings suggesting the added predictive utility of relational aggression/victimization, the field now recognizes the importance of assessing both physical and relational subtypes of aggression and peer victimization.

Developmental theory also recognizes the important role that gender may have in moderating these links between peer victimization and psychopathology outcomes (Ostrov & Godleski, 2010; Rose & Rudolph, 2006). Specifically, relational victimization seems to be more predictive of problematic outcomes for girls relative to boys (e.g., Crick & Bigbee, 1998). Furthermore, the literature has reported on between- and within-group gender differences. Despite some inconsistencies across methodology, culture, and developmental period, the overall mean level rates of relational aggression are relatively similar for boys and girls (Card, Stucky, Sawalani, & Little, 2008). However, the within-group gender differences appear to be robust. That is, the modal form of aggression that girls display and receive is relational relative to physical aggression/victimization (e.g., Putallaz et al., 2007; for review see Ostrov & Godleski, 2010). In addition, the modal form of aggression and peer victimization for boys is believed to be physical relative to relational (see Ostrov & Godleski, 2010). However, within-gender effects have rarely been reported on in prior early childhood studies, and tests of these predictions are needed with young children whose gender identity may still be developing (see Ostrov & Godleski, 2010).

A few prior longitudinal studies have been conducted that have included assessments of relational and physical peer victimization. These studies have demonstrated important prospective links between peer victimization subtypes and the various aforementioned adjustment outcomes, which points to the importance of intervention for peer victimization (e.g., Crick & Bigbee, 1998; Prinstein et al., 2001). Given these robust associations, intervention programs have been developed to reduce relational victimization (e.g., the WITS Program; Leadbeater, Hogg, & Woods, 2003; Ostrov et al., 2009). We, however, do not have many studies that have focused on the predictors of relational victimization, and that is an important omission. Those that have been conducted have shown great promise at uncovering the developmental precursors to relational victimization. For example, emotional dysregulation has been shown to predict increases in relational victimization (Giesbrecht, Leadbeater, & MacDonald, 2011). In addition, peer rejection has also been shown to predict future relational victimization among young children (Ostrov, 2008). The more we can understand the individual and contextual factors that predict relational victimization, the better we can modify our intervention procedures to best reduce relational victimization. Ultimately, studying predictors of relational victimization is important because peer victimization is harmful and is associated with maladaptive trajectories for children and adolescents (e.g., Giesbrecht et al., 2011; Ostrov, 2010; Sullivan et al., 2006).

The sequential social process model of the causes of peer harassment suggests that aggression is an individual difference variable that predicts future victimization (Boivin, Hymel, & Hodges, 2001; Ostrov, 2008). Aggression may place children at risk for peer victimization, given the associated behavioral dysregulation, hostile attribution biases, and peer rejection that may co-occur with aggressive behavior among some children (Hogg & Leadbeater, 2007; Ostrov, 2008). This may be especially the case for children that tend to be “provocative” or aggressive victims rather than “passive” or withdrawn/submissive victims (Hanish & Guerra, 2000; Hodges & Perry, 1996). That is, because other children find their aggressive behavior to be objectionable or inappropriate, they may have diminished positive peer interactions and less social support, which makes them an easy target for peer victimization. Similarly, they may socialize primarily with other rejected aggressive children, which may increase the opportunity for experiencing victimization (Bierman, 2004). Evidence from the Quebec Longitudinal Study of Children confirmed these direct (i.e., from aggression to victimization) pathways between physical aggression and physical peer victimization (Boivin & Hymel, 1997). These models have been confirmed in studies that assessed relational aggression and relational victimization in early childhood (Ostrov, 2008), middle childhood (Ostrov & Godleski, 2013), and emerging adulthood (Ostrov, Hart, Kamper, & Godleski, 2011). Despite past work that supports aggression serving as a predictor of peer victimization (e.g., Buhs & Ladd, 2001; Dhami, Hogg, Leadbeater, & Boone, 2005; Hanish & Guerra, 2000; Hodges & Perry, 1999; Hogg & Leadbeater, 2007; Schwartz, McFadyen-Ketchum, Dodge, Pettit, & Bates, 1999), no known studies have tested links between forms and functions of aggression and peer victimization subtypes. Moreover, past theory and studies suggest bidirectional associations between aggression and peer victimization (e.g., Ostrov & Godleski, 2013). Hanish and Guerra (2000) proposed that peer victimization might be a risk factor for subsequent externalizing problems like aggression because children who are victimized may have reduced opportunity for sustained peer interactions. Thus, there is utility in examining both directions of effect (e.g., Ostrov & Godleski, 2013).

### Forms and Functions of Aggression

Several researchers have recognized the importance of delineating form (i.e., physical and relational) from function (i.e., proactive and reactive) when investigating aggressive behavior (e.g., Little, Jones, Henrich, & Hawley, 2003; Prinstein & Cillessen, 2003). Proactive functions of aggression refer to behaviors that are goal oriented, instrumental, and premeditated in nature (Dodge, 1991). Reactive functions of aggression are emotionally dysregulated, hostile, retaliatory, and displayed in response to a provocation or a perceived provocation (Dodge, 1991). Past work on forms and functions of aggression have shown the utility of this two-dimensional conceptualization (i.e., proactive physical aggression, reac-

tive physical aggression, proactive relational aggression, and reactive relational aggression; Bailey & Ostrov, 2008; Murray-Close & Rellini, 2012; Ostrov & Crick, 2007; Prinstein & Cillessen, 2003). Moreover, past factor analytic work has supported the utility of a conceptualization that delineates proactive and reactive relational aggression (Murray-Close, Ostrov, Nelson, Crick, & Coccaro, 2010), which is similar to prior factor analyses on proactive and reactive physical aggression (Poulin & Boivin, 2000).

It is surprising that few studies have been conducted on links between functions of aggression and peer victimization (see Card & Little, 2006). In one of the first known examinations of the links between functions of physical aggression and physical victimization, Salmivalli and Helteenvuori (2007) found that boys' reactive physical aggression predicted higher levels of future peer victimization (i.e., three items that included physical, verbal, and relational victimization). In addition, proactive physical aggression predicted lower levels of future peer victimization. However, no effects were found for girls. The authors posited that the lack of findings for girls might have been due to the reliance on a measure of physical aggression rather than including an assessment of relational forms of aggression (Salmivalli & Helteenvuori, 2007). These researchers further argued for the importance of taking gender into account when examining associations between aggression and peer victimization (Salmivalli & Helteenvuori, 2007).

