Adaptive, Maladaptive, Mediational, and Bidirectional Processes of Relational and Physical Aggression, Relational and Physical Victimization, and Peer Liking

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A three-wave longitudinal study among ethnically diverse preadolescents (N = 597 at Time 1, ages 9–11) was conducted to examine adaptive, maladaptive, mediational, and bidirectional processes of relational and physical aggression, victimization, and peer liking indexed by peer acceptance and friendships. A series of nested structural equation models tested the hypothesized links among these peer-domain factors. It was hypothesized that (1) relational aggression trails both adaptive and maladaptive processes, linking to more peer victimization and more peer liking, whereas physical aggression is maladaptive, resulting in more peer victimization and less peer liking; (2) physical and relational victimization is maladaptive, relating to more aggression and less peer liking; (3) peer liking may be the social context that promotes relational aggression (not physical aggression), whereas peer liking may protect against peer victimization, regardless of its type; and (4) peer liking mediates the link between forms of aggression and forms of peer victimization. Results showed that higher levels of peer liking predicted relative increases in relational aggression (not physical aggression), which in turn led to more peer liking. On the other hand, more peer liking was predictive of relative decreases in relational aggression and relational victimization in transition to the next grade (i.e., fifth grade). In addition, relational victimization predicted relative increases in relational aggression and relative decreases in peer liking. Similarly, physical aggression was consistently and concurrently associated more physical victimization and was marginally predictive of relative increases in physical victimization in transition to the next grade. More peer liking predicted relative decreases in physical victimization, which resulted in lower levels of peer liking. The directionality and magnitude of these paths did not differ between boys and girls. Aggr. Behav. 40:273–287, 2014. © 2013 Wiley Periodicals, Inc.

INTRODUCTION

Developmental theories, models, and research suggest that the effect of one domain may spread over to other domains of development, which is often called cross-lagged, cross-domain, transactional, mediational, sequential, cascade, or snowball effects (Masten & Cicchetti, 2010). A transactional cascade model is useful as it examines cross-domain effects of factors, the unique effects of factors above and beyond their stability or autoregressive effects, and the processes involving these factors (Masten & Cicchetti, 2010). This kind of model has been empirically tested in previous studies that addressed the interplay among academic competence, peer liking or social competence assessed via friendships, peer acceptance, and prosocial behavior, and psychopathology, including internalizing and externalizing adjustment problems (Burt & Roisman, 2010; Chen, Huang, Chang, Wang, & Li, 2010; Masten et al., 2005; Moilanen, Shaw, & Maxwell, 2010; Obradović, Burt, & Masten, 2010). Despite a large body of evidence suggesting the complex linkages among aggression, victimization, and peer liking (for a review, see Heilbron & Prinstein, 2008), there are important gaps in the literature. First of all, previous studies have produced mixed findings regarding the adaptive/maladaptive effects of physical and relational aggression. Historically, research on aggression have primarily focused on the negative effects of aggression, showing that forms of aggression are associated with developmental maladjustment such as

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peer rejection, peer victimization, and internalizing and externalizing symptoms (for a review, see Card, Stucky, Sawalani, & Little, 2008; Parker, Rubin, Erath, Wójcikowski, & Buskirk, 2006). In contrast, relatively recent studies have shown that aggression such as indirect, social, and relational aggression, a form of aggression in which interpersonal relationships are used as a means to harm others (Björkqvist, Lagerspetz, & Kaukiainen, 1992; Crick, Ostrov, & Kawabata, 2007; Underwood, 2003), can be an adaptive behavior that strategically meets environmental needs, linking to positive outcomes, including, not limited to, a greater level of peer liking (Heilbron & Prinstein, 2008). Although these findings are promising, it remains unclear whether these adaptive and maladaptive processes simultaneously occur within the peer groups and friendships; whether these processes are contingent upon the outcome of interest; and whether the gender of the child alters the magnitude and directionality of these processes.

Second, there are a limited number of studies investigating the dynamic, transactional, and mediating processes in the linkages among aggression, victimization, and peer liking over time. As a result, our understanding of the interplay among these constructs is partial at best. Third, the majority of research on the associations between peer victimization and peer adjustment has primarily focused on a general form of peer victimization (i.e., a composite form of peer victimization or bullying). There is only limited knowledge of the unique and shared effect of physical and relational victimization on each form of aggression and peer liking, and vice versa. Therefore, the present study addressed these gaps in the literature and examined (1) adaptive and maladaptive processes of physical and relational aggression; (2) the dynamic and transactional effects among forms of aggression, peer/friend adjustment, including peer acceptance and the number of friendships, and forms of peer victimization over time; (3) the differential effects of forms of peer victimization on each form of aggression and peer/friend adjustment, and vice versa in the context of a series of transactional cascade models. We also explored gender differences in these developmental processes.

**Maladaptive Processes of Aggression**

It has been widely documented that physical aggression, which includes hitting, kicking, and threatening to physically harm others, is a maladaptive behavior that typically co-varies with social, psychological, and school adjustment problems, including peer rejection, peer victimization, and internalizing and externalizing symptoms (Coie & Dodge, 1997; Parker et al., 2006). This maladaptive process has been partially elucidated by a deficit perspective of aggressive behavior, suggesting that aggressive children typically fail to accurately, appropriately, and prosocially deal with information that is obtained via interactions with peers (Social-Information Processing Model; Crick & Dodge, 1994). In support of this view, research showed that physically aggressive children exhibited greater levels of hostile attribution biases toward instrumental peer provocations, as compared to their nonaggressive peers (De Castro, Veerman, Koops, Bosch, & Monshouwer, 2002; Dodge, 2006). Due to these specific cognitive and behavioral patterns, aggressive children seem to find it difficult to achieve high social status, form harmonious peer relationships, and maintain high-quality friendships. Indeed, physical aggression has been linked to peer-related problems, including peer rejection, low-quality friendships, and negative friendships involving similar aggressive peers (Card et al., 2008; Dishion & Tipsord, 2011; Ladd, 1999; Parker et al., 2006).

