

## Prospective Associations Between Peer Victimization and Aggression

Jamie M. Ostrov

*University at Buffalo, The State University of New York*

The current study involved a short-term longitudinal study of young children ( $M = 44.56$  months,  $SD = 11.88$ ,  $N = 103$ ) to test the prospective associations between peer victimization and aggression subtypes. Path analyses documented that teacher-reported physical victimization was uniquely associated with increases in observed physical aggression over time. The path model also revealed that teacher-reported relational victimization was uniquely associated with statistically significant increases in observed relational aggression over time. Ways in which these findings extend the extant developmental literature are discussed.

The study of peer victimization has become an important focus for psychologists who attempt to understand the etiology, course, and outcomes associated with various forms of psychopathology including aggressive behavior in children (e.g., Hanish & Guerra, 2000; Hodges & Perry, 1999; Juvonen & Graham, 2001; Schwartz, McFadyen-Ketchum, Dodge, Pettit, & Bates, 1998; Troop-Gordon & Ladd, 2005). Rather than focusing on the developmental antecedents of peer victimization, the present study focuses on aggression as an important hypothesized outcome associated with peer victimization. Importantly, peer victimization (i.e., chronic or frequent receipt of aggression from peers over time) is associated with increases in physical aggression (i.e., the use or threat of physical force to hurt, harm, or injure another person; Dodge, Coie, & Lynam, 2006) over time in school-aged samples (Graham & Juvonen, 1998; Hanish & Guerra, 2000, 2002; Hodges, Boivin, Vitaro, & Bukowski, 1999; Khatri, Kuper-smidt, & Patterson, 2000; Kochenderfer-Ladd, 2003; Schwartz et al., 1998). In fact, Hanish and Guerra (2002) proposed that peer victimization might be a risk factor for subsequent serious adjustment issues (e.g., externalizing behavior) because children who are victimized may have limited opportunities for

peer interactions and developmentally salient socialization experiences. Thus, the focus of the present manuscript is testing if peer victimization predicts increases in aggressive behavior for young children. To further test this fundamental question we also examine if the developmental paths from victimization to aggression are present for both physical and relational victimization in early childhood.

Theories have been posited that relational victimization may be associated with increases in relationally aggressive behaviors in which the relationship serves as the means of harm (e.g., threatening friendship withdrawal or direct social exclusion; Crick & Grotpeter, 1996). Two additional conceptually related but distinct forms of aggression include indirect (Lagerspetz, Björkqvist, & Peltonen, 1988; Vaillancourt, Brendgen, Boivin, & Tremblay, 2003) and social (Galen & Underwood, 1997) aggression (see Card, Stucky, Sawalani, & Little, 2008), which were not the focus of the current study. Rose and Rudolph (2006) present a peer-socialization model and are the first known theorists to articulate a conceptual model with potential paths from physical and relational peer victimization (i.e., “exposure to peer stress”) to aggressive behavior (p. 116). According to this model, for example, “greater exposure to overt or physical victimization may contribute to their vulnerability . . . to aggression. Physical aggression is more appropriate in response to overt victimization than subtle [relational] forms of victimization” (Rose & Rudolph, 2006, p. 120). In addition, Yeung and Leadbeater (2007, p. 980) asserted that relationally victimized children may respond with relationally aggressive behaviors to hurt the aggressor or avoid further attacks.

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Correspondence concerning this article should be addressed to Jamie M. Ostrov, 214 Park Hall, Department of Psychology, University at Buffalo, Buffalo, NY 14260-4110. Electronic mail may be sent to [jostrov@buffalo.edu](mailto:jostrov@buffalo.edu).

