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Examination of Sex and Race Differences in Longitudinal Predictors of the Initiation of Adolescent Dating Violence Perpetration

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Abstract

We examined longitudinal predictors of dating violence perpetration and determined if predictors varied by sex and race. Analyses were with 1,666 adolescents who completed questionnaires in a fall and spring semester. Depression, marijuana use, and aggression against peers predicted perpetration by girls but not by boys. Anxiety predicted perpetration by white adolescents and anger predicted perpetration by black adolescents. Number of friends using dating violence was a predictor for all groups. Black girls were more likely to initiate dating violence than all other groups. The findings can inform the development of programs for the primary prevention of adolescent dating violence.

Keywords

adolescent dating abuse; dating violence

Efforts to support adolescent dating violence prevention have increased as researchers, practitioners, and funding agencies recognize that the prevention of dating violence during adolescence is a key strategy for the primary prevention of adult intimate partner violence (IPV). As a result of this increased attention to the primary prevention of IPV, for the first time many practitioners and researchers are taking on the task of developing programs aimed at the primary prevention of adolescent dating abuse. The purpose of this article is to provide practitioners and researchers with information that can inform their development of such programs. Specifically, we identify longitudinal predictors of the initiation of adolescent dating violence perpetration that can be targeted for change in prevention programs. Furthermore, we determine if the predictors vary by sex and race; these findings can be used to guide the development of interventions tailored to specific sub-groups based on sex and race and thus increase the likelihood that programs will be more meaningful to participants and efficacious in preventing dating violence perpetration (Thorton, Craft, Dahlberg, Lynch, & Baer, 2000).

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The goal in developing primary prevention approaches is to target for change factors that are causally related to a particular problem behavior or disease in order to break the chain of causation (Gordon, 1987; Seidman, 1987). These factors then become the mediating variables targeted for change by interventions so as to lead to changes in outcomes. The identification of "causes" or "predictors" of a particular outcome is essential for primary prevention programming.

Longitudinal survey designs provide better evidence for causation than cross-sectional designs because the latter cannot distinguish causes from consequences of an outcome, whereas the former can make that distinction if temporality of relationships is appropriately controlled in the analyses. Much of the correlation identified from cross-sectional designs may be due to changes in risk factors that occur after the behavior has happened. Prevention programs that target factors that are consequences rather than predictors of a behavior are unlikely to be successful. Unfortunately, most adolescent dating violence studies have used cross-sectional designs and there have been relatively few longitudinal studies of adolescent dating violence perpetration (for a review, see Foshee & Matthew, 2007). Thus, interventionists charged with developing adolescent dating violence prevention programs have had little empirical evidence available to help them identify what predictors of adolescent dating violence to target for change with their interventions.

Most of the longitudinal studies of adolescent dating violence conducted thus far have been with boys only (Bank & Burraston, 2001; Brendgen, Vitaro, Tremblay, & Lavoie, 2001; Capaldi & Clark, 1998; Capaldi, Dishion, Stoolmiller, & Yoerger, 2001; Gorman-Smith, Tolan, Sheidow, & Henrey, 2001; Lavoie, Herbert, Tremblay, Vitaro, Vezina, & McDuff, 2002; Simons, Lin, & Gordon, 1998), despite the strong evidence that the prevalence of dating violence perpetration is either nearly the same for boys and girls (Bennett & Fineran, 1998; Capaldi & Crosby, 1997; Johnson-Reid & Bivens, 1999; O'Keeffe, Brockopp, & Chew, 1986; Pflieger & Vazsonyi, 2006; Symons, Groër, Kepler-Youngblood, & Slater, 1994; Wolfe, Wekerle, Reitzel-Jaffe, & Lefebvre, 1998) or greater for girls than boys (Avery-Leaf, Cascardi, O'Leary, & Cano, 1997; Carlson, 1990; Chapple, 2003; Foshee, 1996; Malik, Sorenson, & Aneshensel, 1997; McCloskey & Lichter, 2003; O'Keefe, 1997; O'Leary & Slep, 2003; Ozer, Tschann, Pasch, & Flores, 2004; Plass & Gessner, 1983; Schwartz, O'Leary, & Kendziora, 1997; Wekerle, Wolfe, Hawkins, Pittman, Glickman, & Lovald, 2001). Thus, there is very little empirical evidence to inform the development of interventions for preventing dating violence perpetration by girls.

Furthermore, many of the longitudinal studies of adolescent dating violence have been with almost exclusively white samples (Bank & Burraston, 2001; Brendgen et al., 2001; Capaldi & Clark, 1998; Foshee, Linder, MacDougall, & Bangdiwala, 2001; Schumacher & Slep, 2004; Simons et al., 1998) even though the literature suggests that the prevalence of dating violence perpetration varies by race/ethnicity. After controlling for socioeconomic status, dating violence perpetration is greatest among black adolescents, followed by Latino and white adolescents, and finally Asian adolescents (Chapple, 2003; Foshee, Ennett, Bauman, Benefield, & Suchindran, 2005; Foshee et al., 2008; Malik et al., 1997; O'Keefe, 1997; O'Keeffe et al., 1986; Plass & Gessner, 1983). Only one study has examined racial differences in the predictors of dating violence perpetration (Foshee, et al., 2005) and that

study examined a very limited number of predictors focused only on aspects of family violence exposure. Thus, there is little empirical evidence to inform the development of primary prevention interventions targeted at specific groups based on race/ethnicity. Yet, many organizations across the country are targeting adolescent dating violence prevention programming to specific racial/ethnic groups based on their higher risk status.

The sample used in this study is composed of both boys and girls and includes a large number of white and black adolescents, allowing for tests for interactions between the predictor variables and both sex and race in predicting the initiation of dating violence perpetration. This analytical technique allows for the determination of statistically significant differences in predictors by sex and race.