Akin to maladaptive processes of physical aggression, relational aggression has been shown to be associated with multiple social and school adjustment problems, including peer rejection, peer victimization, as well as internalizing and externalizing adjustment problems (for a review, see Crick et al., 2007). Such link between relational aggression and negative developmental outcomes have been found in Western (Card et al., 2008; Crick et al., 2007; Crick & Zahn-Waxler, 2003) and non-Western cultures (Bowker, Ostrov, & Raja, 2012; Kawabata, Crick, & Hamaguchi, 2010; Kawabata, Tseng, Murray-Close, & Crick, 2012; Lee, 2009; Tom, Schwartz, Chang, Farver, & Xu, 2010). These maladaptive associations may reflect the fact that relationally aggressive children may be deficient in social–cognitive processes, thereby experiencing more rejection, more victimization, and less liking by peers. Supporting this view, multiple studies have confirmed the link between relational aggression and distinct social–cognitive patterns such as hostile attribution biases (Crick, Grotepeter, & Bigbee, 2002). These children, who predictably display hostility and emotional distress in relational provocation contexts, may fail to inhibit anger impulse and to regulate emotion (McLaughlin, Hatzenbuehler, & Hilt, 2009) and, thereby, may use more antagonistic strategies to handle interpersonal conflicts. These children, then, may find it difficult to maintain high-quality, positive friendships (Kawabata et al., 2010) and become less liked and more disliked by peers over time (Cillessen & Mayeux, 2004).

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1 The present study used the term relational aggression primarily because the construct of non-physical aggression assessed by the measure used in this study focused on the manipulation of interpersonal relationships, and it was most akin to the definition of relational aggression among similar constructs (Archer & Coyne, 2005).
Conceivably due to poor peer liking, children who use aggression may suffer from peer victimization, including physical victimization such as being hit, kicked, and punched, as well as relational victimization, defined as peer maltreatment in which interpersonal relationships seem to be an agent of harm (Card & Hodges, 2008; Crick & Bigbee, 1998; Parker et al., 2006). Research showed a high risk of peer victimization for children who were predisposed to aggression (Brendgen et al., 2011), co-occurrence of aggression and victimization and dual effects on psychosocial adjustment problems at school (Graham, Bellmore, & Mize, 2006), and long-term effects of aggression on increases in peer victimization (Giesbrecht, Leadbeater, & MacDonald, 2011). Studies also demonstrated that children who displayed relational aggression reported greater levels of relational victimization and/or physical victimization by peers; in contrast, children who reported higher physical aggression experienced more physical victimization, not relational victimization (Leadbeater, Boone, Sangster, & Mathieson, 2006; Ostrov, 2008; Sullivan, Farrell & Kliewer, 2006). Taken together, aggression may put children at greater risk for peer victimization concurrently and longitudinally and the effect may be contingent upon its form. Nevertheless, the majority of studies showing maladaptive processes of relational aggression are grounded in “a social–cognitive deficit perspective” of aggression and primarily examine its link to forms of psychopathology and negative peer relationships (Heilbron & Prinstein, 2008). Given the limited understanding of the link between relational aggression and positive peer relationships and its directionality, the question remains regarding whether relational aggression is in fact a risk factor that prevents children from having positive peer relationships (i.e., peer liking).

**Adaptive Processes of Aggression**

Despite the well-established link between forms of aggression and maladaptive outcomes, an emerging body of research suggests that, for some children, aggression can be a behavior allowing for strategic adaptation to environmental demands (Hawley, 2003; Pellegrini, 2008; Salmivalli, 2010; Volk, Camilleri, Dane, & Marini, 2012). In a review of an evolutionary perspective on adolescent bullying and aggressive behavior, Volk et al. (2012) contend that children who use aggression, including relational and physical aggression, may be in fact adaptive to peer environment and often make a lot of effort to maximize obtaining available recourses and to minimize the cost of losing these resources for their survival and reproduction. Similarly, Hawley’s resource control theory (2003) suggests that some aggressive children tactically use different social behaviors, including aggressive and prosocial behaviors, depending on the context, and gauge the cost and benefit of using them. Given that, relative to younger children, older children spend more time interacting with peers, put more emphasis on friendships (i.e., reciprocity, quantity, and quality), and tend to use peers as a reference group of social comparison to evaluate themselves (Hartup & Stevens, 1997), it is plausible that getting along with peers via gaining social status, popularity, and peer acceptance plus forming close friendships may be a developmentally paramount task for school-aged children.

Consistent with these views, recent studies have reported positive correlates of aggression, including prosocial behavior, high social status, perceived popularity, social dominance, and friendship intimacy (Banny, Heilbron, Ames, & Prinstein, 2011; Card et al., 2008; Cillessen & Rose, 2006; Rodkin & Farmer, 2000). Recent comprehensive reviews of the literature document that some aggressive children are viewed somewhat positively (e.g., as being cool, being cooperative, and a group leader) by peers, enjoy high levels of popularity, social centrality, and social preference, and also form one or more reciprocated friendships (Heilbron & Prinstein, 2008; Salmivalli, 2010). Perceived popularity seems to be linked bidirectionally to aggression, particularly relational aggression, such that children who perceived to be popular exhibited elevated levels of relational aggression and vice versa (Rose, Swenson, & Waller, 2004). These views are in line with a recent finding that children who formed extended relationships or social network displayed more relationally aggressive behaviors, particularly when they had weaker relationships (Neal & Cappella, 2012), suggesting that children tend to use relational aggression because they may not be afraid of losing weak relationships and have more opportunity to enact it. Taken together, high social status or peer acceptance as well as a larger social network involving multiple friendships may be the socializing context that promotes aggression, particularly relational aggression.

