Anxiety symptoms as a moderator of the reciprocal links between forms of aggression and peer victimization in middle childhood

John L. Cooley | Andrew L. Frazer | Paula J. Fite | Shaquanna Brown | Moneika DiPierro

Clinical Child Psychology Program, University of Kansas, Lawrence, Kansas

Correspondence
John L. Cooley, Clinical Child Psychology Program, University of Kansas, 2015 Dole Human Development Center, 1000 Sunnyside Avenue, Lawrence, KS 66045. E-mail: johnlcooley@ku.edu

The current short-term longitudinal study evaluated whether anxiety symptoms moderated the bidirectional associations between forms (i.e., physical and relational) of aggression and peer victimization over a 1-year period during middle childhood. Participants were 228 predominantly Caucasian children (50.4% boys; M = 8.32 years, SD = .95 years) in the second through fourth grades and their homeroom teachers. Children completed a self-report measure of anxiety symptoms at Time 1. Peer victimization was assessed using self-reports at Time 1 and approximately 1 year later (Time 2), and teachers provided ratings of children’s aggressive behavior at both time points. A series of cross-lagged path analysis models indicated that high (+1 SD) initial levels of anxiety symptoms exacerbated the prospective link from Time 1 relational aggression to Time 2 peer victimization; conversely, when initial levels of anxiety symptoms were low (−1 SD), relational aggression predicted lower levels of subsequent peer victimization. Time 1 peer victimization was also found to predict lower levels of Time 2 physical aggression when initial levels of anxiety symptoms were low, and Time 1 anxiety symptoms were uniquely related to higher levels of relational aggression over a 1-year period. Regions of significance were calculated to further decompose significant interactions, which did not differ according to gender. Study findings are discussed within a social information processing theoretical framework, and directions for future research and implications for practice are reviewed. Specifically, co-occurring anxiety symptoms may need to be addressed in interventions for both aggression and peer victimization during middle childhood.

KEYWORDS
anxiety symptoms, peer victimization, physical aggression, relational aggression, middle childhood

1 | INTRODUCTION

Extant evidence indicates that peer victimization and aggressive behavior are prospectively linked across developmental periods (e.g., Ostrov, 2008; Zimmer-Gembeck & Duffy, 2014). Although this association appears to be reciprocal in nature, not all aggressive youth are victimized, and peer victimization does not inevitably lead to aggression (e.g., Kawabata, Tseng, & Crick, 2014). Indeed, an emerging body of research suggests that certain individual characteristics may influence the strength of these bidirectional relations (e.g., Cooley & Fite, 2016; Pitula, Murray-Close, Banny, & Crick, 2015). Anxiety symptoms are one factor that has been shown to be highly associated with aggression (for a review, see Granic, 2014) and to predict increases in peer victimization over time (e.g., Siegel, La Greca, & Harrison, 2009). It is not yet clear, however, how co-occurring anxiety and aggressive behavior may influence children’s subsequent risk for experiences of victimization. Furthermore, despite theoretical support, the role of anxiety in the development of specific forms (i.e., physical and relational) of aggression, especially in the context of peer victimization, has been largely neglected in previous work (Granic, 2014). The current short-term longitudinal study examined anxiety symptoms as a moderator of the reciprocal links between physical and relational aggression and peer victimization.
relational aggression and peer victimization over a 1-year period during middle childhood, with attention to potential gender differences.

1.1 | Reciprocating risk for peer victimization and aggression

The bidirectional associations between aggressive behavior and peer victimization (i.e., the experience of being the recipient of peers’ aggression) may be understood from a social information processing (SIP) theoretical perspective (see Crick & Dodge, 1994). Aggressive youth’s hostile attribution bias, or tendency to perceive others’ actions as provocative in ambiguous or benign situations, represents one SIP deficit that may provoke frequent conflict with peers and increase their risk for subsequent victimization (for a review, see Dodge, 2006). Repeated displays of anger and aggression may also elicit negative reactions from other children because such behavior is viewed as objectionable or aberrant within the larger context of the peer group (Ostrov, Kamper, Hart, Godleski, & Blakey-McClure, 2014). As a result, aggressive youth are likely to be rejected by their peers and to have limited social support, which leaves them particularly vulnerable to victimization (e.g., Boivin & Hymel, 1997).

It is important to note that aggression is often distinguished according to the form that the behavior takes. Whereas physical aggression refers to physical attacks and verbal threats (Crick, Casas, & Ku, 1999), relational aggression is characterized by harm to another’s social status or relationships by means of ostracism, gossip, rumor spreading, or threats of friendship withdrawal (Crick & Bigbee, 1998). Indirect aggression also refers to a concept similar to relational aggression that was introduced earlier by Lagerspetz and colleagues (Björkqvist, Lagerspetz, & Kaukiainen, 1992; Langerspetz, Björkqvist, & Peltonen, 1988) and emphasized the covert form that such behavior often takes; however, the present study uses the term relational aggression, as it is guided by past theory and research in this tradition, which acknowledges that this form of aggression can be either overt or covert in nature (for a review of indirect and relational aggression, see Archer & Coyne, 2005). Previous research has found that forms of aggression follow distinct trajectories during middle childhood, with rates of physical aggression decreasing while rates of relational aggression are increasing (Dodge, Coie, & Lynam, 2006; Murray-Close, Ostrov, & Crick, 2007). Nonetheless, both physical and relational aggression are associated with hostile attribution biases (Crick, Grotpeeter, & Bigbee, 2002) and have consistently been related to increases in peer victimization over time (e.g., Ostrov, 2008; Pitula et al., 2015).

