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## Shared Risk Factors for the Perpetration of Physical Dating Violence, Bullying, and Sexual Harassment Among Adolescents Exposed to Domestic Violence

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**Author Contributions** VF conceived of the study, co-led the collection of the data, directed statistical analyses, and drafted the manuscript. HLMR performed the statistical analyses, contributed to the conceptualization of the study, including the analytic approach, and participated in writing sections of the manuscript related to measurement and statistical analysis. MSC conducted analyses that contributed to measures creation, performed targeted literature searches, and contributed to the substantive content of the paper. KCB, SD, and AMVK contributed to the conceptualization of the study, implications of the study findings, and literature support, and participated in the writing of the manuscript. STE, KEM, and JMB contributed to the conceptualization of the study, co- led data collection, contributed to the interpretation of the findings and the implications of findings, and contributed to the writing of the manuscript. Additionally, JMB contributed to the overall analytical approach. All authors read and approved the final version of this manuscript.

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## Abstract

The high risk of perpetrating physical dating violence, bullying, and sexual harassment by adolescents exposed to domestic violence points to the need for programs to prevent these types of aggression among this group. This study of adolescents exposed to domestic violence examined whether these forms of aggression share risk factors that could be targeted for change in single programs designed to prevent all three types of aggression. Analyses were conducted on 399 mother victims of domestic violence and their adolescents, recruited through community advertising. The adolescents ranged in age from 12 to 16 years; 64 % were female. Generalized estimating equations was used to control for the covariation among the aggression types when testing for shared risk factors. Approximately 70 % of the adolescents reported perpetrating at least one of the three forms of aggression. In models examining one risk factor at a time, but controlling for demographics, adolescent acceptance of sexual violence, mother–adolescent discord, family conflict, low maternal monitoring, low mother–adolescent closeness, low family cohesion, depressed affect, feelings of anger, and anger reactivity were shared across all three aggression types. In multivariable models, which included all of the risk factors examined and the demographic variables, low maternal monitoring, depressed affect and anger reactivity remained significant shared risk factors. Our findings suggest that programs targeting these risk factors for change have the potential to prevent all three forms of aggression. In multivariable models, poor conflict management skills was a risk for bullying and sexual harassment, but not dating violence; acceptance of dating violence was a risk for dating violence and bullying, but not sexual harassment; and none of the examined risk factors were unique to aggression type. The study's implications for the development of interventions and future research are discussed.

## Keywords

Aggression among adolescents exposed to domestic violence; Physical dating violence; Bullying; Sexual harassment

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## Introduction

Physical dating violence (Haynie et al. 2013), bullying (Nansel et al. 2001), and sexual harassment (American Association of University Women Educational Foundation 2001) are prevalent forms of aggression used by adolescents. In nationally representative samples, 9 % of adolescents reported perpetrating physical dating violence in the prior year (Haynie et al. 2013), 44 % reported bullying others during the current school term (Nansel et al. 2001), and 16 % reported sexually harassing a peer in the past school year (Hill and Kearl 2011). The use of these forms of aggression has serious consequences for both victims (Chiodo et al. 2009; Exner-Cortens et al. 2013; Foshee et al. 2013; Nansel et al. 2001) and perpetrators (Calvete et al. 2014; Farrington and Ttofi 2011; Johnson et al. 2014; Nahapetyan et al. 2014). Adolescents who have been exposed to domestic violence between parents/caregivers and their partners are at particularly high risk of using these forms of aggression (Baldry 2003; Dauvergne and Johnson 2001; Fineran and Bolen 2006; Foshee et al. 1999). Although efforts at preventing the perpetration of physical dating violence, bullying, and sexual harassment are warranted for all adolescents, prevention efforts are especially important for

adolescents exposed to domestic violence, of whom there is an estimated 4.8 million in the United States (Finkelhor et al. 2013; Foshee et al. 2015a).

One approach to prevention that is efficient in terms of time and economic and human resources is use of crosscutting strategies, i.e., single programs that can prevent multiple problem behaviors (DeGue et al. 2013; Flay et al. 2004). Research informing this approach to prevention has been stated as a priority in the 2015 *Centers for Disease Control and Prevention Injury Center Research Priorities* (National Center for Injury Prevention and Control 2015). This approach can be effective when multiple behaviors covary and share risk factors that can be targeted for change in one program. Given the difficulties in engaging adolescents exposed to domestic violence in prevention activities (Dutton et al. 2003), offering a single program that could prevent multiple forms of aggression is particularly appealing. However, although the perpetration of physical dating violence, bullying, and sexual harassment has been found to covary (Espelage and Holt 2007), no study has explicitly examined whether they share risk factors, which requires the use of analytic techniques that account for the covariation among the forms of aggression. The current study examined whether the three forms of aggression share modifiable risk factors among adolescents who had been exposed to domestic violence against their mother, using an analysis strategy that accounted for covariation among the three aggression outcomes.

The modifiable risk factors examined are: adolescent cognitions and skills, including adolescent attitudes that are accepting of aggression and poor conflict management skills; parenting-related risks, including low parental monitoring of the adolescent's activities and friends, poor parental communication with the adolescent, low level of parental responsiveness to the adolescent, family conflict and weak family cohesion; and emotion-based risks, including adolescent depression, feelings of anger, and negative reactivity to anger. As described below, both theoretical and empirical considerations suggest that these may be particularly salient risks for aggression for adolescents exposed to domestic violence.

