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The Influence of Exposure to Violence on Adolescents' Physical Aggression: The Protective Influence of Peers

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Abstract

Introduction: This study examined the degree to which peers can serve as a protective factor to mitigate the negative effects of exposure to violence (i.e., victimization, witnessing violence) on adolescents' physical aggression. Four specific dimensions of peer influence were examined — friends' support for nonviolence, friends' support for fighting, peer pressure for fighting, and friends' delinquent behavior.

Methods: Analyses were conducted on four waves of data collected every 3 months (i.e., fall, winter, spring, summer) from a predominantly African-American (78%) sample of 2,575 sixth, seventh, and eighth graders attending three public middle schools in the United States. The sample was 52% female, with a mean age of 12.3 years ($SD = 1.00$).

Results: Findings for relations with victimization differed by sex. For boys, low levels of friends' delinquent behavior attenuated the relation between victimization and changes in physical aggression across all three waves. The protective effect of low levels of peer pressure for fighting was only evident in the winter for boys, whereas the protective effect of friends' support for nonviolence was only evident in the summer. For girls, high levels of friends' support for nonviolence attenuated the relation between victimization in the winter and changes in physical aggression in the spring. In contrast, none of the peer factors moderated the relation between witnessing violence and physical aggression.

Conclusions: Findings suggest that prevention and interventions that increase positive peer influences and decrease negative peer influences may benefit adolescents by reducing risks associated with victimization.

Keywords

Community violence; exposure to violence; peer influence; physical aggression; adolescence

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Adolescents in underserved communities experience high rates of violence exposure (Richards et al. 2015), which has been associated with a variety of negative outcomes (see review by Fowler et al., 2015). Exposure can occur directly through experiencing victimization or indirectly by witnessing violence (Buka et al., 2001). This is an important distinction based on findings indicating that the strength of relations between violence exposure and adjustment difficulties varies based on the form of exposure. This was highlighted in a meta-analysis by Fowler et al. (2009) that found that although all forms of violence exposure were positively associated with externalizing behavior (e.g., aggressive and delinquent behavior), being a victim of community violence was a stronger predictor than being a witness or hearing about violence. The high prevalence of violence exposure and its adverse consequences highlight the need for research to identify protective factors that may reduce negative consequences experienced by adolescents in communities that place them at increased risk for violence exposure. The purpose of this study was to examine peers as a potential source of protective factors to reduce the impact of victimization and witnessing violence on adolescents' physical aggression.

Peers are a powerful influence during adolescence as youths seek independence from their families (Brown & Klute, 2003). Although adolescents may be exposed to peers at school or in their neighborhoods, they also select and maintain friendships with peers who share similar beliefs and engage in similar behaviors (Byrne et al., 1971). Peers can directly influence adolescents' behavior by regulating group norms (Brown, 2004) and through peer pressure, which involves encouragement to believe or behave in certain ways (e.g., Padilla-Walker & Bean, 2009). Peers can also indirectly influence adolescents' by providing opportunities for adolescents to engage in certain behavior, such as throwing unsupervised parties, or modeling behaviors that adolescents imitate (Brown, 2004). Relations between peer factors (e.g., peer pressure for fighting, friends' support for fighting, friends' delinquent behavior) and physical aggression have been established by quantitative (e.g., Thompson et al., 2019; Zhu et al., 2017) and qualitative studies (e.g., Farrell et al., 2010).

Studies examining protective factors that moderate relations between violence exposure and externalizing behavior have primarily focused on family factors, with less attention given to peer factors (e.g., see review by Ozer et al., 2017). A cross-sectional study by Criss and colleagues (2017) found that peers' prosocial behavior and emotional regulation attenuated the relation between violence exposure and externalizing behavior among a diverse sample of adolescents. In contrast, within a predominantly Latinx sample of middle school students, Salzinger et al. (2010) found that attachment to friends and friends' delinquent behavior did not moderate the relation between violence exposure and externalizing behavior one year later. Both studies used broad measures of community violence and externalizing behavior.

There is theoretical support for the potential protective role of peers. According to resilience theories, resilience occurs when individual, environmental, or social factors (e.g., peers) disrupt negative effects of risk factors (e.g., violence exposure) on outcomes (e.g., aggressive behavior; Luthar et al., 2000; Rutter, 1987). General strain and stress buffering theories suggest that social support during stressful situations may help adolescents cope with negative emotions, which may protect adolescents from negative outcomes (Agnew, 1992;

Cohen & Wills, 1985). This suggests that adolescents whose friends disapprove of physical aggression or approve of nonviolent alternatives may be less influenced by models of physically aggressive behavior, and may be less likely to engage in retaliatory aggression in response to victimization. Conversely, exposure to peer pressure to engage in fighting and association with delinquent peers may exacerbate the effects of witnessing violence and increase the likelihood of aggression among victimized adolescents.

Purpose of the Present Study

The purpose of this study was to examine the protective effects of four peer variables (i.e., friends' support for nonviolence, friends' support for fighting, peer pressure for fighting, friends' delinquent behavior) on relations between two types of community violence exposure (i.e., victimization and witnessing violence) and physical aggression. Its focus was on a predominantly African-American sample of middle school students from under-resourced neighborhoods with high rates of poverty and violence. Adolescents in under-resourced communities are at an increased risk for violence exposure (Foster et al., 2007) and physical aggression (Wang et al., 2009). This makes it essential to identify factors that reduce the relation between violence exposure and physical aggression within this population. In contrast to previous studies that have examined changes across school years, this study focused on changes within the school year to address the fact that middle school years are a time when adolescents experience frequent changes in the structure of peer relations and their broader experiences (e.g., Chan & Poulin, 2007). Such changes cannot be captured by studies examining changes across broader spans of time. This study builds upon a prior study conducted with this same dataset (Author reference) that found that witnessing violence and victimization were each positively related to subsequent changes in physical aggression. This study extends that work by examining peer variables as potential moderators of those relations. We hypothesized that lower levels of friends' delinquent behavior, friends' support for fighting, and peer pressure for fighting, and higher levels of friends' support for nonviolence would reduce the strength of relations between both forms of exposure to violence and subsequent changes in adolescents' frequency of physical aggression.

We also examined the extent to which the moderating effects of peer variables varied as a function of sex. Prior studies highlight the importance of examining sex differences, but have not provided clear guidance regarding whether peer variables would exert stronger moderating effects for boys or girls. A meta-analysis by Hall (2011) found that girls had higher friendship expectations related to communality, solidarity, and symmetrical reciprocity, whereas boys had higher expectations related to agency. In addition, Sumter et al. (2009) found that boys reported less resistance to overall peer influence than girls. We therefore considered our examination of sex differences exploratory.

Methods

Participants and Setting

This study was based on data collected from 10 cohorts of students between 2010 and 2018 as part of a project (Author citation) that evaluated the effectiveness of a school-based

bullying prevention program. Participants were a random sample of students attending three public middle schools in a medium-sized city in the southeastern United States. The student population was predominantly African-American, nearly all of whom (98%) were eligible for the National School Lunch Program. The final sample of 2,575 participants included 865 sixth, 860 seventh, and 850 eighth graders. Eighteen percent of participants identified themselves as Hispanic or Latino. The majority of participants identified as African-American or Black as their only racial identity (72%) or as one of multiple racial identities (6%); 6% identified as White; 1% identified as American Indian or Alaska Native, less than 1% identified as Native Hawaiian or Pacific Islander, or as Asian; and 13% (nearly all of whom had identified as Latinx) did not endorse any racial category. School records identified 52% as females and 48% as males. The mean age was 12.3 years ($SD = 1.00$).

