



Published in final edited form as:

J Youth Adolesc. 2013 April ; 42(4): 596–606. doi:10.1007/s10964-012-9877-1.

Substance Use as a Longitudinal Predictor of the Perpetration of Teen Dating Violence

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Abstract

The prevention of teen dating violence is a major public health priority. However, the dearth of longitudinal studies makes it difficult to develop programs that effectively target salient risk factors. Using a school-based sample of ethnically diverse adolescents, this longitudinal study examined whether substance use (alcohol, marijuana, and hard drugs) and exposure to parental violence predicted the perpetration of physical dating violence over time. 1,042 9th and 10th grade high schools students were recruited and assessed in the spring of 2010, and 93% of the original sample completed the 1-year follow-up in the spring of 2011. Participants who had begun dating at the initial assessment and who self-identified as African American ($n = 263$; 32%), Caucasian ($n = 272$; 33%), or Hispanic ($n = 293$; 35%) were included in the current analyses ($n = 828$; 55% female). Slightly more than half of the adolescents who perpetrated dating violence at baseline reported past year dating violence at follow-up, relative to only 11% of adolescents who did not report perpetrating dating violence at baseline. Structural equation modeling revealed that the use of alcohol and hard drugs at baseline predicted the future perpetration of physical dating violence, even after accounting for the effects of baseline dating violence and exposure to interparental violence. Despite differences in the prevalence of key variables between males and females, the longitudinal associations did not vary by gender. With respect to race, exposure to mother-to-father violence predicted the perpetration of dating violence among Caucasian adolescents. Findings from the current study indicate that targeting substance use, and potentially youth from violent households, may be viable approaches to preventing the perpetration of teen dating violence.

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Conflict of interest: The authors declare that they have no conflict of interest

Keywords

teen dating violence; substance use; adolescents; gender; ethnicity; longitudinal

Introduction: Teen Dating Violence

Teen dating violence presents a serious public health concern. Approximately 10% to 25% of adolescents are victims of physical teen dating violence (Eaton et al., 2008; Silverman, Raj, Mucci, & Hathaway, 2001), with substantially higher rates reported in clinical and at-risk samples (Rothman et al., 2011; Wolfe, Scott, Wekerle, & Pittman, 2001). Several studies have identified correlates of dating violence victimization and perpetration including substance use (Temple & Freeman, 2011), risky sexual behaviors (Alleyne, Coleman-Cowger, Crown, Gibbons, & Vines, 2011), poor psychological health (Wolitzky-Taylor et al., 2008), disordered eating (Ackard, Eisenberg, & Neumark-Steiner, 2002), child maltreatment (Wolfe et al., 2001), dismissive or justifying attitudes about violence (O'Keefe, 1997), and behavior problems (Deater-Deckard, Dodge, Bates, & Pettit, 1998). Further, individuals who perpetrate violence in their adolescent relationships may be at heightened risk for continuing this behavior in their adult intimate relationships (Gidycz, Warkentin, & Orchowski, 2007; Smith, White, & Holland, 2003). Thus, preventing the perpetration of teen dating violence may not only improve the health and lives of adolescent victims, but it carries the potential to also curb the prevalence and consequences of subsequent dating and domestic violence.

Largely owing to a lack of knowledge regarding the causes of teen dating violence, efforts to prevent this form of violence have proven difficult (Capaldi & Langhinrichsen-Rohling, 2012; Whitaker et al., 2006). Much of the literature on dating violence is limited to cross-sectional studies that cannot distinguish between predictors and consequences of dating violence. Thus, longitudinal studies of factors that predict dating violence are needed to inform prevention programs of modifiable behaviors and characteristics that, when reduced or inhibited, preclude the development of perpetrating violence. Therefore, in the current study, we examined longitudinal risk factors of the perpetration of dating violence among a sample of racially diverse adolescents.

Conceptual Framework

Most theoretical frameworks of intimate partner violence have not accounted for adolescent relationships and are thus not specific to teen dating violence (Espelage, 2011; Shorey, Cornelius, & Bell, 2008a). This reality, coupled with the lack of longitudinal data, has resulted in a gap in our understanding of how and under what conditions teen dating violence develops. Indeed, a comprehensive theoretical framework of dating violence that accounts for males and females, and includes victimization and perpetration, has yet to be adequately tested. Social learning theory (Bandura, 1977), which suggests that individuals learn aggressive behavior when presented with violent models, especially if those models are admired (Akers, 2000), has received the most attention in the violence literature.

Although research has demonstrated some support for social learning theory (Sellers, Cochran, & Branch, 2005; Sims, Dodd, & Tejada, 2008), it is necessarily limited as a comprehensive theory because it cannot fully account for the perpetration of partner violence. Specifically, many victims and perpetrators of relationship violence did not experience or witness violence as children, and many who did experience child maltreatment do not become victims or perpetrators of relationship violence. To account for the heterogeneity of partner violence, Bell and Naugle (2008) proposed an alternative model that aims to widen the scope of possible predictors of partner violence by including factors

such as personality traits (e.g., hostility), mental health (e.g., depression), distal antecedents (e.g., exposure to interparental violence), and motivating factors (e.g., substance use). Although this is a promising framework to conceptualize teen dating violence, and researchers have discussed its relevance to understanding and preventing dating violence (Shorey, Cornelius, & Bell, 2008b), to the best of our knowledge there are currently no reports on empirical studies using this framework. Thus, the current study will partially test this theory by considering the role of substance use (motivating factor) and exposure to interparental violence (distal antecedent) in predicting the perpetration of teen dating violence over time.