Collectively, the contentions that children retaliate in kind (i.e., physical victimization is uniquely associated with physical aggression and relational victimization is uniquely associated with relational aggression) have been articulated as the *specificity hypothesis of aggression* (Crick, Casas, & Ku, 1999; Ostrov, 2008). Young children are posited to be influenced primarily by their own personal experiences (i.e., history of adaptation) of peer victimization and aggression, but they may learn by being a bystander or uninvolved observer of peer interactions if they identify (i.e., label the behaviors as consistent with their self-construal) with the experiences of the salient model (i.e., perpetrator or victim). Thus, a child who is victimized may learn from these interactions and if reinforced will model these self-relevant behaviors increasingly in future hostile interactions with peers. Prior concurrent studies have found support for this hypothesis (Crick et al., 1999; Sullivan, Farrell, & Kliewer, 2006) or limited support depending on the method and informant (Putallaz et al., 2007), but no known prospective analysis has examined the links between both physical and relational victimization and changes in physical and relational aggression, respectively. Thus, the primary goal of the current study was to test if peer victimization uniquely predicted increases in aggression subtypes.

There are only a few known concurrent studies that have studied both aggression subtypes and victimization in early childhood, which is an important developmental period for understanding the onset and subsequent course of peer victimization (e.g., Bonica, Arnold, Fisher, Zeljo, & Yerushova, 2003; Crick et al., 1999; Dhimi, Høglund, Leadbeater, & Boone, 2005). Prospective longitudinal studies exploring the association between peer victimization and future aggression subtypes are rare in the extant developmental literature (for exceptions in middle childhood and early adolescence, see Leadbeater & Høglund, 2009; Schwartz et al., 1998). One recent study, in early adolescence, provided evidence that self-reported relational victimization was significantly associated with future self-reported relational aggression, even after controlling for physical victimization (Yeung & Leadbeater, 2007). To avoid shared-method bias concerns, Yeung and Leadbeater (2007) called for multi-informant sources of data in future work testing these links (see also Prinstein, Boergers, & Vernberg, 2001). As such, the current multi-informant and multimethod study (i.e., teacher report and naturalistic observations) advances the developmental literature by being the first to study how teacher-reported peer victimization sub-

types may predict changes in observed aggressive behavior subtypes for young children.

Peer rejection may affect aggression and victimization status (Bierman, 2004; Bierman & Wargo, 1995; Perry, Kusel, & Perry, 1988), and thus, it is important to consider in any peer victimization study. Importantly, peer victimization and rejection are positively related across time, but they are independent constructs (Hodges & Perry, 1999; Perry et al., 1988). Both physical and relational peer victimization have been found to increase a child's likelihood of peer rejection (e.g., Crick & Bigbee, 1998; Hanish & Guerra, 2002), and peer rejection has been associated with increases in aggression subtypes over time (e.g., Werner & Crick, 2004). Aggression and peer victimization are related to peer rejection, but they are often found to be associated with peer rejection for different reasons (Boivin & Hymel, 1997; Perry et al., 1988). Given the moderate to high associations between peer victimization and rejection it is important to test models that include both constructs so that unique associations may be tested (see Morrow, Hubbard, Rubin, & McAuliffe, 2008).

In the present study, aggression is defined as behaviors in which there was the intent to hurt, harm, or injure another person (Dodge et al., 2006). It is well documented in the literature that there are other behaviors that resemble physical and relational aggression, but they do not conform to the definition of aggression. Developmental scholars have called these behaviors: "rough and tumble play," "assertion," or "social dominance," because they explicitly do *not* include the intent to harm others (e.g., Ostrov, Pilat, & Crick, 2006; Pellegrini, 2003). Moreover, exclusion behaviors that are considered fair (e.g., excluding a poor athlete from a sports group; Killen & Stangor, 2001) or actions in which the intent of the child is due only to a desire to play by him- or herself are not examples of relational aggression and were explicitly addressed in training of observers in the present study. It is important to note that children during early childhood (i.e., 3- to 5-year-olds) are able to engage in relatively sophisticated forms of relational aggression (see Crick, Ostrov, & Kawabata, 2007). However, during early childhood, even when these behaviors resemble sophisticated covert actions like spreading a malicious secret, they are direct in nature, based on situations occurring in the present, and the identity of the perpetrator is clearly defined (see Ostrov, Woods, Jansen, Casas, & Crick, 2004).

