



Published in final edited form as:

J Interpers Violence. 2025 December ; 40(23-24): 5574–5604. doi:10.1177/08862605241303951.

Malleable and Static Risk Factors Associated with Boys' Patterns of Interpersonal Violence: A Latent Class Analysis

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Abstract

Despite increased risk of committing and experiencing violence among adolescent boys, little is known about either how different types of violence co-occur within individuals or their association with different risk factors. This study used a person-centered approach to (1) identify patterns in boys' perpetration and victimization across a range of seven types of interpersonal violence (bullying, electronic aggression, sexual harassment/aggression; and psychological/ physical/sexual dating violence); and (2) examine the association of these patterns with twelve risk factors at the individual, relational, and community level to inform future prevention efforts.

We used latent class analysis to identify patterns of violence among a diverse sample of 239 adolescent boys from 12 schools in 4 regions of the United States. Four classes were identified: The LOW-ALL group (36.4% of the sample) described boys unlikely to commit or experience any forms of violence. The PERP-MULTI group (20.9%) included boys at a high probability of committing bullying and sexual harassment, and a relatively lower probability of experiencing sexual harassment. The EQUAL-PEER-SH group (33.5%) described boys with high probability of both committing and experiencing sexual harassment, bullying, and electronic aggression. The smallest group of boys, labeled HIGH-ALL (9.2%), were at a high probability of committing and experiencing nearly all types of violence examined.

We used weighted multiple group analysis to compare risk factors across the latent groups identified. Attitudes supporting violence, internalized traditional masculinity, delinquency, school withdrawal, and both family and community violence exposure were significantly higher in groups with high likelihood to commit various types of violence. These findings provide practical guidance for enhancing universal and selected violence prevention efforts for adolescent boys.

Keywords

Adolescent boys; violence; latent class analysis; masculinity; risk factors

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We have no known conflict of interest to disclose.

Before the end of high school, at least 35% of adolescent boys experience bullying committed by a peer, 8% experience some form of teen dating violence (TDV) committed by a current dating or romantic partner, and 5% experience sexual violence (SV) including sexual assault or rape committed by anyone (Clayton, 2023; Modecki et al., 2014). At the same time, 35% of boys engage in bullying of other adolescents, 16% engage in sexual harassment (SH) of their peers, and 5% admit committing SV before turning 20 years old (Modecki et al., 2014; Smith et al., 2019; Ybarra & Petras, 2021; Zych et al., 2021). Although boys are not the sole perpetrators of interpersonal violence, male adolescents are more likely to engage in most types of violence, including TDV and bullying, relative to their female peers (Smith et al., 2019; Zych et al., 2021). Longitudinal studies show that adolescents who engage in interpersonal violence are most likely to persist, if not escalate, their behavior over time compared to desistance (Ybarra & Petras, 2021). Preventing violence through interventions focused on adolescent boys has thus received attention as a means of addressing the significant broader public health impacts of interpersonal violence, which can have long-term impacts on victims including depression, psychological distress, poor academic achievement, increased substance use, and recurring trauma-like symptoms (Bundock et al., 2020; Exner-Cortens et al., 2017; Gruber & Fineran, 2016; Reed et al., 2019; Théorêt et al., 2021).

Whereas traditional variable-centered inquiries are critical for identifying theoretical predictors of each type of violence that can be targeted in the prevention of that particular type of violence (Crooks et al., 2019; Kovalenko et al., 2022), several recent studies have leveraged person-centered analytic approaches, such as latent class analysis (LCA), to identify unique subgroups of adolescents who experience similar patterns of victimization and perpetration across multiple types of interpersonal violence (Exner-Cortens et al., 2023; Sessarego et al., 2021; Siller et al., 2022). Person-centered approaches have been applied to various health and behavior fields successfully to illuminate latent subgroups beyond population averages and prevalence statistics (for more on this approach, see Howard & Hoffman, 2018). Despite their unique contributions, to date, no studies with this age group have focused exclusively on boys experiences nor examined the association of malleable risk factors (predictors which can be changed through intentional intervention efforts) alongside static risk factors (predictors which indicate who may need more targeted intervention efforts) with these multidimensional violence patterns—a critical step in moving the field towards a more comprehensive model of prevention (Joseph & Kuperminc, 2020). This study aims to expand upon existing LCA models of boys' experiences with interpersonal violence by 1) including a broader range of violence perpetration and victimization indicators, and 2) comparing identified subgroups on malleable and static individual, relational, and community-level risk factors for violence perpetration and victimization.

Boys Experience Unique Patterns of Violence

Interpersonal violence occurs when an individual uses or is the target of physical force, power, or the threat of force that has a high likelihood of resulting in psychological harm, maldevelopment, injury, or death (Rutherford et al., 2007). In the past decade there has been growing recognition that victimization and perpetration of interpersonal violence often co-occur (Hamby & Grych, 2012). Additionally, recent person-centered studies with high

school samples have begun to explore how various forms of interpersonal violence intersect with each other (e.g., Exner-Cortens et al., 2023; Sessarego et al., 2021; Siller et al., 2022). These studies all consistently identify a subgroup that has either no involvement or a very low likelihood of committing or experiencing only one type of violence, often labeled as an ‘uninvolved with’ or ‘low’ violence subgroup. Studies also typically find a subgroup that has experienced high rates of violence victimization, although there is variation in whether that subgroup also has high rates of committing violence (Exner-Cortens et al., 2023) versus low or no perpetration (Sessarego et al., 2021; Siller et al., 2022). One reason for this difference may be that each study includes different types of violence. For example, when measuring teen dating violence (TDV), some studies used a general indicator that any type of TDV was committed or experienced (Sessarego et al., 2021), whereas others used specific indicators of subtypes such as physical TDV versus psychological TDV (Exner-Cortens et al., 2023; Siller et al., 2022). Notably, while there are previous studies to examine sexual TDV with other forms of TDV (e.g., Choi et al., 2017; Paradis et al., 2024), no prior studies have included sexual TDV as an indicator alongside peer violence such as bullying or differentiated sexual TDV from other forms of sexual harassment or aggression. In the present study, we operationalize interpersonal violence to include the most comprehensive set of violence indicators examined to date (bullying, electronic aggression; sexual harassment and aggression; and physical, psychological, and sexual TDV).