Principles of social learning theory support examination of adolescent attitudes that are accepting of aggression and poor conflict management skills as potential shared risk factors across the three forms of aggression. Social learning theory posits that aggression is learned when one develops positive outcome expectations for being aggressive from observing the positive consequences experienced by aggressors (Bandura 1973). Children who observe domestic violence may witness positive consequences from aggression (e.g. the aggressor gets what he/she wanted), which promotes the learning of aggression and development of the attitude that aggression is an acceptable (and even preferable) means of interacting. Consistent with these theoretical expectations, empirical studies have found that adolescents exposed to domestic violence are more accepting of aggression than those not exposed (Carlson 1991; Jaffe et al. 1986). Also, children exposed to domestic violence often do not have the opportunity to observe the positive consequences of constructive conflict management techniques because adults who use violence to resolve conflict typically lack such skills (Schwartz et al. 2006). Lack of opportunities to learn effective conflict management skills increase children's likelihood of using aggression in situations of conflict. Empirical studies have found that children exposed to domestic violence have

poorer conflict management skills than those not exposed (Choice et al.1995; Jaffe et al. 1986).

Parenting-related risk factors are also particularly relevant when studying aggression among adolescents exposed to domestic violence. There is strong empirical evidence that marital discord, including domestic violence, is associated with poor parenting practices and negative parent– child relationship quality (Erel and Burman 1995; Gustafsson et al. 2012; Krishnakumar and Buehler 2000; Levendosky and Graham-Bermann 2001). Numerous mechanisms have been proposed for these consistently found associations. For example, some suggest that the anger and frustration felt by parents because of domestic violence can spillover into critical and harsh interactions with their children (Krishnakumar and Buehler 2000). Others suggest that parents’ preoccupation with relationship problems, safety, and economic stability concerns can deplete their emotional resources for engaging with their children (Gerard et al. 2006), leading to inadequate monitoring of the child’s activities and friends, lack of involvement in the child’s activities, and emotional unavailability for the child. Still others suggest that both marital discord and poor parenting are caused by other factors such as the parent’s poor interpersonal skills (Krishnakumar and Buehler 2000), “ill-tempered” and “unstable” personality characteristics (Caspi and Elder 1988), or economic hardships and stress (Conger et al. 1993). However, regardless of the mechanism explaining these associations, they all suggest that adolescents exposed to domestic violence may be parented in ways that then put them at risk for problematic behaviors, including aggression (Belsky 1984; Gerard et al. 2006; Krishnakumar and Buehler 2000; Levendosky and Graham-Bermann 2001).

Emotion-based risk factors are also particularly important to consider when examining aggression among adolescents exposed to domestic violence. The emotional extremes that these children experience in their home environment can produce intense negative emotional arousal and distress that overwhelm their internal resources for emotion regulation (Fosco et al. 2007) and make it more difficult for them to identify and process emotions appropriately (Jouriles et al. 2012a; Sternberg et al. 2006). Numerous studies have found that children exposed to domestic violence have higher levels of emotional distress and more difficulty regulating their emotions than those not exposed (see Wolfe et al. (2003) for a review). Anger is a particularly prominent emotion felt by these children. Jenkins (2000) suggests that children exposed to high-levels of marital conflict organize their emotions such that anger takes on a central role. Further, the helplessness children can feel when they cannot stop the violence has been found to manifest as anger (Fosco et al. 2007). Additionally, the low family cohesion and lack of emotional availability of parents to their children that can spill over from parent involvement in domestic violence can lead to emotional insecurity in the child, an indicator of which is negative emotional arousal in response to conflict, followed by a negative behavioral response (Davies and Cummings 1994). These considerations suggest that depressed affect, feelings of anger, and impaired regulation of anger are important risk factors to examine when studying aggression among adolescents exposed to domestic violence.

Although, as noted above, there is strong empirical evidence that these risks are more likely to be present in adolescents exposed to domestic violence than those not exposed, little

empirical research has examined whether these are, in fact, risk factors for the perpetration of physical dating violence, bullying, and sexual harassment among adolescents exposed to domestic violence. Although a number of studies have examined whether some of these factors produce risk for general externalizing in children exposed to domestic violence (Jouriles et al. 2014; Levendosky and Graham-Bermann 2001; McDonald et al. 2009), only one study, a study on dating violence, examined risk factors for one of the three forms of aggression of interest here in adolescents exposed to domestic violence (O'Keefe 1998). No studies have examined whether risk factors are shared across the three forms of aggression in either general population samples of adolescents or samples of adolescents exposed to domestic violence.

## The Current Study

The current study tested shared risk factors for the perpetration of physical dating violence, bullying, and sexual harassment among adolescents who had been exposed to domestic violence against their mothers using analytic methods that controlled for the covariation among the three forms of aggression. Based on the theoretical and empirical considerations described above, the expectation was that each risk factor examined would be shared across the three forms of aggression.

## Methods

### Study Design

The study analyzed baseline data from a randomized controlled trial (RCT) that tested the effects of a dating abuse prevention program for adolescents who had been exposed to domestic violence (Foshee et al. 2015b). Mothers who had been in an abusive relationship but were currently living apart from the abusive partner and their 12–16 year old adolescent who had been exposed to the domestic violence were recruited into the RCT from across the nation. Details on the variety of community-based recruitment strategies used can be found in Foshee et al. (2015b). Recruited mothers and adolescents completed a 25-min baseline telephone interview. Mothers provided consent for their own and the adolescent's participation. Adolescents provided verbal assent for participation. Procedures were approved by the University of North Carolina Institutional Review Board.