There were several goals and hypotheses for this study. Our central goal was to test the direct prospective associations between peer victimization

subtypes and increases in aggressive behaviors. Based on the adopted conceptual model (Rose & Rudolph, 2006) and the specificity hypothesis of aggression (Crick et al., 1999; Ostrov, 2008), we predicted that peer victimization would be associated with increases in aggressive behavior. More specifically, in keeping with theory, we predicted that physical victimization would be positively and uniquely associated with increases in physical aggression (e.g., Hanish & Guerra, 2002). Further, we anticipated that relational victimization would be positively and uniquely associated with increases in relational aggression (Yeung & Leadbeater, 2007).

## Method

### *Participants*

A total of 119 (69 girls) children initially participated in this ongoing longitudinal study (e.g., Ostrov, 2008). Attrition was small (13%, 7 boys and 9 girls) and was because of families who moved out of the area, which yielded a final sample size of 103 children (60 girls). Children were on average 44.56 months old ( $SD = 11.88$ ) at the first time point. Children represented various ethnic backgrounds: 14.6% African American, 14.6% Asian, 59.1% Caucasian, 2.9% Hispanic, 3.9% Indian, 1.0% Native American, and 3.9% other ethnicities. Most children were from middle-class families. Children were recruited in two equal cohorts and there were no statistically significant cohort effects for any of the key study variables ( $t = -1.57-1.19, p > .12$ ).

### *Procedure*

The study was approved by the local Institutional Review Board and parents provided written consent prior to participation. Head teachers also provided written informed consent (100% participating) prior to completing teacher reports. The second time point was approximately 4 months after the conclusion of Time 1 (for additional details, see Murray-Close & Ostrov, 2009).

### *Measures*

*Observations of aggression.* The Early Childhood Observational System introduced by Ostrov and Keating (2004) and revised by Crick et al. (2006) was adopted (for a review, see Leff & Lakin, 2005). Naturalistic focal child sampling with continuous recording of children's relational and physical aggression were conducted during free play at participating child-care centers at both time points. At each of the

two time points, every focal child was observed for eight separate sessions (10 min per session), which took place on different days over a 2-month period for 80 min of total observation per child.

Training consisted of several steps (see Ostrov, 2008). Assessments of reliability were conducted throughout the study to avoid observer drift (Pellegrini, 2004). For each 10-min session, the observers recorded, in full detail using a structured observation form: (a) physical aggression (e.g., hitting, kicking, pushing) and (b) relational aggression (e.g., direct verbal [i.e., "You can't play with me'"] or nonverbal exclusion from a group or dyadic interaction [i.e., blocking a child from entering a preferred area], using friendship withdrawal as a threat [i.e., "You are not my friend anymore'"]). Behaviors were summed within category, across the eight sessions, to yield total scores. Interobserver reliability (15% of observations) was acceptable for relational aggression (intraclass correlation coefficients [ICCs] from .72 to .86) and physical aggression (ICCs from .78 to .95). Correlations between teacher-reports and the observations of relational and physical aggression (at both time points) were significant and moderate in nature (see Ostrov, Ries, Stauffacher, Godleski, & Mullins, 2008).

*Teacher report of victimization.* The Preschool Peer Victimization Measure-Teacher Report (PPVM-TR; Crick et al., 1999) assessed physical and relational victimization at the first time point. This measure includes eight items: Two items assess physical victimization ("This child gets pushed or shoved by peers"), three items assess relational victimization ("This child gets left out of the group when someone is mad at them or wants to get back at them"), and three filler items assess received prosocial behavior. Teachers rated how often focal children were relationally or physically victimized on a 5-point scale ranging from 1 (*never to almost never true*) to 5 (*always or almost always true*). The items were summed within category. In the current study, Cronbach's  $\alpha$ s = .85 and .90 for relational and physical victimization, respectively. Moderate levels of stability were found for both subscales, and in this sample the validity of the measure has been supported by replicating the original predicted factor structure and by obtaining significant correlations between teacher and research assistant (RA) reports for both subtypes of victimization (Ostrov, 2008).

