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Associations between forms of aggression and peer victimization: Does prosocial behavior matter?

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Abstract

Relatively little is known regarding factors that may mitigate the strength of the associations between forms of aggressive behavior and peer victimization. The goal of the current study was to investigate prosocial behavior as a moderator of these links over a 2-year period during middle childhood. Participants included 410 third-grade students (53% boys) and their homeroom teachers. Results indicated that prosocial behavior was associated with lower initial levels of victimization, whereas relational aggression was associated with higher initial levels of victimization. Physical aggression predicted more stable patterns of victimization over time, and prosocial behavior moderated the prospective link from relational aggression to peer victimization; specifically, relational aggression predicted decreases in victimization at higher levels of prosocial behavior and more stable patterns over time when levels of prosocial behavior were low. Further, gender differences were observed in the moderating effect of prosocial behavior on the prospective link from physical aggression to peer victimization, such that it served as a risk factor for boys and a protective factor for girls.

Keywords: Prosocial behavior; peer victimization; physical aggression; relational aggression; middle childhood

Aggressive behavior, broadly defined as hostile attacks intended to harm others, is associated with adverse outcomes for children and adolescents (e.g., academic problems, loneliness, somatic complaints; Campbell et al., 2006; Gest et al., 2005; Kokko et al., 2006). Previous research has documented a robust link between aggression and peer victimization (e.g., Cooley et al., 2018), or the experience of being the target of purposeful aggressive behavior at the hands of peers. That is, youth who exhibit aggression may be at a greater risk of future victimization (Hanish & Guerra, 2000). In contrast, several studies have demonstrated that prosocial behavior (i.e., actions that are perceived to benefit others; Penner et al., 2005) is associated with lower levels of peer victimization (e.g., Griese et al., 2016). Although some findings suggest an inverse relationship between aggressive and prosocial behaviors (e.g., Khoury-Kassabri et al., 2020), individuals may also strategically use these behaviors simultaneously and effectively (e.g., Hawley, 1999; Laninga-Wijnen et al., 2018; Peters et al., 2010). However, it is unclear how prosocial behavior interacts with forms of aggression to influence subsequent risk for peer victimization. The goal of the current study was to address this gap by examining prosocial behavior as a moderator of the associations between physical and relational aggression and peer victimization over a 2-year period in middle childhood, with attention to potential gender differences.

Forms of aggression and peer victimization

Aggressive behavior has important implications for youth's social and emotional development (Ladd, 1999; Parker & Asher, 1993), particularly during middle childhood when children spend an increasing amount of time with peers (McHale et al., 2003). Aggression can take various forms, including physical (e.g., hitting, kicking, pushing) and relational (e.g., gossiping, spreading rumors, excluding others) attacks (Crick & Grotpeter, 1996). According to social learning theory (Bandura & Iñesta, 1976), aggressive behavior is learned through observations of, or interactions with, others (e.g., modeling), it is provoked (e.g., by a threat or the desire to attain a goal), and then it is maintained through positive or negative reinforcement (e.g., peers stop teasing a child or the child obtains their desired goal).

Extensive research has indicated gender differences in the use and experience of aggressive behaviors in youth development. Namely, boys are more likely to engage in physical aggression than girls (Björkqvist, 2018). There appears to be little difference in the use of relational aggression among boys and girls, but girls are more likely to exhibit this behavior than any other form of aggression (Archer & Coyne, 2005; Card et al., 2008). Moreover, other findings suggest that boys are more likely to experience victimization than girls over time (e.g., Cillessen & Lansu, 2015).

Notably, previous research suggests that youth are likely to experience physical and relational victimization simultaneously (Felix & McMahon, 2007; Nylund et al., 2007). Although there is evidence highlighting unique aspects of forms of victimization (e.g., Casper & Card, 2017), results from latent class analyses also suggest that groups are distinguishable according to their

frequencies, rather than their forms, of peer victimization (Ettekal & Ladd, 2017; Nylund et al., 2007). Further, forms of victimization have been shown to follow similar trajectories (e.g., Giesbrecht et al., 2011) and similarly predict both youth's short- and long-term adjustment (Nishina & Juvonen, 2005; Rudolph et al., 2011). In contrast, physical and relational aggression tend to follow distinct trajectories across development (Murray-Close et al., 2007; Underwood et al., 2009) and differentially predict adjustment outcomes (Card et al., 2008; Murray-Close et al., 2016). In light of this, forms of peer victimization were combined to reflect the overall frequency of such experiences, whereas aggression was distinguished by form in the current study.

Existing research suggests that aggressive youth may be at a heightened risk for experiencing future victimization (e.g., Cooley et al., 2018). During middle childhood, children tend to be more selective regarding their friendships, preferring peers with similar interests while avoiding those with vastly different qualities from them (Haselager et al., 1998). It is possible that aggression can set children apart from their peers and increase their chances of being excluded and rejected (Paget et al., 2018); lacking social support, these youth may be particularly vulnerable to peer victimization (Boivin & Hymel, 1997). Children who engage in aggressive behavior may also experience victimization because peers retaliate or fight back against them (e.g., Cooley et al., 2018). Indeed, both physical and relational aggression have consistently been shown to predict increases in peer victimization across developmental periods (Cooley et al., 2017; Ostrov, 2008; Pitula et al., 2015).

There is some evidence to suggest that the associations between aggression and peer victimization may differ across gender. In one study, social preference significantly mediated the prospective link from reactive aggression (i.e., angry retaliatory behavior occurring in response to a perceived provocation or threat) to peer victimization for elementary-age girls, but not boys (Manring et al., 2018). Similarly, another longitudinal study found that relational aggression was associated with teacher reports of future relational victimization among girls only during early childhood (Ostrov, 2008). Considering these findings, gender differences need to be considered when examining these longitudinal associations.

The role of prosocial behavior

Prosocial behavior is broadly defined as voluntary deeds perceived as beneficial to others (Penner et al., 2005), such as helping, cooperation, and sharing (Eisenberg et al., 1997; Roberts & Strayer, 1996). Based on their proximal relationships, youth begin to develop mental representations of themselves and others during middle childhood (Kihlstrom et al., 1988); prosocial behavior can enhance such interactions and promote more positive social adjustment (Eisenberg et al., 2016). Generally, highly prosocial children are more likely to develop interpersonal skills that facilitate positive peer interactions and relationships (Catalano et al., 2004). Considering Baumeister and Leary's (1995) framework on the developmental need for a sense of belonging, children may engage in prosocial behavior to increase their social standing among peers (Griese et al., 2016). Indeed, prosocial youth tend to be more liked by peers (Chang, 2003).