With regard to the alternate direction of effects, although youth may respond to hostile peers in diverse ways, numerous findings have demonstrated that peer victimization predicts higher levels of subsequent physical and relational aggression (e.g., Cooley & Fite, 2016; Rudolph, Troop-Gordon, Hessel, & Schmidt, 2011). The tendency for victimized youth to become increasingly aggressive may represent a defensive response that is used in an attempt to retaliate and avoid future incidents of victimization. Extant evidence also suggests that hostile attribution biases serve as a mechanism through which peer victimization leads to aggression (Perren, Ettekal, & Ladd, 2013). Thus, children who experience victimization may become hypervigilant and more likely to view peers’ behavior as hostilely motivated, leading them to react with aggressive behavior. Taken together, physical and relational aggression appear to function as both antecedents and consequences of peer victimization, and thus, Ostrov and Godleski (2013) have emphasized the need to evaluate bidirectional relations between these variables in future research.

1.2 | The role of anxiety symptoms

Several investigations in recent years have begun to identify certain individual characteristics that may affect the strength of the prospective associations between forms of aggression and peer victimization (e.g., Cooley & Fite, 2016; Pitula et al., 2015; Zimmer-Gembeck & Duffy, 2014). Still, research has yet to identify factors that influence both directions of effects; this is a notable omission in the literature, which may have important implications for the development of targeted interventions designed to prevent an escalating cycle of aggressive behavior and peer victimization.

Anxiety symptoms are one factor that may exacerbate these reciprocal links given the extensive theoretical and empirical support suggesting that they confer risk for both peer victimization (e.g., Olweus, 1995; Siegel et al., 2009) and aggression (e.g., Batanova & Loukas, 2011; Granic, 2014). The behavioral tendencies associated with symptoms of anxiety, such as social withdrawal, oversensitivity, and excessive worry may signal vulnerability and make youth easy targets for peer victimization (e.g., Dill, Vernberg, Fonagy, Twemlow, & Gamm, 2004). Furthermore, youth exhibiting these symptoms may have fewer opportunities to develop effective social skills, as anxiety tends to inhibit opportunities for positive peer interactions (Zimmer-Gembeck & Duffy, 2014). Corresponding to the SIP deficits characterizing aggressive youth, anxiety symptoms are also associated with hostile attribution biases (Bubier & Drabick, 2009). Therefore, anxious children may be viewed as less desirable social partners and lack social support, which also heightens their vulnerability for peer victimization.

Previous research has demonstrated that aggressive behavior and anxiety symptoms are highly associated among children and adolescents (for reviews, see Bubier & Drabick, 2009; Granic, 2014). However, it is currently unclear how co-occurring anxiety and aggression may interact to influence youth’s subsequent risk for peer victimization. Given the shared hostile attribution biases and coinciding social deficits, symptoms of anxiety may exacerbate aggressive youth’s behavioral tendencies and leave them largely isolated from their peers. Moreover, aggression that is accompanied by anxiety is likely to be particularly ineffective, thereby leading to increases in victimization over time.

Although it has been posited that anxious children’s temperament heightens risk for victimization because it indicates that they will not retaliate or fight back against aggressors (Olweus, 1995), available theory suggests that there are a number of instances in which anxiety may lead to increased aggressive behavior. Granic (2014) recently proposed a model whereby anxiety plays a causal
role in the development of childhood aggression; most relevant to the current research, it was predicted that anxiety causes youth to become hypervigilant, depletes their ability to inhibit aggressive impulses, and predisposes them to aggress against perceived threats. These patterns may be especially pronounced in the context of peer victimization, which poses a tangible threat to children's physical safety, peer relationships, and emotional well-being. More specifically, the SIP deficits associated with anxiety may exacerbate the tendency for victimized children to view peers' behavior as provocative and hostilely motivated (e.g., Perren et al., 2013), resulting in more physically aggressive tendencies over time. Furthermore, researchers have suggested that relational aggression may provide a means for anxious individuals to avoid or deflect negative attention away from themselves and divert it to others in the peer group (e.g., Loudin, Loukas, & Robinson, 2003), which is likely to be desired by youth experiencing victimization. Yet, despite this theoretical and initial empirical support (Batanova & Loukas, 2011), few studies have directly tested the prospective links between anxiety and aggressive behavior (for a review, see Granic, 2014), and research has yet to examine how co-occurring anxiety may influence the development of specific forms of aggression among victimized youth.