*Teacher report of peer rejection.* The Preschool Social Behavior Scale-Teacher Form (PSBS-TF; Crick, Casas, & Mosher, 1997) was used to assess peer rejection (e.g., Crick et al., 2006). Using the aforementioned 5-point scale, teachers reported how

disliked children were by same and opposite-sex peers (two summed items). This measure had acceptable reliability in the past (e.g., Crick et al., 2006) and in the current study was internally consistent at both times (Cronbach's  $\alpha > .88$ ). Teacher-reported peer rejection was moderately stable across the study and teacher- and RA-reported peer rejection were significantly correlated (Ostrov, 2008).

## Results

We first conducted descriptive statistics for the study variables (see Table 1). Two outliers ( $> 3 SD$ ) were detected for observed relational aggression at Time 2 and these values were replaced with the value of  $3 SD$  above the mean (Kline, 1998). Skew was less than 2 and kurtosis was lower than 8 for all variables, suggesting that non-normality of the data was not a concern (Kline, 1998). We also conducted correlations between the study variables (see Table 1). To avoid being underpowered for testing effects at the level of gender, only the total sample was used in this study. Importantly, physical victimization was significantly associated with future physical aggression ( $r = .35, p < .001$ ) and relational victimization was significantly correlated with future relational aggression ( $r = .27, p = .007$ ). Both physical and relational victimization were significantly correlated with peer rejection. Next, Fisher's  $r$  to  $Z$  tests were conducted to examine differences in the association between variables. The correlation between relational victimization at Time 1 and relational aggression at Time 2 ( $r = .27, p = .007$ ) was significantly higher than the correlation between physical victimization at Time 1 and relational aggression at Time 2 ( $r = .03, ns$ ),

$Z = 2.21, p < .05$ . It was also found that the association between peer rejection at Time 1 and relational victimization at Time 1 ( $r = .56, p < .001$ ) was significantly higher than the corresponding association between peer rejection and initial physical victimization ( $r = .24, p = .013$ ),  $Z = 3.42, p < .01$ .

Observational methods that rely on multiple observers and several sessions have often generated lower levels of intercorrelation between aggression subtypes than other approaches that may have higher levels of association as a result of shared method variance (see Ostrov & Crick, 2007). It is also conceivable that the amount of overlap even with teacher reports for 3- to 5-year-olds (e.g., .46 for boys and .37 for girls reported in Crick et al., 1997) is lower than for children in older developmental periods (e.g., .77; Crick, 1996) because physical aggression may be more common than relational aggression in this developmental period (see NICHD Early Child Care Research Network, 2004). In the present study, similar to past findings, the intercorrelation between observed physical and relational aggression was low and the intercorrelation between teacher-reported physical and relational victimization was moderate in magnitude (see Table 1).

To test the key hypothesis of the study a path analysis model with maximum likelihood estimation using Lisrel 8.54 was conducted (see Figure 1). In keeping with common practice in the field, in the tested models, age was entered as a covariate (e.g., Bonica et al., 2003; Crick et al., 2006; Hart, Nelson, Robinson, Olsen, & McNeilly-Choque, 1998). Models with and without gender as a covariate were virtually identical, and thus, the more parsimonious model without gender is presented. In keeping with recommendations of Hu and Bentler (1999) the standardized root mean square residual

Table 1  
Descriptive Statistics and Correlations Between Key Study Variables

	1	2	3	4	5	6	7
Physical aggression OBS Time 1							
Relational aggression OBS Time 1	.18						
Physical aggression OBS Time 2	.46***	.15					
Relational aggression OBS Time 2	.08	.37***	.22*				
Peer rejection TR Time 1	.23*	.18	.28**	.05			
Physical victimization TR Time1	.34***	.001	.35***	.03	.24**		
Relational victimization TR Time1	.14	.29**	.18	.27**	.56***	.38***	
<i>M</i>	2.53	1.04	2.01	1.54	3.01	3.73	5.80
<i>SD</i>	2.54	1.55	2.42	2.12	1.47	1.84	2.55
Range	0–13	0–7	0–11	0–9	2–8	2–10	3–12

Note. OBS = observations; TR = Teacher report.  
\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