Procedures

The evaluation project used a multiple baseline experimental design that randomly determined the order and timing of implementing the intervention at each school. Four waves of data (i.e., fall, winter, spring, and summer) were collected every 3 months. A missing-by-design approach results in data that are missing completely at random, which provides unbiased parameter estimates, while increasing quality and reducing costs (Graham et al., 2001). Most of the recruited students (82.5%) participated at both of their assigned waves. Participants had data missing at one of their assigned waves for the following reasons: (a) inability to schedule them (6.2%), (b) they left the school during the academic year (6.1%), (c) they chose not to participate (3.1%), and (d) they were no longer eligible or withdrew from the study (2.1%). In addition, 95 observations (1.8% of those obtained) were excluded from the analyses due to the belief that the measures were not completed carefully (e.g., participants' speed of completion).

Research staff verbally described the study to students during school and gave students consent forms to take home. Written parental consent and student assent were obtained for all participants. Research staff administered surveys, mostly in groups of 20 to 30 students at school during the school year and individually in students' homes or at community locations during the summer wave. All measures were administered in English using computer-assisted personal interviews. Participants received \$10 gift certificates for completed assessments and \$5 gift certificates for returning consent forms even if they declined to participate. The university's Institutional Review Board approved all procedures from the larger project and use of de-identified data for secondary analysis.

Measures

Community Violence—Witnessing violence and victimization were measured by a shortened version of the Survey of Exposure to Community Violence (SECV; Richters & Saltzman, 1990). The SECV is perhaps the most frequently used measure to assess youths' violence exposure. Studies have established its construct validity based on correlations with measures of internalizing and externalizing problems, and post-traumatic stress disorder symptoms (see Fowler et al., 2009). Adolescents rated how frequently they experienced or witnessed each item (e.g., "Been beaten up or mugged") in the past 3 months using a 6-point scale, ranging from *never* to *20 or more times*. Ratings are averaged across items to create

separate scores for victimization (7 items, $\alpha = .69$) and witnessing violence (13 items, $\alpha = .86$).

Friends' Delinquent Behavior—The Friends' Behavior Scale (Farrell et al., 2017) assessed adolescents' perceptions of their friends' behavior. Respondents indicate their number of close friends to orient them to the task. The seven-item Friends' Delinquent Behavior subscale asks participants to indicate how many of them engaged in behaviors representing aggression, substance use, and delinquency (e.g., “Sold drugs?”) within the past 3 months using a 5-point scale, ranging from *none of them* to *all of them*. Farrell et al. (2017) found support for the scale structure; strong measurement invariance across gender, grades, settings, and time; and concurrent validity based on correlations with adolescents' problem and prosocial behaviors. The alpha in the current study was .82.

Friends' Approval of Fighting and Nonviolence—Perceived friends' support for fighting and nonviolence was measured using the Friends' Reaction to Responses to Conflict Situations Scale (Farrell et al., 2017). Each item presents a hypothetical problem situation followed by either a nonviolent or violent response. Adolescents then indicate how they think their friends would react if they made that response in that situation. Responses include negative (e.g., “They would think I was weak”), neutral (e.g., “They would not care”), or positive (e.g., “They would think that I'm cool”) reactions, which are scored -1 , 0 , and 1 , respectively and averaged to create scales representing friends' support for nonviolence (5 items; $\alpha = .78$) or friends' support for fighting (5 items; $\alpha = .77$). Validity is supported by correlations with teacher- and self-report of physical aggression (Farrell et al., 2017).

Peer Pressure for Fighting—The Peer Pressure for Fighting scale (Farrell et al., 2017) is a five-item scale asking youth how frequently they experienced pressure to fight during the past 30 days. It includes items about pressure from friends and from the larger peer group (e.g., “Your friends told you that you should fight someone.”). Participants rate each item on a 6-point frequency scale, ranging from *never* to *20 or more times*. Farrell et al. (2017) found support for the concurrent validity of the measure based on correlations with adolescent- and teacher-report of related constructs. The total score ($\alpha = .85$) was created by averaging the items after recoding responses into a 4-point scale by combining the three highest categories based on item response theory analyses (IRT; Farrell et al., 2017).

Physical Aggression—Physical aggression was measured using the five-item Physical Aggression subscale of the Problem Behavior Frequency Scale-Adolescent Report (PBFS-AR; Farrell et al., 2020). Participants rate how often they participated in specific acts of physical aggression (e.g., “Hit or slapped someone”) in the last 30 days on a 6-point frequency scale, ranging from *never* to *20 or more times*. Items are recoded into a 4-point scale by combining the three highest categories on the frequency scale based on IRT analyses (Farrell et al., 2020) and averaged to create a total score ($\alpha = .77$). Validity is supported by its correlations with related constructs (Farrell et al., 2016), teacher ratings

of students' behavior (Farrell et al., 2018), and school office referrals for disciplinary code violations (Farrell et al., 2020).

Analysis Plan

Because the multiple cohort design limited the number of students who participated during all three grades, we conducted longitudinal analyses of four waves of data within a single school year for independent samples of 6th, 7th, and 8th graders. For students who participated in more than one grade, we randomly selected data from one of their grades to maintain independent observations. Analyses were conducted in Mplus Version 8.2 (Muthén & Muthén, 2017). Full information maximum likelihood estimation, which makes use of all available data in calculating parameter estimates, was used to handle missing data. All scores were log transformed to reduce skewness and kurtosis, and a robust estimator was used to account for non-normal data (i.e., MLR). The sandwich estimator (Muthén & Satorra, 1995) was used to address non-independence resulting from nesting of students within groups defined by each combination of cohort, grade, and school. We ran separate path models to determine the degree to which each of the four peer variables moderated relations between witnessing violence or victimization and subsequent changes in the frequency of physical aggression. The exposure and peer variables were grand-mean centered, and product terms were created to represent their interaction.

We used a random intercept model to decompose scores on physical aggression at each wave into between-person and within-person components (Hamaker et al., 2015). Within this model, a random intercept represents the time-invariant between-person component. The within-person component represents temporal deviations from the intercept across waves. Because the focus was on associations between the exposure and peer variables and their interactions with subsequent changes in physical aggression, we used one-sided models in which within-person deviations in physical aggression at waves 2 to 4 were regressed on the exposure and peer variables and their interaction terms at the prior wave (see Figure 1). The exposure variables, peer variables, and interaction terms were regressed on the covariates, but were otherwise treated as exogenous variables (i.e., they were allowed to correlate with each other across all waves, and with the physical aggression intercept and deviation scores at the current and prior waves). The models included lag 1 autoregressive effects, and covariates including grade, intervention condition, and sex, which were dummy-coded with sixth grade, control condition, and female sex as the reference groups.

We examined the consistency of effects across waves by comparing the fit of unconstrained models in which associations between the exposure and peer variables with subsequent changes in physical aggression were allowed to vary across waves versus constrained models in which they were held constant across waves. Models were compared based on the scaled chi-square difference test (Satorra & Bentler, 2010). The significance of all tests was established at an alpha of .05. Model fit was evaluated based on the root mean square error of approximation (RMSEA), comparative fit index (CFI), and Tucker-Lewis index (TLI). We used multiple group models to investigate the consistency of effects across sex by comparing models allowing associations between exposure and peer variables with physical aggression to vary across groups to models constraining effects across sex. In cases where

differences across sex were found, we also tested models in which cross-variable relations were constrained across waves within sex.