Malleable and Static Risk Factors for Violence

Prior research has so far mapped out numerous demographic characteristics, such as age or socioeconomic status, that are differentially associated with violence subgroup membership. Identifying these static risk factors helps us to understand who may be most at risk and thus the most critical targets to reach with limited prevention and support resources. For example, adolescents at greater risk of social marginalization (due to racial identity, immigrant identity, and, or food insecurity) are more likely to be in a high perpetration and victimization subgroup than to be in a subgroup uninvolved with violence (Exner-Cortens et al., 2023). Identifying malleable risk factors, such as attitudes toward violence or beliefs about masculinity, helps inform what content to include in the interventions themselves (Rizzo et al., 2024; Fraser & Galinsky, 2010; Orr et al., 2022). Joseph and Kuperminc (2020) outline an integrated intervention model of prevention that highlights shared risk factors for committing or experiencing peer violence and TDV. However, they acknowledge the model does not account for potential subpopulations; for example, not every bullying victim goes on to perpetrate and not every act of TDV leads to experiencing victimization. No prior LCA studies on violence among adolescent boys have examined malleable risk factors present across multiple types of violence. Understanding which risk factors differentiate group membership could be used to inform comprehensive prevention approaches which address unique subgroups of experiences differently and intentionally.

Risk factors can be organized within the social-ecological model (Bronfenbrenner, 2005) based on whether they exist at the individual-, relational-, or community-level. The individual-level includes an individual’s internal beliefs and attitudes; the relational-level includes an individual’s close and important relationships; and the community-level includes aspects of an individual’s surroundings such as school characteristics, their neighborhood,

or local policies. Recent reviews of adolescent interpersonal violence prevention efforts indicate interventions primarily target individual-level malleable risk factors for behavior change, although the proportion of complex multilevel interventions is increasing (Farmer et al., 2023; Kovalenko et al., 2022). As research examining high school boys expands beyond basic population prevalence to consider nuanced multi-type violence patterns like those discussed above, the parallel examination of potential malleable risk factors should also expand to include multiple levels of the social ecology to inform the ways we enhance existing prevention efforts (Krug et al., 2002). In this study we chose to focus on prior violence exposure and malleable risk factors at the individual, relational, and community levels which are already commonly addressed in prevention efforts designed for adolescent boys.

Individual risk factors.

As most violence prevention efforts target individual-level changes, we included eight individual risk factors which have been shown to increase an individual's likelihood of committing or experiencing at least one type of interpersonal violence and are often targeted by intervention efforts (Rizzo et al., 2024; Orr et al., 2022). These can be grouped into three broad categories of attitudes about violence, beliefs about masculinity, and delinquency, which we discuss in turn below.

Attitudes about violence. Studies show boys who support the use of violence tend to commit more interpersonal violence. For example, endorsing the use of aggression in a relationship as acceptable for any reason is positively linked to committing multiple types of TDV (Ezell, 2021); believing it is ok to fight in some situations is linked to committing greater peer aggression and TDV (Sullivan et al., 2022); and, rape myth acceptance is positively associated with committing sexual aggression, SH, and sexual TDV (Trottier et al., 2021; Yapp & Quayle, 2018). In recent years, rape myth acceptance has been further deconstructed into separate measures of sexual violence (SV) myth acceptance which refers to attitudes about rape, sexual assault, and non-consensual physical contact, and sexual harassment (SH) myth acceptance which refers to attitudes about verbal harassment, sexual threats, sexist remarks, and objectifying comments. Although these more specific measures have been much less examined than rape myth acceptance, studies indicate SH myth acceptance may uniquely account for behavioral variation, particularly for non-physical forms of aggression, beyond what rape myth acceptance explains (Cole et al., 2020; Krivoshchekov et al., 2023; Russell & Oswald, 2016). There is also some evidence that accepting violence as normal in a relationship is linked to more experiences of victimization (Hébert et al., 2019). In the current study, we included four types of attitudes about violence: general support for violence, TDV acceptance, SV myth acceptance, and SH myth acceptance.

Masculinity beliefs. We included three constructs relating to boys' beliefs about masculinity: internalized traditional masculinity, perceived masculine discrepancy, and masculine discrepancy stress. Internalized traditional masculinity is the degree to which boys' attitudes and beliefs conform to rigid stereotypes such as expressing no emotion, getting into fights, or being self-sufficient (Chu et al., 2005). Perceived masculine

discrepancy and masculine discrepancy stress refer to boys' perceptions of the discrepancy between their own behaviors and feelings and the traditional masculine behaviors and feelings, and the amount of stress they feel because of those discrepancies (Reidy et al., 2014). Studies tend to find internalization of traditional masculinity is indirectly related to committing TDV and sexual violence through derivative constructs such as attitudes supportive of violence and masculine discrepancy and discrepancy stress (Reidy et al., 2022; Rizzo et al., 2021). Bullying and masculinity has not often been studied in U.S. high school samples, but research with U.S. middle schoolers, college, and adult populations suggests greater traditional masculinity is linked to committing more bullying (e.g., Malonda et al., 2023). Additionally, boys who do not conform to masculine stereotypes are likely to experience violence victimization from peers (e.g., Rinaldi, 2020).

Delinquency. Engaging in delinquent behaviors, such as stealing something from another person, substance use, or truancy from school, can serve to normalize breaking basic social norms, beliefs about which behaviors are proscribed and which are encouraged (Berkowitz et al., 2022). This can escalate into committing interpersonal violence; specifically, prior work has linked engaging in delinquent behavior to a higher likelihood of committing TDV and peer-directed violence (Kann et al., 2018; Spencer et al., 2020).