### Sample Description

A total of 409 families (mothers and adolescents) were recruited into the study from 17 states, with the majority (51 %) from North Carolina. The average age of the adolescents was 13.6 years. Approximately 36 % were males; 54.8 % were black, 26.9 % white and the rest of another race. The average age of the mothers was 38.1 years. Approximately 20 % had less than a high school education, 59.7 % were unemployed, 64.1 % were single and 84 % received public assistance. Approximately 66 % of the adolescents had been exposed to violence against the mother perpetrated by their biological father, and 52.6 % had been exposed to violence against the mother by more than one perpetrator. The average length of adolescent exposure to domestic violence was 5 years and 4 months (STD = 4 years), with a range from 1 month to 16 years. Approximately 58 % of the mothers had filed for a

Domestic Violence Protection Order (DVPO) against the partner that the adolescent was exposed to most, and 51.0 % of the women had received a DVPO. A small number of adolescents were missing data on the outcomes or covariates and were dropped from analyses ( $n = 10$ ); the final analytic sample included 399 mother–adolescent dyads.

## Measures

### Aggression Outcomes

**Physical Dating Violence Perpetration**—A short version of the Safe Dates Physical Dating Abuse Scale (Foshee 1996) was used to measure the perpetration of physical dating violence. Adolescents were asked how many times they had (1) slapped or scratched a date, (2) physically twisted a date's arm or bent back his or her fingers, (3) pushed, grabbed, shoved or kicked a date, (4) hit a date with a fist or something hard, and/or (5) assaulted a date with a knife or gun. Adolescents were instructed not to count acts perpetrated in self-defense. A date was defined as informal activities like going out in a group and then pairing up with someone in whom they were interested, or meeting someone they were interested in at a mall, a park, or at a sporting event, and more formal activities like going out to eat or to a movie together. Response options ranged from 0 for “never” to 3 for “more than 4 times.” Because the analytic strategy used required binary outcomes, responses were summed (Cronbach's  $\alpha = .80$ ) and then dichotomized such that 0 = no perpetration and 1 = at least one act of perpetration.

### Bullying

Prior to the questions about bullying and sexual harassment, adolescents were first given these instructions: “During the last 3 months, please tell me how many times you have done each of the following things to someone that you were not dating and who was not a family member.” The 5 bullying items, adapted from the Illinois Bullying Scale (Espelage and Holt 2001) were (1) picked on someone, (2) excluded someone from your group of friends, (3) made fun of someone, (4) pushed, grabbed, shoved or kicked someone, and (5) hit someone with your fist. Response options were the same as for dating violence, ranging from 0 for “never” to 3 for “4 or more times.” Again, as required by the analysis strategy, the bullying items were summed ( $\alpha = .79$ ) and then dichotomized. Because bullying has been characterized as repeated aggression (Farrington 1993), we defined bullying perpetration as those with a score of 2 or more.

**Sexual Harassment**—The sexual harassment items came from the American Association of University Women Sexual Harassment Survey (American Association of University Women Educational Foundation 2001) and included (1) touched, grabbed, or pinched someone in a sexual way, (2) made sexual jokes about someone, and (3) made sexual gestures or looks to someone. The response options were the same as for dating violence and bullying. The sexual harassment items were summed ( $\alpha = .74$ ) and dichotomized such that 0 indicated no sexual harassment perpetrated and 1 indicated at least one act of sexual harassment perpetrated in the previous 3 months.



**Risk Factors**—The measures for the risk factors are described in Table 1. All measures were based on adolescent reports. Because of the design of the study, all parenting-related risk factors, except for family conflict and low family cohesion, were in reference to the mother. Consistent with how the risk factors have been examined in prior studies using these measures and to capture a range in risk for each factor, the items measuring each risk were summed and averaged (rather than dichotomized) such that the higher the score the greater the risk. Descriptive statistics on each risk factor are presented in Table 2.

**Control Variables**—Control variables included age, sex and race/ethnicity of the adolescent, mother’s education, and family structure. Age was measured in years. Sex was coded as 0 for female and 1 for male. Race/ethnicity was coded 0 for white and 1 for all other race/ethnicities. Mother’s education was coded as 0 for less than high school, 1 for high school graduate only, and 2 for more than high school. Family structure was coded as 0 for single-parent household and 1 for two-parent household.

### Analytic Strategy

Examining risk factors for each form of aggression separately and then synthesizing the results across models would not account for the covariation in outcomes, potentially resulting in overestimation of the significance of associations and thus misleading findings (Haines et al. 2010). For example, a risk factor identified for a specific type of aggression (physical dating violence, bullying, or sexual harassment), could be a risk factor for another type of aggression instead, and not shared. We therefore used generalized estimating equations (GEE), an analytic strategy that allowed us to adjust standard errors, to account for the correlations between the three aggression outcomes examined (Haines et al. 2010). This strategy made it possible to determine whether a risk factor was shared by the three forms of aggression, was shared by two forms of aggression, was unique to one form of aggression, or did not produce risk in any of the forms of aggression.

To use this approach, data were organized so that a row of data was included for each outcome for each participant (three rows per participant: one for the physical dating violence score, one for the bullying score, and one for the sexual harassment score). An indicator variable for violence type was scored “0” for bullying, “1” for sexual harassment, and “2” for dating violence. For each risk factor, a single-risk-factor model was estimated that included the risk factor, the violence type indicator variable, the control variables, and the interaction between each risk factor and the violence type indicator variable. If the interaction was statistically significant ( $p < .05$ ), indicating that the effect of the risk factor varied depending on violence type, it was retained in the model and we show distinct odds ratios for the association between the risk factor and each outcome variable. If the interaction was not significant it indicated that the association between the risk factor and the outcome did not vary depending on violence type; non-significant interactions were removed from the model and the homogeneous main effect of the risk factor was presented as a single odds ratio denoting the association between that risk factor and all three aggression outcomes. Next, we ran a multivariable GEE model that included all of the risk factors that were found in the single-risk-factor models to be shared across the three forms of aggression, all of the significant interactions between the risk factors and the violence

type variable, and the control variables. Non-significant interactions were dropped to produce the final multivariable model.