Moreover, findings from a recent investigation revealed that prosocial behavior was negatively associated with peer victimization over a 3-month period among elementary, middle, and high school students (Fu et al., 2023). Another study examined prosocial behavior as a predictor of trajectories of peer victimization from

the second through the eighth grade (Sugimura et al., 2017). Results indicated that prosocial behavior predicted lower initial levels of victimization. Among boys, those who exhibited high levels of prosocial behavior experienced lower levels of victimization throughout elementary school compared to those with low levels of prosocial behavior, but this effect did not last into middle school. Girls who exhibited high levels of prosocial behavior exhibited lower levels of victimization than those with low levels of prosocial behavior, and this effect persisted throughout elementary and middle school. The protective role of prosocial behavior is further highlighted by prior work that revealed a "resilient" group of children who experienced high initial levels of peer victimization but then substantial decreases in victimization coupled with high and stable levels of prosocial behavior from the third through the sixth grade (Griese et al., 2016). Overall, prosocial behavior may be critical in enhancing children's relationships with peers and reducing their risk of future victimization.

It is important to note that some children may successfully utilize prosocial and aggressive behavior with minimal social consequences. The resource control theory (Hawley, 1999) suggests that prosocial and coercive (i.e., aggressive) strategies are not necessarily mutually exclusive. That is, the use of both prosocial and aggressive behavior may be adaptive in some circumstances. Youth who utilize both behaviors—termed bistrategic controllers—have been found to be well liked by their peers, socially skilled, morally mature, socially central, and well adjusted (Hawley, 2003a, 2003b). They have friendships characterized by intimacy and fun, but also conflict (Hawley et al., 2007). One study showed that children who behaved aggressively and prosocially were more likely to be perceived as popular among their peers, and this effect was stronger for girls than boys (Kornbluh & Neal, 2016). A recent longitudinal investigation found that elementary school-age children who used prosocial and aggressive behaviors were more likely to be accepted by their peers than those who only exhibited aggressive behavior (Ettekal & Mohammadi, 2020). Finally, another cross-sectional study found that prosocial behavior moderated the links from relational aggression to social adjustment during adolescence (Wang et al., 2015). Specifically, relational aggression predicted higher levels of peer rejection at low, but not high, levels of prosocial behavior among boys and girls. Surprisingly, relational aggression predicted higher levels of peer victimization among girls when levels of prosocial behavior were high, and this association was nonsignificant when levels of prosocial behavior were low. However, it is not yet clear how aggressive and prosocial behavior may interact to influence youth's risk for peer victimization over time.

Middle childhood

Middle childhood is a critical transitional period marked by rapid changes in youth development, behaviors, and social goals (McHale et al., 2003; Rodkin et al., 2013). During this time, social competence is impacted by differences in the development of social skills (Warnes et al., 2005) and children's ability to maintain and navigate peer relationships (Hartup, 1992). In other words, some youth may exhibit characteristics or behaviors that lead to (un)favorable social adjustment. Previous research has found that social functioning in middle childhood strongly predicts adjustment later in life (Catalano et al., 2021). In this context, it is crucial to identify protective factors that may be targeted in prevention and intervention programs when problems in social domains are often more malleable (Catalano et al., 2021; Sørlie et al., 2021).

Current study

Previous research generally indicates that prosocial behavior may be protective against peer victimization. However, it is not currently known whether prosocial behavior attenuates the link between aggression and peer victimization over time. The central goal of the current study was to build on this work by investigating prosocial behavior as a moderator of the associations between physical and relational aggression and peer victimization over a 2-year period during middle childhood. Based on theory and the preponderance of available evidence, it was hypothesized that the links from forms of aggression to peer victimization would be attenuated by high levels of prosocial behavior. Moreover, it has been suggested that forms of aggression may impact youth's psychosocial functioning differently across gender (e.g., Crick, 1997), such that engaging in forms of aggressive behaviors inconsistent with gender-based schemas may increase the risk of adverse outcomes among youth. Thus, potential gender differences in these associations were also considered. Due to mixed findings in the extant literature, however, we did not make specific predictions regarding whether patterns of moderation would differ between boys and girls.

Prior longitudinal studies also provide a strong empirical basis for links from peer victimization to physical and relational aggression across developmental periods (e.g., Cooley & Fite, 2016; Cooley et al., 2017; Ostrov, 2010; Rudolph et al., 2011). Further, numerous studies converge on a negative association between prosocial and aggressive behavior (e.g., Boxer et al., 2004). One investigation found that prosocial behavior and aggression were consistently negatively related across a 22-year period spanning middle childhood to adulthood (Eron & Huesmann, 1984). More recent work provides evidence for prosocial behavior as a protective factor for both physical and relational aggression during early childhood (Khoury-Kassabri et al., 2020). Thus, a secondary aim of the current study was to investigate prosocial behavior as a moderator of the links from peer victimization to forms of aggression.

Method

Participants

Participants for the current project included 410 children (53% boys) in the third grade, as well as their homeroom teachers, from an elementary school serving an entire district in the Midwestern United States. All students who were not receiving special education services were eligible for participation, and four cohorts of children were recruited annually beginning in Fall 2014. Study consent forms were included in back-to-school packets. Overall, 84%–91% of parents/caregivers completed the consent form at Time 1, and permission to participate was obtained for 77%–84% of eligible children from each cohort. Parents/caregivers of children enrolled in the study were asked to provide consent again on an annual basis prior to each data collection. Children also provided verbal assent prior to their participation. Data were excluded for one participant whose teacher did not complete the measure of prosocial behavior. The final sample included 216 boys and 194 girls between the ages of 7 and 9 at Time 1 ($M = 8.27$, $SD = 0.46$). Children's homeroom teachers also provided written informed consent each year (94%–100% participation). Demographic data were not available for individual participants; however, school district records between 2014 and 2018 indicated that the ethnic/racial breakdown of students was 85% non-Latinx White, 5% Black, 5% Latinx, 2% Asian, 2% Native American, and 1% multiracial (National Center for Education Statistics, 2019). Further, approximately 36% of these students qualified for free or reduced-price lunch (National Center for Education Statistics, 2019). In 2019, the median household income in the city where the elementary school is located was $32,338 (U.S. Census Bureau, 2019).

Procedures

The current study was approved by the Institutional Review Board at the university through which these data were collected, as well as by school administrators. Students completed self-reports annually from the third through the fifth grade (i.e., data were collected at three time points). Data were collected via group administration approximately 12 weeks after the start of the Fall semester each year. During survey administration, one research assistant read standardized instructions and then each item aloud while other research assistants provided individualized assistance to students as needed. Teachers completed online surveys during the same month in which student data were collected during each Fall semester; they also completed surveys approximately 6 months later in the Spring semester when students were in the third and fourth grades (i.e., data were collected at five time points). Children received a small prize and teachers were compensated with $50–65 upon completion of their surveys at each time point.

Measures

The hypothesized factor structure for each construct was initially tested within Mplus (Version 8.7). Specifically, a series of item factor analysis models were estimated using diagonally weighted least squares (i.e., weighted least squares mean and variance adjusted [WLSMV] with the THETA parameterization) to account for the ordinal format of the item responses. Constructs with more than one possible factor (i.e., peer victimization and aggressive behavior) were evaluated for discriminant validity using the guidelines outlined by Rönkkö and Cho (2022). After the appropriate factor structure was identified, mean scores were calculated and used for subsequent analyses.