**Mediational Processes of Aggression, Peer Victimization, and Peer liking**

The pathways from forms of aggression to peer victimization may be indirectly influenced by social factors, including social status and friendships. Positive peer relationships and friendships seem to be a mediating factor that may reduce or mitigate the levels of peer victimization over time. In a review of close friendships, Hartup and Stevens (1997) have suggested that friendships, which refer to ties that are close, reciprocated, and voluntary in nature, are predictive of a host of positive outcomes, including success with peers and prosocial behavior, and are inversely related to negative outcomes, such as peer victimization, ostracism, and isolation from the peer group. Similarly, positive peer relationships that
are characterized by high levels of peer acceptance may be the positive socializing context for developing empathy, sociability, and emotion regulation skills as well as obtaining emotional and instrumental support from peers. Hence, the link between forms of aggression and peer victimization may be mediated by friendships and social preference. For example, aggression, which is predictably associated with low social competence and emotion regulation skills, may be predictive of poor social status (i.e., low peer acceptance) and fewer numbers of friendships, which in turn may lead to subsequent peer victimization.

**The Path From Peer Victimization to Aggression**

There is a widely acknowledged consensus that peer victimization is a risk factor for social–psychological adjustment problems, including peer-related problems such as peer rejection and isolation from peer groups, internalizing and externalizing problems, and lower self-esteem and poor self-concept, concurrently, longitudinally, and even bidirectionally (Hawker & Boulton, 2000; Parker et al., 2006; Reijntjes et al., 2010). Research consistently showed that physical victimization was predictive of relative increases in externalizing behavior problems, including physical aggression (Hodges & Perry, 1999). Based on Bandura’s social learning theory (1977), it is conceivable that children who undergo physical victimization may learn to be physically aggressive via observational learning. In other words, these children may memorize experiences of physical aggression and mimic such behaviors when they get mad at and upset with peers at a later time. Indeed, research suggests that physical victimization can be a negative socializing milieu for developing physical aggression and other externalizing problems (Card & Hodges, 2008; Cook, Williams, Guerra, Kim, & Sadek, 2010; Ostrov, 2010).

Similar to physical victimization, relational victimization seems to have an effect on social–psychological adjustment problems, including relational aggression (Crick & Bigbee, 1998; Cullerton-Sen & Crick, 2005; Prinstein, Boergers, & Vernberg, 2001; Rosen et al., 2009; Sullivan et al., 2006). The links between relational victimization and detrimental outcomes have been established with studies showing the high co-occurrence of relational aggression and victimization (Crick & Bigbee, 1998) and with other studies finding the longitudinal effect of relational victimization on aggression (Rudolph, Troop-Gordon, Hessel, & Schmidt, 2011; Troop-Gordon & Ladd, 2005). Furthermore, Sullivan et al. (2006) revealed that physical victimization was related to more physical aggression and delinquency; however, relational victimization uniquely predicted more relational and physical aggression, particularly for girls. Given the modeling drawn from social learning theory, it is plausible that relationally victimized children may learn to use relational aggression (Ostrov, 2008, 2010). These children may also receive more negative evaluations by peers and have fewer friendships. Indeed, a meta-analytic study revealed that, relative to non-victimized children, victimized children were less accepted and more rejected by peers and exhibited poorer peer relationships (Cook et al., 2010). Poor peer liking, as a result, may be related to subsequent aggressive behavior as previously discussed. Taken together, it is conceivable that peer victimization may be linked to aggression directly or indirectly via low peer liking.

**The Present Study**

The goal of the present study was to test a series of comparative models of the processes and mechanisms of relational and physical aggression. Based on our literature review, we hypothesized that relational and physical aggression would follow maladaptive processes, especially when it is linked to negative peer relationships such as peer victimization. However, the link between relational aggression and positive peer relationships such as peer liking may be mixed in its directionality. For example, children who exhibit high peer liking may be able to effectively manipulate peer groups and, therefore, may use more relational aggression over time. On the other hand, children who poorly use relational aggression may suffer low peer liking and experience peer victimization. Accordingly, more relational aggression would result in less peer liking and more relational victimization. We also hypothesized that peer liking would mediate the link between forms of aggression and peer victimization. For example, aggressive children who trail maladaptive processes would have decreased peer liking, which in turn results in more peer victimization. Furthermore, peer victimization would predict increases in aggression directly or indirectly via lowered peer liking. Given the mixed, inconsistent, or null findings of gender differences in aggression, peer victimization, and their links with social–psychological adjustment problems (Card et al., 2008), we explored gender differences in the predicted links.

**METHODS**

**Participants**

Participants were part of a large short-term longitudinal study that examined the associations between aggression and adjustment across three time points. A total of 597 fourth grade students in a large Midwestern city participated in Time 1 peer nomination assessment. At Time 2, 561 (93.97%) students continued with the peer
nomination assessment while at Time 3, 383 students (64.15%) stayed in the study. High attrition rate from Time 2 to Time 3 was largely due to students moving out of the participating elementary schools or the participating school districts, which has been described elsewhere (e.g., Murray-Close, Ostrov, & Crick, 2007). Final sample of the present study included 561 students (50.1% boys) who had peer nomination data from at least two time points. This final sample was ethnically/racially diverse (30.6% European-American, 30% African-American, 12.2% Latino, 13.1% Hmong, 3.8% Asian, 3.3% Native American, and 7% others). No individual-level socioeconomic status data were obtained because parents did not participate in the study and were not asked to fill out questionnaires for their child. However, based on school demographic information, the socioeconomic status of the final sample was estimated to be lower to middle class. Specifically, 74% of students in the original sample were qualified for free or reduced-cost lunch. We conducted attrition analyses comparing means of the study variables and found that participants who were included in the study did not differ from those who were excluded in all of the study variables (i.e., relational and physical aggression, relational and physical victimization, number of friendships, peer acceptance) that were assessed at Time 1 and Time 2. $F$ values = .002–1.83, n.s. ($Ps = .177–.967$).