The predictors examined are amenable to change through intervention and are from four domains that move progressively toward more macro-level factors considered to be key sources of influence on adolescents (i.e., individual attributes and behaviors, and the family, peer, and school context) (Bronfenbrenner, 1979; Brooks-Gunn, 1987). The specific variables examined were chosen based on prior research showing associations between them and adolescent dating violence perpetration or associations between them and other adolescent health risk behaviors. Both risk *and* protective factors are examined; thus, findings can inform identification of both risk factors that can be alleviated and protective factors that can be enhanced through intervention.

The individual attributes examined are anger, anxiety, depression, and social bonding. Anger (Wolfe et al., 1998; Wolfe, Wekerle, Scott, Straatman, & Grasley, 2004) and depression (Capaldi & Crosby, 1997; Foshee et al., 2001; McCloskey & Lichter, 2003) have been found in prior studies to be correlated with adolescent dating violence perpetration. The associations between anxiety and social bonding with dating violence perpetration have not been examined, but anxiety has been found to be positively associated with other adolescent health risk behaviors (Fergusson & Horwood, 1999; Goodwin, Fergusson, & Horwood, 2004) and social bonding has been found in many studies to be protective against adolescent involvement in health risk behaviors (Ennett et al., 2008).

The behavioral predictors examined include tobacco use, alcohol use, marijuana use, and aggression against peers. Alcohol use (Foshee et al., 2001; Malik et al., 1997; O'Keefe, 1997; O'Keeffe et al., 1986) and aggression against peers (Brendgen et al., 2001; Capaldi & Crosby, 1997; Connolly, Pepler, Craig, & Taradash, 2000; Gorman-Smith et al., 2001; Ozer et al., 2004) have been found in prior studies to be associated with adolescent dating violence perpetration. The associations between tobacco use and marijuana use and adolescent dating violence perpetration have not been examined, but their use is indicative of higher risk for other health risk behaviors (Brady, Tschann, Pasch, Flores, & Ozer, 2008; Ellickson, 2001; Vermeiren, Schwab-Stone, Ruchkin, King, Van Heeringen, & Deboutte, 2003).

The family and peer context variables examined have all been found to be associated with dating violence perpetration. The family context variables include family conflict (Simons et al., 1998), parental responsiveness to the adolescent (Gorman-Smith et al., 2001; Simons et

al., 1998), parental monitoring (Brendgen et al., 2001; Capaldi & Clark, 1998; Foshee et al., 2001; Gorman-Smith et al., 2001; Lavoie et al., 2002; Simons et al., 1998), and parental attachment (Gorman-Smith et al., 2001; Simons et al., 1998). The peer context variables examined include the number of friends using violence against peers (Capaldi et al., 2001) and the number of friends using violence against dates (Arriaga & Foshee, 2004; Foshee et al., 2001).

The school context variables include perceptions of school supportiveness, number of school activities the adolescent participates in, and grade point average. Although the associations between these variables and adolescent dating violence perpetration have not been examined, the school context has been found to influence other adolescent health-risk behaviors such as substance use (Aveyard et al., 2004; Battistich & Hom, 1997; Cleveland & Wiebe, 2003; Swaim, 2003) and delinquency (Battistich & Hom, 1997; Gottfredson, 2000). Therefore, it is reasonable to expect that school context variables might influence the development of dating violence perpetration.

Our analyses will allow us to determine if the variables identified as cross-sectional correlates of adolescent dating violence perpetration predict the initiation of dating violence perpetration and whether they vary in their influence on perpetration by race and sex.

Methods

Participants

Adolescents in the eighth, ninth, and tenth grades in the public school systems in three non-metropolitan counties in North Carolina completed self-administered questionnaires in school in the fall and spring of the 2003 – 2004 academic year. All students in the targeted grades who could complete the survey in English and who were not in self-contained special education classes were eligible for the study. Parents had the opportunity to refuse consent for their child's participation by returning a written form or by calling a toll-free telephone number. The Institutional Review Board for the School of Public Health at the University of North Carolina at Chapel Hill approved the data collection protocols. Of the 6,342 students eligible for participation in fall 2003, 79% (N = 5,017) completed a questionnaire. Of the 6,161 eligible students in spring 2004, 76% (N = 4,676) completed a questionnaire.

Participants were eligible for these analyses if they were of black or white race/ethnicity, participated in both the fall and spring assessments, had not been involved in dating violence perpetration by the fall assessment, and reported having ever been on a date by the spring assessment (n = 1,666). The sample was restricted to white and black adolescents because there were not enough adolescents of other race/ethnicities to yield stable interaction estimates. The sample is restricted to those who reported at the fall assessment that they had never perpetrated any violence against a date so that predictors of the *initiation* of dating violence could be examined, which is consistent with the goal of the paper to identify predictors to target in primary prevention efforts. The sample is restricted to those who reported dating by the spring assessment because those who had not dated would not have had the opportunity to use dating violence. A date was defined as including informal

activities like meeting someone at the mall, a park, or at a basketball game as well as more formal activities such as going out to eat or to a movie together.

Of the 4,439 black and white adolescents who completed the fall assessment, 416 (9%) were ineligible for these analyses because they did not complete the spring assessment; 681 (15%) were ineligible because they reported that they had already perpetrated dating abuse at the fall assessment (defined in Measures below); 389 (9%) did not answer the fall questions on dating violence perpetration and were thus eliminated from analyses because some of them could have been perpetrators; 65 (4%) were eliminated because they did not answer the spring questions on dating abuse perpetration; and 1,222 (27.5%) were eliminated because they were not yet dating by the spring assessment, yielding an analytic sample of 1,666 adolescents. Approximately half of the sample (n = 851) was male, 25% (n = 428) was black, 73% were from a two-parent family, and 18% (n = 292) reported a highest parent education of high-school or less.