Results

Descriptive Statistics

Means and standard deviations for all waves are reported in Table 1 and correlations among all variables for waves 1 and 2 are reported in Table 2 (see Table S1 within the supplementary materials for correlations at all waves). Correlations for each construct across adjacent waves were significant and ranged from .31 to .69. Correlations among different constructs within the same wave were significant and in the expected direction. Correlations between witnessing violence and victimization ranged from .64 to .66. Correlations among the four peer variables ranged from .20 to .64 in absolute value. Correlations between the two exposure variables and physical aggression ranged from .39 to .50. Correlations between the four peer variables and physical aggression ranged from .23 to .55 in absolute value.

Analyses Based on the Overall Sample

Fit indices for models evaluating the moderating effects of the peer variables on the association between victimization and changes in physical aggression are reported in Table 3. For all four peer variables, constrained models holding effects of victimization, peer variables, and their interactions constant across waves (see upper half of Table 3) fit the data well (RMSEA = .00 to .02, CFIs = 1.00, TLIs = .97 to 1.00) and did not significantly reduce the model fit relative to unconstrained models based on the scaled chi-square difference test. Within these models, there were significant simple main effects on within-person changes in physical aggression in the expected direction for victimization (β s = .16 to .26, $p < .01$) and for the four peer variables ($|\beta$ s = .15 to .30, $p < .001$) (see Table 4). However, none of the product terms representing moderating effects of peer variables on victimization were significant.

Similarly, models holding the effects of witnessing violence, peer variables, and interaction terms constant across waves fit the data well (RMSEA < .02, CFIs > .993, TLIs > .95) and did not reduce the model fit according to the scaled chi-square difference tests (see lower half of Table 3). There were significant simple main effects on within-person changes in physical aggression in the expected direction for witnessing (β s = .20 to .30, $p < .001$) and the four peer variables ($|\beta$ s = .12 to .26, $p < .05$) (see Table 4). However, there were no significant interaction terms, indicating that none of the peer variables moderated the relation between witnessing violence and changes in physical aggression.

Analyses Examining Sex Differences

Fit indices for multiple group models examining sex differences are reported in Table 5. Comparisons of models allowing all parameters to vary by sex versus models holding cross-wave relations between the exposure and peer variables and physical aggression constant across sex revealed significant sex differences in models of the moderating effects of peer pressure for fighting, friends' delinquent behavior, and friends' support for nonviolence on victimization. Sex differences were not found for models examining moderating effects of

friends' support for fighting on victimization, or models examining moderating effects of any of the four peer variables on witnessing violence. Follow-up analyses were conducted on the three models where sex differences were found to determine if coefficients could be held constant across waves within sex.

Follow-up analyses of the model examining the moderating effect of peer pressure for fighting on victimization indicated that effects varied across sex and across waves within sex. Consistent with our hypothesis, peer pressure for fighting significantly moderated relations between victimization and changes in physical aggression for boys and for girls, but only across one of the three sets of waves, and the specific wave and nature of the effect differed by sex. For boys, peer pressure for fighting served a protective function such that low levels of peer pressure in the fall attenuated the relation between victimization in the fall and changes in physical aggression in the winter (see Table 6 and Figure 2a). The pattern for girls indicated that low levels of peer pressure for fighting had a promotive effect (i.e., reduction) on changes in girls' physical aggression in the winter and summer at low levels of victimization, but this benefit was increasingly less evident at higher levels of victimization (see Figure 2b).

Follow-up analyses of the moderating effects of friends' delinquent behavior indicated that effects differed by sex, but were consistent across waves within sex. Within this model, friends' delinquent behavior significantly moderated the relation between victimization and physical aggression for boys, but not for girls (see Table 5). The overall pattern suggested that having fewer friends who engaged in delinquent behavior served a protective function that reduced the relation between victimization and changes in physical aggression for boys (see Table 6 and Figure 3).

Finally, analyses of the model examining the moderating effects of friends' support for nonviolence indicated that effects differed by sex and across waves within sex (see Table 5). Findings supported friends' support for nonviolence as a protective factor that reduced relations between victimization and subsequent changes in physical aggression in the spring for girls, and in the summer for boys (see Table 6 and Figure 4a). The pattern for girls from the spring into the summer wave suggested that high levels of friends' support for nonviolence benefitted girls experiencing low levels of victimization, but not for those experiencing high levels of victimization (see Figure 4b).

Discussion

The purpose of this study was to examine the degree to which four peer variables (i.e., peer pressure for fighting, friends' delinquent behavior, friends' support for fighting, friends' support for nonviolence) exerted a protective influence by moderating the adverse effects of witnessing violence and victimization on adolescents' frequency of physical aggression. Although studies have sought to identify factors that reduce the effects of violence exposure, few have addressed multiple peer variables as moderators and physical aggression as an outcome. This study focused on a predominantly African-American sample of students from urban schools and examined within-person changes within the course of a school year. We found that three of the four peer variables moderated the impact of victimization on physical

aggression, though results varied by sex and time of year. None of the peer variables moderated the association between witnessing violence and changes in physical aggression.

The clearest evidence for the protective influence of peer variables was found for victimization effects on boys. Low frequencies of peer pressure for fighting and friends' delinquent behavior, and higher levels of friends' support for nonviolence each exerted a protective effect by attenuating the association between boys' frequency of victimization and subsequent changes in their physical aggression at one or more waves. This effect was consistent across all waves for friends' delinquent behavior. Associating with delinquent peers is one of the most consistent risk factors for aggression (Dishion & Patterson, 2006). Our findings suggest that boys who do not associate with delinquent peers may not only avoid influences such as modeling and more subtle socialization processes such as social reinforcement (Clasen & Brown, 1985), but may also be less susceptible to the adverse effects of other risk factors such as victimization.

Although peer pressure for fighting and friends' support for nonviolence also moderated the relation between victimization on boys' frequency of physical aggression, effects differed across waves. The moderating effect of peer pressure for fighting on victimization was only evident at the start of the school year. Victimized boys may be susceptible to peer pressure to be aggressive at the beginning of the year when reputation is being established (e.g., Allen et al., 2005). Friends' support for nonviolence moderated the association between victimization at the end of the school year and subsequent changes in physical aggression in the summer. Because research with large samples of adolescents is typically conducted during the school year, less is known about factors that influence adolescents' behavior outside of the school year. During summer months, adolescents may have more control over their peer groups due to less structured and unsupervised free time. Friends' support for nonviolence may consequently become more salient outside of the school year, when boys no longer experience pressure to improve or maintain their reputation by engaging in aggressive behavior.

Evidence of a moderating effect for girls was found for friends' support for nonviolence, with effects differing across waves. The protective effect of friends' support for nonviolence was limited to the relation between victimization in the winter and changes in physical aggression in the spring. Girls who had been victimized during the middle of the school year were less likely to engage in physically aggressive behavior if they perceived friends' support for nonviolence. The presence of a protective effect during the middle of the school year rather than the beginning or end of the year may be explained by the notion that friendships take time to develop and may remain consistent after being established (Hall, 2011). The importance of nonviolent responses for victimized girls is consistent with girls' socialization to cope with their experiences in ways that avoid conflict (Graves, 2007).