**Procedure**

Data for the present study were collected at three time points during one calendar year: the fall of Grade 4 (Time 1), the spring of Grade 4 (Time 2), and the fall of Grade 5 (Time 3). At each time point of data collection, participants completed a group-administered peer nomination instrument to assess relational and physical aggression, relational and physical victimization, the number of friendships, and peer acceptance. Written informed consent was obtained from the parents of all the study participants (consent rate at Time 1 = 71%) while assent was obtained from the participating students following an explanation of the purposes and procedures of the study, the lack of an obligation to participate, and a reassurance of confidentiality. Participants were compensated for their time and participation with small items (e.g., a pencil, an eraser, or a toy). The procedures and methods of this study were approved by the Institutional Review Board at the authors’ university.

**Measures**

**Relational and physical aggression.** A peer nomination instrument was administered to assess children’s Relational Aggression (5 items) and Physical Aggression (3 items; Crick & Grot Peters, 1995). During the administration of the peer-nomination instrument in grade school classrooms, participants were provided with a class roster and were asked by trained research assistants to nominate up to three classmates who best fit the behavioral descriptions provided for each of the items on the measure. Sample items for Relational Aggression include “Exclude others from the play group” and “Spread rumors or talk behind others’ back.” Sample items for Physical Aggression include “Hit, kick, or punch others” and “Push and shove others.” It is noted that children who did not consent to this study were crossed out from the roster and the participants were told not to nominate those who did not participate in the study. Also, the participating children could only nominate children from their classrooms. The number of nominations children received from classmates for each of the items on these subscales was standardized within classrooms. The average of the standardized scores for the items on each subscale was used in the analyses. The two subscales demonstrated good reliability in the present sample. Cronbach’s $\alpha$ for Relational Aggression and Physical Aggression across three time points ranged from .86 to .92 and from .94 to .95, respectively.

**Relational and physical victimization.** Peer nomination was also used to assess children’s Relational Victimization and Physical Victimization (three items for each; Crick & Bigbee, 1998). Items for Relational Victimization include “Get ignored by others,” “Get left out of the group,” and “Are the target of rumors or gossip.” Items for Physical Victimization include “Get hit or kicked by peers,” “Get pushed or shoved,” and “Get physically threatened.” The number of nominations children received from classmates for each of the items on these subscales was also standardized within classrooms. The average of the standardized scores for the items on each subscale was used in the analyses. The two victimization subscales demonstrated acceptable reliability in the present sample: Cronbach’s $\alpha$ for Relational Victimization and Physical Victimization across three time points ranged from .71 to .78 and from .71 to .82, respectively.

**Peer liking.** Peer acceptance and the number of reciprocated friendships were used as indicators to create a latent construct for peer liking. Peer acceptance was assessed by asking participants to nominate up to three peers that they “like to hang out with the most.” The number of nominations that children received from classmates was standardized within each classroom. Peer nomination technique was also used to identify mutual friendships (Grot Peters & Crick, 1996; Parker & Asher, 1993). Participants were asked to nominate up to five best friends from their classroom rosters. Reciprocated friendships were identified as pairs of children who chose each other as a best friend.
Statistical Analyses

Data analyses for the structural equation models (SEMs) in the present study were conducted using Amos 19.0. Maximum likelihood estimation was used in model testing. Model fit was assessed with multiple criteria: Chi-square ($\chi^2$), Comparative Fit Index (CFI), the Tucker–Lewis index (TLI), and Root Mean Square Error of Approximation (RMSEA). In general, nonsignificant $\chi^2$, CFIs and/or TLI > .95, and RMSEA < .05 suggest a good model fit with the observed data (Hu & Bentler, 1999; McDonald & Ho, 2002); however, some argue that CFIs or TLI > .90, RMSEA < .10 may also be considered adequate fit (Kline, 1998; McDonald & Ho, 2002). Because the $\chi^2$ statistic is considerably affected by sample size, it was not used as the primary indicator of the model fit (Hu & Bentler, 1999).

To examine the dynamic interplay of aggression, victimization, and peer liking over time, we tested a series of nested SEMs, separately for the two forms of aggression/victimization (i.e., relational versus physical). We created latent constructs for relational aggression and victimization, as well as physical aggression and victimization, using items that were supposed to tap on these constructs as indicators. A latent construct for peer liking, as described in the measure section, was created using peer acceptance and the number of friendships as indicators. The error variances of Relational Aggression item “Spread rumors or talk behind others’ back” across time were allowed to correlate with each other, as well as the error variances of Relational Victimization items “Get ignored by others” and “Get left out of the group” within time at each time point, according to modification indices. Likewise, the error variances of Physical Aggression item “Push and shove others” across time, as well as the error variances of Physical Victimization item “Get pushed by others” across time, were allowed to correlate with each other.

Five nested models being tested are shown in Figure 1. All models included within-time correlations among constructs; for example, inter-correlations among relational aggression, relation victimization, and peer liking at each time point were freely estimated. Longitudinal paths were only estimated between adjacent time points because of considerations of power issue and the total number of parameters being estimated. All models also included paths from prior models. Model 1 tested stability paths of relational (or physical) aggression, peer liking, and relational (or physical) victimization (i.e., RV1 → RV2 and RV2 → RV3; see Fig. 1). Model 2 tested maladaptive and/or adaptive effects of relational aggression and physical aggression by examining the paths from relational aggression to subsequent peer liking and subsequent relational victimization, as well as from physical aggression to subsequent peer liking and subsequent physical victimization. Model 3 tested maladaptive and/or adaptive effects of peer liking by examining the paths from peer liking to subsequent relational and physical aggression. Model 4 tested protective effect of peer liking against peer victimization by examining the paths from peer liking to subsequent relational and physical victimization. Model 5 is a full model that allows all remaining cross-lagged paths to be freely estimated by including the paths from

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**Fig. 1. Summary of freely estimated paths for nested models. RA, relational aggression; PA, physical aggression; RV, relational victimization; PV, physical victimization; PL, peer liking. All models included within-time correlations (not shown) and paths from prior models.**

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victimization to subsequent aggression and subsequent peer liking.