For all models an unstructured working correlation matrix was specified, meaning that all correlations between the aggression outcomes were estimated and used to adjust standard errors. This correlation structure proved the most efficient given that relatively few correlations needed to be estimated. Empirical standard errors, which are robust to specification of the working correlation structure, are reported for all parameter estimates. We note, however, that sensitivity analyses suggested negligible differences in findings across different specifications of the working correlation structure. Multicollinearity diagnostics were performed for each model; variance inflation factors were  $< 3$  for all models (a value of greater than 10 is cause for concern). These diagnostics suggest that the models were not adversely affected by multicollinearity.

## Results

### Descriptive Statistics

Approximately 70 % ( $n = 281$ ) of the adolescents reported perpetrating at least one form of aggression. Of these 281 adolescents, 8 % ( $n = 23$ ) reported perpetrating all three forms of aggression; 27 % ( $n = 75$ ) reported perpetrating two forms of aggression only; and 65 % ( $n = 183$ ) reported perpetrating only one form of aggression, with 90 % ( $n = 165$ ) of these adolescents reporting only bullying perpetration. Of the total sample ( $n = 399$ ), approximately 15 % of the adolescents reported perpetrating physical dating violence (8 % of boys and 19 % of girls;  $\chi^2 = 9.17$ ;  $p = .003$ ); 65 % reported perpetrating bullying (61 % of boys and 67 % of girls;  $\chi^2 = 1.47$ ;  $p = .22$ ); and 21 % reported perpetrating sexual harassment (22 % of boys and 20 % of girls;  $\chi^2 = 0.22$ ;  $p = .64$ ). Physical dating violence was significantly correlated with bullying ( $r = .16$ ;  $p = .001$ ) and sexual harassment ( $r = .24$ ;  $p < .0001$ ), and bullying and sexual harassment were also significantly correlated ( $r = .19$ ;  $p < .0001$ ).

### Results from the Single-Risk-Factor GEE Models

Table 3 presents the adjusted odds ratios (AOR) and 95 % confidence intervals (CI) from each single-risk-factor GEE model adjusting for the control variables. When the association with a risk factor differed for physical dating violence, bullying, and sexual harassment (as indicated by a significant interaction between the risk factor and the violence type variable), the AOR and 95 % CI for the association between the risk factor and each type of aggression were calculated; these are presented in the last six columns of the table. When the effect of the risk factor was the same for all three types of aggression (i.e., the interaction between the risk factor and the violence type variable was not significant), the AOR and 95 % CI were calculated for the homogeneous main effect; these are presented in Columns 1 and 2 of the table.

The significant risk factors that were shared across all three forms of aggression were acceptance of sexual violence (AOR = 1.47;  $p < .0001$ ), mother–adolescent discord (AOR = 1.89;  $p < .0001$ ), family conflict (AOR = 1.60;  $p < .0001$ ), low maternal monitoring (AOR =



1.89;  $p < .0001$ ), low mother–adolescent closeness (AOR = 1.31,  $p = .002$ ), low family cohesion (AOR = 1.60;  $p < .0001$ ), depressed affect (AOR = 1.81;  $p < .0001$ ), feelings of anger (AOR = 1.61;  $p < .0001$ ), and anger reactivity (AOR = 1.79;  $p < .0001$ ).

Several risk factors were shared across two forms of aggression. Acceptance of dating violence was a risk for dating violence (AOR = 2.37;  $p = .002$ ) and bullying (AOR = 4.28;  $p < .0001$ ), but not sexual harassment ( $p = .26$ ). Poor conflict management skills was a risk for bullying (AOR = 2.66;  $p < .0001$ ) and sexual harassment (AOR = 2.25;  $p = .0002$ ); low maternal responsiveness was a risk for bullying (AOR = 1.76;  $p = .04$ ) and sexual harassment (AOR = 2.68;  $p < .0001$ ); and poor mother–adolescent communication was a risk for bullying (AOR = 1.81;  $p < .0002$ ) and sexual harassment (AOR = 1.83;  $p < .0001$ ). However, none of these were risks for dating violence.

### Results from the Multivariable GEE Model

Table 4 presents the adjusted odds ratios (AOR) and 95 % confidence intervals (CI) from the final multivariable GEE model. The risk factors that continued to be shared across all three forms of aggression were low mother monitoring (AOR = 1.61;  $p = .0003$ ), depressed affect (AOR = 1.35;  $p = .03$ ), and anger reactivity (AOR = 1.50;  $p = .0005$ ). The homogeneous main effects for acceptance of sexual violence (AOR = 1.21;  $p = .07$ ) and maternal-adolescent discord (AOR = 1.34,  $p = .06$ ) were close to the  $p < .05$  cutoff for statistical significance.

Acceptance of dating violence continued to be shared by physical dating violence (AOR = 1.89;  $p = .04$ ) and bullying (AOR = 3.58;  $p = .0002$ ), but not sexual harassment. Of the three risk factors that were shared across bullying and sexual harassment but not dating violence in the single-risk-factor models (poor conflict management skills, low maternal responsiveness, and poor mother–adolescent communication), only poor conflict management skills continued to be shared across bullying (AOR = 2.23;  $p = .0006$ ) and sexual harassment (AOR = 1.89;  $p = .006$ ). The interactions between low maternal responsiveness and poor maternal-adolescent communication and violence type were not significant in the multivariable model and thus were dropped; neither of these risk factors was significantly associated with any of the aggression outcomes in the multivariable model.