1.3 Gender differences

It is possible that the interactive contribution of anxiety symptoms to the bidirectional associations between forms of aggression and peer victimization may differ for boys and girls. It is well established that physical aggression is the modal form of aggression for boys, whereas relational aggression is the modal form of aggression for girls (for a review, see Ostrov & Godleski, 2010). Furthermore, Ostrov and Godleski (2010) proposed that children's exposure to gender-segregated peer interactions in early and middle childhood affects the salience of specific forms of aggression among boys and girls. It is therefore thought that physical aggression may be more strongly related to psychosocial outcomes for boys and relational aggression may be more strongly related to psychosocial outcomes for girls during these developmental periods (Ostrov & Godleski, 2010). Indeed, previous investigations have demonstrated the importance of examining gender differences in the moderating effects of individual characteristics on the prospective relations between forms of aggression and peer victimization during middle childhood (e.g., Pitula et al., 2015).

1.4 Current study

The central aim of the current study was to evaluate whether anxiety symptoms would exacerbate the reciprocal links between physical and relational forms of aggression and peer victimization over a 1-year period, with attention to potential gender differences. This objective was addressed using a sample of elementary school-age children, which was selected for two main reasons. First, one of the major developmental tasks during middle childhood involves forming and maintaining appropriate peer interactions and relationships (Sroufe, Carlson, & Shulman, 1993). Gaining a better understanding of what factors may inhibit these processes and contribute to an escalating cycle of aggression and peer victimization will aid in the identification of at-risk youth and inform the development of targeted intervention efforts. Second, the influence of anxiety symptoms may be particularly salient in middle childhood, as this represents one of the developmental periods in which externalizing behavior and anxiety are most likely to co-occur (Russo & Beidel, 1994). Based on available theory and previous research, it was predicted that (1) high levels of anxiety symptoms would exacerbate the bidirectional associations between physical aggression and peer victimization, especially among boys, and (2) high levels of anxiety symptoms would exacerbate the bidirectional associations between relational aggression and peer victimization, especially among girls.

2 Method

2.1 Participants

Participants were 228 children (50.4% boys) from an elementary school located in a small, rural Midwestern community in the United States. All students in the second through fourth grades not receiving special education services were recruited for participation in the current study (n = 384), and caregiver consent was obtained prior to student-reported data collection at Time 1. Overall, 288 consent forms were returned at Time 1, and permission was obtained for 252 children to participate in the study (approximately 65.6% of the eligible students). At Time 1, data were missing for 12 children who were absent during data collection, two children who had moved out of the school district, four children who declined to provide assent, and five children who provided verbal assent but did not complete measures of interest in the current study; accordingly, these participants were excluded from longitudinal analyses.

Recruitment took place again approximately 1 year later in the fall semester of the subsequent school year, and 175 of the remaining 228 eligible children participated in the study at Time 2. Data were missing for 16 students who had moved out of the school district, 31 students whose caregivers did not return the consent forms, and 6 students whose caregivers declined to provide consent for their participation at this time point. A series of χ² tests and independent samples t-tests indicated that the 23.2% of participants with missing data at Time 2 did not differ from participants with complete data on any demographic or study variables at Time 1, suggesting a representative longitudinal sample; accordingly, these participants were retained and missing data was accounted for in subsequent analyses. Second, through fourth-grade teachers were also recruited and provided written informed consent prior to their participation at Time 1 (n = 19; 100% consent) and Time 2 (n = 17; 100% consent).

The final sample consisted of 115 boys and 113 girls (N = 228; 59.4% of the eligible students at Time 1) who ranged from 7 to 10 years of age (M = 8.32, SD = .95). The grade distribution of students at Time 1 was as follows: 71 in second grade, 74 in third grade, and 83 in fourth grade. School records indicated that the racial composition of children attending the elementary school was predominantly
Caucasian, with less than 10% identifying as a racial minority, and 40% of all students were eligible for free or reduced-price lunch.

2.2 Measures

2.2.1 Anxiety symptoms

Anxiety symptoms were assessed using self-reports at Time 1. Children completed the Revised Children's Manifest Anxiety Scale, Second Edition (RCMAS-2) Short Form (Reynolds & Richmond, 2008). This measure consists of 10 items assessing symptoms of physiological anxiety, worry, and social anxiety, and children were asked to indicate whether or not each statement was true about them (1 = Yes, 0 = No). In the current study, items were summed and used for analyses, with higher scores indicating greater levels of anxiety symptoms. The Short Form of the RCMAS-2 has previously demonstrated strong psychometric properties among children and adolescents (Reynolds & Richmond, 2008). The RCMAS-2 Short Form demonstrated adequate internal consistency in this sample ($\alpha = .77$).