Relational risk factors.

We included one relational risk factor, family violence exposure, which refers to seeing violence between family members. These are the people with whom adolescents spend a great deal of time and with whom they likely have a close relationship. While having a history of such exposure is a static risk factor, accounting for prior exposure may be important for violence prevention interventions that seek to address multiple forms of violence. Some research finds family violence exposure is linked to both committing more bullying and experiencing more bullying from peers (Lee et al., 2022). Yet a review focused on TDV found mixed evidence, with only half of the included studies showing a positive link between exposure to family violence and committing TDV (Evans et al., 2021).

Community risk factors.

We included three community-level risk factors: community violence exposure, school withdrawal, and perceived school safety. Community violence exposure refers to witnessing harm, aggression, or other acts of violence around the community (Attar et al., 1994). As with family violence exposure, we included community violence exposure as a static risk factor in order to examine whether a broader context of witnessing violence relates to patterns of violent behavior that might guide intervention designs so they can account for such broader contexts. Exposure to community violence is linked with committing and experiencing more peer violence and more TDV (Davis et al., 2020; Hamby et al., 2012). The malleable risk factors of school withdrawal and safety are also linked to violent experiences. Students who feel disconnected and withdrawn from the school environment (e.g., less closeness or trust of their teachers, class, activities) are more likely to commit bullying and experience bullying from their peers (Turanovic et al., 2022). Boys who are more withdrawn from school are also more likely to experience sexual harassment victimization (Bolduc et al., 2023). Finally, feeling less physically safe at school has been

linked to increased experiences of multiple types of violence victimization, including SH, bullying, cyberbullying, and TDV (Garnett & Brion-Meisels, 2017; Yang et al., 2021). Understanding these risk factors could inform not only intervention content but where interventions are implemented (e.g., in the school context, with the broader community, across multiple domains, etc.).

Current Study

In Aim 1 of the current study, we used a person-centered LCA approach to replicate previously identified subgroups in a diverse sample of adolescent boys using the indicators of committing and experiencing peer violence (bullying; electronic aggression), sexual violence (harassment; assault), and TDV (physical; psychological; sexual). This approach allowed us to look beyond the average experience of the entire sample to illuminate latent subgroups, identifying students who share common patterns of committing and experiencing violence; this can inform the design and implementation of prevention efforts targeting multiple types of violence (Howard & Hoffman, 2018). Based on prior LCA studies which used perpetration and victimization indicators across multiple violence types, we anticipated one latent subgroup to have very low or no involvement in any types of violence (Hypothesis 1a). We also expected one latent subgroup to experience high rates of victimization across multiple types of violence (Hypothesis 1b) and further that this same subgroup would also report committing multiple types of violence (Hypothesis 1c). In Aim 2, we explored significant differences between the identified latent groups and a range of individual, relational, and community risk factors, many of which are addressed by different prevention efforts designed for adolescent boys. Although we expect all of the risk factors to differentiate classes in some way based on their variable-oriented prediction of violence in other studies, examination of how they would differentiate was exploratory given the potential for nuanced violence patterns particularly in the more moderate and mixed experience classes. By examining several malleable and static risk factors for violence not previously studied in the context of a person-centered approach, we can move the field towards more intentional comprehensive prevention.

Methods

Recruitment & Procedures

This study used baseline data from a larger program evaluation study conducted with 12 schools in four regions of the U.S. during the 2018–2019 and 2019–2020 school years. Students aged 13 or older in grades 9–12 who identified as boys were eligible. School staff were trained to invite and recruit a diverse range of students to participate, including guidance to identify young men who might be a good fit for an afterschool mentoring program by going beyond the typical student leaders (e.g., good grades, active in school clubs, prominent student athletes, etc.) to include individuals who might also benefit from exposure to strong male role models, or who might have social influence among multiple groups of students. School staff were not given specific quotas for recruiting or selecting certain types of students to participate in the study. Student participation was voluntary; interested students completed a sign-up form, and their parent or guardian completed a

consent form. All students with permission were invited to participate in a 30-minute web-based, self-administered survey completed in-person in groups at their school and administered by a trained data collector. Students were offered a \$10 gift card as a token of appreciation upon survey completion if school policy allowed. These procedures were approved by RTI International's Institutional Review Board.

Participants

The final analytic sample for this study was 239 boys. Most were between 13–15 years old (45.61%) or 16–17 years old (45.61%); 8.79% were 18 years or older. Majority identified as straight (93.72%); 5.86% identified as LGBTQ. Most boys identified as Non-Hispanic Black (53.14%), followed by Hispanic (25.94%), Non-Hispanic White (10.46%), or Non-Hispanic Other (10.46%), which included boys who identified as non-Hispanic and Asian, Native Hawaiian, Other Pacific Islander, American Indian, Alaska Native, or wrote in another identity. Two-thirds lived with both parents (64.44%) compared to one or neither parent (35.56%). About two-thirds (65%) said they had at least one dating partner (e.g., a boyfriend, girlfriend, someone you go out with, hang out with, or are “talking to” in a romantic/sexual way, or someone you hook up with) in the past year.

Measures

The full survey items and response scales for the demographic questions, violence indicators, and the risk factors are provided in Appendix A of the Supplemental Materials.

Violence indicators. We measured 13 different indicators for peer, sexual and teen dating violence, including seven types of perpetration and six types of victimization. Multi-item scales were summed and then scores were dichotomously recoded such that 0 indicated they “had not committed or experienced” and 1 indicated they “had committed or experienced” that type of violence in the past year. Table 1 provides an example item for each violence indicator and what proportion of the full sample experienced or committed each type of violence.