Peer victimization

At Times 1, 3, and 5, children completed a modified version of the Victimization of the Self (VS) subscale from the Peer Experiences Questionnaire (Dill et al., 2004). This measure includes nine items that measure relational (four items; e.g., "Some kids left me out of things just to be mean to me"), physical (four items; e.g., "A kid hit, kicked, or pushed me in a mean way"), and verbal (one item; i.e., "A kid teased me in a mean way") experiences of peer victimization. Students were asked to indicate how often they experienced each item since the beginning of the school year on a 5-point scale ranging from 1 (*Never*) to 5 (*Several Times a Week*). This measure of peer victimization has previously demonstrated good psychometric properties in elementary school-age samples (e.g., Cooley et al., 2017, 2018; Dill et al., 2004). An initial item factor analysis indicated that a two-factor physical and relational victimization model[1] provided a close fit to the data at Time 1, $\chi^2(19) = 44.04$, $p = .001$; root mean square error of approximation (RMSEA) = .06; comparative fit index (CFI) = .99; Tucker–Lewis Index (TLI) = .98; standardized root mean square residual

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[1]The one item assessing verbal victimization was initially excluded from analysis to facilitate comparisons with the two-factor physical and relational aggression model detailed below.

(SRMR) = .03. The two factors were strongly correlated, $r = .87$, 95% CI [.81, .93], and when this correlation was fixed to 1, the model did not fit significantly worse, $\chi^2(1) = 0.54$, $p = .46$. Thus, the two-factor model exhibited a "severe" problem with discriminant validity, suggesting that physical and relational victimization could not be distinguished empirically (Rönkkö & Cho, 2022). A subsequent analysis indicated that a one-factor model with all nine items also provided a close fit to the data, $\chi^2(27)$ 81.94, $p < .001$; RMSEA = .07; CFI = .97; TLI = .96; SRMR = .04, and standardized loadings ranged from .70 to .80 ($R^2 = .48–.64$). Therefore, all items were averaged, with higher scores indicating higher frequencies of overall peer victimization. Internal consistencies were good in the current sample across time points (α's = .86–.91).

Forms of aggression

At Times 1–5, teachers completed a measure that was adapted from a peer nomination scale (Crick & Bigbee, 1998). This measure includes three items that assess for relational aggression (e.g., "Tries to make other kids not like a certain person by spreading rumors about them") and three items that assess for physical aggression (e.g., "Hits, kicks, punches others"). Teachers were asked to rate how often the student engages in each behavior on a 5-point scale ranging from 1 (*Never*) to 5 (*Almost Always*). This adapted measure has previously demonstrated good psychometric properties in elementary school-age samples (e.g., Cooley & Fite, 2016; Cooley et al., 2017). An initial item factor analysis of the two subscales at Time 1 indicated that the model provided a close fit to the data, $\chi^2(8) = 9.59$, $p = .29$; RMSEA = .02; CFI = 1.00; TLI = 1.00; SRMR = 0.02. Standardized loadings for the relational aggression factor ranged from .95 to .98 ($R^2 = .90–.96$) and from .97 to .99 for physical aggression ($R^2 = .94–.98$). The two factors exhibited a strong correlation, $r = .71$, 95% CI [.62, .81], but when this correlation was fixed to .80 or higher, the model was not able to be identified. Thus, the two-factor model exhibited only a "marginal" problem with discriminant validity, suggesting that relational and physical aggression can be interpreted as distinct constructs (Rönkkö & Cho, 2022). Items were averaged separately for each subscale, with higher scores indicating higher levels of relational and physical aggression. Internal consistencies for relational aggression (α's = .87–.95) and physical aggression (α's = .68–.88) were modest to excellent in the current sample across time points.

Prosocial behavior

At Time 1, teachers completed the prosocial behavior subscale from the Children's Social Behavior Scale–Teacher Form (Crick, 1996). This subscale includes four items that assess for various types of prosocial behaviors: "This child says supportive things to peers," "This child tries to cheer up peers when they are sad or upset about something," "This child is helpful to peers," and "This child is kind to peers." Teachers were asked to rate how true each item was for the student on a 5-point scale ranging from 1 (*Never*) to 5 (*Almost Always*). This subscale has previously demonstrated good psychometric properties in elementary school-age samples (e.g., Mildrum Chana et al., 2021). An initial item factor analysis of this subscale at Time 1 indicated that, after including one residual correlation, the model provided a close fit to the data, $\chi^2(1) = 0.12$, $p = .73$; RMSEA = .00; CFI = 1.00; TLI = 1.00; SRMR = 0.00, and standardized loadings ranged from .86 to .98 ($R^2 = .73–.96$). Therefore, all items were averaged, with higher scores indicating

more prosocial behavior. Internal consistency was excellent in the current sample ($\alpha = .95$).

Analytic method

Descriptive statistics and correlations were first estimated within SPSS (Version 29). A series of independent samples *t*-tests (i.e., for continuous measures) and chi-square tests (i.e., for gender) at each time point revealed that participants with missing Time 2 data exhibited lower relational aggression scores at Time 1 ($M = 1.17$, $SD = 0.49$) than participants without missing data ($M = 1.30$, $SD = 0.69$), $t(248.02) = 2.00$, $p = .05$; there were no other significant differences between participants with and without missing data at any time point (p values $\geq .20$).

All subsequent analyses were conducted within *Mplus* (Version 8.7). Full-information maximum likelihood estimation with robust standard errors (MLR) was used to account for missing outcomes at Times 1 (0.2%), 2 (25.1%), 3 (16.6%–31.5%), 4 (53.9%), and 5 (20.2%–54.1%), as this approach has been shown to perform well when the level of missingness is 50% or more (Arbuckle, 1996; Graham, 2009; Newman, 2003; Wothke, 2000). Model fit was evaluated using the RMSEA, CFI, TLI, and SRMR. Models are considered to have adequate fit when RMSEA and SRMR values are at or lower than .08 and CFI and TLI values are at or above .90 (Brown, 2015; Hu & Bentler, 1999). The χ^2 values are also reported (nonsignificance indicates close fit), but these statistics are not relied on given that they are sensitive to sample size and the strength of the correlations in the model.

Unconditional multi-group latent growth curve models were initially estimated to determine which patterns of change best fit the data and whether these differed across gender. Specifically, random linear time models were estimated for each outcome,[2] and all parameters were constrained to be equal for boys and girls. The latent intercept and slope means and variances (and the correlation between these factors) were then freed to test for potential gender differences. The corresponding change in model fit was evaluated using a likelihood ratio test, which accounted for the scaling correction factor obtained using MLR. Note that for the aggression models, residual covariances were estimated between observations that occurred within the same academic year (e.g., Time 1 with Time 2).