2.2.2 Forms of aggression

Aggressive behavior was assessed using teacher-reports at Times 1 and 2. Teachers completed a measure that was adapted from a peer nomination scale (Crick & Bigbee, 1998), which includes a three-item physical aggression subscale and a three-item relational aggression subscale. Teachers were instructed to rate how often they had observed this behavior since the beginning of the school year on a 5-point Likert scale ranging from 1 (Never) to 5 (Almost Always). In the current study, items for each subscale were summed and used for analyses, with higher scores indicating higher levels of physical and relational aggression, respectively. This adapted measure has demonstrated criterion validity and good internal consistency among elementary school-age children (e.g., Cooley & Fite, 2016). Both the physical (Time 1 $\alpha = .87$; Time 2 $\alpha = .80$) and relational (Time 1 $\alpha = .85$; Time 2 $\alpha = .87$) aggression subscales demonstrated good internal consistency at both time points in this sample.

2.2.3 Peer victimization

Peer victimization was assessed using self-reports at Times 1 and 2. Children completed a modified version of the Victimization of Self (VS) scale from the Peer Experiences Questionnaire (Dill et al., 2004). The VS scale consists of nine items that assess both physical and relational experiences of peer victimization. At each time point, students were asked to rate the frequency of such occurrences since the beginning of the school year on a 5-point Likert scale ranging from 1 (Never) to 5 (Several Times a Week). In the current study, physical and relational victimization were strongly correlated within each wave of data, sharing between 58% and 66% of their variance; thus, these items were summed and used for analyses, with higher scores indicating more frequent overall experiences of peer victimization. The VS scale has demonstrated strong psychometric properties among elementary school-age children (Dill et al., 2004). The VS scale demonstrated good internal consistency at both time points in this sample (Time 1 $\alpha = .89$; Time 2 $\alpha = .94$).

2.3 Procedure

The study was approved by the researchers’ Institutional Review Board as well as by school administrators. Time 1 data collection took place 10 weeks after the start of the fall semester. Verbal assent was obtained from each participant prior to student-reported data collection, which occurred through group administration over the course of 1 week. During the 30-min assessment sessions, a trained research assistant provided standardized instructions to the students and then read each item aloud. Additional research assistants circulated through the classroom to answer questions and assist students who had difficulty understanding particular items. No school staff or children without consent were present in the rooms in order to facilitate accurate responding. Teachers were asked to report on all participating children in their homeroom using a secure online survey during the same month in which student-reported data were collected. Similar procedures were followed for Time 2 data collection, which occurred approximately 1 year later. Students received a small prize (i.e., a mechanical pencil) for participating at each time point; teachers received $7 per completed survey at Time 1 and were compensated $50 upon completion of their surveys at Time 2.

2.4 Data analytic plan

Three cross-lagged path analysis models were estimated using Mplus statistical software (Version 7; Muthén & Muthén, 1998–2012) in order to test study hypotheses. Reciprocal influences were evaluated across the two waves of data while taking into account the stability of each construct. Consistent with previous research (e.g., Cooley & Fite, 2016; Ostrov & Godleski, 2013), each model adjusted for the co-occurrence of the alternate form of aggression at Time 1, and gender and grade level were included as covariates in the models. A hierarchical approach was employed in which all outcomes were simultaneously regressed on all predictors and control variables in order to examine main effects (Model 1). Model 1 also included a covariance between each of the predictor variables and a covariance between the residuals of the outcome variables. This cross-lagged path analysis model was fully saturated (i.e., 0 degrees of freedom), which resulted in a perfect fit to the data; accordingly, model fit statistics are not relevant. Next, Time 2 peer victimization was regressed on the cross-product terms between both forms of aggression and anxiety symptoms at the same time as Time 2 physical and relational aggression were regressed on the cross-product term between peer victimization and anxiety symptoms (Model 2). To evaluate potential gender differences in the moderating effect of anxiety symptoms, each outcome was then regressed on the corresponding three-way interaction(s) along with the remaining lower order two-way interactions (Model 3).

Initial inspection of the outcomes indicated that Time 2 physical aggression was positively skewed and leptokurtic (see Table 1); a log-transformation was used to address this non-normal distribution, which brought the skewness (Time 2 = 2.72) and kurtosis (Time 2 = 6.94) of the outcome variable below the recommended values of 3 and 10 (Kline, 2010). All continuous variables were standardized prior to analyses to aid in the interpretation of effects. Consistent with standard
procedures (Aiken & West, 1991), significant interactions were individually probed when the model was conditioned to represent associations for boys and/or girls at low (−1 SD), moderate (mean), and high (+1 SD) levels of the moderator. Regions of significance were also calculated using the fixed effect estimates and their associated covariance matrix to further decompose significant interactions (Bauer & Curran, 2005). Full information maximum likelihood estimation was used to accommodate the Time 2 missing data (23.2%).

3 | RESULTS

3.1 | Preliminary analyses

Descriptive statistics and correlations among study variables are presented in Table 1. As shown, physical and relational aggression were strongly positively associated within each wave of data, sharing between 18% and 36% of their variance. Overall, approximately 10.1% (n = 23) of the sample endorsed clinically elevated levels of anxiety symptoms at Time 1 on the RCMAS-2 Short Form (T-Scores > 60). At Time 1, teachers reported having observed 10.1% of students engage in at least one physically aggressive act and 21.1% of students engage in at least one relationally aggressive act. Furthermore, 63.2% of children reported having experienced at least one incident of peer victimization since the beginning of the school year at Time 1.