Friends' delinquent behavior and peer pressure for fighting did not serve protective functions in the relation between victimization and physical aggression for girls. Findings from the current study are consistent with findings that friends' delinquent behavior did not moderate the relation between violence exposure (i.e., victimization and witnessing) and externalizing behavior (Salzinger et al., 2010). Regarding peer pressure for fighting, previous research

suggests that adolescents may be more likely to succumb to pressure to engage in specific behaviors that are consistent with gender norms (Ruegar et al., 2008). Given that girls are more likely to be socialized to avoid violence (Graves, 2007), it is likely that peer pressure for fighting is a less salient peer factor for victimized girls.

Low levels of friends' support for fighting did not serve a protective function in relations between victimization and physical aggression for boys or for girls. This suggests that in the presence of victimization, experiencing low levels of friends' support for fighting is not sufficient to reduce adolescents' aggressive behavior. General strain and stress buffering theories (Agnew, 1992; Cohen & Wills, 1985) suggest that social support might protect victimized adolescents from negative outcomes. However, victimized adolescents whose friends express disapproval for aggressive behavior may continue to be victimized and may still be exposed to physically aggressive behavior. In addition, these adolescents may experience unresolved emotions if they feel their friends are not offering alternative ways for them to cope with their negative peer interactions, which may result in physically aggressive behavior.

Witnessing Violence

We did not find support for our hypotheses that peer variables would moderate the relation between witnessing violence and changes in physical aggression. These findings are consistent with those of a longitudinal study that did not find support for the protective effect of friends' delinquent behavior and attachment to friends (Salzinger et al., 2010). The lack of moderating effects for witnessing violence compared with victimization may be explained by the physical proximity of victimization, which may result in greater risk of negative outcomes (Fowler et al., 2009). In addition, victimization occurring in the school may have an impact on adolescents' reputation, whereas witnessing violence may not result in social consequences.

Limitations—Several limitations of the current study should be noted. All of the measures used were self-report. Relying on a single source of data makes it possible that associations among measures may be influenced by shared method variance. Nonetheless, in contrast to teacher and parent ratings, or behavioral observations that are limited to specific contexts, self-report provides a basis for assessing adolescents' behavior and experiences across multiple contexts. This may be important for assessing behaviors such as physical aggression or violence exposure, which are less likely to occur in the presence of teachers, parents, or observers. Moreover, because friends' behavior and support for fighting and nonviolent behaviors were based on adolescents' reports, they reflect adolescents' perceptions rather than their friends' actual behaviors or attitudes. It could, however, be argued that such perceptions may exert a stronger influence.

Other limitations are related to study design. Longitudinal data were used to examine associations between exposure and peer variables on subsequent changes in physical aggression. Although this provides a stronger basis than cross-sectional analyses, it does not rule out the possibility that other variables may account for relations among the variables. Our focus on changes across shorter time intervals provided a basis for examining changes

within the course of a school year, but may not capture longer-term changes. Finally, the majority of participants were African-American students from an underserved area. Although this sample was appropriate for the specified aims of the study, the findings may not generalize to samples of adolescents in other contexts.