Past studies have documented prospective bidirectional associations between peer rejection as well as emotion dysregulation and reactive functions of aggression (e.g., Ostrov et al., 2013). In contrast, proactive functions of aggression have been associated with social dominance, leadership, and social skills among children (e.g., Dodge & Coie, 1987; see Card & Little, 2006). Proactive functions of aggression have been recently shown to predict increases in emotion regulation skills among young children (Ostrov, Murray-Close, Godleski, & Hart, 2013). Theoretically, reactive functions of aggression should predict future peer victimization because reactively aggressive children are by definition impulsive and emotionally dysregulated, which may be irritating, disturbing, or obnoxious to others (Salmivalli & Helteenvuori, 2007). Moreover, past scholars have argued that reactively aggressive children frequently vent emotion (e.g., crying), and these displays, coupled with associated emotional outbursts (i.e., reactive aggression is typically marked by hostility), might be reinforcing for bullies or aggressors (Salmivalli & Helteenvuori, 2007). Finally, seeking revenge, which is a component of reactive functions of aggression (i.e., reactive aggression is typically in response to a provocation or perceived provocation) has been shown to perpetuate peer victimization (e.g., Kochenderfer-Ladd, 2004; see Salmivalli & Helteenvuori, 2007). In contrast, proactive physical aggression has been shown to be uniquely and negatively associated with peer victimization, and scholars have argued that proactive functions of aggression might be protective against peer victimization because proactive aggressors are often bullies

(Prinstein & Cillessen, 2003) or socially dominant (Pellegrini et al., 2011) and may be feared by others, which makes them poor targets (Salmivalli & Helteenvuori, 2007). Thus, past research and theory suggests that reactive functions of aggression should predict increases in peer victimization, whereas proactive functions of aggression should be associated with either no change or decreases in peer victimization. However, this prior work has not included a gender-balanced perspective with regard to both forms of aggression/victimization, and this is a key limitation of this past work.

### Early Childhood

The majority of prior research on the present topic has been addressed in middle childhood and adolescence, and only a few known studies have addressed the temporal associations between aggression and peer victimization during early childhood. This is surprising given that Crick, Casas, and Ku first introduced the study of relational victimization during early childhood in 1999. This past work during early childhood has shown support for what has been called the *specificity hypothesis of aggression* (Crick, Casas, & Mosher, 1997; Ostrov, 2008, 2010). As initially proposed, children should receive the same type of behavior they display to others in kind (e.g., "You can't come to my birthday party" is followed by similar social exclusion tactics, and hitting or kicking is not the means of retaliation). This hypothesis argues that each form of aggression should be positively associated prospectively only with the same form of victimization (i.e., physical aggression with physical victimization, relational aggression with relational victimization). The mechanism that is theorized to account for these links is a social learning process, which was supported in a past study in which researchers found that preschoolers' rates of physical victimization were uniquely associated with increases in physical aggression (Ostrov, 2010). Moreover, children who were relationally victimized increased only in their rates of relational aggression (Ostrov, 2010). It is believed that the initial victims learn about aggression from these victimization experiences. That is, they are being socialized by the victimization experiences they have with their peers and in turn model only those *specific* forms of aggression in the future. This explanatory model seems better equipped to address how victims become aggressors over time. It is not surprising that the alternative model and reverse direction of effect (i.e., aggression predicting victimization) has not shown the same clear patterns of specificity. For example, physical aggression (in addition to relational aggression for girls only) was found to predict changes in relational victimization during early childhood (Ostrov, 2008). The inclusion of functions of aggression could conceivably help to further elucidate these prospective associations among young children. In addition, the inclusion of functions of aggression would allow for replication and extension of these prior findings during early childhood. For these reasons, the present study will examine both directions of effect.

## Hypotheses

The present study has several preliminary study goals and key hypotheses. As one of the largest known observational studies of forms and functions of aggression during early childhood, the present study has an opportunity to contribute data on both within-group and between-group gender differences. To this end, we hypothesize that girls will display more relational relative to physical aggression and that this pattern will hold regardless of function type. Further, across the function types, we predict that boys will display more physical compared to relational aggression. With regard to the between-group gender differences, we anticipate that girls would display more proactive and reactive relational aggression when compared to boys, whereas we predict boys would display more proactive and reactive physical aggression relative to girls. Even though overall between-group gender differences are relatively small, meta-analytic findings also indicate that developmental period and methodology may impact the size of these gender differences (Card et al., 2008). That is, prior research in this developmental period (i.e., early childhood) with the adopted methodology (e.g., teacher reports and observations) in the present study provides some justification for the a priori prediction of between-group gender differences (e.g., Crick, Ostrov, Burr, et al., 2006; Ostrov, 2006; Ostrov & Keating, 2004).

A central question in the present study concerned the prospective association between forms and functions of aggression and peer victimization. Based on the aforementioned theory and past empirical support, we hypothesize that reactive relational aggression will predict increases in relational victimization. In contrast, we anticipate that proactive relational aggression will predict decreases in relational victimization. Further, we hypothesize that reactive physical aggression will uniquely predict increases in physical victimization. Finally, we predict that proactive physical aggression will uniquely predict decreases in physical victimization. We will also explore the possible moderating role of gender (see Ostrov & Godleski, 2010). Prior literature has shown robust links between forms of aggression and peer victimization in early childhood (Ostrov, 2008). However, studies with preschoolers (Ostrov, 2010) and older children did reveal the utility of examining the reverse direction of effect or models testing if peer victimization predicts changes in aggressive behavior (Ostrov & Godleski, 2013), which is supported by the specificity hypothesis of aggression. Given the relatively limited past research, the alternative models testing peer victimization subtypes as the predictors and aggressive behavior subtypes as the respective outcomes are exploratory.

## Method

### Participants

Three hundred and one children (155 girls; 51.5%) participated in the study at Time 1 and were an average of 44.76

months old ( $SD = 8.20$ ) at the beginning of data collection. The ethnic composition of the participating sample was as follows: 9.3% African American, 9.6% Asian/Asian American, 7.0% Hispanic/Latino, 1.3% Native American, 59.8% Caucasian, 5.6% multiracial, 3.3% other ethnicities, and 4.1% unknown. Based on parental occupations and reported family income, the overall sample was primarily middle class (Ostrov & Bishop, 2008; Ostrov et al., 2013). The children were recruited in three large cohorts from the same schools and classrooms. There were no significant cohort effects for the key study variables, so the cohorts were included into an overall sample to maximize statistical power. Prior data from the first two individual cohorts has been previously published (e.g., Ostrov et al., 2013; Ostrov, Ries, Stauffacher, Godleski, & Mullins, 2008), but these articles did not address the specific questions in the current study and had no overlap with the key measures or data used in the present study.

Children were recruited from seven urban and suburban schools, and 28 participating mixed-age classrooms within those schools, in the Buffalo, New York, and Amherst, New York, area. Of the participating schools, four were university/college/community college affiliated and three were community-based schools. Each of the schools had a similar educational philosophy and was either currently or recently accredited by the National Association for the Education of Young Children. Within the 28 classrooms, the teachers had known the participating child for an average of 10.64 months at Time 1 ( $SD = 10.18$ ). Across the two time points, attrition was small (10.6%; 16 girls, 16 boys) and was due to children changing schools or families moving out of the area. The final sample with prospective data from Time 1 to Time 2 was 269 children (139 girls). Attrition analyses indicated that there were no significant differences on most of the key study variables between the 32 children (10.6%) who left the study after Time 1 compared to the 269 children who remained in the study ( $ts < 1.28$ , *ns*). The only exception was that those children who left the study were less relationally victimized at Time 1 ( $M = 0.18$ ,  $SD = 0.44$ ) relative to their peers ( $M = 0.49$ ,  $SD = 0.66$ ),  $t(297) = 2.16$ ,  $p = .032$ ,  $d = 0.55$ . This difference made it more difficult to confirm the predicted effects and thus was not addressed.