3.2 | Cross-lagged path analysis models

3.2.1 | Peer victimization

Results from Model 1 (see Figure 1 and Table 2) indicated that peer victimization was stable from Times 1 to 2, and both physical aggression and anxiety symptoms predicted higher levels of peer victimization over the 1-year period. The main effects resulted in a total $R^2 = .25$. When the cross-product terms were added to Model 2, anxiety symptoms significantly interacted with relational aggression, but not physical aggression, to influence Time 2 peer victimization; the inclusion of these effects accounted for an additional 12% of the residual variance. As illustrated by follow-up simple slope analyses (see Figure 2a), whereas Time 1 relational aggression predicted lower levels of subsequent peer victimization at low (−1 SD) levels of anxiety symptoms, relational aggression predicted higher levels of subsequent peer victimization when levels of anxiety symptoms were high (+1 SD); time 1 relational aggression was unrelated to Time 2 peer victimization at moderate (mean) levels of anxiety symptoms. Regions of significance were also calculated. For the effect of relational aggression, the obtained boundary values of anxiety symptoms were −.52 SD and +.17 SD, which corresponded to RCMAS-2 Short Form scores of 1.81 and 3.60. Thus, the effect of relational aggression was predicted to be significantly negative for 7- to 8-year olds with T-scores less than 44 (28th percentile) and 9- to 10-year olds with T-scores less than 46 (35th percentile). Conversely, the effect of relational aggression was predicted to be significantly positive for 7- to 8-year olds with T-scores equal to or greater than 50 (50th percentile) and 9- to 10-year olds with T-scores equal to or greater than 52 (58th percentile). No significant gender differences were observed when three-way interactions were included in Model 3.

3.2.2 | Physical aggression

Results from Model 1 (see Figure 1 and Table 3) indicated that physical aggression was stable from Times 1 to 2, and boys exhibited higher subsequent levels of physical aggression over the 1-year period. The main effects resulted in a total $R^2 = .21$. When the cross-product term was added to Model 2, anxiety symptoms significantly interacted with peer victimization to influence Time 2 physical aggression; the
inclusion of this effect accounted for an additional 4% of the residual variance. As illustrated by follow-up simple slope analyses (see Figure 2b), Time 1 peer victimization predicted lower levels of subsequent physical aggression at low (−1 SD) levels of anxiety symptoms. Furthermore, a non-significant trend ($p < .10$) occurred in which Time 1 peer victimization marginally predicted higher levels of physical aggression when levels of anxiety symptoms were high (+1 SD). Time 1 peer victimization was unrelated to Time 2 physical aggression at moderate (mean) levels of anxiety symptoms. Regions of significance were also calculated. For the effect of peer victimization, the obtained boundary values of anxiety symptoms were −.37 SD and +1.09 SD, which corresponded to RCMAS-2 Short Form scores of 2.18 and 6.00. Thus, the effect of peer victimization was predicted to be significantly negative for 7- to 8-year olds with T-scores less than 44.

**TABLE 2** Main and interaction effects cross-lagged models predicting Time 2 peer victimization

<table>
<thead>
<tr>
<th>T2 Peer Victimization</th>
<th>Model 1</th>
<th></th>
<th></th>
<th>Model 2</th>
<th></th>
<th></th>
<th>Model 3</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\beta$</td>
<td>SE</td>
<td>$p$</td>
<td>$\beta$</td>
<td>SE</td>
<td>$p$</td>
<td>$\beta$</td>
<td>SE</td>
<td>$p$</td>
</tr>
<tr>
<td>T1 peer victimization</td>
<td>-.27</td>
<td>.07</td>
<td>&lt;.001</td>
<td>.37</td>
<td>.07</td>
<td>&lt;.001</td>
<td>.37</td>
<td>.06</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Gender</td>
<td>-.11</td>
<td>.14</td>
<td>.42</td>
<td>.01</td>
<td>.13</td>
<td>.95</td>
<td>.03</td>
<td>.13</td>
<td>.85</td>
</tr>
<tr>
<td>Grade</td>
<td>.05</td>
<td>.08</td>
<td>.53</td>
<td>.04</td>
<td>.07</td>
<td>.63</td>
<td>.02</td>
<td>.07</td>
<td>.77</td>
</tr>
<tr>
<td>T1 physical aggression</td>
<td>.19</td>
<td>.09</td>
<td>.03</td>
<td>.25</td>
<td>.08</td>
<td>.002</td>
<td>.36</td>
<td>.14</td>
<td>.009</td>
</tr>
<tr>
<td>T1 relational aggression</td>
<td>.15</td>
<td>.09</td>
<td>.10</td>
<td>.07</td>
<td>.08</td>
<td>.38</td>
<td>-.07</td>
<td>.18</td>
<td>.70</td>
</tr>
<tr>
<td>T1 anxiety symptoms</td>
<td>.16</td>
<td>.07</td>
<td>.03</td>
<td>.14</td>
<td>.06</td>
<td>.03</td>
<td>.11</td>
<td>.10</td>
<td>.27</td>
</tr>
<tr>
<td>Physical aggression $\times$ anxiety</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-.01</td>
<td>.07</td>
<td>.87</td>
<td>-.04</td>
<td>.09</td>
<td>.66</td>
</tr>
<tr>
<td>Relational aggression $\times$ anxiety</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-.50</td>
<td>.08</td>
<td>&lt;.001</td>
<td>.56</td>
<td>.12</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Physical aggression $\times$ gender</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-.23</td>
<td>.22</td>
<td>.29</td>
</tr>
<tr>
<td>Relational aggression $\times$ gender</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>.19</td>
<td>.20</td>
<td>.33</td>
</tr>
<tr>
<td>Anxiety $\times$ gender</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-.06</td>
<td>.16</td>
<td>.74</td>
</tr>
<tr>
<td>Physical Agg $\times$ Anx $\times$ gender</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-.52</td>
<td>.47</td>
<td>.27</td>
</tr>
<tr>
<td>Relational Agg $\times$ Anx $\times$ gender</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-.03</td>
<td>.17</td>
<td>.86</td>
</tr>
</tbody>
</table>