Measures

Dating violence perpetration—Dating violence perpetration was assessed at each of the two waves with the question “How many times have you ever used physical force against someone you were dating or on a date with (such as hitting, pushing, shoving, kicking, or assaulting them with a weapon) that was not in self-defense or play?” Response options were 0 for “never,” 1 for “1 to 2 times,” 2 for “3 to 5 times,” 3 for “6 to 9 times,” and 4 for “10 times or more.” Adolescents were coded 0 on the dating violence perpetration variable if they had a score of 0 and were coded 1 if their score was greater than 0. As noted above, adolescents who reported at the fall assessment a score greater than 0 were eliminated from analyses (n = 681; 15%). The dating violence perpetration outcome was from the spring assessment. Because adolescents who reported any dating violence perpetration at the fall assessment were eliminated from analyses, the outcome variable represents the *initiation* of dating violence perpetration between fall and spring assessments.

Predictor variables: Predictor variables measured at the fall assessment were used in analyses to predict dating violence perpetration by the spring assessment. The primary demographic predictors were sex and race. Sex was dummy coded such that 0 = female and 1 = male. Race was dummy coded such that 0 = white and 1 = black. Table 1 lists the predictors from the four domains of influence and describes the measurement of each. All constructs were measured based on self-reports, except for the peer context variables, which were measured using sociometric data. Each respondent was provided with a student roster in which all students in the same grade were given an identification number. On the questionnaires, adolescents identified up to five friends using the identification number from the student roster. The adolescent’s friendship network was defined as those school friends identified by the respondent and those adolescents who identified the respondent as a friend. Because the respondent’s friends in school were included in data collection, the friends’ reports of violence, rather than the respondent’s perceptions, were used to create the variables “number of friends using dating violence” and “number of friends using violence against peers.”

Control variables: All analyses control for parent education, family structure, age of the adolescent, and number of in-school friends who completed the survey. Parent education, which has been found to be associated with other indicators of socioeconomic status among adolescents (Goodman, 1999), was used as a proxy for socioeconomic status. It was coded from 0 ("*didn't graduate from high school*") to 5 ("*graduate or professional school after college*"). The maximum of the mother's and father's education level was used. Family structure was coded 0 for two-parent households and a 1 for other family structures. Age was based on respondent's reported birthday. The number of in-school friends who completed the survey was included as a control variable because the social network variables were based on the friend's reports of their own violence and dating violence behaviors; if a reported friend did not complete the survey, they did not contribute data for creating the social network variables.

Analysis Strategy

Although the amount of missing data was small (less than 3% missing on any independent variables), multiple imputation procedures (Rubin, 1987) using PROC MI and PROC MIANALYZE in SAS Version 9.1 (SAS Institute, 2003) were used to fill in missing data to minimize attrition bias. Following the recommendations of Allison (2001) for specifying an imputation model for an analytic model that includes interaction terms, our imputation strategy involved dividing the sample into four groups by race and sex, then imputing separately for each group and finally recombining the samples prior to conducting our analysis. All of the predictors used in the model (including control variables) were included in the imputation model. Five sets of imputations were specified. All models had relative efficiencies larger than .95 indicating that the number of imputations specified was sufficient for achieving stable parameter estimates. To improve interpretation of model results and reduce multi-collinearity, all continuous predictors were centered prior to analysis.

Because the dating violence outcome is dichotomous, logistic regression analyses were used. Likelihood ratio tests were used to determine whether two-way interactions (sex by the predictors and race by the predictors) and three-way interactions (sex by race by the predictors) contributed significantly to model prediction. We first compared a model that included all the above two- and three-way interactions to a model that only included the two-way interactions. This test indicated that the three-way interactions (sex by race by predictors) did not contribute significantly to the model, χ^2 (20, N = 1666) = 24.90, $p > .05$. Thus they were dropped from further consideration. We next compared the model with the two-way interactions to a model with only main effects. This test indicated that the two-way interactions (sex by predictors and race by predictors) contributed significantly to the model, χ^2 (41, N = 1666) = 70.66, $p < .05$. We next compared the model with all the two-way interactions to a model with only two-way interactions by sex and to a model with only two-way interactions by race. These tests indicated that both the chunk of two-way interactions by sex (χ^2 [20, N = 1666] = 31.54, $p < .05$) and the chunk of two-way interactions by race (χ^2 [20, N = 1666] = 34.17, $p < .05$) contributed significantly to model fit. Finally, because we did not have a strong theoretical rationale for keeping non-significant interaction terms in the model, and following the recommendations of Aiken and West (1991, pp. 103-105), we dropped non-significant interactions from the model, keeping only the six interaction terms

that were significant. This did not lead to a significant decrement in model fit, χ^2 [35, N = 1666] = 27.54, $p > .05$.

To probe the nature of significant interactions, we followed post-hoc analyses suggested by Frazier, Tix, and Barron (2004). We first computed the predicted probability of initiation of dating abuse perpetration for each moderator group (i.e., boys vs. girls or blacks vs. whites) for predictor values set at the mean and one standard deviation above and below the mean (for continuous variables) or for each group denoted by the categorical predictors (sex and marijuana use). The predicted values obtained from this process were then used to create Figures 1 and 2, which display the nature of the significant interactions. Finally, we tested the significance of the value of the slopes of the simple regression lines denoting the relationship between the predictor and the outcome for each moderator group.

Results

Sixteen percent (n = 270) of the sample reported initiating dating violence perpetration between the fall and spring assessments. Of those who initiated dating violence perpetration, 82 (30%) were white females, 85 (31%) were black females, 68 (25%) were white males and 35 (13%) were black males. Among the white females, 13% initiated perpetration; among the black females, 38% initiated perpetration; among the white males, 11% initiated perpetration; and among the black males, 17% initiated perpetration.