### Discussion

The high risk for perpetrating physical dating violence (Foshee et al. 1999; Lutzman et al. 2015), bullying (Baldry 2003; Dauvergne and Johnson 2001), and sexual harassment (Fineran and Bolen 2006) among adolescents exposed to domestic violence points to the need for programs to prevent each of these types of aggression in this high risk group. Because of the difficulties in engaging adolescents exposed to domestic violence in prevention activities (Dutton et al. 2003), implementing effective cross-cutting prevention programs (i.e., single programs that can prevent all three types of aggression) is appealing. However, this requires identification of risk factors shared by the three types of aggression that can be targeted for change in a single program. To our knowledge, no study to date, either in the general population or in adolescents exposed to domestic violence, has done this. The current study addressed this gap by examining whether dating violence, bullying,

and sexual harassment share risk factors using a sample of adolescents who had been exposed to domestic violence against their mothers and an analytic strategy that accounted for the covariation among the different forms of aggression. We found that aggression was high in this sample, and we identified modifiable risk factors that are shared by the three forms of aggression that could be targeted for change in a single program to prevent all three forms of aggression. We also identified some risk factors that were shared by only two forms of aggression. None of the risk factors examined were associated with only one form of aggression.

Aggression was prevalent in this sample of adolescents exposed to domestic violence; 70 % reported perpetrating at least one of the forms of aggression. Although the referenced time frames for reporting aggression varies between our study and nationally representative studies, in general, the findings suggest that the prevalence of dating violence, bullying and sexual harassment are higher in our sample than in the general population of adolescents. Approximately 15 % of our sample reported ever perpetrating physical dating violence, whereas 9 % of the adolescents in a nationally representative sample reported perpetrating physical dating violence in the prior year (Haynie et al. 2013). Sixty-four percent of the adolescents in our study as compared to 44 % of those in a nationally representative study reported perpetrating bullying during a similar time frame (approximately the prior 3 months) (Nansel et al. 2001). Approximately 20 % of the adolescents in our study reported sexually harassing a peer in the prior 3 months, whereas 16 % of a slightly older nationally representative sample of adolescents reported sexually harassing a peer over a much longer time-frame (in the past school year) (Hill and Kearl 2011). No studies have examined sex differences in the prevalence of the three forms of violence in a sample of adolescents exposed to domestic violence. Our finding that the prevalence of the perpetration of physical dating violence was higher for girls than boys is consistent with many studies of physical dating violence conducted in general populations of adolescents (Foshee and Reyes 2011a). However, our findings of no sex differences in the prevalence of bullying and sexual harassment are not consistent with most studies that have examined sex differences in these forms of aggression, with most reporting greater perpetration of bullying (Álvarez-García et al. 2015) and sexual harassment (Clear et al. 2014) by boys than girls.

Based on theoretical and empirical considerations our expectation was that all of the risk factors examined would be shared by the three forms of aggression. In the single-risk-factor models, this was the case for nine of the thirteen risk factors: adolescent acceptance of sexual violence, mother–adolescent discord, family conflict, low maternal monitoring, low mother–adolescent closeness, low family cohesion, depressed affect, feelings of anger, and anger reactivity. In the multivariable model, three of the risk factors continued to be significantly associated with all three types of aggression—low maternal monitoring, depressed affect, and anger reactivity—and an additional two risk factors were marginally associated with all three forms of aggression—acceptance of sexual violence ( $p = .07$ ) and mother–adolescent discord ( $p = .06$ ). The findings that many of the parenting-related risk factors became non-significant in the multivariable model, while depressed affect and anger reactivity remained significant are consistent with the idea that has been put forth by others (Jouriles et al. 2012a; Kinsfogel and Grych 2004) that family-based risk factors may increase risk for aggression through increased adolescent emotional distress and anger

reactivity. We were unable to test this supposition in the current paper, but comparison of the findings from the single-risk-factor models with those from the multivariable model can inform future research examining the process through which family risks influence these types of aggression among adolescents exposed to domestic violence. That low maternal monitoring remained a significant shared risk factor in the multivariable model suggests that it may produce risk for the three forms of aggression through mechanisms other than producing adolescent emotional distress.

Four of the thirteen risk factors examined were shared by only two forms of aggression in the single-risk-factor models. Three of these—poor conflict management skills, low mother–adolescent responsiveness and poor mother–adolescent communication—were shared by bullying and sexual harassment, but not dating violence; in the multivariable model, this pattern of associations remained for conflict management skills, but not for the other two risk factors. Changing conflict management skills is a primary focus for many dating violence prevention programs (see Foshee and Reyes 2011b for a review). However, very few etiological studies of dating violence have examined this potential risk factor (Vagi et al. 2013); those that have, found that low conflict management skills was not a risk for dating violence perpetration (Foshee et al. 2001; Wolfe et al. 2004). More research is needed that compares the importance of low conflict management skills as a risk for the three forms of aggression before concluding that this risk factor should be targeted for change in bullying and sexual harassment prevention programs, but not in dating violence prevention programs. Also, given that in longitudinal studies bullying and sexual harassment have been found to precede progression to dating violence (Foshee et al. 2014; Espelage et al. 2012; Pellegrini 2001), it is possible that the association between low conflict management skills and the perpetration of dating violence could manifest later when dating is more frequent; multiwave longitudinal research would be needed to test that assertion.