Note. T1 = Fall 2012; T2 = Fall 2013; Gender (0 = Male, 1 = Female); Grade (0 = 2nd Grade, 1 = 3rd Grade, 2 = 4th Grade); Bold estimates represent statistically significant paths.
and relational forms of aggression and peer victimization over a 1-year period during middle childhood. Overall, results provided support for the hypotheses that high levels of anxiety symptoms would exacerbate these bidirectional relations. However, the patterns of moderation differed according to specific forms of aggression, and no gender differences were observed. Results also suggest that when levels of anxiety symptoms are low, relational aggression may serve an adaptive social function and victimized youth tend to exhibit lower levels of physical aggression over time. Specific findings, directions for future research, and implications for practice are reviewed below.

Consistent with expectations, anxiety symptoms were found to moderate the prospective association between relational aggression and peer victimization. It appears that the effect of relational aggression on peer victimization is significantly positive for children scoring at or above the 50–58th percentile on anxiety symptoms and significantly negative for children scoring below the 28–35th percentile. Thus, these effects are evident in non-clinical levels, suggesting that even minimal anxiety may put relationally aggressive youth at greater risk for peer victimization. These findings build on past work (Pitula et al., 2015; Zimmer-Gembeck & Duffy, 2014) and provide additional evidence that certain individual characteristics may influence relationally aggressive youth’s subsequent risk for peer victimization. Although many acts of relational aggression (e.g., gossip, rumor spreading) are covert in nature and can be perpetrated in the absence of direct confrontation, Pitula et al. (2015) point out that “poorly regulated relationally aggressive behaviors are less likely to be skillful and/or more obvious, which may lead peers to identify their aggressors more easily and retaliate aggressively” (p. 15). Given their corresponding SIP and social skills deficits, it is unlikely that children with high levels of anxiety symptoms who engage in relational aggression will be able to effectively manipulate peers’ social status and relationships while avoiding detection.

On the other hand, relational aggression that is accompanied by low levels of anxiety symptoms appears to reduce children’s subsequent risk for peer victimization. Whereas prior work has shown that relational aggression was only linked to higher peer victimization at high levels of intimacy avoidance (Zimmer-Gembeck & Duffy, 2014) and physiological stress reactivity (for girls only; Pitula et al., 2015), this is the first study to our knowledge to identify an individual characteristic that interacts with relational aggression to predict lower levels of peer victimization over time. Although initially surprising, this finding is consistent with existing theory and evidence documenting the social benefits of aggression in some instances (see Hawley, Little, & Rodkin, 2007). In fact, relational aggression has been linked to a more central social status and popularity among peers (e.g., Kawabata et al., 2014). Peers may feel less comfortable seeking revenge against relationally aggressive children who possess these qualities due to concerns about retaliation that has the potential to further harm their own social standing. Youth with low levels of anxiety symptoms may also be able to use relational aggression in a more strategic manner that is not easily detected, and they may better at selecting targets that are not likely to respond (Zimmer-Gembeck & Duffy, 2014).