RESULTS

Preliminary Analyses

Bivariate correlations among study variables at each time point are presented in Table 1. Results indicated that relational and physical aggression were highly and positively correlated with each other at every time point; so were relational and physical victimization; further, relational and physical aggression were each positively correlated with relational and physical victimization. Moreover, relational and physical aggression were negatively related to relational and physical victimization. However, the successive models showed incrementally better fit, indexed by the chi-square difference tests, as additional parameters were estimated. A significant chi-square difference test implies rejection of the more parsimonious model in favor of the model with more parameters. Therefore, Model 5 was selected as the most plausible models among those tested in this study.

Figure 2 shows the standardized path coefficients for the significant paths of Model 5. Results indicated that relational aggression, peer liking, and relational victimization were stable over one year period. In addition, relational aggression and relational victimization were highly correlated with each other within time, even at Time 2 and Time 3 when the previous relations of the two constructs were controlled for. Moreover, relational aggression was concurrently related to poor peer liking at Time 1 and Time 2, but not Time 3. Interestingly, peer liking at Time 1 predicted more relational aggression at Time 2 which, in turn, predicted peer liking at Time 3. In contrast, peer liking at Time 2 predicted less relational aggression and victimization at Time 3. Further, relational victimization at Time 2 predicted more relational aggression and poor peer liking at Time 3.

TABLE 1. Correlations Among Study Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<tbody>
<tr>
<td>Time 1</td>
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<tr>
<td>1. Relational aggression</td>
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<td></td>
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<tr>
<td>2. Physical aggression</td>
<td>.69***</td>
<td>—</td>
<td></td>
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<tr>
<td>3. Peer acceptance</td>
<td>−.12**</td>
<td>−.16***</td>
<td>—</td>
<td></td>
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<tr>
<td>4. Number of friendships</td>
<td>−.14***</td>
<td>−.21***</td>
<td>.64***</td>
<td>—</td>
<td></td>
<td></td>
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<tr>
<td>5. Relational victimization</td>
<td>.52***</td>
<td>.34***</td>
<td>−.18***</td>
<td>−.18***</td>
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<td></td>
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<tr>
<td>6. Physical victimization</td>
<td>.31***</td>
<td>.32***</td>
<td>−.19***</td>
<td>−.26***</td>
<td>.54***</td>
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<td>Time 2</td>
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<tr>
<td>1. Relational aggression</td>
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<tr>
<td>2. Physical aggression</td>
<td>.70***</td>
<td>—</td>
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<tr>
<td>3. Peer acceptance</td>
<td>−.13**</td>
<td>−.15***</td>
<td>—</td>
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<tr>
<td>4. Number of friendships</td>
<td>−.11**</td>
<td>−.21***</td>
<td>.59***</td>
<td>—</td>
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<tr>
<td>5. Relational victimization</td>
<td>.50***</td>
<td>.31***</td>
<td>−.24***</td>
<td>−.23***</td>
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<td></td>
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<tr>
<td>6. Physical victimization</td>
<td>.26***</td>
<td>.29***</td>
<td>−.25***</td>
<td>−.23***</td>
<td>.66***</td>
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<tr>
<td>Time 3</td>
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<tr>
<td>1. Relational aggression</td>
<td>—</td>
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<tr>
<td>2. Physical aggression</td>
<td>.66***</td>
<td>—</td>
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<tr>
<td>3. Peer acceptance</td>
<td>−.11</td>
<td>−.06</td>
<td>—</td>
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<td></td>
<td></td>
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<tr>
<td>4. Number of friendships</td>
<td>−.03</td>
<td>−.08</td>
<td>.59***</td>
<td>—</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Relational victimization</td>
<td>.59***</td>
<td>.30***</td>
<td>−.24***</td>
<td>−.19***</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>6. Physical victimization</td>
<td>.34***</td>
<td>.30***</td>
<td>−.25***</td>
<td>−.19***</td>
<td>.64***</td>
<td>—</td>
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</tbody>
</table>

Note. *p < .05, **p < .01, ***p < .001.
parsimonious models, according to the chi-square differences tests, Model 4, with added parameters, fit significantly better than Model 3. Model 5, in turn, fit slightly better than Model 4. Therefore, Model 5 was chosen as the final model.

Figure 3 shows the standardized path coefficients for the significant paths of Model 5. Results indicated that physical aggression, peer liking, and physical victimization were stable over one year period. Additionally, physical aggression and physical victimization were significantly correlated with each other within time, even at Time 2 and Time 3 when the previous relations of the two constructs were controlled for. Moreover, physical aggression was concurrently related to poor peer liking at Time 1 which was concurrently related to more physical victimization. Further, peer liking at Time 1 predicted less physical victimization at Time 2. Peer liking at Time 2 predicted less physical victimization and possibly also less physical aggression at Time 3 ($P = .055$). Physical victimization at Time 2 predicted poor peer liking at Time 3. There was a trend that physical aggression at Time 2 predicted more physical victimization at Time 3 ($P = .053$).

**Additional Analyses**

We conducted additional analyses to explore the moderating effect of gender on the cross-lagged paths in the final models (Model 5) using multigroup analysis in AMOS with gender as the grouping variable. An unconstrained model in which the cross-lagged paths were set to be freely estimated while the rest of the paths were constrained to be equal across gender group. For the model predicting relational aggression, relational victimization, and peer liking, model fit for the unconstrained model was: $\chi^2 = 1,315.66$, $df = 784$, $P < .001$, $CFI = .940$, $TLI = .929$, and $RMSEA = .035 [0.032, 0.038]$; for the constrained model: $\chi^2 = 1,328.30$, $df = 796$, $P < .001$, $CFI = .940$, $TLI = .930$, and $RMSEA = .035 [0.031, 0.038]$. Goodness of fit statistics between the constrained and the
unconstrained models revealed very negligible change in fit, \( \Delta \chi^2 (12) = 12.64, P = .395 \), suggesting that the cross-lagged paths did not vary with gender. Similarly, for the model predicting physical aggression, physical victimization, and peer liking, model fit for the unconstrained model was: \( \chi^2 = 900.69, df = 474, P < .001 \), CFI = .949, TLI = .936, and RMSEA = .04 [.036, .044]; for the constrained model: \( \chi^2 = 918.09, df = 486, P < .001 \), CFI = .949, TLI = .937, and RMSEA = .04 [.036, .044]. The change in model fit, again, was negligible, \( \Delta \chi^2 (12) = 17.4, P = .135 \), suggesting that the cross-lagged paths did not vary with gender.