### Measures

*Observations of peer victimization.* Focal child sampling with continuous recording (see Ostrov & Hart, 2012; Pellegrini, 2004) of children's relational and physical victimization was conducted, and these observations occurred during free-play sessions using revised procedures (Crick, Ostrov, Burr, et al., 2006) originally developed by Ostrov and Keating (2004; for a review, see Leff & Lakin, 2005). In keeping with the past procedures, each child was observed for exactly 10 min (using a stopwatch) for each of the eight assessments by a trained observer over a 2-month period. That is, each child was observed for 80 min at each of the two overall time points, or 160 min of total observation time per child

across the study. Observers (26 female undergraduate as well as 7 female and 2 male graduate students/professional staff who were used primarily for training and reliability purposes) were trained via discussion, watched past DVDs from prior studies, conducted live practice coding, and completed a coding examination. Observers always conducted observations within earshot of the focal child in order to hear and see the full peer interactions. Therefore, observers were trained to reduce reactivity and maintained a “minimally responsive manner” in the classroom (i.e., monitoring nonverbals, posture, sitting position, eye contact, and movement around the classroom or playground; Pellegrini, 2004). Observers spent a minimum of 2 days sitting in the classrooms learning the names of the participants and working to diminish participant reactivity. Reactivity (i.e., frequency of comments, direct eye contact from the focal child, and questions from the focal child to the observer) was low over the course of the study ( $M < 2.60$ ,  $SD < 2.77$ ; Crick, Ostrov, Burr, et al., 2006). Focal children were only observed one time per day. The observation order was typically random, although efforts were made to maintain a similar number of current observation sessions per each child (i.e., attempts were made so that all children received two sessions before a third session was completed). If a child went out of range for more than 30 s during an observation, the session was discontinued and redone either later on the same day or on the next available day.

For the current study, observers recorded the focal child’s display of relational victimization (e.g., being told “You can’t play with us”) and physical victimization (e.g., being hit or shoved). Observers recorded physical aggression, relational aggression, and additional behaviors for purposes of different study goals (see Ostrov, 2008, 2010). The observers always recorded a written description of what occurred and the gender of all children involved. A paper and pencil approach was used, and observers were trained to briefly record the behaviors on an observational form in order to avoid missing details while writing (for more details see Ostrov & Keating, 2004). In keeping with past procedures, each separate independent behavior, based on a temporal break in the interaction, was recorded as a new behavior. Behaviors were summed to yield total scores.

Reliability was assessed for approximately 15% of the time and was conducted across the study to avoid observer drift concerns, a threat to the validity of the study (Ostrov & Hart, 2012; Pellegrini, 2004). As the authors of this system have noted before (see Crick, Ostrov, Burr, et al., 2006; Ostrov & Keating, 2004), the means by which the observations are collected was not amenable to kappa coefficients, because observers did not indicate intervals when victimization behaviors were absent (see Ostrov & Hart, 2012; Pellegrini, 2004). The use of intraclass correlation coefficients (ICCs) has been suggested in similar situations (see McGraw & Wong, 1996) and used by past authors (e.g., Arnold, Homrock, Ortiz, & Stowe, 1999; Crick, Ostrov, Burr, et al., 2006; NICHD Early Child Care Research Network, 2004; Ostrov & Keating, 2004). Past studies have supported the fa-

vorable reliability of the observation system (i.e., ICCs  $> 0.70$ ; Ostrov & Keating, 2004). In the present investigation, reliability was acceptable for observations of relational and physical victimization (ICCs  $> 0.70$ ) at both time points. This observational system has also demonstrated appropriate validity in the past with moderate correlations between teachers and observers (see Leff & Lakin, 2005).

*Forms and functions of aggression.* Teacher ratings of each child’s aggressive behavior were obtained with the Preschool Proactive and Reactive Aggression—Teacher Report (Ostrov & Crick, 2007). This measure includes 12 items, 3 for each type of aggressive behavior: proactive physical aggression (e.g., “This child often hits, kicks, or pushes to get what s/he wants”), reactive physical aggression (e.g., “If other children anger this child, s/he will often hit, kick, or punch them”), proactive relational aggression (“To get what s/he wants, this child will often ignore or stop talking to them”), and reactive relational aggression (e.g., “When this child is upset with others, s/he will often ignore or stop talking to them”). Teachers responded on a 5-point scale (1 = *never or almost never true*, 5 = *always or almost always true*). The Cronbach alphas have been acceptable ( $>0.70$ ) in the past, and significant moderate correlations between teachers and observers have been found ( $r_s > .34$ ) for all four subtypes of aggression (Ostrov & Crick, 2007). In the present study, we removed two items: one for proactive relational aggression (i.e., Item 10, “To get what this child wants, s/he often tells others that s/he won’t be their friend anymore) and one for reactive relational aggression (i.e., Item 8, “When s/he is angry at others, this child will often tell them that s/he won’t be their friend anymore”), to reduce the correlation between these constructs. Two positively toned filler items were also included to avoid negative response bias. In the present study, the Cronbach alphas at Time 1 and Time 2 were internally consistent: proactive relational aggression ( $\alpha = 0.76$ ), reactive relational aggression ( $\alpha = 0.69$ ), proactive physical aggression ( $\alpha = 0.85$ ), and reactive physical aggression ( $\alpha = 0.86$ ). At Time 2 the Cronbach alphas were also acceptable for proactive relational aggression ( $\alpha = 0.82$ ), reactive relational aggression ( $\alpha = 0.80$ ), proactive physical aggression ( $\alpha = 0.90$ ), and reactive physical aggression ( $\alpha = 0.93$ ).

### Procedure

The study was approved by our university’s social and behavioral sciences institutional review board, and parents provided written consent prior to participation. Children’s head teachers also provided written informed consent prior to completing reports. In order to permit time for children to establish peer relationships and for teachers to get to know the children, observations were started approximately 8 weeks after the children began attending school (i.e., most began school in August) for that year (i.e., observations began roughly in mid-October). Observations typically took 8 weeks to collect at each of the time points. The second time point was approxi-

mately 4 months after the conclusion of Time 1 observations (i.e., late March depending on school vacations). Teacher reports were always distributed when approximately half of the observations were completed. Teachers were provided an honorarium (\$10–\$25 gift certificate depending on class size) after completing packets at each time point. Participants and school personnel received newsletters summarizing the major results of the project.

## Results

First, preliminary analyses (i.e., descriptive statistics, mean-level differences, stability, and correlations between study variables) were conducted. Second, using hierarchical regression models, we tested the prospective associations between forms and functions of aggression, and changes in peer victimization subtypes, when controlling for gender, age, and initial levels of behavior. We also examined moderation by gender. As part of this goal, we tested both directions of effects between aggressive behavior and peer victimization.

### *Attrition, descriptive statistics, and correlations*

First, descriptive statistics were calculated and are found in Table 1. Skew was less than 3 (range = 0.67 to 2.27) and kurtosis less than 8 (range = –0.07 to 7.5), suggesting that non-normality of the data was not a concern (Kline, 2011) for all variables except for observations of relational victimization at Time 1. A square root transformation was conducted and normalized the skew (1.08) and kurtosis (0.30) of this variable.