On the other hand, relational aggression that is accompanied by low levels of anxiety symptoms appears to reduce children’s subsequent risk for peer victimization. Whereas prior work has shown that relational aggression was only linked to higher peer victimization at high levels of intimacy avoidance (Zimmer-Gembeck & Duffy, 2014) and physiological stress reactivity (for girls only; Pitula et al., 2015), this is the first study to our knowledge to identify an individual characteristic that interacts with relational aggression to predict lower levels of peer victimization over time. Although initially surprising, this finding is consistent with existing theory and evidence documenting the social benefits of aggression in some instances (see Hawley, Little, & Rodkin, 2007). In fact, relational aggression has been linked to a more central social status and popularity among peers (e.g., Kawabata et al., 2014). Peers may feel less comfortable seeking revenge against relationally aggressive children who possess these qualities due to concerns about retaliation that has the potential to further harm their own social standing. Youth with low levels of anxiety symptoms may also be able to use relational aggression in a more strategic manner that is not easily detected, and they may better at selecting targets that are not likely to respond (Zimmer-Gembeck & Duffy, 2014).
### Table 3

Main and interaction effects cross-lagged models predicting Time 2 physical and relational aggression

<table>
<thead>
<tr>
<th></th>
<th>β</th>
<th>SE</th>
<th>p</th>
<th></th>
<th>β</th>
<th>SE</th>
<th>p</th>
<th></th>
<th>β</th>
<th>SE</th>
<th>p</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>T2 Physical Aggression</td>
<td></td>
<td></td>
<td></td>
<td>T2 Relational Aggression</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Model 1</td>
<td>Model 2</td>
<td>Model 3</td>
<td></td>
<td>Model 1</td>
<td>Model 2</td>
<td>Model 3</td>
<td></td>
<td>Model 1</td>
<td>Model 2</td>
<td>Model 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>β</td>
<td>SE</td>
<td>p</td>
<td></td>
<td>β</td>
<td>SE</td>
<td>p</td>
<td></td>
<td>β</td>
<td>SE</td>
<td>p</td>
<td></td>
</tr>
<tr>
<td>T1 physical aggression</td>
<td>.26</td>
<td>.08</td>
<td>.001</td>
<td>.26</td>
<td>.08</td>
<td>.001</td>
<td>.001</td>
<td>.26</td>
<td>.08</td>
<td>.001</td>
<td>.001</td>
<td></td>
</tr>
<tr>
<td>T1 relational aggression</td>
<td>.12</td>
<td>.08</td>
<td>.05</td>
<td>.13</td>
<td>.03</td>
<td>.002</td>
<td>.002</td>
<td>.13</td>
<td>.03</td>
<td>.002</td>
<td>.002</td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td>.01</td>
<td>.08</td>
<td>.99</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td></td>
</tr>
<tr>
<td>T1 peer victimization</td>
<td>.07</td>
<td>.07</td>
<td>.11</td>
<td>.07</td>
<td>.07</td>
<td>.07</td>
<td>.11</td>
<td>.07</td>
<td>.07</td>
<td>.07</td>
<td>.11</td>
<td></td>
</tr>
<tr>
<td>T1 anxiety symptoms</td>
<td>.06</td>
<td>.06</td>
<td>.26</td>
<td>.06</td>
<td>.06</td>
<td>.06</td>
<td>.26</td>
<td>.06</td>
<td>.06</td>
<td>.06</td>
<td>.26</td>
<td></td>
</tr>
<tr>
<td>Peer victimization × anxiety</td>
<td>.23</td>
<td>.06</td>
<td>.001</td>
<td>.23</td>
<td>.06</td>
<td>.001</td>
<td>.001</td>
<td>.23</td>
<td>.06</td>
<td>.001</td>
<td>.001</td>
<td></td>
</tr>
<tr>
<td>Anxiety × gender</td>
<td>.03</td>
<td>.19</td>
<td>.87</td>
<td>.03</td>
<td>.19</td>
<td>.87</td>
<td>.87</td>
<td>.03</td>
<td>.19</td>
<td>.87</td>
<td>.87</td>
<td></td>
</tr>
<tr>
<td>Peer victimization × Anx × gender</td>
<td>.17</td>
<td>.19</td>
<td>.22</td>
<td>.17</td>
<td>.19</td>
<td>.22</td>
<td>.22</td>
<td>.17</td>
<td>.19</td>
<td>.22</td>
<td>.22</td>
<td></td>
</tr>
</tbody>
</table>

**Note.** T1 = Fall 2012; T2 = Fall 2013; Gender (0 = Male, 1 = Female); Grade (0 = 2nd Grade, 1 = 3rd Grade, 2 = 4th Grade); Bold estimates represent statistically significant paths.

With regard to the alternative direction of effects, anxiety symptoms were also found to moderate the prospective association between peer victimization and physical aggression. More specifically, it appears that the effect of peer victimization on physical aggression is significantly positive for children scoring at or above the 72–82nd percentile on anxiety symptoms and significantly negative for children scoring below the 28–35th percentile. Previous research has demonstrated that victimized youth may become more likely to interpret peers’ behavior as hostilely motivated, leading them to react with aggressive behavior (e.g., Perren et al., 2013). Anxiety may contribute to this pattern by exacerbating hostile attribution biases among victimized youth and depleting their ability to inhibit aggressive impulses during interpersonal conflict (Granic, 2014); considering the findings described above, these children may be at heightened risk for experiencing an escalating cycle of peer victimization and physical aggression over time. In contrast, youth with low levels of anxiety symptoms may be less likely to attend to threats in their social environment and to “excessively anticipate, worry about, and ruminate over the impact of these threats” (Granic, 2014, p. 1523). As a result, they may be better able to problem-solve and employ coping strategies other than physical aggression during future conflicts with peers.