The first column in Table 2 presents the bivariate associations (OR) between the fall predictor variable and the spring dating violence perpetration outcome variable. Sex did not predict initiation of dating violence perpetration but race did; black adolescents were significantly more likely than white adolescents to initiate dating violence perpetration by the spring assessment. All of the predictor variables except for marijuana use, number of friends using violence against peers, involvement in school activities, and supportiveness of the school environment significantly ($p < .05$) predicted dating violence perpetration in the expected directions.

The third column in Table 2 presents the adjusted odds ratio (AOR) from the final model produced from the model reduction procedures described in the Analysis Strategy section. Sex moderated the associations of depression (AOR = .89; CI = 0.87, 0.90), marijuana use (AOR = .48; CI = 0.25, 0.94), and aggression against peers (AOR = 0.87; CI = 0.77, 0.98) with dating violence perpetration. The nature of these significant interactions is depicted in Figure 1. Depression is a significant ($p < .001$) predictor of dating violence perpetration by girls but not by boys. Marijuana use is a significant predictor of dating violence perpetration by girls ($p < .05$) such that the greater the marijuana use, the more likely the girl is to initiate dating violence perpetration. For boys, however, there is a slight ($p < .09$) negative association between marijuana use and the initiation of dating violence perpetration. Aggression against peers is a significant predictor of the initiation of dating violence perpetration by girls ($p < .0001$) but not by boys. The association for girls appears to be especially strong for girls who are using greater than average amounts of aggression against their peers.

Race moderated the associations of sex (AOR = .34; CI = 0.18, 0.66), anxiety (AOR = .93; CI = 0.89, 0.97), and anger (AOR = 1.24; CI = 1.09, 1.42) with dating violence perpetration. The nature of these significant interactions is depicted in Figure 2. Among black adolescents, there are significant sex differences in the initiation of dating violence perpetration, with black girls being significantly ($p < .01$) more likely than black boys to initiate dating violence perpetration. However, among white adolescents there are no significant sex differences in the likelihood of initiating dating violence perpetration. This interaction also indicates that black girls are significantly ($p < .0001$) more likely than white girls to initiate dating violence perpetration, and that black boys are marginally ($p = .051$) more likely than white boys to initiate dating violence perpetration. Thus, race is a risk factor for both sexes but more of a risk factor for girls. Anxiety is a significant ($p < .05$) predictor of dating violence perpetration by white, but not by black adolescents. However, anger is a significant ($p < .05$) predictor of dating violence perpetration by black but not by white adolescents.

Number of friends using dating violence (AOR = 1.39; CI= 1.08, 1.79) is a significant ($p < .05$) predictor of dating violence initiation and that association was not moderated by sex or race. Social bonding was marginally ($p < .10$) protective (AOR = .96; CI = 0.91, 1.00) against the initiation of dating violence perpetration as was higher parent education (AOR = .92; CI = 0.83, 1.01). Unexpectedly, a supportive school environment was marginally ($p < .10$) predictive of the initiation of dating violence perpetration (AOR = 1.12, CI = 0.73, 1.08).

Discussion

Sex- and race-specific predictors of the initiation of dating violence perpetration as well as general predictors of dating violence perpetration were identified that can inform the development of interventions for the primary prevention of dating violence perpetration. Depression, marijuana use, and aggression against peers predicted the initiation of dating violence perpetration by girls, but not by boys. Sex and anger predicted initiation of dating violence perpetration by black but not white adolescents, while anxiety predicted initiation of dating violence perpetration by white but not black adolescents. Having a friend who used violence against dates predicted the initiation of dating violence perpetration by all adolescents. Despite having many variables in the model, the significant associations were relatively strong. For example, black adolescents were four times as likely to initiate dating violence perpetration as white adolescents, and there was a 39% increase in the odds of perpetrating dating abuse for each friend who had been involved in dating abuse. We discuss these findings in light of the findings from other studies of adolescent dating violence perpetration to make recommendations for primary prevention programming. We then discuss the study limitations and strengths.

Discussion of Findings

A growing body of literature, including the findings from this study, suggest that depressed affect may influence the development of dating violence perpetration by girls. In cross-sectional analyses, several studies have found that depression was positively correlated with

dating violence perpetration by girls, but not by boys (Capaldi & Crosby, 1997; Foshee et al., 2001). Furthermore, in a longitudinal study of dating violence perpetration, McCloskey and Lichter (2003) found a significant interaction between sex and depression, with depression (measured around age 14.7) being a much stronger predictor of dating violence perpetration (measured around age 16.4) for girls than boys. However, in that analysis dating violence was not measured at the baseline wave; the temporality of the association thus was not completely controlled in their analysis. In our study, depression predicted dating violence perpetration by girls but not by boys, even when controlling for temporality and for the other variables in the model. However, it is important to note that in another longitudinal study, Foshee et al. (2001) found that depression did not predict dating violence perpetration by boys or girls when controlling for self-esteem, destructive responses to anger, and poor communication skills. None of those variables were controlled in the current analyses. Thus, future studies examining depression as a predictor of dating violence perpetration by girls need to control for variables that could potentially explain that relationship to more fully inform primary prevention efforts focused on addressing depressed affect in girls.