Next, conditional latent growth curve models were estimated separately for each outcome. All continuous Time 1 predictors were standardized prior to analyses to aid in the interpretation of effects. For outcomes where boys and girls did not exhibit different patterns of change, gender was included as a covariate and centered such that boys served as the model reference (0 = Boys, 1 = Girls). After evaluating main effects, two-way interactions were added to the model. That is, peer victimization latent factors were regressed on interactions between Time 1 physical aggression and prosocial behavior as well as relational aggression and prosocial behavior. Finally, for outcomes where boys and girls did not exhibit different patterns of change, a three-way interaction term (e.g., relational aggression × prosocial behavior × gender), along with the embedded lower-order interactions, were added separately to the models to test for potential gender differences. Significant interaction terms were evaluated by calculating their regions of

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[2]Random quadratic models were also tested for physical aggression and relational aggression, but not peer victimization given that it was only assessed at three time points. However, each of these models resulted in a not positive definite matrix, so these effects were removed from subsequent analyses.
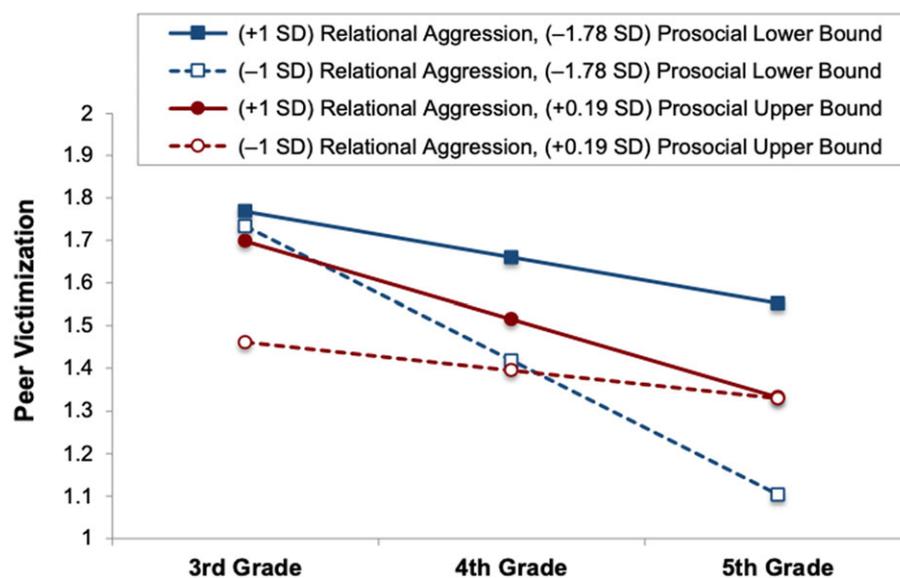
Figure 1. Interactive effects of relational aggression and prosocial behavior on trajectories of peer victimization. *Note.* For illustrative purposes, relational aggression is presented at traditionally identified high (+1 *SD*) and low (−1 *SD*) levels, and prosocial behavior is presented at its regions of significance.

significance, which identify the values of the moderator (i.e., prosocial behavior) at which the association between the independent variable and dependent variable becomes significant (Bauer & Curran, 2005). To help interpret the patterns of moderation, figures are provided with prosocial behavior presented at its regions of significance; note that for upper and lower bounds that fell outside of the data (> +3 *SD* or < −3 *SD*), traditionally identified high (+1 *SD*) and/or low (−1 *SD*) values of prosocial behavior are presented instead for comparison (Aiken & West, 1991). For illustrative purposes, the independent variable (i.e., relational aggression or physical aggression) is also presented at traditionally identified high (+1 *SD*) and/or low (−1 *SD*) values.

Results

Preliminary analyses

Descriptive statistics and correlations among study variables are presented in Table S1. Initial inspection of the outcome variables revealed that physical aggression was positively skewed and leptokurtic at each time point, and peer victimization was leptokurtic at T5. Note, however, that MLR – the estimator used in all primary analyses – is robust to deviations from normality. At T1, 76% of children reported having experienced at least one incident of peer victimization since the beginning of their third-grade school year. Further, third-grade teachers reported having observed 11% of students exhibit physical aggression, 20% of students exhibit relational aggression, and 99% exhibit at least one act of prosocial behavior at T1.

Peer victimization

Freeing the random intercept and linear slope parameters in the multi-group latent growth curve model did not lead to a significant improvement in model fit, $-2\Delta LL(5) = 3.19$, $p = .67$, suggesting that boys and girls exhibited similar initial levels and patterns of change in peer victimization over time. Thus, a combined random linear time model was used in subsequent analyses, which provided a close fit to the data, $\chi^2(1) = 0.02$, $p = .88$; RMSEA = .00; CFI = 1.00; TLI = 1.00; SRMR = 0.00. Results indicated that there were significant linear decreases in peer victimization over

time ($\beta = -.47$, $b = -.10$, $SE = .02$, $p < .001$). Further, there was significant interindividual variability in children's initial levels of peer victimization ($p < .001$) and in their trajectories over time ($p = .047$). A strong negative correlation was observed between the random intercept and the random slope ($r = -.52$, $p < .001$).

When main effects were added to the model (see Table S2), Time 1 prosocial behavior uniquely predicted lower initial levels but subsequent increases in peer victimization over time. As shown in Figure S1, the lowest levels of peer victimization were observed in the third grade among children who exhibited high levels of prosocial behavior, but this protective effect waned over time. Relational aggression uniquely predicted higher initial levels of peer victimization, whereas physical aggression predicted more stable patterns over time. These effects accounted for 7% of the variance in the random intercept and 17% of the variance in the random slope.

When two-way interactions were added to the model (see Table S2), prosocial behavior significantly moderated the prospective ($\beta = -.38$, $b = -.08$, $SE = .04$, $p = .02$), but not the concurrent ($p = .39$), link from relational aggression to peer victimization. As shown in Figure 1, at higher levels of prosocial behavior ($\geq +0.19$ *SD*; upper bound), relational aggression predicted decreases in peer victimization over time. In contrast, at lower levels of prosocial behavior (≤ -1.78 *SD*; lower bound), relational aggression predicted more stable patterns of peer victimization. The observed decreases in peer victimization at the lower bound of prosocial behavior *and* at low levels of relational aggression can be understood by the simple main effects of prosocial behavior; that is, children who engage in low levels of prosocial behavior exhibit higher initial levels of peer victimization, but the social cost of low prosocial behavior wanes over time. Prosocial behavior did not significantly interact with physical aggression to influence concurrent levels or trajectories of peer victimization over time (p values $\geq .17$). These effects accounted for an additional 3% of the variance in the random intercept (total $R^2 = .10$) and 11% of the variance in the random slope (total $R^2 = .28$).