The fourth risk factor that was shared by two forms of aggression in the single-risk-factor models was acceptance of dating violence; this risk was shared by dating violence and bullying, but not sexual harassment, and it continued to be a risk for those two forms of aggression in the multivariable model. The acceptance of dating violence measure did not tap acceptance of violence that was sexual in nature, which may be particularly relevant when considering sexual harassment. It is important to note that the acceptance measure that did tap acceptance of sexual violence was associated with all three forms of aggression. These findings suggest the importance of the specificity of measures assessing the acceptance of aggression.

The findings have implications for practice and future research. Our findings suggest that programs aimed at reducing depressed affect, anger reactivity, acceptance of sexual violence, and mother–adolescent discord, and increasing maternal monitoring have the potential to prevent all three forms of aggression among adolescents who have been exposed to domestic violence. Future crosscutting programs for preventing the three forms of aggression could be informed by existing programs that demonstrated effectiveness through randomized controlled trials at changing these risk factors. Several programs targeted specifically to children exposed to domestic violence, most of which included activities for both children and mothers, have been found to be effective in decreasing depressed affect, anger and anger

dysregulation in the child (Cohen et al. 2011; Graham-Bermann et al. 2007; Wagar and Rodway 1995), reducing mother-child discord and harsh parenting practices (Jouriles et al. 2009; McDonald et al. 2006), and improving parental monitoring (Foshee et al. 2015a). Programs targeted to abused children and/or those exposed to community violence have also been found effective in reducing emotion-based risks (Najavits et al. 2006; Stein et al. 2003; Wolfe et al. 2003) and improving parenting skills (Chaffin et al. 2004). These programs ranged in intensity from 10 weekly group sessions (Graham-Bermann et al. 2007; Stein et al. 2003; Wagar and Rodway 1995) to over 25 weekly individual therapy sessions (Jouriles et al. 2009; McDonald et al. 2006; Najavits et al. 2006). Although no studies targeted specifically at adolescents who have been exposed to violence have assessed program effects on acceptance of sexual violence, several programs targeted at general populations, primarily college students, have demonstrated favorable effects on this risk factor (see reviews by Anderson and Whiston 2005; DeGue et al. 2014; Vladutiu et al. 2010). Examining the strategies used to obtain favorable impact on these risk factors would be useful for developing new cross-cutting strategies.

The findings also have implications for future research. Our findings that some risk factors were shared by two rather than three forms of aggression are useful for spurring consideration of theoretical explanations for why, among adolescents exposed to domestic violence, risk factors may vary by aggression type. Also, comparison of findings between the single-risk-factor models and the multivariable model can inform future research examining the process through which risk factors influence the aggression types. Also, programs that are developed to be cross-cutting need to be rigorously evaluated and future evaluations of programs that were developed for a single form of aggression (e.g. dating violence prevention programs) should include measures for other forms of aggression as well; not doing so is a missed opportunity to efficiently identify crosscutting programs.

Additionally, future research should examine whether there are sub-group differences in the risk factors that are shared across the three forms of aggression. Sub-groups based on sex and race/ethnicity would be particularly important to consider given that sex (Evans et al. 2008; Jouriles et al. 2012b) and race/ethnicity (Spilsbury et al. 2007) differences have been found in the effects of domestic violence exposure on adolescents, and sex and race/ethnicity differences have also been found in risk factors for dating violence (Foshee et al. 2010; Niolon et al. 2015), bullying (Espelage et al. 2012; Hong and Espelage 2012), and sexual harassment (Fineran and Bolen 2006). Also, there is some suggestion that the impact of exposure to domestic violence may vary depending on the ages at which the child was exposed to the violence (Clements et al. 2008; Sternberg et al. 2006); thus it is possible that the shared risk factors could also vary by age of exposure. Shared risk factors may also vary depending on whether there was child abuse concomitant with the domestic violence. If child abuse moderates the associations between shared risk factors and different forms of aggressive behavior among adolescents exposed to domestic violence, this would have implications for the target audience for a cross-cutting intervention. Statistical power considerations precluded our ability to examine sex, race/ethnicity, and age of exposure differences in shared risk factors in the current study and a measure of child abuse was not available in this data set.

The primary limitation of this study was the cross-sectional design, which limits the ability to distinguish a predictor from a consequence of aggression. This has implications for program development because predictors, rather than consequences, should be targeted in prevention programs. Thus, future studies that examine shared risk factors for these three forms of aggression in adolescents exposed to domestic violence should use longitudinal data and analytic techniques that control not only for the covariation of outcomes but also for the temporality of relationships. Other limitations of this study relate to the generalizability of the findings. The sample was a convenience sample, and the sample characteristics suggest that it was not representative of all adolescents in the US exposed to domestic violence. Approximately 60 % of the mothers in the sample were unemployed and 64 % were single; also 84 % of the families received public assistance, suggesting that the sample was primarily low SES. Thus, the findings may not generalize to adolescents at higher SES levels, many of whom are also exposed to domestic violence. Additionally, the sample was composed of adolescents who were exposed to violence against the mother and whose mothers had left the abusive relationship; thus, whether the findings are applicable for adolescents exposed to domestic violence against the father, or adolescents whose mothers still live with the abuser is not known.