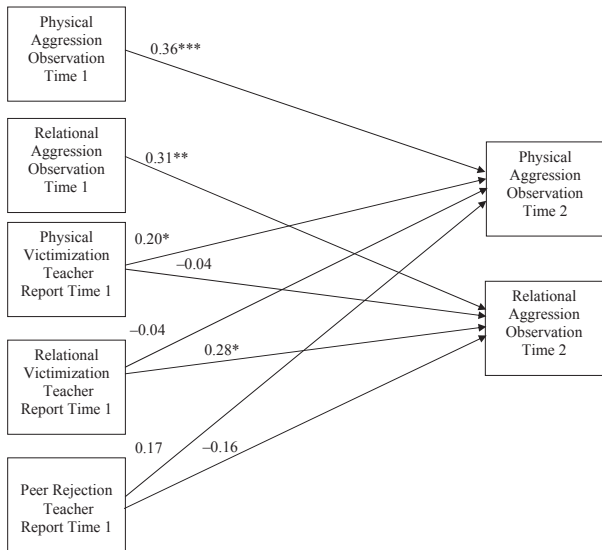


Figure 1. Path analysis model predicting changes in observed physical and relational aggression.

Note. Standardized path coefficients are shown. Covariance paths (see text) and disturbances, as well as the covariate age, are not shown for ease of communication. The model fit was acceptable,  $\chi^2(5) = 6.36$ ,  $p = .27$ ; root mean square error of approximation = .053, standardized root mean square residual = .037, comparative fit index = .99.

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

(SRMR) and the comparative fit index (CFI) were used to evaluate goodness of model fit. A cutoff of .08 or lower for SRMR and a value of .95 or larger for the CFI is viewed as a good fit (Hu & Bentler, 1999). The SRMR and CFI have been found to provide an appropriate balance between Type I and II error rates (Hu & Bentler, 1999). In addition, in keeping with standard reporting practices, the root mean square error of approximation (RMSEA) is also reported and acceptable values are considered less than .06 (Hu & Bentler, 1999).

The first model tested was the hypothesized model and the goodness-of-fit indices were acceptable,  $\chi^2(5) = 6.36$ ,  $p = .27$ ; RMSEA = .053, SRMR = .037, CFI = .99. The hypothesized model was compared with a more specified model but the additional two paths (i.e., between physical aggression at Time 1 and future relational aggression as well as from relational aggression at Time 1 to future physical aggression) were not significant. The model fit of this more specific model was generally adequate although the RMSEA was outside the acceptable range,  $\chi^2(3) = 5.51$ ,  $p = .14$ ; RMSEA = .093, SRMR = .030, CFI = .98. The  $\Delta\chi^2$  test between the nested models was not significant,  $\Delta\chi^2(2) = .85$ ,  $ns$ . In keeping with standard practice, the more parsimonious, hypothesized model was

adopted. Importantly, the parameter estimates were similar and the same paths were significant in the two models. The adopted model also included (not shown in Figure 1 for ease of communication) a covariance between each of the predictor constructs and a covariance between the residuals of the outcome variables (i.e., physical and relational aggression at Time 2). We included initial levels of observed physical and relational aggression in the model so that testing increases in aggressive behavior over time could be analyzed. Importantly, as hypothesized, physical victimization was significantly associated with increases in physical aggression. In addition, as hypothesized, relational victimization was associated with significant increases in relational aggression (see Figure 1).

## Discussion

The central study goals were to examine the prospective associations between peer victimization subtypes and future aggression subtypes. Rose and Rudolph (2006) posited that physical aggression rather than more subtle forms of behavior like relational aggression would be a more appropriate behavioral response to physical victimization. In keeping with the peer-socialization model (Rose & Rudolph, 2006) and past research (Hanish & Guerra, 2002), we found that peer physical victimization was associated with increases in physically aggressive behavior across time. Moreover, responding with the same behavior in kind has been posited for relational forms of behavior as well (see Yeung & Leadbeater, 2007). In keeping with these predictions and the *specificity hypothesis of aggression* (Crick et al., 1999; Ostrov, 2008), we found that teacher-reported relational victimization was associated with increases in observed relational aggression. Given the moderate and significant overlap between relational victimization and peer rejection, it is important to note that the conservative model also controlled for the influence of peer rejection (Morrow et al., 2008). Thus, it is not just that these children are rejected by their peers, which directly leads to changes in aggressive behavior; rather, the current findings suggest that experiencing victimization is a unique predictor of increases in aggression. Moreover, the present findings suggest that children who are victimized may learn from these interactions and adopt behaviors from salient social models (see Rose & Rudolph, 2006). Finally, if these actions are reinforced over time, presumably because they are effective at reducing peer victimization and facilitating

goal obtainment such as social status, the child may continue to increase in his or her rate of aggression.