Support was not found for the hypothesis that anxiety symptoms would exacerbate the prospective relation between peer victimization and relational aggression. In fact, only anxiety symptoms were uniquely associated with higher levels of relational aggression over time after taking into account prior levels of aggressive behavior and peer victimization. Although similar results have been reported in early adolescence (Batanova & Loukas, 2011), this study is the first to our knowledge to document this prospective link during middle childhood, when the frequency of relational aggression tends to increase (Murray-Close et al., 2007). Researchers have theorized that acts of relational aggression may provide a means for anxious individuals to divert negative attention away from themselves and onto others in the peer group (Loudin et al., 2003). Unfortunately, this strategy is unlikely to be effective for these youth considering the aforementioned findings.

Contrary to our initial predictions, no gender differences occurred in the moderating effects of anxiety symptoms on the reciprocal links between physical and relational forms of aggression and peer victimization. It has been posited that “gender differences in peer domains may be more pronounced in adolescence, when substantive gender-linked social, cognitive, and biological changes occur” (Kawabata et al., 2014, p. 284). Thus, the similar pattern of results observed among boys and girls in the current study may be accounted for by the fact that gender specific trajectories eventuating from
aggression and experiences of victimization may not occur until the transition to adolescence (e.g., Rudolph et al., 2011).

4.1 Limitations, future directions, and contributions to the literature

Findings from the current study should be interpreted within the context of its methodological limitations. Although the present research design employed a multi-informant design, which helps reduce concerns regarding shared method variance, one limitation involves a reliance on a relatively small sample of teachers to provide ratings of aggressive behavior, with few items assessing each form of aggression. It is important to note that teachers may be less likely to recognize relational acts of aggression due to their covert nature (Willford, Fite, & Cooley, 2015). Future investigations would therefore benefit from also integrating parent- and peer-reports in order to obtain a more comprehensive representation of aggressive behavior that spans multiple settings (e.g., home, school, and community). Of note, aggression may also be distinguished according to its function, which refers to the underlying motivation behind the behavior. Taking into account existing evidence (see Bubier & Drabick, 2009) suggesting that symptoms of anxiety are more closely related to reactive aggression (i.e., aggression that occurs in response to perceived provocation or threat) than proactive aggression (i.e., instrumental, goal-oriented aggression), additional research is needed to examine how anxiety symptoms may influence the reciprocal links between experiences of victimization and both forms and functions of aggression. Moreover, subsequent work is needed to determine whether these findings extend to other developmental periods (i.e., adolescence) when internalizing and externalizing problems may be less likely to co-occur. Future studies may benefit from examining whether distinct constellations of anxiety symptoms (e.g., physiological anxiety, worry, social anxiety) differentially moderate these prospective associations. The generalizability of findings may also be limited due to the characteristics of the study sample, which was community-based and drawn from a predominantly Caucasian, rural Midwestern community in the United States.

Nevertheless, the current study makes several key contributions to the literature. Although other recent work has demonstrated that certain individual characteristics may influence the prospective relations between aggressive behavior and peer victimization (e.g., Cooley & Fite, 2016; Pitula et al., 2015; Zimmer-Gembeck & Duffy, 2014), this is the first investigation to our knowledge to identify a factor that influences both direction of effects. Findings suggest that anxiety symptoms may need to be considered in the divergent developmental pathways associated with the use of relational aggression. Anxiety symptoms also appear to uniquely predict higher levels of subsequent relational aggression and to contribute to individual variation in children's responses to peer victimization. Of note, anxiety symptoms may not need to reach clinically significant (T-scores > 60) levels in order to exacerbate the prospective links between relational aggression and peer victimization on the one hand and peer victimization and physical aggression on the other.

4.2 Implications for practice

These findings may have implications for identifying at-risk youth and informing the development of targeted interventions. With regard to aggression, existing interventions tend to focus on reducing physically aggressive behavior (see Ostrov et al., 2009). The current study, however, serves to further underscore the importance of addressing relational aggression, which may serve an adaptive social function in some instances. Consistent with recent recommendations (Granic, 2014), findings suggest that interventions may need to address co-occurring symptoms of anxiety among relationally aggressive youth. Anxiety symptoms may also need to be targeted in interventions for victimized youth in order to mitigate their risk for engaging in higher levels of physical aggression over time. Of particular relevance, one school-based program, the "Social Skills Group Intervention," has demonstrated efficacy in improving peer acceptance, social self-efficacy, and self-esteem and in reducing depressive symptoms, anxiety, and aggression among victimized third-graders over a 1-year period (DeRosier & Marcus, 2005). Timely interventions such as this may prove to be an important aspect of preventing an escalating cycle of peer victimization and aggressive behavior.

REFERENCES