Second, correlations between study variables were conducted and are presented in Table 1. Age was also correlated with each study variable and revealed significant associations with observations of relational victimization at Time 1 ( $r = .16, p = .006$ ), and thus age was controlled in the subsequent regression models. The bivariate associations showed that observations of physical and relational victimization were significantly correlated at Time 1 ( $r = .14, p = .02$ ) and Time 2 ( $r = .30, p < .001$ ), and consistent with similar studies (e.g., Ostrov, 2008; Sullivan et al., 2006) the magnitude of these associations was low to moderate. Each form of behavior was significantly stable across the study (see Table 1). As expected, the overlap between proactive and reactive physical aggression as well as proactive and reactive relational aggression was high, which has been found with this measure in the past (Ostrov & Crick, 2007; Ostrov et al., 2013). However, the variance inflation factor (VIF) estimates for each predictor in the regression models reported below suggested that multicollinearity was not a concern (VIF values in the current analyses ranged from 1.03 to 3.16, which are well below the established threshold of 10).

### *Within-group and between-group gender differences*

Third, preliminary analyses were also conducted to test both within- and between-group gender differences. Prior to run-

ning the within-group tests, the eight aggression variables were rescored by calculating the respective averages in order to make the variables comparable because the variables had different numbers of items (i.e., physical aggression subscales had one more item than the relational aggression subscales).

For girls, the anticipated within-group differences were significant at both time points but are only reported at the initial time point for ease of communication. That is, girls displayed more proactive relational ( $M = 1.88, SD = 0.96$ ) than proactive physical ( $M = 1.26, SD = 1.25$ ) aggression,  $t(148) = 9.04, p < .001, d = 0.56$ . Similarly, girls also displayed more reactive relational ( $M = 2.16, SD = 1.05$ ) than reactive physical ( $M = 1.72, SD = 0.78$ ) aggression,  $t(147) = 5.54, p < .001, d = 0.48$ . These findings confirmed our predictions and add to the current literature (e.g., Putallaz et al., 2007), suggesting these effects are also present for young children.

For boys, an unanticipated pattern emerged when examining the within-group effects. According to teachers, at Time 1, boys displayed more proactive relational ( $M = 1.78, SD = 0.88$ ) than proactive physical ( $M = 1.50, SD = 0.78$ ) aggression,  $t(147) = 5.54, p < .001, d = 0.34$ , but showed similar levels of the two forms of proactive aggression at Time 2. Given the current lack of replication at Time 2, future work will be needed to replicate this effect. Boys did not show a significant difference in levels of reactive relational aggression or reactive physical aggression at either time point.

The between-group gender differences indicated that girls ( $M = 3.66, SD = 1.89$ ) displayed more proactive relational aggression compared to boys ( $M = 3.07, SD = 1.50$ ), but only at Time 2,  $t(241) = -2.72, p = .001, d = 0.35$ . According to teachers, girls ( $M = 4.10, SD = 1.98$ ) also displayed more reactive relational aggression compared to boys ( $M = 3.60, SD = 1.65$ ), but also only at Time 2,  $t(241) = -2.12, p = .016, d = 0.27$ . Thus, despite obtaining these predicted and moderate effects at Time 2, there were no significant gender effects for either function of relational aggression at Time 1.

Boys ( $M = 4.49, SD = 2.31$ ) displayed more proactive physical aggression than did girls ( $M = 3.76, SD = 1.68$ ) at Time 1,  $t(294) = 3.09, p < .001, d = 0.36$ . Boys ( $M = 6.11; SD = 3.19$ ) also displayed more reactive physical aggression than did girls ( $M = 5.14, SD = 2.33$ ) at Time 1,  $t(293) = 2.99, p < .001, d = 0.35$ . At Time 2, boys ( $M = 6.02, SD = 3.42$ ) displayed more reactive physical aggression than girls ( $M = 4.90, SD = 2.75$ ) displayed,  $t(262) = 2.92, p = .001, d = 0.36$ , but there was no significant gender difference ( $p = .10$ ) in rates of teacher-reported proactive physical aggression at Time 2. Thus, the overall pattern of findings is consistent with a myriad of studies documenting that young boys are more physically aggressive than are young girls.

### *Regression models*

Fourth, to test the key study goals a series of hierarchical regression models were conducted. The first two models were designed to test aggression subtypes as predictors of change



**Table 2.** Regression models testing prospective relations between aggression and peer victimization subtypes

Outcome, Step, and Predictors	$\beta$	$F, \Delta F$	$R^2$	$\Delta R^2$
Model 1: Rvict OBS T2				
Step 1				
Age	-0.05	(3, 245) = 8.21, $p < .001$	.09	
Pvict OBS T1	0.11			
Rvict OBS SQRT T1	0.27***			
Step 2				
Gender	0.03	(5, 240) = 3.08, $p = .010$		.06
Pro Pagg TR T1	-0.13			
Rea Pagg TR T1	0.15			
Pro Ragg TR T1	-0.30**			
Rea Ragg TR T1	0.35***			
Model 2: Pvict OBS T2				
Step 1				
Age	-0.01	(3, 245) = 5.62, $p = .001$	.06	
Pvict OBS T1	0.20***			
Rvict OBS SQRT T1	0.12			
Step 2				
Gender	-0.19**	(5, 240) = 3.67, $p = .003$		.07
Pro Pagg TR T1	0.01			
Rea Pagg TR T1	0.08			
Pro Ragg TR T1	-0.26*			
Rea Ragg TR T1	0.14			
Step 3				
Pro Ragg TR T1 $\times$ Gender	1.00*	(4, 236) = 1.85, $p = .12$		.03

Note: OBS, Observations; TR, teacher report; SQRT, square root transformation; T1, Time 1; T2, Time 2; Pvict, physical victimization; Rvict, relational victimization; Pro, proactive; Rea, reactive; Ragg, relational aggression; Pagg, physical aggression. All two-way interactions from Step 2 with gender (boys = 1, girls = 2) were run in each model and are only shown when significant for ease of communication.

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

a different pattern of effects. At Time 1, boys were engaging in higher levels of proactive relational aggression than physical aggression, although all other analyses indicated that boys displayed similar levels of both relational and physical aggression. Between-group differences emerged for both functions of relational aggression, but only at Time 2. It is possible that these effects represent developmental change in that girls' rates of relational aggression may be increasing over the course of the academic year relative to boys. However, prior observational research during this developmental period has not demonstrated these timing effects when assessing overall rates of relational aggression (Crick, Ostrov, Burr, et al., 2006) or when adopting a similar forms and functions approach (Ostrov & Crick, 2007). Thus, future longitudinal work is needed to further examine and replicate this effect. When comparing between-group gender differences in physically aggressive behavior, boys engaged in higher levels of both proactive and reactive physical aggression than did girls. The current findings indicate that although boys are engaging in higher levels of physical aggression than are girls, they are also displaying similar levels of relational aggression in early childhood. In line with Ostrov and Godleski's (2010) gender-linked model of aggressive behavior, this suggests that gender identity may still be developing for boys during this develop-

mental timeframe, leading them to display both forms of aggression during early childhood.