Conclusion—The overall findings of this study provide limited support for the notion that peer factors may serve a protective function by reducing the impact of victimization on adolescents. In particular, effects varied across waves within sex and across specific domains of peer variables. This variability highlights the need for further research to determine if these patterns can be replicated. It also suggests the need for researchers to pursue a more nuanced approach that considers multiple domains of peer factors, addresses sex differences, and avoids lumping multiple dimensions of violence exposure and externalizing behaviors into global measures. Such an approach is needed to address the complexity of relations among these constructs. Our findings also highlight the need to expand the search for protective factors into other domains. Even in instances where peer variables moderated the effects of victimization, the net result was that they reduced, rather than eliminated the effect of victimization on changes in physical aggression. The serious negative consequences of violence exposure, particularly among adolescents who experience high levels of violence exposure, underscores the need for further research to identify factors that might serve to reduce its impact. Our findings also have implications for prevention efforts. In particular, they suggest the potential benefits of prevention and intervention efforts geared towards increasing positive peer influences (i.e., friends' support for nonviolence) and decreasing negative peer influences (i.e., peer pressure for fighting, friends' delinquent behavior) for boys exposed to victimization. Such efforts may provide not only direct benefits, but may also provide protective effects, particularly for boys. In contrast, interventions reducing the frequency of victimization at the school level may have additional benefits for girls by providing a context that enhances the benefits of positive peer influences.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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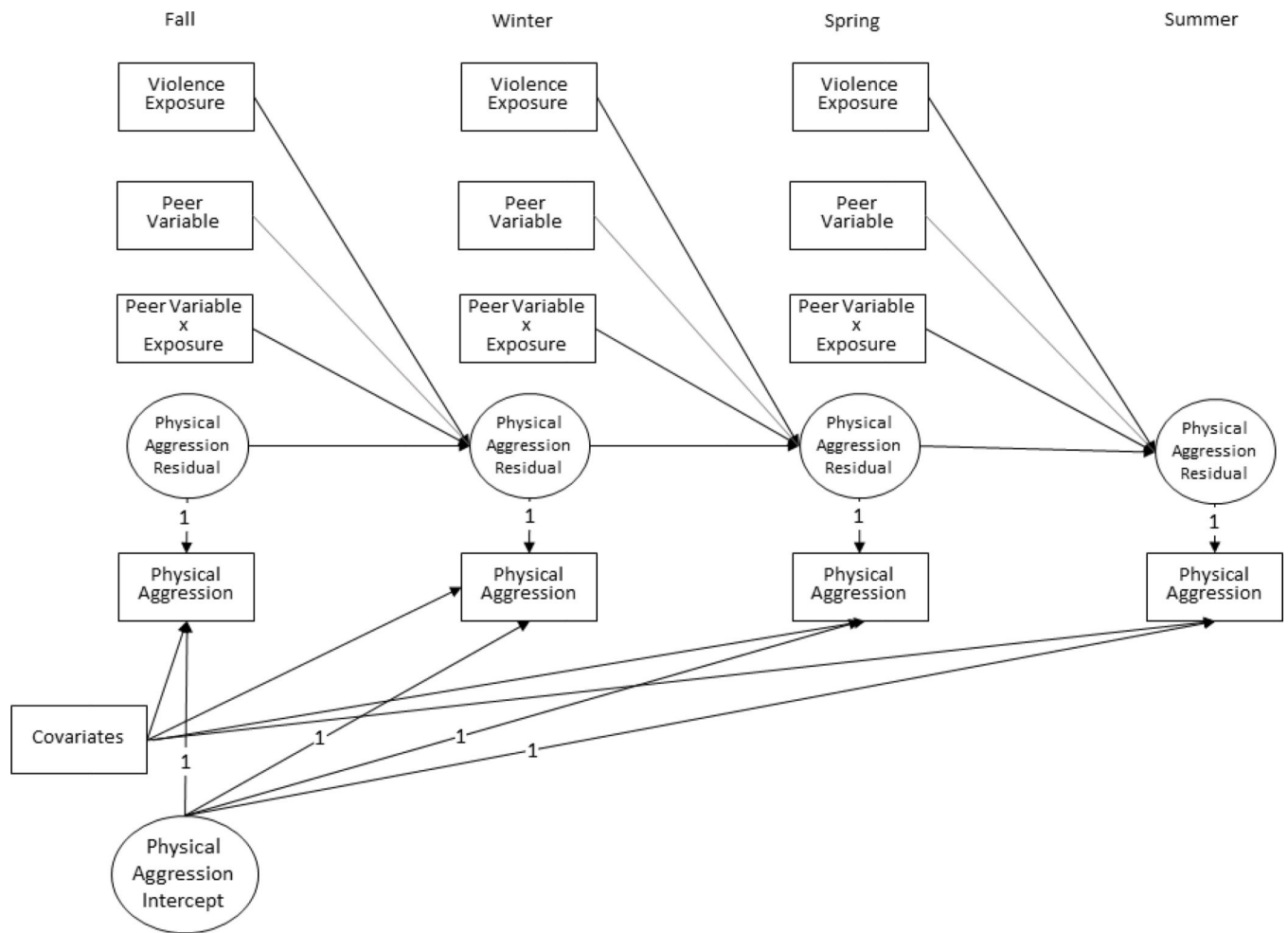
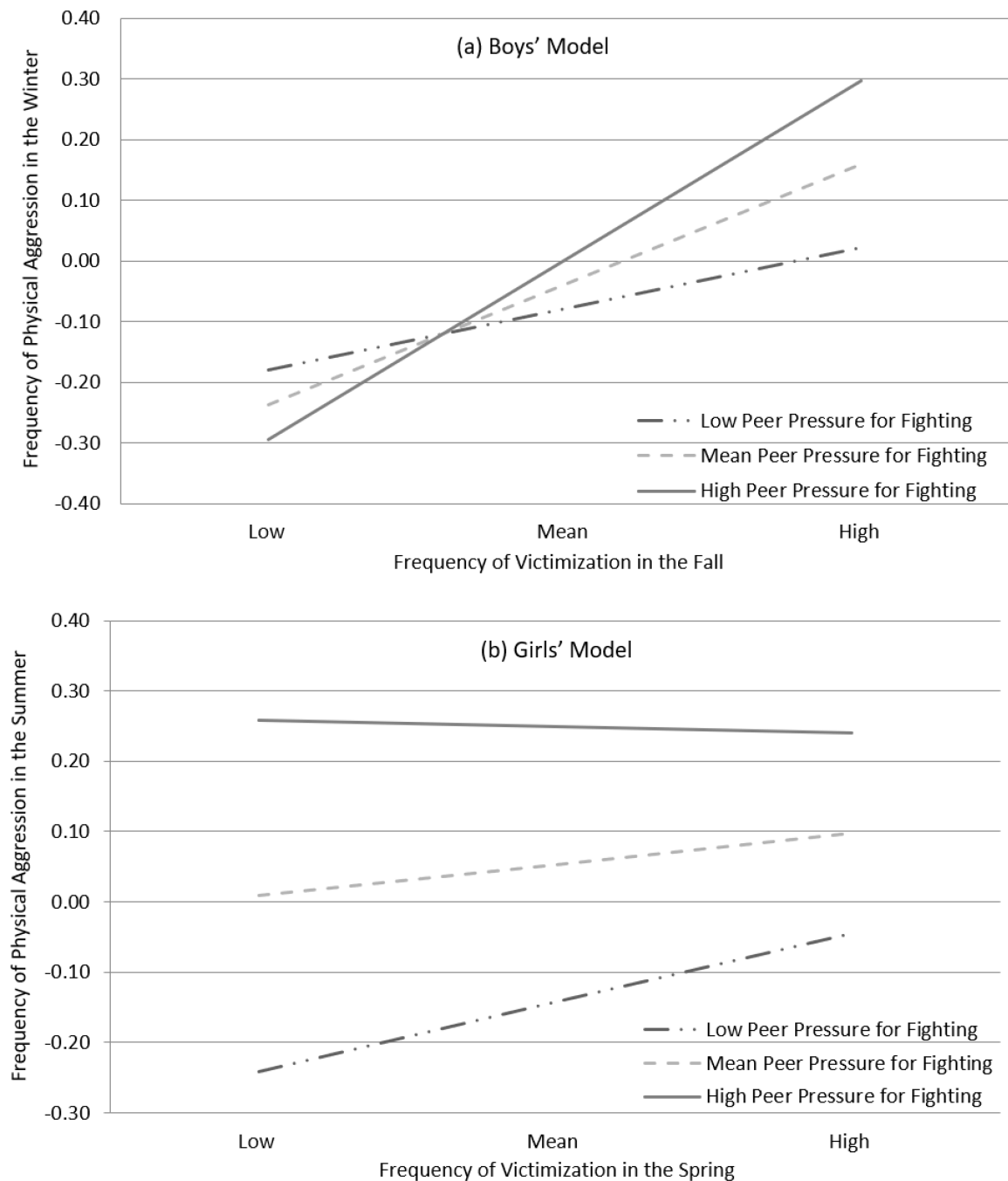


Figure 1:

One-Sided Path Model Representing Each Peer Variable as a Moderator of Relations

Between Exposure to Violence and Subsequent Changes in Physical Aggression

Note. Exposure variables, peer variable, and interaction terms were regressed on the covariates, but were otherwise treated as exogenous variables (i.e., they were allowed to correlate with each other across all waves, and with the physical aggression intercept and deviation scores at the current and prior waves).

**Figure 2.**

Moderating Effect of Peer Pressure for Fighting on the Relation Between Victimization and Physical Aggression Across Specific Waves for (a) Boys and (b) Girls

Note. Plots represent adolescents at high and low levels of peer pressure for fighting (1 *SD* above or below the mean).