Individual risk factors. Four constructs related to attitudes about violence. We measured *support for violence* with six items from the Beliefs about Aggression subscale (Miller-Johnson et al., 2004); $\alpha = 0.74$. We measured *TDV acceptance* with seven items about the acceptable use of violence between dating partners (Foshee et al., 1992, 1998); $\alpha = 0.82$. We measured *SV myth acceptance* with ten items from the updated Rape Myth Acceptance scale (Cook-Craig et al., 2014; McMahon & Farmer, 2011; Payne et al., 1999) adapted to be about sexual assault; $\alpha = 0.88$. We measured *SH myth acceptance* with eight items from the Illinois Sexual Harassment Myth Acceptance scale (Lonsway et al., 2008); $\alpha = 0.78$. For each measure, we averaged items; higher scores indicated greater acceptance of that type of violence.

Three constructs related to beliefs about masculinity. For *internalized traditional masculinity*, we used 10 items from the Adolescent Masculinity Ideology in Relationships Scale (Chu et al., 2005; $\alpha = 0.70$). We used nine items from the Gender Role Discrepancy & Discrepancy Stress Scale (Reidy et al., 2016), adapted to be age appropriate for our

sample (e.g., “most women I know...” changed to “most girls I know...”), to create separate subscales of *perceived masculine discrepancy* (four items; $\alpha = 0.90$) and *masculine discrepancy stress* (five items; $\alpha = 0.86$). For each scale we averaged items; higher scores indicated greater internalized traditional masculinity, a greater perceived discrepancy, and feeling greater stress.

To measure *delinquency* we adapted ten items from the Attitude Toward Delinquency – Pittsburgh Youth Study (Loeber et al., 1998) to ask about boys’ frequency of engaging in delinquent behaviors in the past twelve months. We recoded item responses to be dichotomous then summed responses to create a single indicator.

Relational risk factors. We measured *family violence exposure* with a single item, “How many times have you ever seen or heard physical fights between your parents, between your parent and his or her romantic partner, or between two adults who live in your home,” (adapted from Ehrensaft et al., 2003). We recoded responses to be dichotomous such that 0 indicated “never” and 1 indicated they had witnessed family violence “at least once.”

Community risk factors. We measured *community violence exposure* with four dichotomous (yes or no) items from the Stress Index (Attar et al., 1994) which asked participants if during the past year: (a) a family member or someone else they know was beaten, attacked, or really hurt by others, (b) they had seen anyone beaten, shot, or really hurt by others, (c) they had seen or been around people shooting guns, and (d) they had been afraid to go outside, or have their parents made them stay inside because of gangs or drugs in their neighborhood? We summed items to create a single indicator. We measured *school withdrawal* and *perceived school safety* with five items adapted from the National Longitudinal Study of Adolescent Health (McNeely et al., 2002) and the California School Climate Survey (Furlong et al., 2005). The questions asked about positive experiences (e.g., trust, closeness to people at school). For this paper, given our focus on risk factors, we reverse-coded these items for consistency and ease of interpretation alongside the other variables. We averaged four items to create school withdrawal ($\alpha = 0.74$) and used a single item for perceived school safety; higher scores indicated more withdrawal and feeling less safe.

Analysis Plan

We conducted a series of latent class analyses (LCA) in Mplus version 8.7 software (Muthén & Muthén, 2017) to identify classes of adolescent boys with similar patterns of peer, sexual, and teen dating violence experiences. Violence experiences were entered as dichotomous indicators in the model. We imputed zeros for the TDV perpetration and victimization variables for anyone who indicated they had not had a dating partner in the past year. We chose the optimal number of classes by comparing models with increasing numbers of classes, starting with one class. We compared model fit based on several statistical fit indices, including the Akaike information criteria (AIC), the Bayesian information criteria (BIC), and the sample-size adjusted BIC (aBIC); for all three indices, lower values indicate better fitting models (Nylund et al., 2007). We also used the Lo-Mendell-Rubin likelihood ratio test (LMR-LRT) and the bootstrap likelihood ratio test (BLRT), where p values below

.05 indicate the current model is a better fit than a model with one less class, and model entropy, where values near 1.00 suggest better class structure, to determine when adding a class significantly improved the fit of the model (Nylund et al., 2007). Finally, we reviewed class size for stability (> 5% per class) and considered theoretical and conceptual contributions of each class.

After identifying the optimal class solution, we examined whether and how latent classes differed across malleable and static risk factors for violence. We standardized all risk factors around their means to improve the interpretability of results. To test for differences, we used the automatic Bolck-Croon-Hagenaars (BCH; 2004) method which evaluates mean scores across classes for continuous auxiliary variables (Asparouhov & Muthén, 2021; Bakk et al., 2013; Bolck et al., 2004). This method is preferable to other alternatives (e.g., posterior probability class assignment and analysis) due to its use of a weighted multiple group analysis which accounts for classification error in the latent classes. Mean differences between classes were evaluated with the Wald chi-square test (Asparouhov & Muthén, 2021).

Results

Aim 1: Latent Class Analysis Results

Model fit statistics are presented in Table 2. Accepted practice is to identify the point where decrease in each criterion across models begins to plateau, which was between the three- and four-class models. The LMR-LRT was significant for the three-class model and approaching significance for the four-class model. The BLRT was significant for the four-class model but not the five- or six-class models. The other fit indices examined pointed to selection of the four-class model over the three-class model: there was higher entropy in the four-class model compared to the three-class model; the AIC, BIC, and aBIC all decreased in the four-class model compared to the three-class model and then increased in the five-class model compared to the four-class model. Furthermore, to identify the best solution we examined how the response probabilities for the indicators of violence differentiated the three- and four-class models. The four-class model showed good separation of all four subgroups from each other using a 0.5 probability cutoff in the violence indicators, whereas the three-class model showed less subgroup separation at the same cutoff and within each subgroup, boys were more heterogeneous from each other. Based on these considerations, we selected the four-class solution.