Next, we added a physical aggression × prosocial behavior × gender three-way interaction (and all lower-order terms) to the model (see Table S3). Prosocial behavior and gender significantly
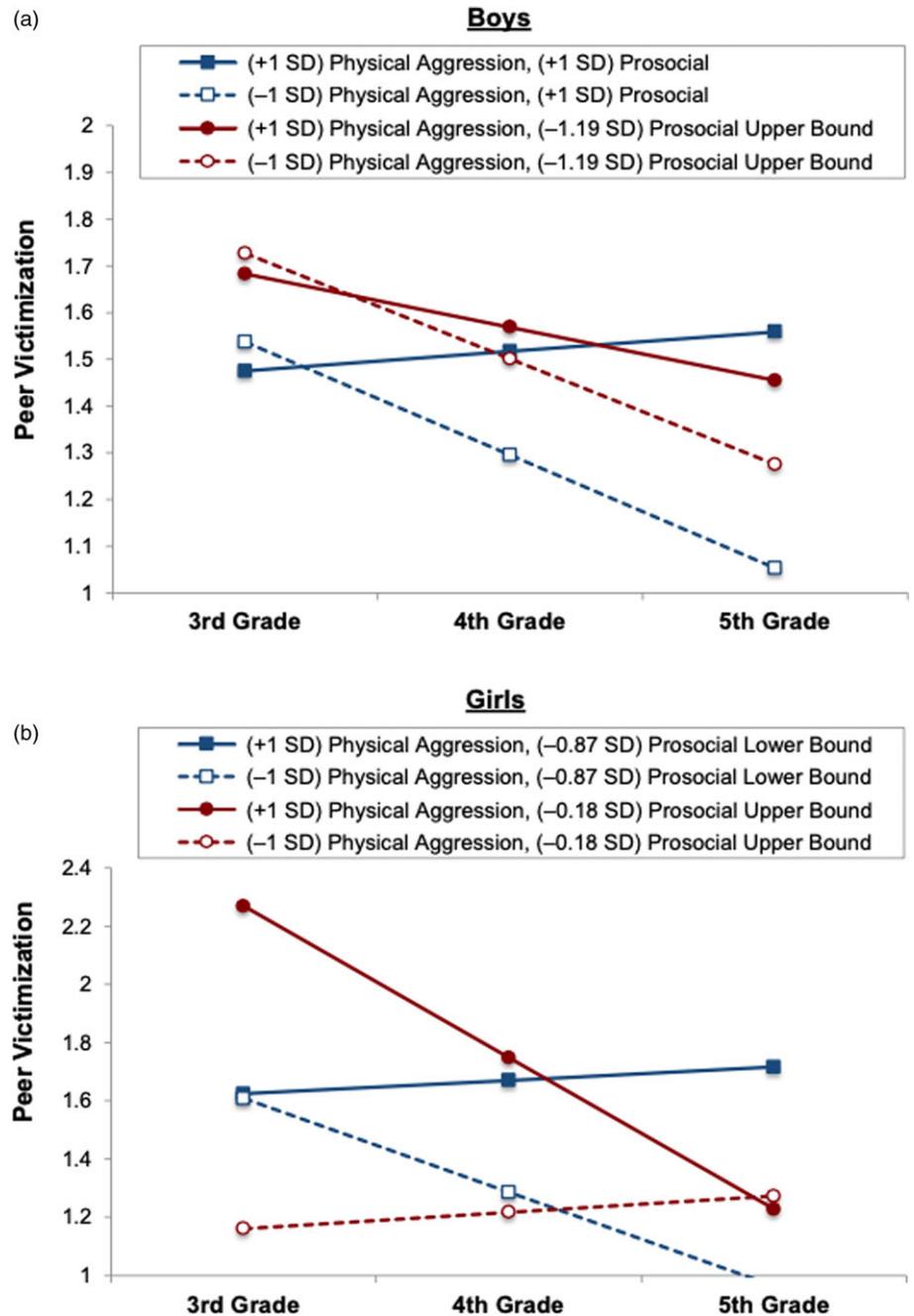
(a)

(b)

Figure 2. Interactive effects of physical aggression, prosocial behavior, and gender on trajectories of peer victimization. *Note.* For illustrative purposes, physical aggression is presented at traditionally identified high (+1 *SD*) and low (−1 *SD*) levels, and prosocial behavior is presented at its regions of significance; given that the lower bound for boys fell outside of the data, traditionally identified high levels (+1 *SD*) of prosocial behavior are presented instead for comparison.

interacted with physical aggression to predict the random linear time slope ($\beta = -.69$, $b = -.72$, $SE = .21$, $p = .001$), but not the random intercept ($p = .10$). As shown in Figure 2a, among boys, physical aggression predicted more stable patterns of (or increases in) peer victimization over time at lower and higher levels of prosocial behavior. That is, physical aggression was positively associated with the peer victimization linear slope at any prosocial behavior value greater than or equal to -1.19 *SD* (upper bound). However, the lower bound fell outside of the data (< -3 *SD*). As shown in Figure 2b, among girls, physical aggression predicted more stable patterns of (or increases in) peer victimization over time at lower levels of prosocial behavior (≤ -0.87 *SD*; lower bound) and decreases over time at higher levels of prosocial behavior (≥ -0.18 *SD*; upper bound). These effects accounted for an additional 2% of the variance in the random intercept

(total $R^2 = .12$) and 5% of the variance in the random slope (total $R^2 = .33$).

Finally, we added a relational aggression × prosocial behavior × gender three-way interaction (and all lower-order terms) separately to the model (see Table S3). Prosocial behavior and gender significantly interacted with relational aggression to predict the random intercept ($\beta = .35$, $b = .23$, $SE = .11$, $p = .03$), but not the random linear time slope ($p = .20$). Among girls, relational aggression was positively associated with third-grade peer victimization at higher levels of prosocial behavior (≥ -0.73 *SD*; upper bound); the lower bound fell outside of the data (< -3 *SD*). As shown in Figure 3, the lowest initial levels of peer victimization among girls were observed when levels of prosocial were high and relational aggression were low; however, the protective effect of prosocial behavior was no longer observed when levels of relational
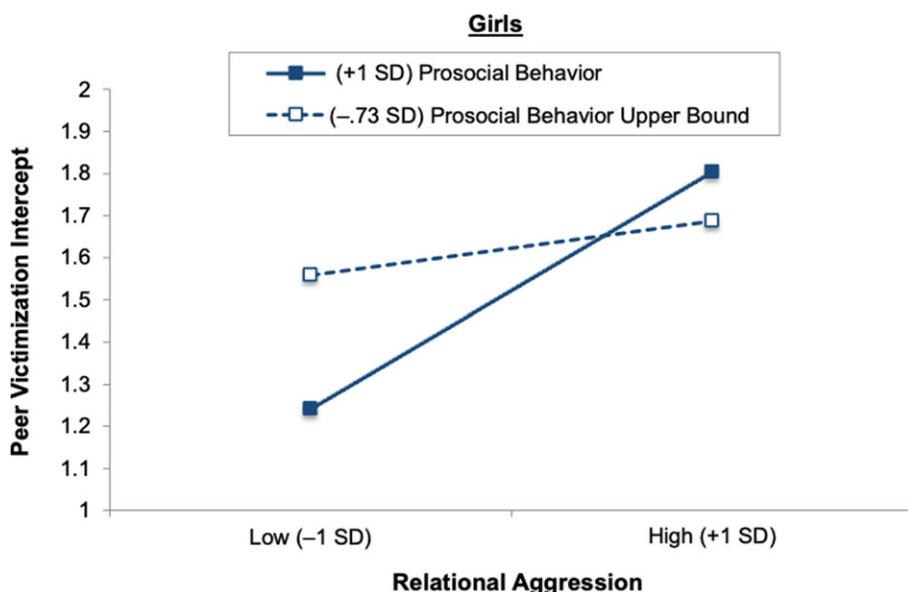
Figure 3. Interactive effects of relational aggression and prosocial behavior on initial levels of peer victimization among girls. *Note.* For illustrative purposes, relational aggression is presented at traditionally identified high (+1 SD) and low (−1 SD) levels, and prosocial behavior is presented at its regions of significance; given that the lower bound fell outside of the data, traditionally identified high levels (+1 SD) of prosocial behavior are presented instead for comparison.