The prospective findings seem to suggest that both functions of physical aggression may be more stable than functions of relational aggression during early childhood. However, prior studies using this measure and similar designs have not found differential levels of stability between these subtypes of aggression (Ostrov & Crick, 2007; Ostrov et al., 2013). Given that we modified the scale in order to reduce the overlap between the functions of relational aggression (but did not reduce the scale for physical aggression subtypes), it is difficult to compare across the forms of aggression in the present study and perhaps inappropriate to make comparisons between the present findings and prior studies. Therefore, future research with a more comprehensive assessment of forms and functions of aggression will be needed to examine these questions. However, there are some indirect indications that levels of physical aggression/victimization may have been more common than relational aggression/victimization (i.e., comparison of mean levels of observations of physical and relational victimization). It is conceivable that functions of physical aggression did not predict changes in peer victimization because experiences with physical aggression were more normative or acceptable during this develop-

**Table 3.** Regression models testing prospective relations between peer victimization and aggression subtypes

Outcome, Step, and Predictors	$\beta$	$F, \Delta F$	$R^2$	$\Delta R^2$
<b>Model 3: Pro Pagg TR T2</b>				
Step 1				
Age	0.05	(5, 245) = 45.26, $p < .001$	.48	
Pro Pagg TR T1	0.58***			
Rea Pagg TR T1	0.05			
Pro Ragg TR T1	0.25**			
Rea Ragg TR T1	-0.13			
Step 2				
Gender	0.03	(3, 242) = .87, $p = .46$		.01
Pvict OBS T1	0.07			
Rvict OBS SQRT T1	0.01			
<b>Model 4: Rea Pagg TR T2</b>				
Step 1				
Age	0.01	(5, 243) = 52.20, $p < .001$	.52	
Pro Pagg TR T1	0.42***			
Rea Pagg TR T1	0.31***			
Pro Ragg TR T1	0.10			
Rea Ragg TR T1	-0.05			
Step 2				
Gender	-0.06	(3, 240) = 1.95, $p = .12$		.01
Pvict OBS T1	0.09			
Rvict OBS SQRT T1	0.01			
<b>Model 5: Pro Ragg TR T2</b>				
Step 1				
Age	-0.02	(5, 225) = 3.94, $p = .002$	.08	
Pro Pagg TR T1	0.03			
Rea Pagg TR T1	0.19			
Pro Ragg TR T1	-0.04			
Rea Ragg TR T1	0.15			
Step 2				
Gender	0.21**	(3, 222) = 3.92, $p = .009$		.05
Pvict OBS T1	0.05			
Rvict OBS SQRT T1	0.07			
<b>Model 6: Rea Ragg TR T2</b>				
Step 1				
Age	0.02	(5, 225) = 4.22, $p = .001$	.09	
Pro Pagg TR T1	0.05			
Rea Pagg TR T1	0.17			
Pro Ragg TR T1	-0.03			
Rea Ragg TR T1	0.15			
Step 2				
Gender	0.17*	(3, 222) = 2.36, $p = .07$		.03
Pvict OBS T1	0.05			
Rvict OBS SQRT T1	0.03			

Note: OBS, Observations; TR, teacher report; SQRT, square root transformation; T1, Time 1; T2, Time 2; Pvict, physical victimization; Rvict, relational victimization; Pro, proactive; Rea, reactive; Ragg, relational aggression; Pagg, physical aggression; All two-way interactions from Step 2 with gender (boys = 1, girls = 2) were run in each model, were all nonsignificant, and are not shown for ease of communication.

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

mental period (Dodge et al., 2006). Future research is needed to further test these hypotheses and ascertain how normative physical aggression/victimization is relative to relational aggression/victimization during early childhood.

This study was conducted to test the sequential social process model of the causes of peer harassment (Boivin & Hymel, 1997; Hanish & Guerra, 2000; Ostrov, 2008; Ostrov & God-

leski, 2013) and associated specificity hypothesis of aggression (Crick et al., 1999; Ostrov, 2010). We found some evidence in support of the social process model. That is, we found some evidence that the predicted direction of effect from aggression to peer victimization was supported. For example, regression models revealed that only aggression constructs predicted changes in peer victimization and the reverse

direction of effect was not supported. Aggressive children are often rejected by their peers or have few social supports, which may put them at risk for peer victimization (Hanish & Guerra, 2000; Ostrov, 2008; Ostrov & Godleski, 2013). The alternative model was not supported in the present study (although see Ostrov, 2010; Ostrov & Godleski, 2013) and suggests that when both forms and functions of aggression are considered and simultaneously controlled, the overall direction of effect seems to be relatively clear. Given past evidence and the specificity hypothesis of aggression, which posits that forms of victimization predict changes in respective forms of aggression (e.g., Ostrov, 2010), future research is needed to replicate the present pattern of effects with functions of aggression and with a more comprehensive measure of proactive and reactive functions of physical and relational aggression. We did find that only relational aggression subtypes were predictive of increases in relational victimization. However, similar effects were not found for physical aggression subtypes and physical victimization, which was surprising given the prior literature with older children (e.g., Dhami et al., 2005; Hanish & Guerra, 2000; Hodges & Perry, 1999; Schwartz et al., 1999), and thus future research is needed to continue to examine this hypothesis.

The present test of the social process model adds important information to the literature by examining if the functions of aggressive behavior were uniquely related to peer victimization subtypes. Theoretically, reactive functions of aggression should predict future peer victimization because reactively aggressive children are by definition dysregulated. The associated revenge seeking, emotional venting, or impulsive behavior may be triggers leading to others victimizing them (Kochenderfer-Ladd, 2004; Salmivalli & Helteenvuori, 2007). In contrast, scholars have posited that proactive physical aggression should be uniquely and negatively associated with peer victimization because proactive aggressors have qualities (e.g., social dominance; Pellegrini et al., 2011), which make them poor targets (Salmivalli & Helteenvuori, 2007). Moreover, these children by definition instigate aggressive acts, causing them to be feared by their peers (Salmivalli & Helteenvuori, 2007). The present study found evidence in support of these theoretical assertions. That is, reactive relational aggression was associated with increases in relational victimization. In keeping with predictions, proactive relational aggression was associated with decreases in relational victimization for boys and girls as well as with physical victimization among boys only.

In general, the present results support prior published findings (e.g., Salmivalli & Helteenvuori, 2007) and extend this work to relational aggression in a younger sample. Moreover, they suggest that future tests of the sequential social process model of the causes of peer harassment should continue to include assessments of the functions of aggressive behavior in order to further delineate these important developmental mechanisms. The finding that gender moderated the association between proactive relational aggression and physical victimization is potentially interesting. Certainly replication is needed, but it may be that knowing to whom the behavior

is directed may impact the pattern of findings. Perhaps boys who are proactive relational aggressors are spending most of their social time with other-sex peers and directing any aggressive behavior to these girls whom do not retaliate in kind when male perpetrators use physical force. These findings have implications for the specificity hypothesis of aggression, and it may be that a match or mismatch in the gender of the dyad (i.e., focal child's gender and the recipient peer's gender) may impact the degree to which behaviors mirror the displayed behavior in kind or not. Future work that more carefully examines these specific questions would help to further elucidate these possible patterns.