Despite a general belief that substance use plays an important role in the development of adolescent dating violence, there has been very little empirical research to examine those relationships. In fact, no longitudinal studies have examined the associations of tobacco use and marijuana use with adolescent dating violence perpetration and only one longitudinal study has examined alcohol use as a predictor of dating violence perpetration (Foshee et al., 2001). Although a few longitudinal studies of adolescent dating violence conducted with boys assessed substance use, those items were combined with items assessing other deviant behaviors to create an overall delinquency scale, and thus the contribution of substance use to dating violence perpetration could not be examined (Gorman-Smith et al., 2001; Lavoie et al., 2002; Simons et al., 1998). In the current study, we found that marijuana use significantly predicted dating violence perpetration by females, but that marijuana use was actually slightly protective against dating violence perpetration by boys. That the direction of this relationship was the opposite for girls and boys is likely what was responsible for the non-significant bivariate association between marijuana use and dating violence, revealing the importance of examining sub-group differences in predictors of dating violence perpetration. Although alcohol and tobacco use were predictive of dating violence perpetration in the bivariate analyses, those associations decreased to non-significance when controlling for the other variables in the model, suggesting that other variables in the model may have mediated or confounded the associations between alcohol use and tobacco use with dating violence perpetration. In the only other longitudinal study that included both boys and girls that examined alcohol use as a predictor of dating violence perpetration, alcohol use predicted dating violence by girls but not by boys (Foshee et al., 2001). However, that study did not examine marijuana use.

We found that aggression against peers was a significant predictor of the initiation of dating violence by girls but not by boys; the association for girls appears to be especially strong for girls who are using greater than average amounts of aggression against their peers. These findings, however, are not consistent with other studies. For example, Ozer et al. (2004) found cross-sectional associations between aggression against peers and dating violence

perpetration by boys but not by girls; however, they states that their sample size for girls may have been too small to detect significant associations. Although in cross-sectional analyses Foshee et al. (2001) found that being in a physical fight against a peer was a strong correlate of dating violence perpetration by girls but not by boys, in longitudinal analyses (Foshee et al., 2001) being in a physical fight against a peer did not predict dating violence perpetration by boys or girls when controlling for other problem behaviors such as weapon carrying and alcohol use. The only other longitudinal studies that examined aggression against peers as a predictor of dating violence perpetration that controlled for temporality of associations were with boys only (Brendgen et al., 2001; Capaldi & Clark, 1998; Lavoie et al., 2002; Simons et al., 1998); all of these studies found that aggression against peers predicted dating violence perpetration by boys. Thus, counter to our findings a fairly consistent finding in the literature is that aggression against peers is an important predictor of dating violence perpetration by boys. However, because only one other longitudinal study has examined aggression against peers as a predictor of dating violence perpetration by girls, our finding that aggression against peers predicts dating violence perpetration by girls makes an important contribution to the literature.

Only one study has examined race differences in predictors of dating violence perpetration (Foshee et al., 2005); as mentioned earlier, that study was limited to examining predictors related to family violence exposures, which were not measured in this study. Thus, we are limited in our ability to compare our race-related findings to the findings of others. The significant race by sex interaction in the current study suggests that black girls are significantly more likely to initiate dating violence perpetration than black boys, white boys, or white girls and that black boys are marginally more likely to initiate dating violence perpetration than white boys. No studies have examined interactions between sex and race in predicting the initiation of dating violence. Findings from a longitudinal study that stratified by sex reflect those of the current study, with black girls being at the greatest risk for initiating dating violence perpetration (Foshee et al., 2001). However, in that study race was not a predictor of dating violence perpetration by boys.

We found that anxiety predicted dating violence perpetration by white but not black adolescents, whereas anger predicted dating violence perpetration by black but not white adolescents. No studies have examined anxiety as a predictor of adolescent dating violence perpetration. Although anger is a commonly reported motive for dating abuse perpetration (Henton, Cate, Koval, Lloyd, & Christopher, 1983; O'Keefe, 1997), only one longitudinal study has examined anger as a predictor of dating violence perpetration and that study did not test for racial differences in predictors (Wolfe et al., 2004). However, Foshee et al. (2008) examined factors that mediate the association between minority status and trajectories of dating violence perpetration from ages 13 to 19. They found that at each age, minority adolescents reported more dating violence perpetration than non-minority adolescents and that destructive communication skills, which was a measure composed mostly of items assessing destructive responses to anger, significantly mediated that relationship; minority adolescents reported more destructive communication skills than non-minority adolescents, and destructive communication skills predicted dating violence perpetration. The minority sample in that study was 70.8% black.

The number of friends using dating violence predicted dating violence perpetration by both boys and girls and by white and black adolescents. Because of our longitudinal design, we can conclude that adolescents perpetrated dating violence after, rather than before, their friend had been a perpetrator, an important distinction as the former implies peer influence and the latter implies a tendency to select peers who are similar in behaviors. There is a growing body of literature linking friend's abusive dating behaviors to adolescent abusive dating behaviors. In longitudinal analyses, having a friend involved in an abusive dating relationship, either as a victim or a perpetrator, predicted later dating violence perpetration by boys (Arriaga & Foshee, 2004) and girls (Arriaga & Foshee, 2004; Foshee et al., 2001). However, in those analyses the association for boys decreased to non-significance in models that included measures of acceptance of dating abuse and perceived normalcy, suggesting that those variables may mediate the peer behavior and perpetration relationship (Foshee et al., 2001). Foshee et al. (2008) found that having a friend that was a perpetrator of dating abuse predicted trajectories of moderate physical dating violence perpetration from ages 13-19 years. Capaldi et al. (2001) found that having deviant peers in the eighth grade predicted hostile talk about women with peers in the 12th grade, which predicted use of violence against a dating partner at ages 19 to 24. However, the temporality of associations in that study is difficult to determine because dating abuse was not measured during 8th and 12th grades.