aggression were high. Among boys, the lower (< -3 SD) and upper (> 3 SD) bounds fell outside of the data. These effects accounted for an additional 2% of the variance in the random intercept (total $R^2 = .12$) and 3% of the variance in the random slope (total $R^2 = .31$).

Secondary analyses

Physical aggression

Freeing the random intercept and linear slope parameters in the multi-group latent growth curve model resulted in a nonpositive definite matrix due to the slope parameters. Further, there were no significant linear changes in physical aggression over time ($p = .69$), nor was there significant variability in this slope ($p = .71$), in the fully constrained model. Thus, a combined random intercept model was used in subsequent analyses, which provided a close fit to the data, $\chi^2(10) = 12.91$, $p = .23$; RMSEA = .03; CFI = .96; TLI = .96; SRMR = .09, with the exception of the SRMR value. Note that there were no modifications available that would yield a significant improvement in model fit. Results indicated that there was significant interindividual variability in children's overall levels of physical aggression across the five time points ($p < .001$).

When main effects were added to the model (see Table S4), gender was significantly associated with the random intercept such that boys exhibited higher overall levels of physical aggression. Time 1 relational aggression uniquely predicted higher overall levels of physical aggression, whereas prosocial behavior uniquely predicted lower overall levels of physical aggression. These effects accounted for 48% of the variance in overall physical aggression.

When two-way interactions were added to the model (see Table S4), prosocial behavior did not moderate the link from peer victimization to physical aggression ($p = .23$). Further, prosocial behavior and gender did not significantly interact with peer victimization to influence physical aggression ($p = .54$; see Table S4).

Relational aggression

Freeing the random intercept and linear slope parameters in the multi-group latent growth curve model led to a significant improvement in model fit, $-2\Delta LL(5) = 68.37$, $p < .001$, suggesting

that boys and girls differed in their initial levels and patterns of change over time. Specifically, boys did not exhibit significant linear changes in relational aggression ($p = .90$), and there was not significant interindividual variability in their intercept ($p = .88$) or linear slope ($p = .13$). Girls also did not exhibit significant linear changes in relational aggression ($p = .74$); however, there was significant interindividual variability in their initial levels ($p < .001$) and their trajectories over time ($p = .02$). For girls, there was also a significant negative association between the random intercept and the random linear slope, $r = -.72$, $p = .02$. Given these different patterns of change, subsequent analyses were run separately for boys and girls.

The random intercept model provided a good fit to the data for boys, $\chi^2(10) = 14.18$, $p = .17$; RMSEA = .04; CFI = .94; TLI = .94; SRMR = .08. Results indicated that, although there was not significant change over time, there was significant variability in boys' overall levels of relational aggression across third through fifth grade ($p = .009$). When the main effects were added to the model (see Table S5), only Time 1 physical aggression significantly predicted higher levels of overall relational aggression. These effects accounted for 81% of the variance in overall relational aggression for boys. When two-way interactions were added to the model (see Table S5), prosocial behavior did not moderate the link from peer victimization to relational aggression for boys ($p = .07$).

The random linear time model provided a good fit to the data for girls, $\chi^2(7) = 15.24$, $p = .03$; RMSEA = .08; CFI = .94; TLI = .91; SRMR = .09, with the exception of the SRMR value. Note that there were no modifications available that would yield a significant improvement in model fit. When the main effects were added to the model (see Table S6), only Time 1 prosocial behavior significantly predicted lower initial levels of relational aggression but increases in relational aggression over time. As shown in Figure S2, the lowest levels of relational aggression were observed in the third grade among girls who exhibited high levels of prosocial behavior, but this protective effect waned over time. These effects accounted for 39% of the variance in the random intercept and 33% of the variance in the random slope. When two-way interactions were added to the model (see Table S6), prosocial behavior did not interact with peer victimization to predict the random intercept ($p = .98$) or the random slope ($p = .75$) for girls.

Summary of key results

Prosocial behavior was associated with lower initial levels of peer victimization, whereas relational aggression was associated with higher initial levels of peer victimization; these effects were qualified by a significant interaction, such that the protective effect of prosocial behavior was diminished at higher levels of relational aggression among girls only. Physical aggression uniquely predicted more stable patterns of peer victimization over time. Prosocial behavior was also found to moderate the prospective link from relational aggression to peer victimization. Specifically, relational aggression predicted decreases in peer victimization over time at higher levels of prosocial behavior ($\geq +0.19$ *SD*) and more stable patterns of peer victimization over time at lower levels of prosocial behavior (≤ -1.78 *SD*). Moreover, there were significant gender differences in the moderating effect of prosocial behavior on the prospective link from physical aggression to peer victimization. Among boys, physical aggression predicted more stable patterns of (or increases in) peer victimization over time at higher levels of prosocial behavior (≥ -1.19 *SD*). In contrast, among girls, physical aggression predicted decreases in peer victimization over time at higher levels of prosocial behavior (≥ -0.18 *SD*) and more stable patterns of (or increases in) peer victimization over time at lower levels of prosocial behavior (≤ -0.87 *SD*).

Results from secondary analyses showed that prosocial behavior uniquely predicted lower overall levels of physical aggression. Prosocial behavior also predicted lower initial levels of relational aggression among girls, but this protective effect waned over time. Prosocial behavior did not moderate the links from peer victimization to physical or relational aggression.

Discussion

There is substantial evidence documenting the harmful outcomes associated with aggressive behavior, which include increased risk for experiences of victimization (e.g., Cooley et al., 2018; Ostrov, 2008; Ostrov & Godleski, 2013). The current study sought to advance this literature by investigating the moderating role of prosocial behavior on the links from physical and relational aggression to peer victimization over a 2-year period during middle childhood. Findings generally support the notion that prosocial behavior serves as a protective factor, but this was not always the case, and patterns of moderation differed between boys and girls.

Risk for peer victimization

On average, children in the current study exhibited decreases in peer victimization from third through fifth grade, and there was significant variability in these trajectories. This finding corresponds to prior work that has documented differences in patterns of peer victimization during middle childhood (e.g., Rudolph et al., 2011) and underscores the importance of examining interindividual predictors of peer victimization trajectories in order to inform prevention and intervention efforts.