Our group labels reflect item-response probabilities (provided in Table 3) both within each group and compared across groups (see Figure 1 for a visualization of group probabilities for committing and experiencing each type of violence). In support of Hypothesis 1a, the LOW-ALL group included the most boys (36.4%). Boys in this group had low probabilities of committing or experiencing any forms of violence. The PERP-MULTI group included a fifth of the sample (20.9%). Boys in this group had high probabilities of committing bullying and sexual harassment and of experiencing sexual harassment, though their probability of committing bullying and sexual harassment was higher than their probability of experiencing sexual harassment victimization. The EQUAL-PEER-SH group included about a third of the boys (33.5%) who exhibited high probabilities of both committing and experiencing sexual

harassment and both forms of peer violence (bullying and electronic aggression). Whereas boys in this group had higher probabilities of experiencing bullying victimization, electronic aggression victimization, and sexual harassment victimization, relative to their peers in the LOW-ALL and PERP-MULTI groups, boys in the EQUAL-PEER-SH group still had a high probability of committing those same types of violence (similar to PERP-MULTI). Boys in this group also endorsed a higher probability of committing electronic aggression than boys in the PERP-MULTI group. The final group, HIGH-ALL, supported Hypotheses 1b and 1c and included a small number of boys (9.2%) who had high probabilities of committing and experiencing nearly all types of violence. Demographics by latent class are provided in Appendix B of the Supplemental Materials for interested readers but are not the primary focus in this paper.

Aim 2: Examination of Risk Factors Associated with Class Membership

Table 4 presents the results of the weighted multiple group analyses comparing standardized means for continuous risk factors across the identified latent classes. Among individual-level risk factors, support for violence, internalized traditional masculinity, and delinquency differed significantly across classes. Boys in the LOW-ALL group had lower support for violence than boys in the EQUAL-PEER-SH or HIGH-ALL groups. Boys in the HIGH-ALL group had greater internalized traditional masculinity and engaged in more delinquency than boys in the other three groups. Additionally, boys in the LOW-ALL group engaged in significantly less delinquency than boys in the other three groups.

At the relational-level, family violence exposure differed significantly across classes. Boys in the LOW-ALL group witnessed less family violence than boys in the other three groups. Additionally, boys in the HIGH-ALL group witnessed more family violence than boys in the PERP-MULTI group.

Among community-level risk factors, community violence exposure and school withdrawal differed significantly across classes. Boys in the LOW-ALL group witnessed less community violence and reported less school withdrawal than boys in either the EQUAL-PEER-SH or HIGH-ALL groups. Boys in the PERP-MULTI groups witnessed less community violence than boys in the EQUAL-PEER-SH group; additionally, boys in the PERP-MULTI group reported less school withdrawal than boys in the HIGH-ALL group.

Discussion

In this study, we examined latent class patterns of violence perpetration and victimization among high school boys and explored whether there are differences by class membership on risk factors across the social-ecological model which can be targeted by violence prevention efforts. In Aim 1, we identified four classes of interpersonal violence experience: LOW-ALL, PERP-MULTI, EQUAL-PEER-SH, and HIGH-ALL. Several patterns described within the classes were consistent with our hypotheses based on prior studies that used mixed gender adolescent samples. For example, our LOW-ALL group was conceptually very similar to prior classes identified with no types of violence (Exner-Cortens et al., 2023; Sessarego et al., 2021; Siller et al., 2022) among samples of boys and girls in middle school and high school, although our LOW-ALL group did have some risk of committing

and experiencing bullying. Our HIGH-ALL group was also similar, as expected, to the mutual violence group identified by Exner-Cortens and colleagues (2023) with a sample of Canadian high school students. Our EQUAL-PEER-SH group was somewhat similar to Sessarego and colleagues' (2021) high victimization with low perpetration group of high school girls and boys, although our sample of only boys exhibited higher rates of perpetration. Sessarego and colleagues did not include measures of any non-sexual peer violence (e.g., bullying, electronic aggression), which were the most perpetrated forms of violence in the current study and may account for this difference. Finally, our PERP-MULTI group was unique relative to prior LCA studies but aligns with recent variable-centered studies which find a high association between committing sexual harassment and peer bullying (e.g., Espino et al., 2022).

In Aim 2, the comparison of means identified several interesting similarities and differences in risk factors across the latent groups. Membership in the LOW-ALL group, in comparison to the other groups, was associated with significantly lower scores on six different risk factors (attitudes supporting violence, delinquency, witnessing family violence and community violence, and school withdrawal). Yet that whole list of risk factors mainly described the difference between the LOW-ALL and HIGH-ALL groups. The boys in the PERP-MULTI group, who had the second lowest amount of violence experiences pattern identified by the LCA, was distinguished from the LOW-ALL group on only one risk factor (a higher likelihood of witnessing family violence) and interestingly, was only distinguished from the EQUAL-PEER-SH group on a single risk factor as well (a lower likelihood of witnessing community violence). At the upper end of the amount of violence experiences, boys in the EQUAL-PEER-SH group only differed from the HIGH-ALL group on two risk factors (lower internalized traditional masculinity and lower delinquency). These patterns suggest several implications for the design and implementation of both universal and selective prevention efforts.

Prevention Implications for Adolescent Boys

Universal efforts to address bullying and sexual harassment. Nearly all boys in our sample endorsed experiences with some violence, and a majority experienced more than one type. Even those in the LOW-ALL group had some risk of committing and experiencing bullying, and sexual harassment was likely to be committed or experienced by two-thirds or more of the boys in the other three groups. Our finding on the ubiquity of bullying and sexual harassment experiences aligns with prior research and suggestions that universal prevention programs may benefit from the inclusion of these topics together (e.g., Espelage et al., 2022). Adolescent boys may not draw a clear distinction between different “types” of violence when thinking about their past experiences or learning about these topics. Moreover, not addressing certain types of violence in a program could inadvertently label those experiences as “not a problem” or “not really violence,” potentially further victimizing students who have experienced those forms of violence. This is even more important when tailoring programs for boys given boys are already socialized to minimize feelings of pain and hurt (Armengol, 2024). Universal efforts with boys in this age group may therefore need to be broad to avoid potentially delegitimizing some forms of violence. Existing interventions such as *Safe Dates* (Foshee et al., 2014) and *Dating Matters* (DeGue et al.,

2020) have already shown some effect on reducing peer violence, sexual violence, and sexual harassment despite being initially developed to address TDV, suggesting that slight modifications to intentionally broaden these TDV interventions could produce even further benefits.