There were also several measurement limitations to the study. Data were collected via telephone interviews, which could have resulted in underestimates of the amount of aggression reported because social desirability bias has been found to be greater in data collection that involves the presence of an interviewer (Tourangeau and Yan 2007). This may especially have been the case for boys' reports of dating violence, given the social unacceptability of male aggression against females. Also, the bullying measure did not tap perceptions of a power imbalance between the perpetrator and the victim, which has been considered an important component of bullying in some definitions of bullying (Farrington 1993; Gladden et al. 2014). Additionally, the repeated aggression characterizing bullying has been defined by some as multiple acts perpetrated against the same victim (Gladden et al. 2014), but our measure of bullying did not allow for making that distinction. However, others have suggested that repetition is not required for defining bullying (Guerin and Hennessy 2002). Another measurement limitation is that the parenting variables were in reference to only the mother's behavior because the parenting behaviors of the abusive partner that the mother left were not assessed. Finally, some risk factors found to be important in violence-specific studies and found in general population samples to be shared among aggression types were not examined because they were not in the data set. For example, lack of empathy, need for power and control, impulsivity, and low self-esteem have been found to be important risk factors for the three types of aggression in violence-specific studies and could potentially be shared across the three types of aggression (Álvarez-García et al. 2015; Basile et al. 2009; Espelage and Swearer 2003; Foshee and Reyes 2011a). Also, risk factors at upper levels of the social ecology, including exposure to models of deviant behavior in the adolescent's school and neighborhood, were found to be shared across multiple forms of aggression (physical dating violence and peer violence) in a study conducted in a general population of adolescent that controlled for the covariation in the aggression outcomes (Foshee et al. 2015c). However, risk factors at these upper levels of the social ecology were not available in this data set. Despite these limitations, however, the

study measures also had strengths. With the exception of the mother–adolescent discord variable, the measures demonstrated good to very good internal consistency. Also, the aggression measures distinguished the target of the aggression (dates verses peers who were not dates), decreasing the likelihood that reports of bullying and sexual harassment were actually reports of dating violence, and thus decreasing the possibility of finding inflated associations.

## Conclusion

Despite the high risk for perpetrating dating violence, bullying and sexual harassment among adolescents exposed to domestic violence, to our knowledge, no studies have examined risk factors for bullying and sexual harassment in this high risk population and only one study (O'Keefe 1998) has examined risks for dating violence perpetration among adolescents exposed to domestic violence. Additionally, no prior study, in any population, has examined whether these three forms of aggression share risk factors when accounting for the covariation in aggression outcomes, even though doing so would inform the development of efficient cross-cutting programs designed to prevent all three forms of aggression. Thus, the current study addressed significant gaps in the literature by being the first to examine whether the three forms of aggression share risk factors among a sample of adolescents exposed to domestic violence, using an analytic technique that controlled for the covariation among the forms of aggression. We found that the prevalence of physical dating violence, bullying, and sexual harassment was higher in this sample than in national samples. Additionally, we found that low maternal monitoring, depressed affect, and anger reactivity were risk factors that were shared by the three forms of aggression and that mother–adolescent discord and adolescent acceptance of sexual violence were marginally associated with all three forms of aggression. Thus, programs aimed at reducing these risk factors have the potential to prevent all three forms of aggression among adolescents who have been exposed to domestic violence. Additional research is needed to determine whether the findings can be replicated using longitudinal data.

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The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

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Table 1

## Measurement of risk factors

Variable	# of items (alpha or correlation)	Response categories	Item or example item
<i>Cognitions and skills risk factors</i>			
Acceptance of dating violence (Foshee et al. 2005)	18 (.87)	1 = strongly disagree to 4 = strongly agree	"It is OK for a girl to hit her boyfriend if he insulted her in front of friends." "A girl who makes her boyfriend jealous on purpose deserves to be hit"
Acceptance of sexual violence	2 ( $r = .40$ ; $p < .001$ )	1 = strongly disagree to 4 = strongly agree	"Girls who get drunk at parties or on a date deserve whatever happens to them." "Girls who wear sexy clothes are asking to be taken advantage of sexually"
Poor conflict management skills (Foshee et al. 2005)	10 (.78)	1 = very often to 4 = never	"During the last 3 months, when you were angry or having a disagreement with someone, how often would you say that you:" "explained to the person why you were angry?" "Asked the person questions to better understand the situation?" "Suggested possible solutions to the problem?"
<i>Parenting-related risk factors</i>			
Maternal-adolescent discord	4 (.66)	1 = never to 4 = very often	Frequency of disagreements with mother; Frequency of anger toward the mother; "How often in the past 3 months was your mother critical of what you said?" "Did your mother put down your choices and preferences?"
Family conflict (Simpson and McBride 1992)	4 (.87)	1 = never to 4 = very often	"How often in the past 3 months did members of your family say bad things to each other?" "Family members got really mad at one another?"
Low maternal monitoring	7 (.73)	1 = just like her to 4 = not like her	"How like or unlike your mother is it to find out where you are going when you go out?" "Try to meet your friends?" "Monitor your music, video games, and computer games?"
Low maternal responsiveness (Simpson and McBride 1992)	7 (.85)	1 = very often to 4 for never	"How often does your mother try to understand what you need to be happy?" "Try to cheer you up when you are sad?" "Make you feel loved?"
Poor mother-adolescent communication	2 ( $r = .63$ ; $p < .001$ )	1 = very easy to 4 = very hard	"In general, how hard or easy is it for you to talk to your mother about things that are personal to you?"
		1 = very satisfied to 4 = very dissatisfied	"In general, how dissatisfied or satisfied are you with the way you and your mother talk about things that are personal to you?"
Low mother-adolescent closeness (Office of Applied Studies 2000)	1	1 = extremely close to 5 = not close at all	"How close do you feel to your mother?"
Low family cohesion (Simpson and McBride 1992)	3 (.74)	1 = very often to 4 for never	"In the past 3 months, how often was there a feeling of togetherness in your family?"
<i>Emotion-based risk factors</i>			
Depressed affect (Radloff 1977)	4 (.76)	1 = never to 4 = very often	"How often in the past 4 weeks did you feel lonely?" "Depressed?" "Happy [reverse coded]?" "Sad?"
Feelings of anger	1	1 = never to 4 = very often	"How often in the past 3 months have you felt angry at someone?"