Also consistent with previous research (Khoury-Kassabri et al., 2020; Ostrov, 2008), relational aggression in the third grade was associated with higher initial levels of peer victimization, and prosocial behavior was associated with lower initial levels of peer victimization in the current study. Of note, these links were qualified by a significant interaction; specifically, the protective effect of prosocial behavior on concurrent peer victimization was diminished at higher levels of relational aggression among girls,

and this effect was nonsignificant for boys. The current study also builds on prior work (Cooley et al., 2017; Rudolph et al., 2011) by demonstrating that physical aggression increases children's risk for more stable patterns of peer victimization from the third through the fifth grade. Further, prosocial behavior uniquely predicted trajectories of peer victimization, such that its protective effect waned over time.

In line with our hypothesis, however, prosocial behavior was found to attenuate the prospective link from relational aggression to peer victimization. When levels of prosocial behavior were high, relational aggression predicted decreases in victimization from third through fifth grade. In contrast, relational aggression predicted more stable patterns of victimization over time at low levels of prosocial behavior. These results are consistent with prior work suggesting that prosocial behavior can promote positive social adjustment (Fu et al., 2023; Griese et al., 2016; Sugimura et al., 2017), whereas the use of relational aggression may have an immediate social cost (Ostrov, 2008; Wang et al., 2015). Despite this initial cost, children who gossip, spread rumors, and socially ostracize others while also engaging in prosocial behavior may be less likely to be victimized over time. These youth—previously termed bistrategic controllers (Hawley, 2003a, 2003b)—may be more skilled at using relational aggression effectively and strategically in a manner that is not detected. Thus, current findings support the resource control theory (Hawley, 1999) by highlighting the fact that the dual use of prosocial and relationally aggressive strategies can be adaptive in some environments.

Given the importance of social relationships for each construct, prosocial behavior and relational aggression operate within a similar "realm" (French et al., 2022; Wurster & Xie, 2014). In other words, highly prosocial children may be able to make more friends and enjoy some "privileges" due to their social status and popularity (Hartl et al., 2020). In addition to having more information about others, they may gain a more profound understanding of social dynamics. Bistrategic controllers may, in turn, use their understanding of social dynamics to effectively employ acts of relational aggression (e.g., gossip, rumor spreading, social ostracism) while maintaining some protection against subsequent victimization due to their social standing and friends (Hawley et al., 2002; Rodkin et al., 2013). In order to maintain their high social status among peers, these youth may target less socially skilled children who have limited resources to defend themselves or fight back (Cillessen & Mayeux, 2004). It is also possible that prosocial behavior may repair some of the ruptures caused by relational aggression in the aggressor's peer relationships (Ma et al., 2020), albeit less intentionally and strategically. On the other hand, children's use of relational aggression in the relative absence of prosocial behavior may have long-term consequences. The tendency for these youth to be rejected may leave them vulnerable to more chronic patterns of peer victimization during middle childhood (Boivin & Hymel, 1997; Paget et al., 2018).

A more complex pattern emerged for the prospective link from physical aggression to peer victimization, as it was moderated by both prosocial behavior and gender. Contrary to our hypothesis, among boys, the use of physical aggression predicted more stable patterns of (or increases in) peer victimization over time at higher levels of prosocial behavior. As noted above, prior work has shown that bistrategic controllers are socially central (Ettekal & Mohammadi, 2020; Hawley, 2003a; Kornbluh & Neal, 2016). At the same time, rates of physical aggression tend to decrease during the transition into middle childhood (Dodge et al., 2007; Jambon et al., 2019). Thus, the overt nature of physical aggression may be

particularly salient among elementary school-age boys who also exhibit prosocial behavior, and the violation of social norms by hitting, kicking, pushing, and/or threatening their peers may increase their own risk for experiences of victimization. Considering the "gender-segregated social world of peer interactions" during middle childhood (see Ostrov & Godleski, 2010, p. 234), it is likely that boys are engaging in physically aggressive behavior toward other boys who retaliate and fight back. This would be consistent with previous work indicating that bistrategic controllers tend to have friendships characterized by conflict (Hawley et al., 2007). Taken together, it appears that the social costs associated with physical aggression may be more detrimental than those of relational aggression among boys who exhibit high levels of prosocial behavior.

Among girls, physical aggression predicted more stable patterns of (or increases in) peer victimization at lower levels of prosocial behavior. In contrast, girls' use of physical aggression was associated with decreases in peer victimization over time at higher levels of prosocial behavior. The latter effect was surprising, especially in light of previous assertions that children who engage in gender nonnormative forms of aggression are more likely to elicit negative reactions from peers (e.g., Crick & Dodge, 1994). Indeed, relational aggression is the modal form of aggression for girls (Ostrov & Godleski, 2010), and as consistently demonstrated in the literature (Björkqvist, 2018), boys exhibited higher levels of physically aggressive behavior than girls in the current study. Taking into account this lower base rate, it may be that prosocial girls who occasionally engage in acts of physical aggression are less likely to be targeted as victims themselves due to their other social resources (e.g., peer acceptance, popularity, friendships with other aggressive peers; Ettekal & Mohammadi, 2020; Hawley, 2003a; Hawley et al., 2007; Kornbluh & Neal, 2016). That is, their behavior may be viewed as more aberrant in the broader social context, and victimized peers may avoid retaliating for fear that doing so would further harm their own social standing and relationships. Since girls value intimacy and warmth in their relationships during middle childhood (Gifford-Smith & Brownell, 2003), prosocial behavior may be particularly vital for maintaining healthy interpersonal relationships. Previous research has indeed shown that youth—especially girls—who engage in aggression and prosocial behavior are more likely to be perceived as popular (Kornbluh & Neal, 2016). Taking into account gender-segregated peer interactions (Ostrov & Godleski, 2010), girls are also likely hitting, kicking, pushing, and/or threatening other girls who tend to avoid such behavior themselves. These explanations are speculative and await further investigation, whereas the social costs of physical aggression among girls who exhibit low levels of prosocial behavior are more clear-cut.

Notably, a recent longitudinal study found that prosocial behaviors buffered the effect of direct (physical and verbal) aggression on peer acceptance among elementary-age students (Ettekal & Mohammadi, 2020). Compared to those exhibiting only moderate aggression, children utilizing prosocial and aggressive behavior were more likely to be accepted by their peers over time. The current study extends this line of research in several key ways. First, peer victimization and peer acceptance are related but distinct constructs (Craig et al., 2016; Graham et al., 2003) and may exist independently of each other; previous investigations have demonstrated that these constructs generally show weak to moderate negative correlations (r's = −.16 to −.49; e.g., Craig et al., 2016; Kochel et al., 2012; Malcolm et al., 2006), suggesting that they both may offer unique understandings of youth's social

functioning. Further, peer victimization has been identified as a nearly universal experience among school-age youth that may negatively impact multiple domains of psychosocial functioning for decades (see McDougall & Vaillancourt, 2015). The current study advances the literature by elucidating how prosocial behavior may differentially impact risk for peer victimization when children engage in physical and/or relational aggression; indeed, different patterns of results emerged for these two forms of aggressive behavior.