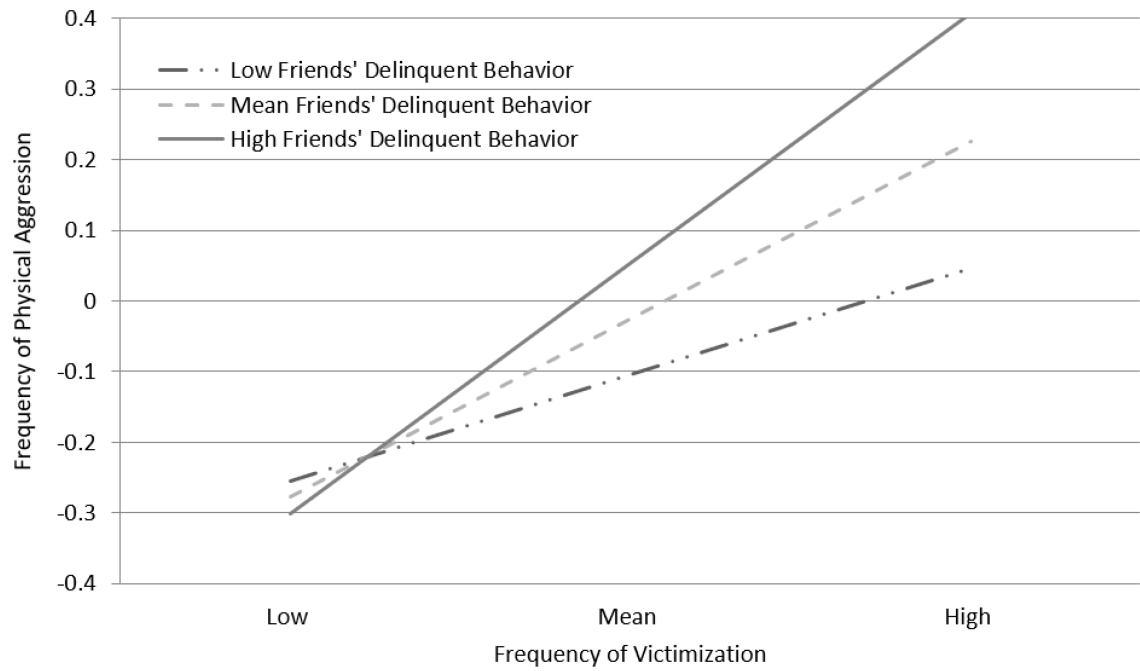
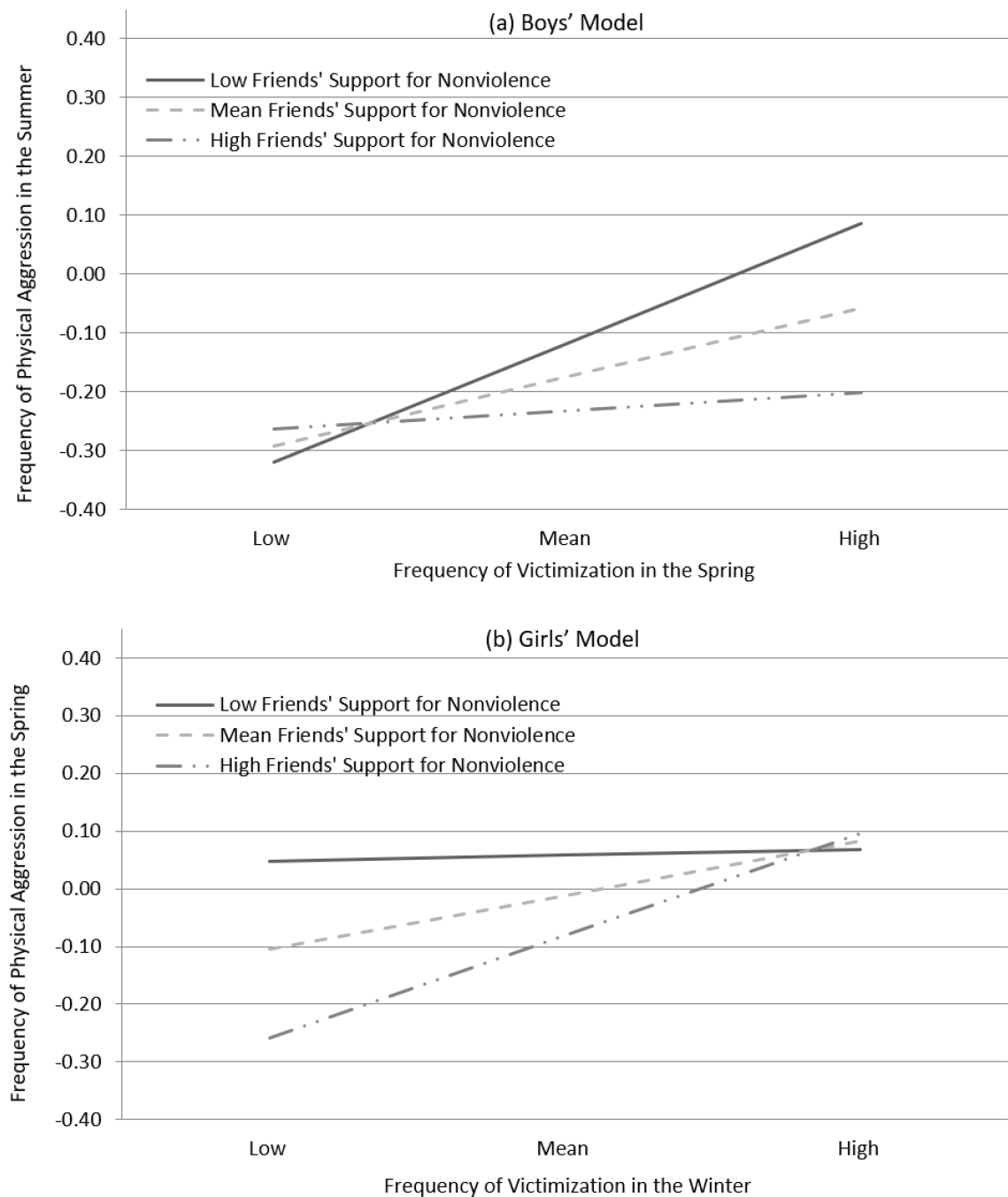


Figure 3. Moderating Effect of Friends' Delinquent Behavior on the Relation Between Victimization in the Fall and Changes in Physical Aggression in the Winter for Boys
Note. Plots represent adolescents at high and low levels of friends' delinquent behavior (1 *SD* above or below the mean). Effects were constrained across waves.

**Figure 4.**

Moderating Effect of Friends' Support for Nonviolence on the Relation Between Victimization and Physical Aggression Across Specific Waves for (a) Boys and (b) Girls
Note. Plots represent adolescents at high and low levels of friends' support for nonviolence (1 *SD* above or below the mean).

Table 1

Means (SDs) By Wave For Study Variables

| | Fall | Winter | Spring | Summer |
|----------------------------------|--------------|--------------|--------------|-------------|
| Physical Aggression | 1.40 (0.53) | 1.39 (0.54) | 1.39 (0.55) | 1.31 (0.49) |
| Victimization | 1.27 (0.39) | 1.25 (0.38) | 1.23 (0.38) | |
| Witnessing Violence | 1.60 (0.53) | 1.54 (0.51) | 1.50 (0.51) | |
| Peer Pressure for Fighting | 1.52 (0.65) | 1.47 (0.65) | 1.42 (0.61) | |
| Friends' Delinquent Behavior | 1.13 (0.28) | 1.13 (0.29) | 1.13 (0.30) | |
| Friends' Support for Fighting | −0.16 (0.58) | −0.14 (0.56) | −0.12 (0.53) | |
| Friends' Support for Nonviolence | 0.24 (0.60) | 0.23 (0.58) | 0.20 (0.58) | |

Note. $N = 2,575$.

Table 2

Correlations for Wave 1 and Wave 2 Victimization, Witnessing Violence, Peer Variables, and Physical Aggression Measures

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|--------------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Wave 1 | | | | | | | | | | | | | |
| 1. Victimization | - | | | | | | | | | | | | |
| 2. Witnessing violence | .66*** | - | | | | | | | | | | | |
| 3. Peer pressure for fighting | .38*** | .51*** | - | | | | | | | | | | |
| 4. Friends' delinquent behavior | .28*** | .34*** | .33*** | - | | | | | | | | | |
| 5. Friends' support for fighting | .10** | .20*** | .23*** | .25*** | - | | | | | | | | |
| 6. Friends' support for nonviolence | -.12*** | -.17*** | -.20*** | -.25*** | -.62*** | - | | | | | | | |
| 7. Physical aggression Wave 2 | .39*** | .44*** | .49*** | .37*** | .25*** | -.26*** | - | | | | | | |
| 8. Victimization | .57*** | .44*** | .37*** | .26*** | .15** | -.04 | .33*** | - | | | | | |
| 9. Witnessing violence | .56*** | .67*** | .49*** | .32*** | .13* | -.06 | .38*** | .65*** | - | | | | |
| 10. Peer pressure for fighting | .41*** | .44*** | .57*** | .33*** | .17** | -.13* | .36*** | .42*** | .55*** | - | | | |
| 11. Friends' delinquent behavior | .28*** | .27*** | .34*** | .39*** | .23*** | -.14** | .24*** | .33*** | .37*** | .34*** | - | | |
| 12. Friends' support for fighting | .19** | .20*** | .22*** | .19** | .62*** | -.48*** | .28*** | .10** | .19*** | .22*** | .24*** | - | |
| 13. Friends' support for nonviolence | -.13*** | -.14* | -.21*** | -.18** | -.64*** | .69*** | -.23*** | -.14*** | -.15*** | -.21*** | -.21*** | -.64*** | - |
| 14. Physical aggression | .36*** | .37*** | .55*** | .28*** | .27*** | -.13* | .58*** | .45*** | .50*** | .55*** | .47*** | .27*** | -.27*** |

Note. $N = 2,575$.* $p < .05$.** $p < .01$.*** $p < .001$.