Several variables were predictive of dating violence perpetration in the bivariate analyses but decreased to non-significance in the multivariate analyses, suggesting that their effects on dating violence perpetration may have been mediated by other variables in the model. This was the case for all four family context variables. A number of other studies have found that the effects of family variables on adolescent problem behaviors are mediated by constructs that we considered in our analyses. For example, a number of studies have found that the effects of parental monitoring on negative child outcomes are mediated by associations with deviant peers (Patterson & Yoerger, 1993; Reid & Eddy, 1997) and with alcohol, tobacco, and substance use (Dishion, Reid, & Patterson, 1988). Studies specific to dating violence have found that the association between parental monitoring and adolescent dating abuse is mediated by adolescent antisocial behavior (Capaldi & Clark, 1998; Lavoie et al, 2002; Simons et al., 1998) and having friends who were perpetrators of dating violence (Foshee et al., 2001). Although we did not measure exposure to family violence in this study, our measure of family conflict includes hitting and yelling between family members. Anger and depression have been found to mediate associations between exposure to family violence and dating violence perpetration (Wekerle et al., 2001; Wolfe et al., 1998, 2004). Also, alcohol use, tobacco use, social bonding, and school grades were all significant predictors of initiation of dating violence perpetration in the bivariate analyses but no longer significant in the multivariate analyses, and thus their effects are being explained by other variables in the model.

Implications for Intervention

Dating violence perpetration is prevalent for both boys and girls and for both white and black adolescents; therefore, universal primary prevention interventions that target general populations of adolescents are warranted. These findings also identify high risk groups to

target for selective interventions and they highlight precursors to target for change in both selective and universal prevention programs. High risk groups to target with selective interventions include black adolescents and particularly black girls, and girls of both races who exhibit signs of depression, are using marijuana, and demonstrate aggression towards their peers. The findings also suggest that interventions targeted at girls in general need to address depression, correlates of depression such as self-esteem, and the root cause of the depression, substance use, and aggression against peers. Addressing anxiety and its role in dating abuse may be an appropriate focus for primary prevention efforts targeted at white boys and girls, whereas addressing anger and its role in dating abuse perpetration may be an appropriate focus for primary prevention efforts targeted at black boys and girls. Black adolescents are more likely than white adolescents to have experienced racism and racism has been identified as a stressor that puts minorities at risk for a number of health-related problems. As pointed out by Brondolo, ver Halen, Pencille, Beatty, and Contrada (2009), anger is an emotional consequence of blocked opportunities, interpersonal conflict, worry for other family members, and social exclusion that result from racism. It is possible that black adolescents unleash the built up anger from a history of these experiences on partners, suggesting that dating violence prevention programs for black adolescents need to focus on teaching effective ways of coping and responding to anger. Our findings also suggest that for all adolescents, interventions focused on changing the peer context are warranted. Though not examined directly in this study, other studies suggest that important aspects of the peer context to alter are perceptions of the normalcy and acceptance of dating abuse (Capaldi et al., 2001; Foshee et al., 2001).

Study Limitations

This study has several limitations. One is that some of the key variables that have been found to predict adolescent dating violence perpetration in other longitudinal studies such as attitudes about the acceptability of dating abuse (Foshee et al., 2001), corporal punishment (Simons et al., 1998), harsh parenting practices (Lavoie et al., 2002), and exposure to domestic violence (Foshee et al., 2005) were not measured in this study. Another is that we examined predictors after eliminating a high-risk group — those who reported perpetration at the fall assessment. It is possible that the predictors of dating violence perpetration differ for adolescents who reported earlier perpetration of dating violence. However, this exclusion criterion was necessary because our primary aim was disentangling the direction of relationships to distinguish causes from consequences of dating violence perpetration and aim to inform primary prevention. Also, because there were very few adolescents in the larger study that were of a race/ethnicity other than black or white, we were unable to test for predictors in other racial/ethnic groups, such as Latino adolescents, who are the largest and fastest growing minority group in the United States (U.S. Census Bureau, 2003) and who are being targeted in many communities by dating violence prevention programs. Additionally, the only other longitudinal study that examined predictors of dating violence perpetration by race found that the predictors of dating violence perpetration were not only different between black and white adolescents, but that they were also different within race, depending on socioeconomic status (SES) and family structure (Foshee et al., 2005). Thus, it is possible that the variables found in the current study to predict dating violence for each race could vary further depending on the adolescent's SES and family structure. However,

we did not have a large enough sample size to test for the 4-way interactions (i.e., sex by race by SES by family structure) required for examining that possibility. Finally, we used a single item for assessing dating violence perpetration and this item did not allow for determining the severity of the dating violence perpetrated. Although numerous studies of adult and teen partner violence have found that the prevalence of perpetration is nearly the same men and women, research suggests that women are more likely than men to be injured as a consequence of partner violence (Archer, 2000; Morse, 1995). Our findings could have been different if we assessed predictors of only severe forms of dating violence perpetration.

Study Strengths

Despite its limitations, this study has many strengths. There have been very few longitudinal studies of adolescent dating violence that have used analytical methods that can inform primary prevention efforts such as the analytical methods used in the current study. Particularly noteworthy is the lack of longitudinal studies of adolescent dating violence that have tested for sex and race differences in predictors, despite the potential usefulness of such studies for informing the development of selective primary prevention efforts. Of the longitudinal studies that have included both boys and girls, very few used analytical techniques such as those used in this study that tested for statistical differences in the predictors of dating violence by boys and girls; instead most examined predictors of dating violence perpetration stratifying by sex which is not sufficient for determining if there are statistically significant sex differences in predictors (Arriaga & Foshee, 2004; Foshee et al., 2001; Foshee et al., 2008; Ozer et al., 2003; Wolfe et al., 2004). It is also the first longitudinal study to examine anxiety, social bonding, tobacco use, marijuana use, and school context variables as predictors of adolescent dating violence perpetration.