Risk for physical and relational aggression

Secondary analyses indicated that prosocial behavior did not moderate the links from peer victimization to forms of aggression. Rather, it uniquely predicted lower levels of overall physical aggression. One possibility is that victimized youth may show deficits in other-oriented behaviors and may have a limited repertoire of social skills (e.g., Perren & Alsaker, 2009; Rudolph et al., 2014), resorting to using aggression to address their relationship conflicts. It is also possible that the use of prosocial behaviors may not have downstream effects on the cognitive biases and emotional regulation deficits that may play a key role in the link between peer victimization and aggression (Martinelli et al., 2018). Research should investigate these associations further, however, given the evidence that prosocial behaviors may positively influence self-regulation skills (e.g., Memmott-Elison et al., 2020). Moreover, prosocial behavior was also associated with lower initial levels of relational aggression among girls only, but this protective effect waned from third through fifth grade. These findings build on previous research conducted in early childhood (Khoury-Kassabri et al., 2020) by providing additional evidence that prosocial behavior may be a protective factor for both physical and relational aggression during middle childhood.

Strengths, limitations, and directions for future research

Strengths of the current study include its multi-informant design and the collection of data across multiple time points spanning a 2-year period, allowing for an investigation of the associations between forms of aggression and peer victimization. However, there are several limitations that should be noted. Participants in the current study were predominantly non-Latinx White, which limits the generalizability of the results. Another notable limitation is that demographic data were not collected on individual participants, and school district records may only capture a rough estimate of the sample. Replication with more diverse samples is needed to determine the robustness of findings. Further, our measures of aggressive and prosocial behavior only provided data on teachers' observations within the school context. Future research would benefit from collecting parent- and/or peer-reports of aggressive and prosocial behavior in order to better understand youth's behavioral functioning across the school, home, and community contexts. It will also be important to assess for experiences of cyber victimization, which is increasingly recognized as a significant problem, even among elementary school-age youth (e.g., DePaolis & Williford, 2015). Additionally, there were high rates of missing data across time points; although we accounted for this in our analyses, and there were minimal differences between participants with and without missing data, this may have had an unknowable impact on our findings.

The current study relied solely on self-reports of peer victimization, which has notable strengths and limitations. It is likely that other informants (i.e., parents and teachers) may not be

aware of many incidents, as they often occur in settings with limited adult supervision (e.g., playground and cafeteria), and victims frequently choose not to disclose peer victimization (Fite et al., 2013; Smith & Shu, 2000). Moreover, peer-reports may be closely related to a child's status in the classroom and impacted less by ongoing victimization experiences (Pouwels et al., 2016), making them less sensitive to change. With regard to self-reports, previous research has shown that victimized youth tend to develop hostile attribution biases, becoming hypervigilant and interpreting ambiguous situations as antagonistic (e.g., Yao & Enright, 2022). Although this may lead to overreporting, children's perception of victimization by peers may have a strong impact on adjustment outcomes, including their use of aggression (Cooley et al., 2018), regardless of its accuracy.

The current study utilized latent growth curve modeling in order to examine how initial (i.e., third-grade) levels of prosocial behavior impacted the associations between forms of aggression and peer victimization over time. Future investigations could further explore the role of prosocial behavior by using person-centered analyses (e.g., growth mixture modeling), which would elucidate how prosocial behavior predicts co-occurring trajectories of aggression and peer victimization. This would provide insight into whether prosocial behavior differentially predicts trajectories for victims, aggressors, aggressive victims, and uninvolved youth (e.g., Bettencourt et al., 2013). Moreover, a preliminary factor analysis revealed a severe problem with discriminant validity, suggesting that physical and relational victimization could not be distinguished empirically in the current study. Future research should continue to evaluate the dimensionality of peer victimization—and need to distinguish between its forms—across developmental periods; subsequent work could also consider whether the moderating influence of prosocial behavior on the associations between physical and relational aggression and peer victimization differs according to specific forms of victimization.

The current study focused on sharing, helping, and comforting, yet prosocial behavior is a complex construct that can be conceptualized in other ways. For example, Eisenberg and colleagues (1988) found that "requested" prosocial behavior was related to more self-oriented responding, whereas "spontaneous" prosocial behavior was related to other-oriented responding. Youth can also act prosocially in ways that are deviant from social norms. One study revealed that anonymous and public prosocial behaviors were positively related to delinquency in an adolescent sample (Carlo et al., 2014). Thus, future research could build on the current findings by investigating how these different types of prosocial behavior impact aggression and peer victimization. Finally, it is important to note that peer victimization and aggression can also predict changes in prosocial behavior over time (e.g., Griese et al., 2016; Obsuth et al., 2015), and it would be informative for subsequent investigations to examine how these variables may uniquely and interactively predict trajectories of prosocial behavior over time.

Implication for practice

Findings from the current study may provide important information for researchers, mental health providers, and school personnel working to address problems of peer victimization and aggression. In general, it appears that prosocial behavior may reduce elementary school-age children's risk for experiencing peer victimization and engaging in aggressive behavior. Taking into account the current findings, prosocial interventions may help to address these peer problems in schools, even if aggression and peer victimization are not the targets of the intervention. In fact, a meta-analysis of ten controlled trials found that interventions aimed at promoting prosocial behavior among children and adolescents within school settings had a moderate effect on prosocial behavior as well as a large effect on reducing levels of aggression (Mesurado et al., 2019).

Universal interventions designed to directly address aggression and peer victimization within schools often have a primary focus on encouraging bystanders to intervene when they witness incidents of victimization, and they have been found to have a moderate effect on increasing prosocial behavior in this regard (Polanin et al., 2012). In addition to reducing rates of peer victimization and aggression (Gaffney et al., 2019), these approaches may help prevent these problems from emerging in the first place. Prosocial behavior also has many benefits beyond peer victimization and aggression, including improved youth mental health and academic outcomes (e.g., Caprara et al., 2000; Evans et al., 2019).

Additionally, evidence suggests that group-based cognitive-behavioral interventions are a promising approach for addressing the mental health needs of youth who are involved in more persistent patterns of peer victimization (i.e., victims and aggressive victims; Fite et al., 2019; Fung, 2012), yet it is currently unclear whether they increase participants' engagement in prosocial behavior. It will be important for future research to examine whether an explicit focus on promoting prosocial behavior enhances the effectiveness of these intervention approaches. Lastly, it is important to recognize that the dual use of prosocial and aggressive behavior may confer some social benefits. That is, prosocial behavior was found to mitigate the prospective link from relational aggression to peer victimization among boys and girls, as well as the link from physical aggression to peer victimization for girls only. Thus, prevention and intervention efforts may need to target social information processing deficits among bistrategic controllers, including their positive outcome and efficacy beliefs for aggression (e.g., Crick & Dodge, 1996).

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