Table 3

Fit Indices for Models of Moderating Effects of Each Peer Variable on Relations between Exposure to Violence and Aggression Within the Overall Sample

| Model | χ^2 ^a | df | RMSEA | CFI | TLI | χ^2 ^b | df ^b |
|--|-----------------------|----|-------|-------|-------|-----------------------|-----------------|
| Models of moderating effects on victimization | | | | | | | |
| Moderating effects of peer pressure for fighting | | | | | | | |
| 1. Unconstrained | 21.64*** | 11 | .019 | .997 | .962 | | |
| 2. Constrained across waves | 31.08*** | 19 | .016 | .996 | .975 | 10.09 | 8 |
| Moderating effects of friends' delinquent behavior | | | | | | | |
| 3. Unconstrained | 16.49*** | 11 | .014 | .999 | .987 | | |
| 4. Constrained across waves | 17.15*** | 19 | .000 | 1.000 | 1.000 | 2.38 | 8 |
| Moderating effects of friends' support for fighting | | | | | | | |
| 5. Unconstrained | 17.44*** | 11 | .015 | .997 | .964 | | |
| 6. Constrained across waves | 28.58*** | 19 | .014 | .995 | .969 | 11.26 | 8 |
| Moderating effects of friends' support for nonviolence | | | | | | | |
| 7. Unconstrained | 15.41*** | 11 | .012 | .998 | .976 | | |
| 8. Constrained across waves | 20.08*** | 19 | .005 | .999 | .997 | 5.14 | 8 |
| Models of moderating effects on witnessing violence | | | | | | | |
| Moderating effects of peer pressure for fighting | | | | | | | |
| 9. Unconstrained | 24.90*** | 11 | .022 | .997 | .960 | | |
| 10. Constrained across waves | 32.21*** | 19 | .016 | .997 | .978 | 8.40 | 8 |
| Moderating effects of friends' delinquent behavior | | | | | | | |
| 11. Unconstrained | 32.21*** | 11 | .027 | .992 | .910 | | |
| 12. Constrained across waves | 29.91*** | 19 | .015 | .996 | .973 | 2.75 | 8 |
| Moderating effects of friends' support for fighting | | | | | | | |
| 13. Unconstrained | 29.83*** | 11 | .026 | .993 | .912 | | |
| 14. Constrained across waves | 36.78*** | 19 | .019 | .993 | .952 | 8.41 | 8 |
| Moderating effects of friends' support for nonviolence | | | | | | | |
| 15. Unconstrained | 24.22*** | 11 | .022 | .995 | .941 | | |
| 16. Constrained across waves | 34.56*** | 19 | .018 | .994 | .960 | 10.87 | 8 |

Note. $N = 2,575$. Constrained models held effects of violence exposure, peer variables, and interaction terms constant across waves. RMSEA = Root mean square error of approximation. CFI = comparative fit index. TLI = Tucker-Lewis Fit index.

^aChi-square test of model fit.

^bSatorra-Bentler scaled chi-square difference test indicates whether the unconstrained model fit the data significantly better.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 4

Standardized Regression Coefficients (Standard Errors) for Models Regressing Wave 2 Physical Aggression on Wave 1 Peer Variables, Exposure to Violence, and Interaction Terms

| Wave 1 predictors of Wave 2 change | Peer variable included as moderator | | | |
|---|-------------------------------------|------------------------------|-------------------------------|----------------------------------|
| | Peer pressure for fighting | Friends' delinquent behavior | Friends' support for fighting | Friends' support for nonviolence |
| Models of peer variables as moderators of effects of victimization on physical aggression | | | | |
| Physical aggression | .22* (.09) | .18 (.09) | .26** (.09) | .26** (.09) |
| Peer variable (PV) | .30*** (.05) | .20*** (.05) | .21*** (.04) | -.15*** (.04) |
| Victimization | .16** (.03) | .24*** (.05) | .25*** (.05) | .26*** (.06) |
| PV*Victimization Interaction | .01 (.03) | .06 (.04) | .05 (.04) | -.03 (.04) |
| Male sex | -.05 (.03) | -.09** (.03) | -.09** (.03) | -.10** (.03) |
| Grade 7 | .08* (.03) | .05 (.03) | .03 (.03) | .05 (.03) |
| Grade 8 | .05 (.04) | .00 (.04) | .01 (.03) | .01 (.03) |
| Intervention Condition | -.06 (.03) | -.08* (.03) | -.08** (.03) | -.07* (.03) |
| R ² | .32*** (.03) | .26*** (.03) | .29*** (.03) | .27*** (.03) |
| Models of peer variables as moderators of effects of witnessing violence on physical aggression | | | | |
| Physical aggression | .22* (.09) | .19* (.10) | .25** (.09) | .26** (.09) |
| Peer variable (PV) | .26*** (.06) | .13* (.05) | .18*** (.04) | -.12*** (.03) |
| Witnessing violence | .20*** (.05) | .29*** (.06) | .29*** (.06) | .30*** (.06) |
| PV*Witnessing Violence Interaction | -.01 (.03) | .06 (.04) | .04 (.03) | -.04 (.04) |
| Male sex | -.04 (.03) | -.07* (.03) | -.07* (.03) | -.08* (.03) |
| Grade 7 | .09* (.03) | .06 (.03) | .05 (.03) | .06 (.03) |
| Grade 8 | .04 (.04) | .01 (.03) | .01 (.03) | .01 (.03) |
| Intervention Condition | -.05 (.03) | -.05 (.03) | -.07* (.03) | -.05 (.03) |
| R ² | .33*** (.03) | .29*** (.03) | .31*** (.03) | .30*** (.03) |

Note. $N = 2,575$. Each column reports the coefficients for separate models regressing physical aggression at Wave 2 on covariates, and Wave 1 measures of an exposure variable (victimization or witnessing violence), a peer variable named in the column heading, and their interaction. Unstandardized coefficients were held constant across waves.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 5