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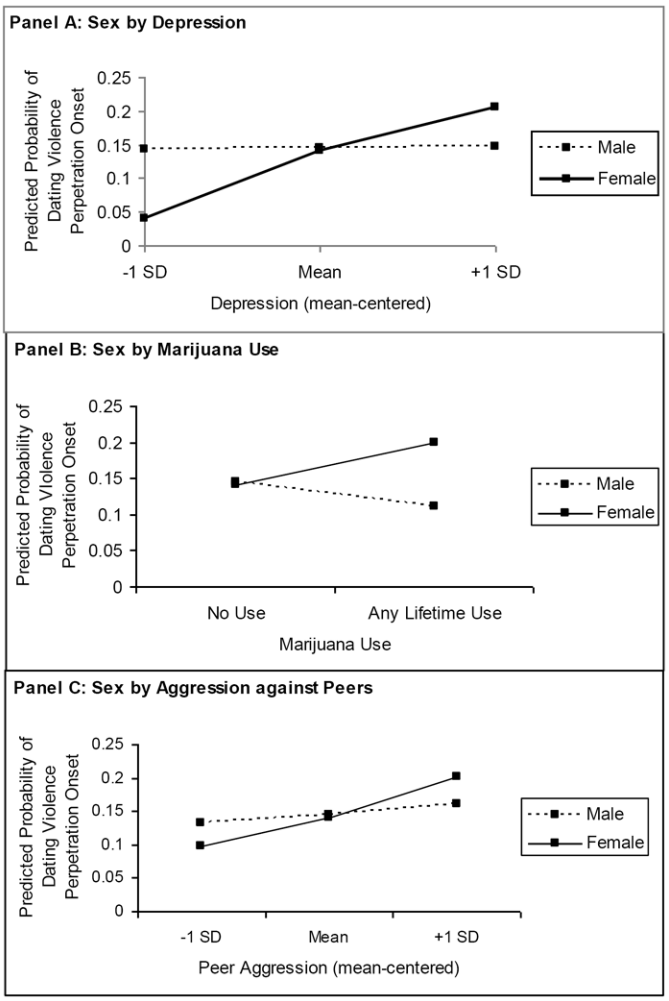

Figure 1.

Plots Depicting Sex as a Moderator of the Effects of Depression, Marijuana Use and Peer Aggression on the predicted probability of Dating Abuse Perpetration.

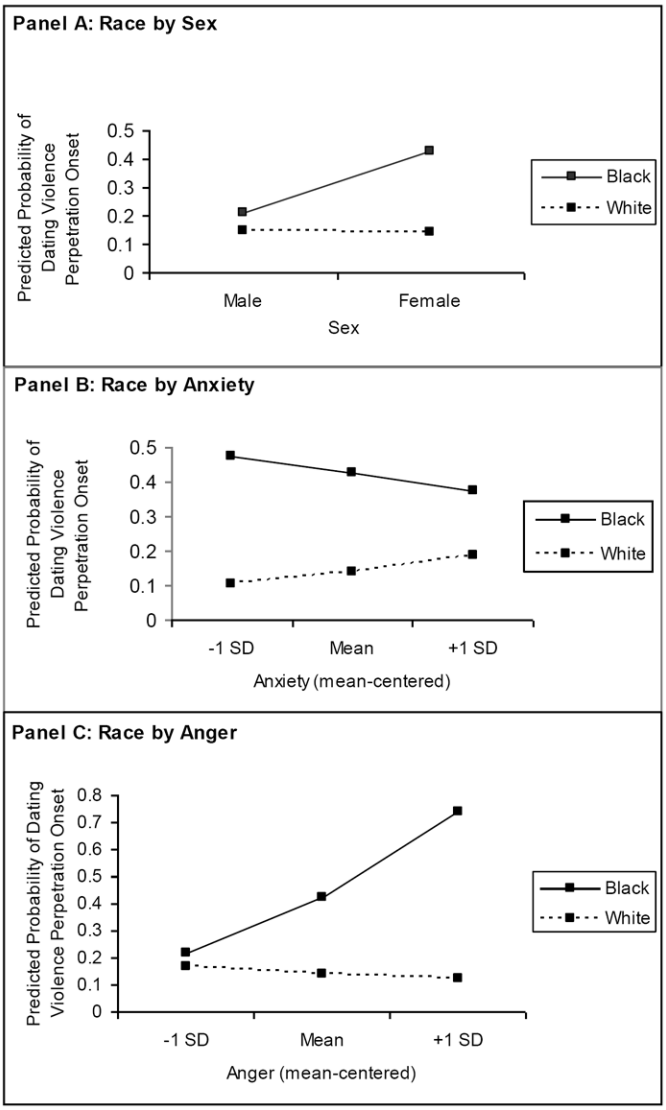

Figure 2.

Plots Depicting Race as a Moderator of the Effects of Sex, Anxiety and Anger on the predicted probability of Dating Abuse Perpetration.