Universal efforts with boys need to address both victimization and perpetration. The high rates of victimization in the groups which also had high rates of perpetration (EQUAL-PEER-SH and HIGH-ALL) remind us that even primary prevention programs should account for the presence of potential perpetrators *and* prior victims in the audience. Programs that essentialize boys as only a cause of violence risk alienating individuals who might most benefit from a more trauma-informed and victim-centered approach (Maynard et al., 2019). Boys who experience multiple forms of victimization might become withdrawn from available support resources or may be targeted because they are already disconnected from support. Prevention programs might consider first addressing general school readiness to engage in violence prevention and behavior change work. That might include, for example, improving student knowledge and trust of school support resources, prior to engaging in education about violence topics (Stanley et al., 2023). Programs could include more social cohesion building activities early on which are not directly about bullying or violence, to build up protective factors and reduce feelings of school withdrawal or to address early acts of delinquency. Providing clear information about resources both at the school and in the community, if available, might also help boys in these groups who are witnessing violence to access support (Ali-Saleh Darawshy et al., 2020).

Selective efforts for targeted boosters and risk factors. Our findings suggest that a relatively small proportion of boys (HIGH-ALL group) are committing TDV and sexual aggression. Further, we see that these occurred mainly with other types of violent experiences rather than in isolation. Booster sessions for particular groups of boys who are more likely to be in the HIGH-ALL group, for example using the static risk factors of prior exposure to community and family violence, may be an ideal way to address these types of violence in this smaller group without needing to survey boys about prior perpetration. This would not only reduce the potential for boomerang effects¹ but also aligns with a growing trend to consider programs addressing sexual violence and relationship violence jointly given their common underlying risk factors and behaviors (Farmer et al., 2023; Graham et al., 2021; Malamuth et al., 2018). Tailored booster programs could be further specialized to address the malleable risk factors that distinguished boys in the HIGH-ALL group from other boys. This might look like a workshop on ideas about masculinity in relationships or efforts to increase boys' feeling of belonging and bonding at school (e.g., Banyard et al., 2019). Alternately, booster programs for boys likely to be in the HIGH-ALL group could focus on helping boys process experiences they may have had such as witnessing violence between their parents (which they might later model in their own romantic relationships).

¹Boomerang effect refers to when an intervention results in an increased probability that the target behavior will occur rather a reduced probability as intended, a phenomenon documented in various domains of public health in addition to violence prevention among boys and men (e.g., Ringold, 2002).

Although the current study is cross-sectional, the variation of risk factors across all four groups hints that there is an accumulation of risk associated with an increasing variety of interpersonal violence experiences (Stoddard et al., 2013). This pattern suggests that risk factor clusters (masculinity, delinquency, school withdrawal, and violence exposure) may be more important to address to prevent a seeming escalation of violent behaviors. Prior work has found multiple trajectories for middle school adolescents in their experiences of different types of violence leading into high school (e.g., Miller et al., 2013), but future research must examine such transitions alongside risk factors that could be addressed through prevention efforts. Combined school- and family-based programs have had some success in reducing violence (e.g., Foshee et al., 2014). Adding delinquency material and community-level prevention efforts might further boost the efficacy of such programs.

Limitations & Future Directions

Our limited sample size likely reduced our ability to detect additional classes of violent experiences among boys and did not provide sufficient power to examine interactions among covariates and, or risk factors. Further, masculinity is understudied among boys who identify as a minority or marginalized ethnicity or race in the U.S., although we do know that there are important cultural differences in what are the most celebrated or essential aspects of masculinity (Leone & Parrott, 2018). Therefore, it is possible that some forms of violence may be discouraged by parents, peers, etc., for one group of boys yet be an essential rite of passage in proving one's manliness for another group of boys. A final limitation is that we cannot comment empirically on the potential for escalation of boys' violence across the different groups identified because of the cross-sectional nature of our data.

While our findings align with some prior LCA, future replication of the classes we identified particularly regarding the mixed and moderate violence experiences is needed to confirm that the emergent latent groups are consistent beyond this sample. Future studies using longitudinal data and latent transition models should explore changes in these patterns and whether prevention programs can disrupt or delay potential escalation of boys' experiences with interpersonal violence. We also encourage future studies to extend the study of malleable risk factors with person-centered analyses to mixed adolescent samples. These could explore adolescent girls' and non-binary adolescents' multi-dimensional experiences engaging in and experiencing various types of interpersonal violence, which may or may not be similar to the patterns we observed among adolescent boys.

The significant contribution of this study is a combined examination of multiple interpersonal violence experiences with multiple potential malleable and static risk factors to inform future interventions' content focus and audience tailoring efforts. We found that boys who committed the most violence and widest variety of violence types also experienced the most violence and widest variety. These boys were distinguished from their peers by greater internalized traditional masculinity, greater delinquency, more school withdrawal, and witnessing family and community violence. Interventions should address these factors in order to have a wider impact on multiple types of interpersonal violence that adolescent boys experience.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Author Note

This research was supported by Award #R01CE002904 from the CDC NCIPC to RTI International (PI: Kan); Dr. Rizzo's time on this manuscript was supported by the UF Substance Abuse Training Center in Public Health from the National Institute of Drug Abuse (NIDA) of the National Institutes of Health under award number #T32DA035167. The content is solely the responsibility of the author(s) and does not necessarily represent the official views of the National Institutes of Health nor the Centers for Disease Prevention & Control.