The present study has several strengths and addresses novel empirical questions. The study relied on multiple informants (i.e., teacher reports and time-intensive systematic observations) and a short-term longitudinal design with one of the largest sample sizes for observational studies of this type (Crick, Ostrov, Burr, et al., 2006,  $N = 91$ ; Juliano, Werner, & Cassidy, 2006,  $N = 67$ ; Keating & Heltman, 1994,  $N = 57$ ; McEvoy, Estrem, Rodriguez, & Olson, 2003,  $N = 56$ ; Ostrov & Keating, 2004,  $N = 48$ ; Pellegrini, Long, Roseth, Bohn, & Van Ryzin, 2007,  $N = 73$ ; Pellegrini, Roseth, et al., 2007,  $N = 65$ ; Roseth et al., 2011,  $N = 88$ ). We also tested novel theoretically informed empirical questions among young children in a particularly important developmental period for future social emotional development. More specifically, this study adds significantly to our knowledge of the interrelations between the forms and functions of aggression and victimization (e.g., Salmivalli & Helteenvuori, 2007). In particular, demonstrating important gender differences in the associations with proactive relational aggression is a particular strength of the current study and accounts for limitations in past research in which relational aggression was not included (Salmivalli & Helteenvuori, 2007).

#### *Limitations and future directions*

Despite the various strengths, there are several limitations that must be addressed in future research. First, the demographics of the sample limit the external validity and generalizability of the findings. The childcare centers that were used are open to the community and the sample was ethnically and socioeconomically diverse, but the schools comprised children who attend high-quality childcare centers in an urban or suburban area. The decision to use these high-quality childcare centers, which generally share an educational philosophy and have similar school climates, was motivated by a desire to eliminate as many confounding variables as possible. However, future research should be conducted to replicate the present findings in a more diverse sample and with children attending schools that have greater range in quality.

Second, the time interval between the two time points was brief, given the amount of time it took to collect the observational methods. This interval is consistent with prior short-term longitudinal studies (e.g., Crick, Ostrov, Burr, et al., 2006; Hay, Castle, Davies, Demetriou, & Stimson, 1999)

and may be an appropriate design for testing the proposed mechanisms that likely occur over short intervals, but additional prospective longitudinal work is needed that examines these associations across a longer time period and especially as children make the transition from early to middle childhood.

Third, much like past studies (e.g., Ostrov & Crick, 2007), given the high overlap between teacher-reported proactive and reactive relational aggression, we reduced the number of items on the teacher-report form such that only two items were included. This procedure resulted in the possibility of a reduced range of responses for these subscales, and the final overlap although reduced was still rather high. The diagnostic statistics (i.e., VIF) did not indicate that multicollinearity was an issue, but future work must attempt to reduce this overlap by adding in additional items and using alternative methods.

Fourth, our findings are limited to early childhood, and future research is needed to replicate these effects in later developmental periods. Prior research on physical aggression and victimization (Hoglund & Leadbeater, 2007) has demonstrated the value of examining similar questions in a later developmental period. However, it is possible that a different pattern of results would emerge in later developmental periods. When particular aggressive behaviors are considered atypical/nonnormative or generally are viewed as inappropriate and trigger more severe sanctions (i.e., physical aggression becomes less normative when it is labeled as “assault” in later developmental periods), it is plausible that the display of those behaviors will likely promote peer maltreatment, which are assertions generally in the spirit of Crick’s (1997) nonnormative model of aggression. Thus, it is conceivable that physical aggression will predict increases in peer victimization in late adolescence when the peer group and society begins to view physical aggression as unacceptable and aberrant.

Fifth, we must continue to examine predictors and outcomes of relational victimization with an eye toward the importance of multiple levels of influence (from cells and neurons to neighborhoods and cultures) and domains (i.e., social, cognitive, and biological) of functioning. That is, a developmental psychopathology perspective would continue to search for the theoretically driven dynamic bidirectional prospective associations between relational victimization and various predictors and outcomes. Nicki R. Crick always maintained this theoretical orientation and framework in her work (e.g., Crick & Zahn-Waxler, 2003), and future studies must continue this important programmatic research within the same multidisciplinary developmental perspective.

## References

- Arnold, D. H., Homrock, S., Ortiz, C., & Stowe, R. M. (1999). Direct observation of peer rejection acts and their temporal relation with aggressive acts. *Early Childhood Research Quarterly, 14*, 183–196.
- Bailey, C. A., & Ostrov, J. M. (2008). Differentiating forms and functions of aggression in emerging adults: Associations with hostile attribution biases and normative beliefs. *Journal of Youth & Adolescence, 37*, 713–722. doi:10.1007/s10964-007-9211-5
- Bierman, K. L. (2004). *Peer rejection: Developmental processes and intervention strategies*. New York: Guilford Press.
- Boivin, M., & Hymel, S. (1997). Peer experiences and social self-perceptions: A sequential model. *Developmental Psychology, 33*, 135–145.
- Boivin, M., Hymel, S., & Hodges, E. V. E. (2001). Toward a process view of peer rejection and harassment. In M. Putallaz & K. L. Bierman (Eds.),

## Implications

In this study, an analysis of the functions of aggression enabled a key distinction to be made as to whether aggressive behavior predicted increases or decreases in peer victimization. Our findings imply that children who react impulsively to slights or perceived slights may benefit from being taught coping skills in order to reduce the risk that they will endure long-term social difficulties. Moreover, the vast array of gender differences found in this study suggests that intervention programs should be sensitive to the types of aggression and victimization that are salient for each gender. Although in need of replication, the effects suggested that, according to teachers, boys may display more proactive relational aggression relative to proactive physical aggression. This finding indicates that young boys may also display relationally aggressive behavior, especially in the service of instrumental goals, and we should be mindful of both girls and boys when designing our prevention and intervention efforts regarding relational aggression. In addition to informing prevention and intervention programs designed to reduce aggression and victimization in young children (e.g., Ostrov et al., 2009), our findings suggest that future studies should integrate multiple approaches to the conceptualization of aggression (i.e., form, function, and gender) in order to develop a nuanced picture of risk factors for victimization.

## Conclusions

In conclusion, it was revealed that teacher-reported proactive relational aggression predicted a decrease in observed relational victimization over time. Conversely, teacher-reported reactive relational aggression predicted an increase in observed relational victimization over time. These findings demonstrate the discriminant validity of the forms and functions of aggression approach (see also Ostrov & Crick, 2007; Ostrov et al., 2013). The present study relied on theory, methods, and an overall empirical approach that was in keeping with the research program of Crick and her colleagues. Nicki R. Crick’s seminal work expanded aggression research to include a more gender-balanced approach to the study of aggression and peer victimization as well as our overall conceptualizations of psychopathology (see Crick & Zahn-Waxler, 2003). Her vast theoretical, empirical, and applied contributions will continue to shape and influence the aggression literature and the field of developmental psychopathology for generations to come.