Table 1

Description of Measures

Variable	# of items (α)	Original response categories	Item or example item	Mean (*SD*)
Individual attributes and behaviors				
Anger (Zuckerman & Lubin, 1985)	3 (.88)	0 = never to 3 = always	"How often did you feel each of the following in the past three months (mad, angry, furious)?"	3.10 (2.34)
Anxiety (Reynolds & Richmond, 1979)	7 (.88)	0 = strongly disagree to 4 = strongly agree	"I worried about what was going to happen"	11.67 (7.64)
Depression (Angold, Costello, & Messer, 1995)	3 (.92)	0 = strongly disagree to 4 = strongly agree	"I hated myself"	3.03 (3.68)
Social bonding (composite of endorsement of conventional beliefs, commitment to pro-social values, and degree of religiosity)[a]	9 (.74)	0 = strongly disagree to 4 = strongly agree	Endorsement of conventional beliefs (e.g. "It is good to be honest")	0.04 (3.43)
		0 = not at all important to 3 = very important	Commitment to pro-social values (e.g. "finishing high school," "going to college")	
		0 = never to 5 = more than once a week 0 = not at all to 3 = very much	Degree of religiosity (frequency of church attendance, religion importance and religion influence)	
Tobacco use	1	0= None at all, not even a puff to 7=more than 20 whole cigarettes	How much have you every smoked cigarettes in your life?	2.42 (2.43)
Alcohol use	1	0 = none at all, not even a sip to 7 = More than 20 whole drinks	How much alcohol have you ever had in your life?	1.66 (2.24)
Marijuana use	1	0=No 1=Yes	Have you ever used Marijuana in your life?	0.23 (0.42)
Aggression against peers	6	0= None to 4=10 times or more	During the past 3 months, how many times have you done each of the following things to someone about the same age as you that you were NOT dating? (pushed, slapped, twisted someone's arm, hit with fist, beat up, assaulted with knife or gun)?	0.89 (2.27)
Family Context				
Family conflict (Bloom, 1985)	3 (.86)	0 = strongly disagree to 4 = strongly agree	"We fight a lot in our family."	2.87 (3.33)
Parental responsiveness [b] (Jackson, Henriksen, & Foshee, 1998)	3 (.88)	0 = not like him/her to 3 = just like him/her	"He/she tells me when I do a good job on things."	2.43 (0.78)
Parental monitoring [b] (Jackson et al., 1998)	3 (.81)	0 = not like him/her to 3 = just like him/her	"He/she tells me when I must come home."	2.43 (0.75)
Parental attachment [b]	3 (.80)	0 = not close at all to 3 = very close	"How close do you feel to her/ him?"	2.53 (0.58)
Peer Context [c]				
Number of friends using peer violence		Range: 0-10	Number of in-school friends who reported using peer violence over the past three months	1.36 (1.24)
Number of friends using dating violence		Range: 0-10	Number of in-school friends who reported using dating violence over the past three months	0.29 (0.56)
School Context				

Variable	# of items (α)	Original response categories	Item or example item	Mean (*SD*)
Perceptions of school supportiveness (Roberts, Hom, & Battistich, 1995)	3 (.86)	0 = strongly disagree to 4 = strongly agree	"Students at this school treat each other with respect."	1.37 (1.12)
Number of school activities	3	1 = yes, 0 = no	Number of school groups respondent participated in during the school year (e.g. sports teams, service clubs, performance groups, etc…)	0.30 (.25)
Grade point average	4		Average grade point average based on self-reported grades during the two semesters in English/Language arts, Mathematics, History/Social studies, and Science.	1.95 (0.82)

[a] Each subscale was standardized before summing to create the social bonding composite measure

[b] If two parents were in the household, the highest values of the two parents was used

[c] Peer context variables were created using social network methods

Table 2

Bivariate and adjusted odds ratios for the influence of individual, family, school and peer characteristics on the likelihood of dating violence perpetration initiation.

	OR	95% CI	AOR	95% CI
Demographic Variables				
Sex	0.97	(0.84,1.11)	1.03	(0.69,1.55)
Race	1.50***	(1.26,1.80)	4.49***	(2.83,7.13)
Individual context				
Anger	1.11**	(1.04,1.19)	0.92^	(0.85,1.01)
Anxiety	1.05***	(1.03,1.08)	1.05*	(1.01,1.08)
Depression	1.12***	(1.07,1.16)	1.13***	(1.05,1.22)
Social bonding	0.93***	(0.89,0.96)	0.96^	(0.91,1.00)
Tobacco use	1.08*	(1.02,1.16)	1.03	(0.94,1.12)
Alcohol use	1.07*	(1.00,1.13)	0.97	(0.89,1.05)
Marijuana use	1.41^	(1.00,1.99)	1.52	(0.92,2.51)
Aggression against peers	1.12***	(1.05,1.18)	1.21***	(1.10,1.32)
Family Context				
Family conflict	1.11***	(1.06,1.16)	1.03	(0.98,1.07)
Parental responsiveness	0.80*	(0.67,0.97)	0.93	(0.83,1.04)
Parental monitoring	0.80*	(0.66,0.96)	0.94	(0.75,1.18)
Parental attachment	0.75*	(0.59,0.96)	1.05	(0.79,1.41)
Peer Context				
# of friends using peer violence	1.07	(0.92,1.24)	1.04	(0.90,1.20)
# of friends using dating violence	1.49**	(1.14,1.95)	1.39*	(1.08,1.79)
School Context				
Supportive school environment	1.04	(0.90,1.19)	1.12^	(0.73,1.08)
# of school activities	0.94	(0.50,1.78)	1.25	(0.98,1.28)
Grade point average	0.74**	(0.62,0.89)	0.89	(0.73,1.08)
Interaction Terms				
Sex*Depression	--	--	0.89**	(0.87,0.90)
Sex*Marijuana use	--	--	0.48*	(0.25,0.94)
Sex*Aggression against peers	--	--	0.87*	(0.77,0.98)
Race*Sex	--	--	0.34**	(0.18,0.66)
Race*Anxiety	--	--	0.93**	(0.89,0.97)
Race*Anger	--	--	1.24**	(1.09,1.42)

OR=Bivariate odds ratio; AOR=Adjusted odds ratio; CI=Confidence interval;

^ $p < .10$;

* $p < .05$;

** $p < .01$;

*** $p < .001$

Note. Adjusted odds ratios are for the full model that includes the interaction terms. This model also controls for family structure, parent education and number of friends who completed the survey. Likelihood ratio test: 214.16 (29); $p < .001$.