Fit Indices for Multiple Group x Sex Models of Moderating Effects of Each Peer Variable on Relations between Exposure to Violence and Aggression

| Model | χ^2^a | df | RMSEA | CFI | TLI | χ^2^b | df ^b |
|--|------------|----|-------|------|------|------------|-----------------|
| Models predicting changes in victimization | | | | | | | |
| Peer pressure for fighting | | | | | | | |
| 1. Unconstrained | 30.58*** | 22 | .017 | .997 | .971 | | |
| 2. Constrained across sex | 62.62*** | 34 | .026 | .991 | .938 | 31.88** | 12 |
| 3. Constrained across waves | 68.20*** | 38 | .025 | .990 | .941 | 36.93** | 16 |
| Friends' delinquent behavior | | | | | | | |
| 4. Unconstrained | 28.51*** | 22 | .015 | .998 | .974 | | |
| 5. Constrained across sex | 60.49*** | 34 | .025 | .990 | .930 | 31.38** | 12 |
| 6. Constrained across waves | 49.64*** | 38 | .015 | .996 | .973 | 21.11 | 16 |
| Friends' support for fighting | | | | | | | |
| 7. Unconstrained | 28.50*** | 22 | .015 | .997 | .967 | | |
| 8. Constrained across sex | 48.70*** | 34 | .018 | .993 | .952 | 19.71 | 12 |
| 9. Constrained across waves Friends' support for nonviolence | 58.86*** | 38 | .021 | .990 | .939 | 29.42* | 16 |
| 10. Unconstrained | 29.91*** | 22 | .017 | .996 | .959 | | |
| 11. Constrained across sex | 63.45*** | 34 | .026 | .986 | .901 | 34.55*** | 12 |
| 12. Constrained across waves | 62.05*** | 38 | .022 | .988 | .928 | 32.28** | 16 |
| Models predicting changes in witnessing violence | | | | | | | |
| Peer pressure for fighting | | | | | | | |
| 13. Unconstrained | 37.17*** | 22 | .023 | .996 | .960 | | |
| 14. Constrained across sex | 55.19*** | 34 | .022 | .995 | .963 | 18.20 | 12 |
| Friends' delinquent behavior | | | | | | | |
| 15. Unconstrained | 41.18*** | 22 | .026 | .994 | .934 | | |
| 16. Constrained across sex | 49.16*** | 34 | .019 | .995 | .966 | 12.55 | 12 |
| Friends' support for fighting | | | | | | | |
| 17. Unconstrained | 34.09*** | 22 | .021 | .995 | .950 | | |
| 18. Constrained across sex | 43.47*** | 34 | .015 | .996 | .975 | 10.25 | 12 |
| Friends' support for nonviolence | | | | | | | |
| 19. Unconstrained | 36.11*** | 22 | .022 | .995 | .943 | | |
| 20. Constrained across sex | 52.28*** | 34 | .020 | .993 | .952 | 16.37 | 12 |

Note. $N = 2,575$. Constrained models held effects of violence exposure, peer variables, and interaction terms constant across sex or across waves within sex. RMSEA = Root mean square error of approximation. CFI = comparative fit index. TLI = Tucker-Lewis Fit index.

^aChi-square test of model fit.

^bSatorra-Bentler scaled chi-square difference test indicates whether the unconstrained model fit the data significantly better.

*
 $p < .05$.

**
 $p < .01$.

 $p < .001$.

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Table 6

Standardized Regression Coefficients (Standard Errors) for Regression of Wave t Physical Aggression on Wave t-1 Peer Variables, Victimization, and Interaction Terms for Subgroup Models by Sex

| | Moderation model for peer pressure for fighting | | Moderation model for friends' delinquent behavior | | Moderation model for friends' support for nonviolence | |
|------------------------------------|---|--------------|---|--------------|---|--------------|
| | Girls | Boys | Girls | Boys | Girls | Boys |
| Wave 1 predictors of Wave 2 change | | | | | | |
| Physical Aggression | .35* (.14) | .16 (.16) | .19 (.13) | .16 (.15) | .36** (.14) | .16 (.15) |
| Peer Variable (PV) | .29** (.09) | .01 (.11) | .28** (.08) | .10 (.07) | -.20** (.08) | -.03 (.07) |
| Victimization | -.02 (.07) | .37*** (.10) | .19** (.06) | .29** (.09) | .07 (.08) | .48*** (.12) |
| PV*Victimization Interaction | .07 (.07) | .27*** (.08) | -.04 (.04) | .17** (.07) | .04 (.07) | -.02 (.08) |
| Grade 7 | .11* (.05) | .04 (.05) | .08 (.05) | .01 (.05) | .07 (.05) | .03 (.05) |
| Grade 8 | .04 (.05) | .02 (.05) | .02 (.05) | -.03 (.05) | .01 (.05) | .02 (.05) |
| Intervention Condition | -.07 (.04) | -.02 (.04) | -.11* (.05) | -.05 (.04) | -.08 (.04) | -.03 (.05) |
| R ² | .33*** (.08) | .41*** (.08) | .26*** (.04) | .31*** (.07) | .27** (.08) | .36*** (.08) |
| Wave 2 predictors of Wave 3 change | | | | | | |
| Physical Aggression | .47*** (.13) | -.06 (.24) | .19 (.14) | .16 (.14) | .43** (.13) | .13 (.19) |
| Peer Variable (PV) | .10 (.09) | .49** (.15) | .30** (.09) | .11 (.08) | -.14* (.08) | -.20** (.08) |
| Victimization | .16 (.09) | .21 (.11) | .17** (.06) | .29** (.09) | .20* (.09) | .33* (.13) |
| PV*Victimization Interaction | -.01 (.07) | .06 (.09) | -.05 (.06) | .18** (.06) | -.14* (.07) | -.05 (.10) |
| Grade 7 | -.02 (.04) | -.04 (.05) | -.01 (.05) | -.06 (.05) | -.02 (.04) | -.09 (.05) |
| Grade 8 | .03 (.04) | .04 (.05) | .01 (.05) | -.01 (.05) | .03 (.04) | -.01 (.05) |
| Intervention Condition | -.01 (.04) | .01 (.05) | -.05 (.04) | -.05 (.04) | -.03 (.04) | -.03 (.05) |
| R ² | .41*** (.06) | .37*** (.08) | .28*** (.05) | .33*** (.05) | .40*** (.07) | .27*** (.07) |
| Wave 3 predictors of Wave 4 change | | | | | | |
| Physical Aggression | .13 (.21) | .21 (.16) | .22 (.15) | .18 (.16) | .26 (.18) | .29 (.16) |
| Peer Variable (PV) | .48** (.16) | .38** (.13) | .32** (.10) | .12 (.09) | -.17 (.10) | -.07 (.08) |

| | Moderation model for peer pressure for fighting | | Moderation model for friends' delinquent behavior | | Moderation model for friends' support for nonviolence | |
|------------------------------|---|--------------|---|--------------|---|--------------|
| | Girls | Boys | Girls | Boys | Girls | Boys |
| Victimization | .14 (.11) | .15 (.11) | .20** (.07) | .31** (.09) | .21 (.12) | .24* (.11) |
| PV*Victimization Interaction | -.17** (.06) | .00 (.11) | -.05 (.06) | .22* (.10) | .18* (.07) | -.20* (.10) |
| Grade 7 | .04 (.06) | .12* (.06) | .01 (.06) | .13* (.06) | -.02 (.06) | .11 (.06) |
| Grade 8 | .03 (.07) | .00 (.06) | -.06 (.06) | .01 (.06) | -.07 (.06) | .00 (.06) |
| Intervention Condition | -.03 (.05) | .14** (.05) | -.06 (.05) | .10* (.05) | -.05 (.05) | .10* (.05) |
| R2 | .37*** (.07) | .39*** (.07) | .31*** (.05) | .39*** (.08) | .28*** (.07) | .35*** (.09) |

Note. $N = 2,575$. Each column represents coefficients for boys or girls from separate models regressing physical aggression at Wave t on covariates, and Wave $t-1$ measures of an exposure variable (victimization or witnessing violence), the peer variable named in the column heading, and their interaction from the best-fitting model.

* $p < .05$.

** $p < .01$.

*** $p < .001$.