- Aggression, antisocial behavior, and violence among girls: A developmental perspective* (pp. 265–289). New York: Guilford Press.
- Buhs, E. S., & Ladd, G. W. (2001). Peer rejection as antecedent of young children's school adjustment: An examination of mediating processes. *Developmental Psychology, 37*, 550–560. doi:10.1037/0012-1649.37.4.550
- Card, N. A., Stucky, B. D., Sawalani, G. M., & Little, T. D. (2008). Direct and indirect aggression during childhood and adolescence: A meta-analytic review of gender differences, intercorrelations, and relations to maladjustment. *Child Development, 79*, 1185–1229. doi:10.1111/j.1467-8624.2008.01184.x
- Card, N. A., & Little, T. D. (2006). Proactive and reactive aggression in childhood and adolescence: A meta-analysis of differential relations with psychosocial adjustment. *International Journal of Behavioral Development, 30*, 466–480. doi:10.1177/0165025406071904
- Crick, N. R. (1996). The role of overt aggression, relational aggression, and prosocial behavior in the prediction of children's future social adjustment. *Child Development, 67*, 2317–2327.
- Crick, N. R. (1997). Engagement in gender normative versus non-normative forms of aggression: Links to social-psychological adjustment. *Developmental Psychology, 33*, 610–617.
- Crick, N. R., & Bigbee, M. A. (1998). Relational and overt forms of peer victimization: A multi-informant approach. *Journal of Consulting and Clinical Psychology, 66*, 337–347.
- Crick, N. R., Casas, J. F., & Ku, H. (1999). Relational and physical forms of peer victimization in preschool. *Developmental Psychology, 35*, 376–385.
- Crick, N. R., Casas, J. F., & Mosher, M. (1997). Relational and overt aggression in preschool. *Developmental Psychology, 33*, 579–587.
- Crick, N. R., & Grotpeter, J. K. (1995). Relational aggression, gender, and social-psychological adjustment. *Child Development, 66*, 710–722.
- Crick, N. R., & Grotpeter, J. K. (1996). Children's treatment by peers: Victims of relational and overt aggression. *Development and Psychopathology, 8*, 367–380.
- Crick, N. R., Ostrov, J. M., Burr, J. E., Jansen, E. A., Cullerton-Sen, C., & Ralston, P. (2006). A longitudinal study of relational and physical aggression in preschool. *Journal of Applied Developmental Psychology, 27*, 254–268. doi:10.1016/j.appdev.2006.02.006
- Crick, N. R., Ostrov, J. M., & Kawabata, Y. (2007). Relational aggression and gender: An overview. In D. J. Flannery, I. Waldman, & A. Vazsonyi (Eds.), *The Cambridge handbook of violent behavior and aggression* (pp. 243–258). Cambridge: Cambridge University Press.
- Crick, N. R., Ostrov, J. M., & Werner, N. E. (2006). A longitudinal study of relational aggression, physical aggression, and children's social-psychological adjustment. *Journal of Abnormal Child Psychology, 34*, 131–142. doi:10.1007/s10802-005-9009-4
- Crick, N. R., & Zahn-Waxler, C. (2003). The development of psychopathology in females and males: Current progress and future challenges. *Development and Psychopathology, 15*, 719–742.
- Dhami, M. K., Hoglund, W. L., Leadbeater, B. J., & Boone, E. (2005). Gender-linked risks for peer physical and relational victimization in the context of school-level poverty in first grade. *Social Development, 14*, 532–549. doi:10.1111/j.1467-9507.2005.00315.x
- Dodge, K. A. (1991). The structure and function of reactive and proactive aggression. In D. J. Pepler & K. H. Rubin (Eds.), *The development and treatment of childhood aggression*. Hillsdale, NJ: Erlbaum.
- Dodge, K. A., & Coie, J. D. (1987). Social-information processing factors in reactive and proactive aggression in children's peer groups. *Journal of Personality and Social Psychology, 53*, 1146–1158.
- Dodge, K. A., Coie, J. D., & Lynam, D. (2006). Aggression and antisocial behavior in youth. In W. Damon (Series Ed.) & W. Damon (Vol. Ed.), *Handbook of child psychology: Vol. 3. Social, emotional, and personality development* (6th ed., pp. 719–788). Hoboken, NJ: Wiley.
- Giesbrecht, G. F., Leadbeater, B. J., & Macdonald, S. W. S. (2011). Child and context characteristics in trajectories of physical and relational victimization among early elementary school children. *Development and Psychopathology, 23*, 239–252. doi:10.1017/S0954579410000763
- Hanish, L. D., & Guerra, N. G. (2000). Predictors of peer victimization among urban youth. *Social Development, 9*, 521–543.
- Hay, D. F., Castle, J. D., Davies, L., Demetriou, H., & Stimson, C. A. (1999). Prosocial action in very early childhood. *Journal of Child Psychology and Psychiatry, 40*, 905–916.
- Henington, C., Hughes, J. N., Cavell, T. A., & Thompson, B. (1998). The role of relational aggression in identifying aggressive boys and girls. *Journal of School Psychology, 36*, 457–477.
- Hodges, E. V. E., & Perry, D. G. (1996). Victims of peer abuse: An overview. *Journal of Emotional and Behavioral Problems, 5*, 23–28.
- Hodges, E. V. E., & Perry, D. G. (1999). Personal and interpersonal antecedents and consequences of victimization by peers. *Journal of Personality and Social Psychology, 76*, 677–685.
- Hoglund, W. L., & Leadbeater, B. J. (2007). Managing threat: Do social-cognitive processes mediate the link between peer victimization and adjustment problems in early adolescence? *Journal of Research on Adolescence, 17*, 525–540. doi:10.1111/j.1532-7795.2007.00533.x
- Juliano, M., Werner, R. S., & Cassidy, K. W. (2006). Early correlates of preschool aggressive behavior according to type of aggression and measurement. *Journal of Applied Developmental Psychology, 27*, 395–410. doi:10.1016/j.appdev.2006.06.008
- Keating, C. F., & Heltman, K. R. (1994). Dominance and deception in children and adults: Are leaders the best misleaders? *Personality and Social Psychology Bulletin, 20*, 312–321.
- Kline, R. B. (2011). *Principles and practice of structural equation modeling* (3rd ed.). New York: Guilford Press.
- Kochenderfer-Ladd, B. (2004). Peer victimization: The role of emotions in adaptive and maladaptive coping. *Social Development, 13*, 329–349. doi:10.1111/j.1467-9507.2004.00271.x
- Lagerspetz, K. M., Björkqvist, K., & Peltonen, T. (1988). Is indirect aggression typical of females? Gender differences in aggressiveness in 11- to 12-year-old children. *Aggressive Behavior, 14*, 403–414.
- Leadbeater, B., Hoglund, W., & Woods, T. (2003). Changing contents? The effects of a primary prevention program on classroom levels of peer relational and physical victimization. *Journal of Community Psychology, 31*, 397–418.
- Leff, S. S., & Lakin, R. (2005). Playground-based observational systems: A review and implications for practitioners and researchers. *School Psychology Review, 34*, 475–489.
- Little, T. D., Jones, S. M., Henrich, C. C., & Hawley, P. H. (2003). Disentangling the “whys” from the “whats” of aggressive behavior. *International Journal of Behavioral Development, 27*, 122–183.
- 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. doi:10.1037/1082989X.1.1.30
- Murray-Close, D., Ostrov, J. M., & Crick, N. R. (2007). A short-term longitudinal study of growth of relational aggression during middle childhood: Associations with gender, friendship intimacy, and internalizing problems. *Development and Psychopathology, 19*, 187–203. doi:10.1017/S0954579407070101
- Murray-Close, D., Ostrov, J. M., Nelson, D. A., Crick, N. R., & Coccaro, E. F. (2010). Proactive, reactive, and romantic relational aggression in adulthood: Measurement, predictive validity, gender differences, and association with intermittent explosive disorder. *Journal of Psychiatric Research, 44*, 393–404. doi:10.1016/j.jpsychires.2009.09.005
- Murray-Close, D., & Rellini, A. H. (2012). Cardiovascular reactivity and proactive and reactive relational aggression among women with and without a history of sexual abuse. *Biological Psychology, 89*, 54–62. doi:10.1016/j.biopsycho.2011.09.008
- 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*(Serial No. 278).
- Ostrov, J. M. (2006). Deception and subtypes of aggression in early childhood. *Journal of Experimental Child Psychology, 93*, 322–336. doi:10.1016/j.jecp.2005.10.004
- Ostrov, J. M. (2008). Forms of aggression and peer victimization during early childhood: A short-term longitudinal study. *Journal of Abnormal Child Psychology, 36*, 311–322. doi:10.1007/s10802-007-9179-3
- Ostrov, J. M. (2010). Prospective associations between peer victimization and aggression. *Child Development, 81*, 1670–1677. doi:10.1111/j.1467-8624.2010.01501.x
- Ostrov, J. M., & Bishop, C. M. (2008). Preschoolers' aggression and parent-child relationships: A short-term longitudinal study. *Journal of Experimental Child Psychology, 99*, 309–322. doi:10.1016/j.jecp.2008.01.001
- Ostrov, J. M., & Crick, N. R. (2007). Forms and functions of aggression in early childhood: A short-term longitudinal study. *School Psychology Review, 36*, 22–43.