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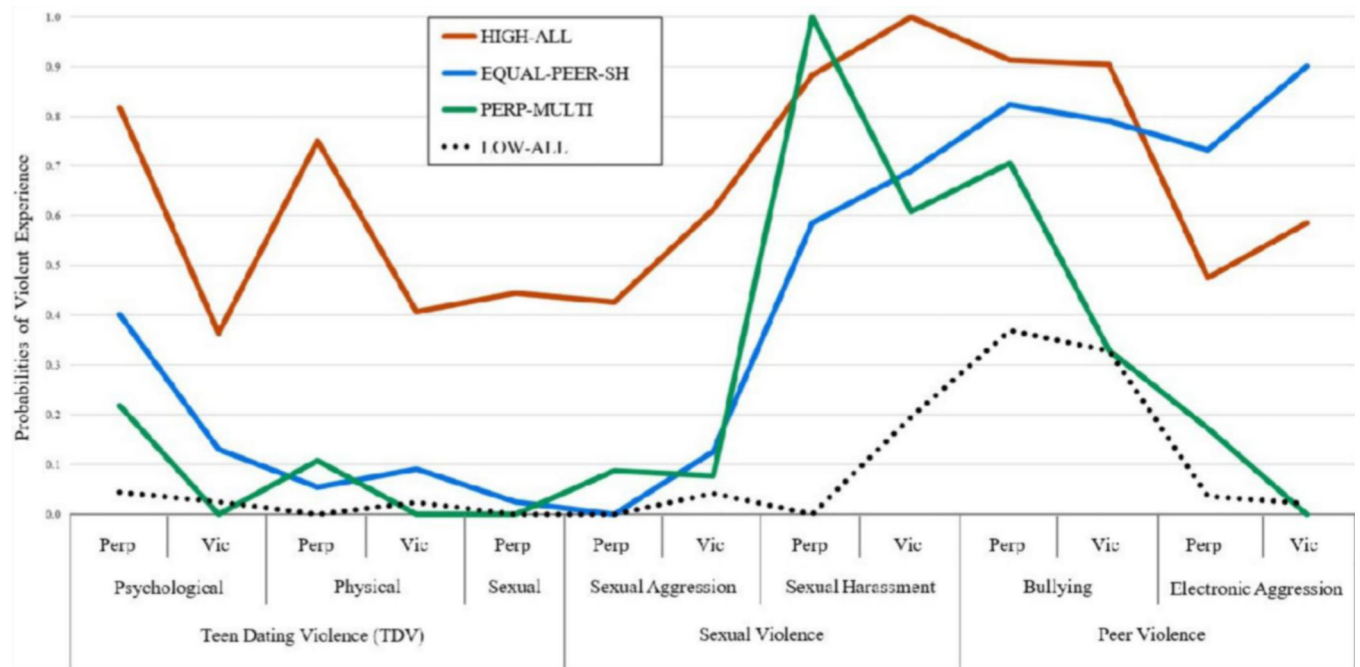


Figure 1. Response Patterns for Four-Class Solution

Note. Perp = Perpetration; Vic = Victimization.

Table 1 Summary of Violence Indicator Measures and Rates of Endorsement (N = 239)

Violence Indicator	Description of Instrument(s) Used	Example Item	N (%) ^a
Teen Dating Violence (TDV)			
Psychological TDV Perpetration	Five items describing emotional and verbal acts of violence taken from a prior study (Reidy et al., 2017) and the CADRI-SF (Fernández-González et al., 2012).	<i>I destroyed or threatened to destroy something my partner cared about.</i>	49 (20.50)
Psychological TDV Victimization	Single item about all the behaviors described in the psychological TDV perpetration items; author-created.	<i>Someone you were dating or going out with put you down, threatened to hurt you, tried to keep you from friends or family, or made nasty comments about you to others?</i>	16 (6.69)
Physical TDV Perpetration	Three items describing pushing, slapping, or hitting a dating partner taken from the CADRI-SF (Fernández-González et al., 2012).	<i>I slapped my partner or pulled my partner's hair.</i>	22 (9.21)
Physical TDV Victimization	Single item taken from the Youth Risk Behaviour Survey (Kann et al., 2018).	<i>Someone you were dating or going out with physically hurt you on purpose? (Count such things as being hit, slammed into something, or injured with an object or weapon.)</i>	15 (6.28)
Sexual TDV Perpetration	Four items about forcing and coercing a partner in a dating relationship to engage in sexual acts, taken from the CADRI-SF (Fernández-González et al., 2012).	<i>I pressured my partner to engage in a sexual act.</i>	11 (4.60)
Sexual Violence			
Sexual Harassment Perpetration	Nine items describing both in-person and cyber harassment of a sexual nature taken from prior studies (Bennett et al., 2011; Espelage et al., 2012; Hamburger et al., 2011; Ybarra et al., 2007).	<i>Made sexual comments, jokes, gestures, or looks at or about [someone].</i>	115 (48.12)
Sexual Harassment Victimization	Nine items; reworded sexual harassment perpetration items to reflect personal experiences.	<i>[Someone] spread sexual rumors about you.</i>	125 (52.30)
Sexual Aggression Perpetration	Nine items describing non-consensual kissing, touching, unwanted contact, and sexual assault taken from prior studies (Coker et al., 2011; Muñoz-Rivas et al., 2009); modified for use with high school participants.	<i>Had sexual activities with someone because you pressured the other person by arguing or begging.</i>	15 (6.28)
Sexual Aggression Victimization	Nine items (same as sexual aggression perpetration items).	<i>Had sexual activities when you didn't want to because you were passed out or sleeping.</i>	33 (13.81)
Peer Violence			
Bullying (In-Person) Perpetration	Six items taken from the IBS (Espelage & Holt, 2001)	<i>I upset other students for the fun of it.</i>	154 (64.44)
Bullying (In-Person) Victimization	Three items taken from the IBS (Espelage & Holt, 2001)	<i>I got hit and pushed by other students.</i>	130 (54.39)
Electronic Aggression Perpetration	Four items taken from studies with other age groups (Bennett et al., 2011; Ybarra et al., 2007); modified for use with high school participants.	<i>Made threatening or aggressive comments using mobile apps, social networks, texts, or other digital communication.</i>	81 (33.89)
Electronic Aggression Victimization	Single item about personal experience with behaviors described in the electronic aggression perpetration items; author-created.	<i>How often has someone done any of these things to you?</i>	87 (36.40)

Note.