Variable	# of items (alpha or correlation)	Response categories	Item or example item
Anger reactivity	2 ( $r = .54$ ; $p < .0001$ )	1 = never to 4 = very often	"During the past 3 months when you were angry at someone how often did you yell at the person?" "Make nasty comments about the person to others?"

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**Table 2**

Means, standard deviation and ranges of examined risk factors (n = 399)

<b>Risk factor</b>	<b>Mean (SD)</b>	<b>Potential range</b>	<b>Actual range</b>
<i>Cognitions and skills risk factors</i>			
Acceptance of dating violence	1.54 (0.45)	1–4	1–3.39
Acceptance of sexual violence	1.62 (0.79)	1–4	1–4
Poor conflict management skills	1.91 (0.54)	1–4	1–3.67
<i>Parenting-related risk factors</i>			
mother–adolescent discord	2.70 (0.66)	1–4	1–4
Family conflict	2.70 (0.79)	1–4	1–4
Low maternal monitoring	2.17 (0.64)	1–4	1–3.86
Low maternal responsiveness	1.41 (0.47)	1–4	1–4
Poor mother–adolescent communication	2.08 (0.83)	1–4	1–4
Low mother–adolescent closeness	1.97 (0.96)	1–5	1–5
Low family cohesion	1.90 (0.75)	1–4	1–4
<i>Emotion-based risk factors</i>			
Depressed affect	2.14 (0.71)	1–4	1–4
Feelings of anger	3.16 (0.77)	1–4	1–4
Anger reactivity	2.34 (0.83)	1–4	1–4

**Table 3**

Single-risk-factor GEE model parameter estimates (N = 399)

Risk factor	Homogenous main effect		Differential effect by outcome					
	AOR	95 % CI	Dating violence		Bullying		Sexual harassment	
			AOR	95 % CI	AOR	95 % CI	AOR	95 % CI
<i>Cognitions and skills risk factors</i>								
Acceptance of dating violence	-	-	2.37	1.38, 4.08	4.28	2.35, 7.80	1.35	0.80, 2.30
Acceptance of sexual violence	1.47	1.24, 1.75	-	-	-	-	-	-
Poor conflict management skills	-	-	1.06	0.64, 1.74	2.66	1.67, 4.22	2.25	1.46, 3.48
<i>Parenting-related risk factors</i>								
mother-mother-adolescent discord	1.89	1.47, 2.43	-	-	-	-	-	-
Family conflict	1.60	1.30, 1.97	-	-	-	-	-	-
Low maternal monitoring	1.89	1.49, 2.40	-	-	-	-	-	-
Low maternal responsiveness	-	-	1.26	0.77, 2.05	1.76	1.02, 3.06	2.68	1.64, 4.38
Poor mother-adolescent communication	-	-	1.03	0.77, 1.39	1.81	1.33, 2.46	1.83	1.38, 2.43
Low mother-adolescent closeness	1.31	1.10, 1.57	-	-	-	-	-	-
Low family cohesion	1.60	1.29, 1.98	-	-	-	-	-	-
<i>Emotion-based risk factors</i>								
Depressed affect	1.81	1.42, 2.30	-	-	-	-	-	-
Feelings of anger	1.61	1.29, 2.03	-	-	-	-	-	-
Anger reactivity	1.79	1.46, 2.21	-	-	-	-	-	-

Each model controlled for adolescent sex, age, race/ethnicity, mother's education, and family structure

Bolding represents statistically significant results ( $p < .05$ )

AOR adjusted odds ratio, CI confidence interval

**Table 4**

Multivariable GEE model parameter estimates (N = 399)

Predictor	Homogenous main effect			Different effect by outcome					
	AOR	95 % CI		Dating violence		Bullying		Sexual harassment	
				AOR	95 % CI	AOR	95 % CI	AOR	95 % CI
<i>Cognitions and skills risk factors</i>									
Acceptance of dating violence	-	-		<b>1.89</b>	<b>1.04, 3.41</b>	<b>3.58</b>	<b>1.84, 6.97</b>	0.92	0.52, 1.63
Acceptance of sexual violence	1.21	0.98, 1.48		-	-	-	-	-	-
Poor conflict management skills	-	-		0.90	0.43, 1.39	<b>2.23</b>	<b>1.42, 3.764</b>	<b>1.89</b>	<b>1.21, 3.07</b>
<i>Parenting-related risk factors</i>									
mother-adolescent discord	1.34	0.98, 1.83		-	-	-	-	-	-
Family conflict	1.07	0.83, 1.38		-	-	-	-	-	-
Low maternal monitoring	<b>1.61</b>	<b>1.24, 2.08</b>		-	-	-	-	-	-
Low mother responsiveness	0.69	0.42, 1.16		-	-	-	-	-	-
Poor mother-adolescent Communication	1.22	0.93, 1.59		-	-	-	-	-	-
Low mother-adolescent closeness	0.96	0.75, 1.23		-	-	-	-	-	-
Low family cohesion	1.17	0.92, 1.50		-	-	-	-	-	-
<i>Emotion-based risk factors</i>									
Depressed affect	<b>1.35</b>	<b>1.03, 1.77</b>		-	-	-	-	-	-
Feelings of anger	1.01	0.76, 1.33		-	-	-	-	-	-
Anger reactivity	<b>1.50</b>	<b>1.19, 1.89</b>		-	-	-	-	-	-

The model controlled for adolescent sex, age, race/ethnicity, mother's education, and family structure

Bolding represents statistically significant results ( $p < .05$ )

AOR adjusted odds ratio, CI confidence interval