- Ostrov, J. M., & Godleski, S. A. (2010). Toward an integrated gender-linked model of aggression subtypes in early and middle childhood. *Psychological Review*, *117*, 233–242. doi:10.1037/a0018070
- Ostrov, J. M., & Godleski, S. A. (2013). Relational aggression, victimization, and adjustment during middle childhood. *Development and Psychopathology*, *25*, 801–815. doi:10.1017/S0954579413000187
- Ostrov, J. M., & Hart, E. J. (2012). Observational methods. In T. D. Little (Ed.), *Oxford handbook of quantitative methods* (Vol. 1, pp. 285–303). New York: Oxford University Press.
- Ostrov, J. M., Hart, E. J., Kamper, K. E., & Godleski, S. A. (2011). Relational aggression in women during emerging adulthood: A social process model. *Behavioral Sciences and the Law*, *29*, 695–710. doi:10.1002/bsl.1002
- 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. doi:10.1111/j.1467-9507.2004.000266.x
- Ostrov, J. M., Masetti, G. M., Stauffacher, K., Godleski, S. A., Hart, K. C., Karch, K. M., et al. (2009). An intervention for relational and physical aggression in early childhood: A preliminary study. *Early Childhood Research Quarterly*, *24*, 15–28. doi:10.1016/j.ecresq.2008.08.002
- Ostrov, J. M., Murray-Close, D., Godleski, S. A., & Hart, E. J., (2013). Prospective associations between forms and functions of aggression and social and affective processes during early childhood. *Journal of Experimental Child Psychology*, *116*, 19–36. doi:10.1016/j.jecp.2012.12.009
- Ostrov, J. M., Ries, E. E., Stauffacher, K., Godleski, S. A., & Mullins, A. D. (2008). Relational aggression, physical aggression and deception during early childhood: A multi-method, multi-informant, short-term longitudinal study. *Journal of Clinical Child and Adolescent Psychology*, *37*, 664–675. doi:10.1080/15374410802148137
- 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. doi:10.1016/j.ecresq.2004.04.009
- Pellegrini, A. D. (2004). *Observing children in their natural words: A methodological primer* (2nd ed.). Mahwah, NJ: Erlbaum.
- Pellegrini, A. D., Long, J. D., Roseth, C. J., Bohn, C. M., & Van Ryzin, M. (2007). Longitudinal study of preschoolers' (Homo sapiens) sex segregation: The role of physical activity, sex, and time. *Journal of Comparative Psychology*, *121*, 282–289. doi:10.1037/0735-7036.121.3.282
- Pellegrini, A. D., Roseth, C. J., Mliner, S., Bohn, C. M., Van Ryzin, Vance, N., et al. (2007). Social dominance in preschool classrooms. *Journal of Comparative Psychology*, *121*, 54–64. doi:10.1037/0735-7036.121.1.54
- Pellegrini, A. D., Van Ryzin, M. J., Roseth, C., Bohn-Gettler, C., Dupuis, D., Hickey, M., et al. (2011). Behavioral and social cognitive processes in preschool children's social dominance. *Aggressive Behavior*, *37*, 248–257. doi:10.1002/ab.20385
- Poulin, F., & Boivin, M. (2000). Reactive and proactive aggression: Evidence of a two-factor model. *Psychological Assessment*, *12*, 115–122.
- Prinstein, M. J., Boergers, J., & Vernberg, E. M. (2001). Overt and relational aggression in adolescents: Social-psychological adjustment of aggressors and victims. *Journal of Clinical Child Psychology*, *30*, 479–491.
- Prinstein, M. J., & Cillessen, A. H. N. (2003). Forms and functions of adolescent peer aggression associated with high levels of peer status. *Merill-Palmer Quarterly*, *49*, 310–342.
- Putallaz, M., Grimes, C. L., Foster, K., J., Kupersmidt, J. B., Coie, J. D., & Dearing, K. (2007). Overt and relational aggression and victimization: Multiple perspectives within the school setting. *Journal of School Psychology*, *45*, 523–547. doi:10.1016/j.jsp.2007.05.003
- Rose, A. J., & Rudolph, K. D. (2006). A review of sex differences in peer relationship processes: Potential trade-offs for the emotional and behavioral development of girls and boys. *Psychological Bulletin*, *132*, 98–131. doi:10.1037/0033-2909.132.1.98
- Roseth, C. J., Pellegrini, A. D., Dupuis, D. N., Bohn, C. M., Hickey, M. C., Hilck, C. L., et al. (2011). *Social Development*, *20*, 185–211. doi:10.1111/j.1467-9507.2010.00579.x
- Salmivalli, C., & Helteenvuori, T. (2007). Reactive, but not proactive aggression predicts victimization among boys. *Aggressive Behavior*, *33*, 198–206. doi:10.1002/ab.20210
- Schwartz, D., McFadyen-Ketchum, S., Dodge, K. A., Pettit, G. S., & Bates, J. E. (1999). Early behavior problems as a predictor of later peer group victimization: Moderators and mediators in the pathways of social risk. *Journal of Abnormal Child Psychology*, *27*, 191–201.
- Sullivan, T. N., Farrell, A. D., & Kliewer, W. (2006). Peer victimization in early adolescence: Associations between physical and relational victimization and drug use, aggression, and delinquent behaviors among urban middle school students. *Development and Psychopathology*, *18*, 119–137. doi:10.1017/S095457940606007X