^a Experienced or committed this type of violence at least once in the past year; TDV = Teen Dating Violence, IBS = Illinois Bully Scale; CADRI-SF = Conflict in Adolescent Dating Relationships Inventory – Short Form.

Table 2 Model Fit Statistics for Latent Class Analysis Models Specifying One to Six Classes

Classes	N of free parameters	LL	AIC	BIC	ABIC	Entropy	LMR-LRT	LMR LRT p-value	BLRT	BLRT p-value
1	13	1405.60	2837.20	2882.40	2841.19	n/a	n/a	n/a	n/a	n/a
2	27	1252.95	2559.90	2653.77	2568.18	0.76	301.37	0.001	1405.60	0.001
3	41	1206.89	2495.78	2638.32	2508.36	0.82	90.94	0.002	1252.95	0.001
4	55	1179.23	2468.47	2659.67	2485.34	0.88	54.60	0.059	1206.89	0.001
5	69	1165.84	2469.69	2709.56	2490.85	0.85	26.44	0.332	1179.23	0.217
6	83	1150.79	2467.57	2756.12	2493.03	0.91	29.73	0.168	1165.84	0.079

Note. *LL* = Loglikelihood; *AIC* = Akaike information criteria; *BIC* = Bayesian information criteria; *ABIC* = sample size adjusted *BIC*; *LMR-LRT* = Lo-Mendell-Rubin Likelihood Ratio Test; *BLRT* = Bootstrapped Likelihood Ratio Test.

Table 3 Probabilities of Violent Experience as a Function of Latent Class Membership

Class	Prevalence in		LOW-ALL		PERP-MULTI		EQUAL-PEER-SH		HIGH-ALL	
Proportion (N = 239)	Full Sample (n = 239)		36.4% (n = 87)		20.9% (n = 50)		33.5% (n = 80)		9.2% (n = 22)	
Type of Violence	Perp	Vic	Perp	Vic	Perp	Vic	Perp	Vic	Perp	Vic
Teen Dating Violence										
Psychological	21%	7%	0.04	0.02	0.22	0.00	0.40	0.13	0.82	0.36
Physical	9%	6%	0.00	0.02	0.11	0.00	0.05	0.09	0.75	0.41
Sexual	5%	n/a	0.00	n/a	0.00	n/a	0.02	n/a	0.44	n/a
Sexual Violence										
Sexual Harassment	48%	52%	0.00	0.20	1.00	0.61	0.59	0.69	0.88	1.00
Sexual Aggression	6%	14%	0.00	0.04	0.09	0.08	0.00	0.13	0.43	0.61
Peer Violence										
Bullying	64%	54%	0.37	0.33	0.71	0.33	0.82	0.79	0.91	0.90
Electronic Aggression	34%	36%	0.04	0.02	0.17	0.00	0.73	0.90	0.48	0.59

Note. Perp. = Perpetration; Vic. = Victimization; Bold = values above 0.50.

Table 4 Standardized Means of Risk Factors by Latent Class Membership (N = 239)

Risk Factors	LOW-ALL		PERP-MULTI		EQUAL-PEER-SH		HIGH-ALL		Wald's χ^2
	M	(SE)	M	(SE)	M	(SE)	M	(SE)	
Individual									
Attitudes About Violence									
Support for Violence	-0.21 _a	(0.10)	-0.02 _{a,b}	(0.16)	0.11 _b	(0.13)	0.41 _b	(0.23)	8.55 [*]
Acceptance of TDV	-0.15	(0.16)	-0.03	(0.17)	0.14	(0.01)	0.15	(0.01)	6.29
SV Myth Acceptance	-0.02	(0.12)	-0.15	(0.21)	0.05	(0.10)	0.17	(0.01)	6.47
SH Myth Acceptance	-0.15	(0.16)	-0.03	(0.17)	0.14	(0.01)	0.16	(0.01)	7.65
Beliefs About Masculinity									
Internalized Traditional Masculinity	-0.01 _a	(0.10)	0.02 _a	(0.17)	-0.20 _a	(0.12)	0.59 _b	(0.23)	8.17 [*]
Perceived Masculine Discrepancy	-0.07	(0.13)	-0.03	(0.17)	0.04	(0.11)	0.16	(0.02)	5.31
Masculine Discrepancy Stress	-0.06	(0.13)	-0.04	(0.17)	0.04	(0.11)	0.17	(0.02)	5.85
Delinquency	-0.31 _a	(0.07)	0.02 _b	(0.15)	0.09 _b	(0.14)	0.72 _c	(0.28)	19.92 ^{**}
Relational									
Family Violence Exposure	0.16 _a	(0.04)	0.33 _b	(0.08)	0.37 _{b,c}	(0.06)	0.61 _c	(0.11)	20.66 ^{**}
Community									
Community Violence Exposure	-0.25 _a	(0.10)	-0.21 _{a,c}	(0.15)	0.30 _b	(0.13)	0.26 _{b,c}	(0.23)	14.63 ^{**}
School Withdrawal	-0.23 _a	(0.12)	-0.13 _{a,b}	(0.16)	0.16 _{b,c}	(0.10)	0.54 _c	(0.22)	13.35 ^{**}
Perceived School Safety	0.09	(0.10)	-0.11	(0.14)	-0.04	(0.14)	0.01	(0.21)	1.36

Note.

**
p < .01;*
p < .05;

TDV = Teen Dating Violence, SV = Sexual Violence, SH = Sexual Harassment; SE = Standard Error; Each subscript letter denotes a subset of class categories whose column proportions differ significantly from each other at the .05 level based on equality tests of means conducted with the automated BCH procedure in Mplus; column proportions with matching letters do not differ significantly.