The present study addressed theoretically driven hypotheses with a multi-informant and multimethod short-term longitudinal study. Despite the strengths of this approach and use of time-intensive observational methods, the current study is limited in several ways. First, we were unable to explore moderation by gender analyses because we were underpowered for testing these effects and future work should examine models for both boys and girls with a larger and more diverse sample (see Card et al., 2008). Second, additional time points would have permitted an examination of growth trajectories in the development of both aggression and victimization and would have permitted more robust estimates of the present effects. Third, it is conceivable that earlier aggressive behavior may have predicted peer victimization, which in turn predicts increases in aggression. That is, physically (or relationally) aggressive children may receive more physical (or relational) retaliation which in turn, contributes to increases in his or her own aggression. Future longitudinal work with earlier assessments is needed to test these additional feasible pathways. Fourth, multiple methods (e.g., peer ratings or nominations, observations) for assessing victimization subtypes should be conducted in future studies (Kochenderfer & Ladd, 1997).

The current findings raise several implications for future research. The present study indicates that our past understanding of how victimization and aggression are linked across time may need to be revised. That is, a large amount of theory and research has focused exclusively on prospective links from aggression to victimization (for two exceptions, see Leadbeater & Hoglund, 2009; Schwartz et al., 1998). In fact, past social process models of peer harassment have posited that relatively stable behavioral tendencies like aggressive behavior may directly or indirectly lead to peer victimization via peer rejection (Boivin, Hymel, & Hodges, 2001). The current study used multiple methods and high levels of statistical control to examine the reverse direction of effect and found prospective links from peer physical victimization to physical aggression during early childhood, even with peer rejection in the model. We are also the first known study to reveal that relational victimization may uniquely lead to increases in relational aggression among young children. Thus, we may tentatively conclude a unique link between exposure to peer stress/harassment and increases in aggression over time (Rose & Rudolph, 2006). More

specifically, we have demonstrated initial prospective support for the specificity hypothesis of aggression (Crick et al., 1999; Ostrov, 2008). Replication of the specificity hypothesis of aggression is needed with more diverse samples. In addition, the extent to which the children in the current study were provocative victims or aggressive victims (i.e., high in both aggression and victimization) with associated emotional and behavioral regulation problems is unknown and requires further investigation (see Schwartz, 2000; Schwartz, Dodge, Pettit, & Bates, 1997; Schwartz, Proctor, & Chien, 2001).

Several implications for future intervention and prevention efforts are raised by the current study. The findings suggest that children who are physically or relationally victimized by their peers may be at risk for displaying increases in school-based aggression over short periods of time. Interventions designed to reduce peer victimization in early childhood classrooms should be developed to minimize the likelihood of this future occurrence and should convey effective strategies for handling peer victimization other than retaliation (i.e., reframing social cognitions and social goals, notification of a teacher or caregiver). That is, school-based early childhood intervention efforts will likely be enhanced if programs explicitly address both peer victimization and aggression subtypes among peers (see Leadbeater, Hoglund, & Woods, 2003). Developmentally appropriate, early prevention would center on facilitating prosocial and friendship formation skills, while also reducing words and actions that cause harm (see Ostrov et al., 2009). In addition, these early childhood programs should be designed to foster a culture in which physical and relational aggression (e.g., malicious social exclusion) are not acceptable (see Harrist & Bradley, 2003). These programs should also provide children with effective tools to decode and distinguish harmful, intention acts from benign behaviors (e.g., exclusivity among close friends; see Leff et al., 2009).

In conclusion, the present study builds on prior theory and research to test novel empirical questions concerning the prospective associations between peer victimization and aggression. Specifically, the present study highlights the importance of understanding peer victimization to predict increases in aggressive behavior in young children.

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