**Follow-Up Cluster Analyses**

We conducted follow-up analyses to understand whether there is a subgroup of relationally aggressive or nonaggressive children who are adaptive or maladaptive to the peer groups. Clusters of variables including relational aggression, relational victimization, numbers of friends, and peer acceptance (from Time 1 data) were identified using the SPSS TwoStep Clustering (SPSS, 2001). Three clusters were specified to capture subgroups of relationally aggressive children who are adaptive to the peer group, relationally aggressive children who are maladaptive to the peer group, and relationally nonaggressive children who are adaptive to the peer group. Results from the culture analysis showed that 19.3% of children fell into a group with high levels of relational aggression (\( M = 0.56 \), relational victimization (\( M = 0.49 \)), and peer liking (peer acceptance: \( M = 0.55 \); friends: \( M = 3.44 \)) (Group 1); 40.6% of children were in a group with a middle range of relational aggression (\( M = 0.07 \) and relational victimization (\( M = 0.16 \)) and low peer liking (peer acceptance: \( M = 0.79 \); friends: \( M = 1.14 \)) (Group 2); and 40.1% of children were in a group with low levels of relational aggression (\( M = 0.50 \) and victimization (\( M = 0.49 \)) and high peer liking (peer acceptance: \( M = 0.68 \); friends: \( M = 3.45 \)) (Group 3). Relationally aggressive children in Group 1 seemed to be a subgroup of well-liked aggressive victims who exhibited high levels of relational aggression and peer liking but high in relational victimization. Relationally

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**TABLE 3. Fit Statistics and Model Comparisons for Nested Hypothesized Models Involving Physical Aggression and Victimization**

<table>
<thead>
<tr>
<th>Model</th>
<th>( \chi^2 )</th>
<th>df</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
<th>Model Comparison</th>
<th>( \Delta \chi^2 )</th>
<th>( \Delta df )</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Stabilities + within-time correlations</td>
<td>583.46</td>
<td>231</td>
<td>.960</td>
<td>.948</td>
<td>.052 (.047, .057)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>2. Maladaptive/adaptive model of RA and PA</td>
<td>577.71</td>
<td>227</td>
<td>.960</td>
<td>.947</td>
<td>.053 (.047, .058)</td>
<td>2 vs. 1</td>
<td>5.75</td>
<td>4</td>
<td>.219</td>
</tr>
<tr>
<td>3. Maladaptive/adaptive model of PL</td>
<td>576.33</td>
<td>225</td>
<td>.960</td>
<td>.947</td>
<td>.053 (.047, .058)</td>
<td>3 vs. 2</td>
<td>1.38</td>
<td>2</td>
<td>.502</td>
</tr>
<tr>
<td>4. Protective effect of PL</td>
<td>564.67</td>
<td>223</td>
<td>.961</td>
<td>.948</td>
<td>.052 (.047, .058)</td>
<td>4 vs. 3</td>
<td>11.66</td>
<td>2</td>
<td>.003</td>
</tr>
<tr>
<td>5. Full model</td>
<td>555.75</td>
<td>219</td>
<td>.962</td>
<td>.946</td>
<td>.052 (.047, .058)</td>
<td>5 vs. 4</td>
<td>8.92</td>
<td>4</td>
<td>.063</td>
</tr>
</tbody>
</table>

Note. CFI, comparative fit index; TLI, Tucker–Lewis index; RMSEA, root mean square error of approximation; RA, relational aggression; PA, physical aggression; PL, peer liking.
aggressive children in Group 2 were maladaptive aggressive victims as they experienced average relational victimization and received low peer liking, but exhibited moderate relational aggression. Children in Group 3 were adaptive to the peer group because they displayed low aggression and experienced low victimization and concurrently they were well liked by peers. These findings suggest that there may be subgroups of relationally aggressive children who differ in the level of peer liking and relational victimization.

A similar analysis was conducted for physical aggression, physical victimization, and peer liking (i.e., peer acceptance, and friendships). Three clusters were specified to capture subgroups of physically aggressive and nonaggressive children. Results of the cluster analysis showed that 14.3% of children fell into a group with high physical aggression ($M = 1.60$), high physical victimization ($M = 0.62$), and low peer liking (peer acceptance: $M = −0.50$; friends: $M = 1.52$) (Group 1); 33.8% of children were in a group with low physical aggression ($M = −0.34$), mid-ranged physical victimization ($M = 0.05$), and low peer liking (peer acceptance: $M = −0.67$; friends: $M = 1.34$) (Group 2); and 49.9% of children were in a group with low physical aggression ($M = −0.34$), low physical victimization ($M = −0.26$), and high peer liking (peer acceptance: $M = 0.74$; friends: $M = 3.62$) (Group 3). Children in Groups 1 and 2 seemed to be maladaptive to the peer group. Children in Group 1 were aggressive victims as they displayed physical aggression, experienced physical victimization, and were viewed as unpopular by peers. Children in Group 2 were passive victims because they were physically victimized and less liked by peers but exhibited low physical aggression. Children in Group 3 were adaptive to the peer group as they were low in aggression and victimization and highly liked by peers. Unlike a subgroup of children who used relational aggression and were liked by peers, children who displayed a medium to high level of physical aggression were less liked by peers.

**DISCUSSION**

The present study examined the processes and mechanisms of relational and physical aggression in relation to peer liking and forms of peer victimization. Results showed that, as hypothesized, relational aggression followed somewhat complex adaptation processes. That is, higher peer liking at Time 1 predicted relative increases in relational aggression at Time 2, which in turn led to more peer liking at Time 3. On the other hand, more peer liking at Time 2 was predictive of relative decreases in relational aggression at Time 3. As hypothesized, relational victimization at Time 2 predicted relative increases in relational aggression and relative decreases in peer liking in the fifth grade. Unlike relational aggression, physical aggression followed maladaptive (but not adaptive) processes. That is, physical aggression was consistently and concurrently associated with more physical victimization and was marginally predictive of relative increases in physical victimization in transition to the next grade. Moreover, lower peer liking at Time 1 predicted relative increases in physical victimization at Time 2, which in turn resulted in lower peer liking at Time 3. No gender differences in these effects were found. These findings are discussed along with the more person-oriented findings of an additional cluster analysis evidencing subgroups of relationally aggressive children who were adaptive or maladaptive to the peer group (i.e., high peer liking or low peer liking, respectively) and a subgroup of physically aggressive children who were maladaptive to the peer group.

The present study supported maladaptive processes of relational aggression and victimization. That is, relational aggression was concurrently associated with more relational victimization and lower peer liking. Additionally, relational victimization at Time 2 also was linked to relative increases in relational aggression and relative decreases in peer liking at Time 3. One possible explanation for this finding is that given Bandura’s social learning theory (1977), children who undergo relational victimization may learn to be relationally aggressive by observing their relationally aggressive peers in the same peer group. These children may also develop hostility, hostile attribution bias, or revengeful feelings toward peers and, thus, use more aggression that has the same function (Ostrov, 2010). These views are in line with the findings of prior studies that have demonstrated that relationally victimized children developed maladaptive socio-cognitive processes, including negative views about peers and emotional and behavioral dysregulation (McLaughlin et al., 2009; Rudolph, Troop-Gordon, & Flynn, 2009), which in turn relate to aggression (Crick et al., 2002; Eisenberg et al., 2001). These processes may spill over to other domains of social development, such that relationally victimized children are becoming less socially competent (i.e., less liked by peers and lose friendships). Taken together, experiences of relational victimization may be a risk factor for the development of relational aggression and poor peer liking (Crick & Zahn-Waxler, 2003).

Adaptive processes of relational aggression were also evidenced. Despite the high stability of relational aggression over time, peer liking—peer acceptance and friendships—at Time 1 predicted relative increases in relational aggression at Time 2, which in turn resulted in greater levels of peer liking at Time 3. This finding suggests that positive peer relationships indexed by high levels of peer acceptance and friendships may be the
socializing context that fuels the use of relational aggression to solidify peer groups. Indeed, empirical studies have demonstrated the linkages among relational aggression, peer liking, and positive peer relationships, including social dominance, perceived popularity, and friendship intimacy and closeness (for a review, see Heilbron & Prinstein, 2008). These views are supported by an evolutionary perspective of aggression that indicates that children who use aggression may be in fact adaptive to environmental demands and effectively use different strategies such as aggression and prosocial behavior when they deal with problems with peers. Hence, relationally aggressive children may have an ability to calculate the costs and benefits of using such aggression, which may be necessary social skills for human survival (Hawley, 2003; Pellegrini, 2008; Volk et al., 2012).

Although the mediating effects of peer acceptance and friendships were not evidenced, these factors indicating peer liking were predictive of relative decreases in both relational aggression and relational victimization in the transition to the fifth grade. Given that positive friendships are the socializing context for acquiring peer liking, developing a sense of belongingness to peers, and enhancing self-esteem, self-worth, and self-confidence (Hartup & Stevens, 1997), it is conceivable that they may be a preventive factor for reducing a risk of developing problem behaviors. Positive friendships may also be the context in which children receive support from peers and provide the protection from peer victimization. These children may be less likely to be a target of peer victimization, conceivably because the bullies may view victimizing these children as costing more benefits than gains.

The findings of the positive association between peer liking and relational aggression from Time 1 to Time 2 and the negative association between these two constructs from Time 2 to Time 3 may seem contradictory at first. However, results from the cluster analysis (a person-centered approach) showed that there were subgroups of children who were high in both relational aggression and peer liking and children who were low in relational aggression and high in peer liking. That is, there may be a subgroup of children who use relational aggression but still are liked by peers and a subgroup of children who inhibit to use relational aggression and, thereby, are liked by peers. Some children who have a larger peer group and friendships may use the social network as a tool to enact relational aggression, while other children inhibit relational aggression to obtain peer liking or maintain their social network. Moreover, cluster analyses also showed that some relationally aggressive children were high in peer liking and other relationally aggressive children were low in peer liking. This is in line with the findings of the SEM (a variable-centered approach) showing that peer liking predicted higher relational aggression, which in turn resulted in more peer liking; however, relational aggression also predicted lower peer liking. The former may reflect the existence of children who have larger peer groups and friendships and have more opportunity to use relational aggression and, thereby, become more accepted by peers over time; in contrast, the latter may be the children who use relational aggression unsuccessfully and, thereby, tend to be disliked by peers. Together, these findings illustrate the value of integrating a variable-centered approach with a person-centered approach in uncovering the complex developmental processes of aggressive behaviors and social context.

We find it interesting that physical aggression did not track adaptive processes as did relational aggression. This finding is inconsistent with the evolutionary perspective of aggression. However, this discrepancy indicates that there may be differential developmental processes of relational and physical aggression and that aggression, particularly relational aggression, can be an adaptive behavior, depending on its context and consequences. Given that relational aggression includes features of tactic manipulation of relationships, some children may strategically use these behaviors and, as a result, enjoy high social status and are well liked by peers (Group 1 from the cluster analysis). Hence, the consequences of some relationally aggressive children may not be as detrimental as those of physically aggressive peers. In contrast, the cost of using physical aggression may be higher as it is more observable to school authorities, teachers, and parents and perhaps more subject to censure by peers. Our finding that physical aggression at Time 2 predicted more physical victimization at Time 3 (marginally significant) provides preliminary support for this notion. This is consistent with the findings of the cluster analysis showing that children who were higher in physical aggression were predictably categorized as a subgroup of children with higher physical victimization and lower peer liking (there was no subgroup of children who used physical aggression but still received high peer liking). Collectively, physically aggressive children may tend to be more maladaptive to the peer group and, thereby, being less accepted and more disliked by peers.

Another notable finding is the differential effects of the assessment time window on the transactional effects of aggression and other study factors. That is, the transactional processes occurred more often in the transition to the next grade. This is in part due to the stability of both forms of aggression and peer victimization along with social status and friendship formation for children who stay in the same classrooms. Once these children change
classrooms, the dynamics of peer relationships and social status may be re-structured. These dynamical changes in peer culture may provide an opportunity for children to find new niche peer groups and friendships, thereby enhancing or undermining the adaptation to the peer environment. In turn, these new peer groups and friendships may be the positive or negative social contexts for reducing or increasing aggression and experiences of peer rejection and victimization, depending on children’s social status and characteristics of peers (i.e., aggressive or prosocial).

Relatedly, the mixed finding of the link between peer liking and relational aggression needs more elaboration. One possible explanation for this finding is that children who form positive peer relationships may afford to use such relationships as a means to hurt peers and, thus, exhibit more relational aggression in the same classroom. However, when they change classrooms, they may not be able to maximize the benefits from peer groups as a resource for relational aggression due to the instability of group members. Children who are relationally victimized by peers may seek new peer groups for safety and, thereby, children who can afford to use relational aggression may lose their targets in the transition to new classrooms. These dynamical changes in terms of the relationship between perpetrators and victims may reflect the differential directionality in the link between peer liking and relational aggression.

Gender did not moderate the interplay among forms of aggression and peer victimization and peer liking. This is in line with the finding of a meta-analytic study showing that gender did not change the magnitude of the link between forms of aggression and outcomes, including peer acceptance, peer rejection, and social–psychological adjustment problems in children and adolescents (Card et al., 2008). However, this finding is inconsistent with the view of gender differences in socialization, including the emphasis on interpersonal relationships, relational social–cognitive processes, experiences of peer victimization that seem to be more salient for girls (Rose & Rudolph, 2006), and the stronger vulnerability to peer stress for girls (Conley & Rudolph, 2009). One possible explanation is the age differences in the sample of the study. Whereas the present study primarily included fourth grade children, an emerging body of studies showing sex differences, in combination of the timing of puberty, in the heightened effect of peer stress used adolescent samples (e.g., Conley & Rudolph, 2009). Gender differences in peer domains may be more pronounced in adolescence, when substantial gender-linked social, cognitive, and biological changes occur.

Overall, the present study made significant contributions to the current literature by demonstrating that relational aggression and physical aggression may track differential pathways to peer liking. In other words, relational aggression may trail both adaptive and maladaptive processes, depending on time, assessment period, and social context (peer liking and peer victimization), whereas physical aggression may typically result in maladaptive outcomes. These differential processes of physical and relational aggression may merit an integrative investigation of different forms of aggression and social–psychological adjustment, using both variable-centered and person-centered approaches in future studies that examines, but not limited to, the following questions: in what conditions physically aggressive children can be adaptive to the peer group, what factors differentiate subgroups of relationally aggressive children, and how some children are relationally aggressive and victimized by peers and yet still well liked by peers.

Limitations and Directions to Future Studies

Similar to other studies, there were several limitations in this study. First, the sample representativeness and generalizability of the findings is an issue of matter. Although our ethnically diverse sample including more than seven different ethnic groups is an advantage of this study, the ethnic make-up of our sample is somewhat unique and thus the findings may not be generalizable to populations that are less diverse. Second, the lack of specific information on children’s SES, neighborhood, residency, and school district may also limit the generalizability of our findings. Third, the assessment of friendships itself may have the potential for problems. That is, the present study focused on in-school friendships. However, friendships formed outside classrooms such as neighborhoods, relatives, and churches may be important, especially for ethnic minority children. Fourth, the lack of assessment of perceived popularity, which is predictably associated with relational aggression, is another methodological limitation. Given that perceived popularity covaries with both peer liking and relational aggression, the finding concerning the association between more relational aggression and increased peer liking may be accounted for by the contribution of perceived popularity. Fifth, the mean classroom participation rates of peer nomination across three time points were 72.4%, 76.9%, and 71.2%, respectively. Although these rates exceed the recommended rate of 70% for obtaining a valid assessment using limited peer nomination measures (Crick & Ladd, 1989), for some classrooms at Time 3, the participation rate was as low as 50%, which may have influenced the validity of our constructs. Sixth, the present study looked at only a snapshot of transactional paths among aggression, victimization, and peer liking over one year period in preadolescence, which precluded us from concluding long-term or age-related adaptive and maladaptive processes among these factors. Sixth, causal inference was not possible given
the correlational nature of the methodology. Overall, these limitations call for replications of our findings with longitudinal studies in larger samples that are more diverse in age.

The maladaptive and adaptive processes of relational aggression deserve attention as it may impact the effectiveness of intervention and prevention programs that promote peer liking (i.e., an ability to be accepted by peers, to form multiple, high-quality friendships) aiming at reducing relational aggression. For example, relationally aggressive children who are initially maladaptive to the peer groups may learn the social skills from the intervention and become less relationally aggressive. However, this effect may not be evidenced for some children who use relational aggression in a strategic and adaptive way because the promotion of social skills may in fact support the maintenance of or even increases in relational aggression. Therefore, future design and implementation of a personalized intervention program that considers individual differences in the degree to which children’s use of relational aggression is adaptive or maladaptive to the peer groups and the functions of relational aggression in the peer context may be useful.

Although this is beyond the scope of the present study, it is important to note that ethnic diversity in peer liking and friendships may influence the mechanisms and processes linking aggression with peer victimization. Indeed, an emerging body of research is suggesting that ethnic peer liking and friendships across races/ethnicities (Wilson & Rodkin, 2011). Furthermore, given that aggression and victimization may occur within and across ethnic groups, the perpetrator–victim relationships may consist of varying numbers of cross-ethnic and same-ethnic peers. Investigations of the ethnic composition of peer groups and friendships in the development of cross-ethnic, in addition to same-ethnic, aggression and victimization merit future research.

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REFERENCES