Substance Use and Teen Dating Violence—Substance use has consistently and robustly been linked to the perpetration of domestic and dating violence, especially in adult and college student samples (Rothman, Reyes, Johnson, & LaValley, 2012; Shorey, Stuart, & Cornelius, 2011). Though less established, results from several cross-sectional studies suggest a similar association between adolescent dating violence and substance use. For example, in a recent study of youth recruited from an emergency department, Walton and colleagues (2009) found that heavy episodic drinking and marijuana use were risk factors for the perpetration of dating violence. In a large sample of Boston area high school students, alcohol, tobacco, and marijuana use were all associated with the perpetration of dating violence among both boys and girls (Rothman, Johnson, Azrael, Hall, & Weinberg, 2010). Similar results regarding the perpetration of dating violence/substance use link have been observed with adolescents from Mexico (Rivera-Rivera, Allen-Leigh, Rodriguez-Ortega, Chavez-Ayala, & Lazcana-Ponce, 2007), Thailand (Chaveepojnkamjorn & Pichainarong, 2011), and Russia (Lysova & Hines, 2008). Indeed, a recent meta-analysis of 28 studies published prior to 2011 (23 cross-sectional; 5 longitudinal) concluded that alcohol use (including frequent drinking, problem drinking, and heavy episodic drinking) significantly increased the risk for perpetrating teen dating violence (Rothman et al., 2012).

While the above studies advocate a link between substance use and the perpetration of teen dating violence, existing longitudinal research, albeit limited, suggests a more complex relationship. For example, Foshee, Linder, MacDougall, & Bangdiwala (2001) found that alcohol use was concurrently related to the perpetration of dating violence for male and female 8th and 9th grade students. However, when the data were examined longitudinally, alcohol use was only predictive of subsequent (1.5 years later) perpetration of dating violence for adolescent girls. A study by Reyes, Foshee, Bauer, & Ennett (2012) found that alcohol use predicted subsequent perpetration of dating violence, but that the strength of this association diminished as adolescents progressed through high school. Similarly, they found that the strength of the association between *concurrent* alcohol use and the perpetration of dating violence faded as adolescents aged. In a follow-up study of the same sample, Reyes and colleagues (2012) found that the association between alcohol and the perpetration of dating violence was moderated by adolescents' experiences with family violence and having friends involved in violent dating relationships. Further, despite a strong concurrent association (Shorey et al., 2011), longitudinal studies of college students generally have not found substance use to be predictive of dating violence perpetration over time (Gidycz et al., 2007; Stappenbeck & Fromme, 2010). Notably, there is a paucity of research on the relationship between the use of illicit substances and the perpetration of dating violence. Thus, the current study will extend the limited longitudinal research on the perpetration of teen dating violence and substance use, including investigating the effects of illicit drug use.

Gender—Although some studies suggest that male-to-female violence is more severe than female-to-male violence (Foshee et al., 2011), mounting evidence has demonstrated that girls perpetrate dating violence at a rate similar to or more than boys (Rothman et al., 2010; Swahn, Simon, Arias, & Bossarte, 2008). Thus, programs designed to prevent dating

violence would be remiss if they did not consider gender. With respect to the relationship between substance use and the perpetration of dating violence, results regarding gender are mixed. Some studies suggest that substance use is a more robust correlate of the perpetration of dating violence for boys (Follingstad, Bradley, Laughlin, & Burke, 1999; Shorey et al., 2011), while others find little to no differences by gender (Nabors, 2010; Reyes, Foshee, Bauer, & Ennett, 2011; Rothman et al., 2010). Still, others studies have found that substance use was more important for females in predicting the perpetration of dating violence (Foshee et al., 2001; Lysova & Hines, 2008; McDonnell, Ott, & Mitchell, 2010). Moreover, Rivera-Rivera and colleagues (2007) found that alcohol use predicted the perpetration of dating violence in female youth, and illicit drug use predicted the perpetration of dating violence in male youth. Thus, it is clear that continued research is needed to examine whether there are gender differences in both the perpetration of and risk factors for teen dating violence, namely substance use. In the current study, we examine gender differences in the longitudinal relationship between substance use and the perpetration of dating violence.

Race—The limited existing studies examining the relationship between race and teen dating violence have found that, relative to their Caucasian counterparts, African American and Hispanic teens evidence higher rates of dating violence (Eaton et al., 2008; Foshee et al., 2008; see Temple & Freeman, 2011 for an exception), even when accounting for socio-economic status (Walton et al., 2010). In fact, along with alcohol use and having friends in violent relationships, being of a non-Caucasian race was one of the few predictors of the perpetration of dating violence among females in Foshee and colleagues (2001) longitudinal study of high school students. Moreover, there is some evidence that a risk factor's ability to predict dating violence varies by race (Foshee, Ennett, Bauman, Benefield, & Suchindran, 2005; Foshee, Reyes, & Ennett, 2010). For example, Schnurr and Lohman (2008) found that the early use of alcohol and drugs predicted perpetration of dating violence for females and Hispanic males. The current study will therefore examine whether there are differences in the longitudinal relationship between substance use and the perpetration of dating violence among African American, Hispanic, and Caucasian adolescents.

Current Study

Using a large school-based sample of male and female high school students, the goal of the current longitudinal study was to examine whether substance use (alcohol, marijuana, and “hard drugs”) predicted the perpetration of physical teen dating violence across time. We extend the literature by examining potential gender differences in the relationship between substance use and dating violence. We further extend the limited existing research by examining an ethnically diverse sample of adolescents and determining whether the relationship between substance use and dating violence varied across race. We hypothesize that the perpetration of dating violence at baseline will predict the perpetration of dating violence at the 1 year follow-up. We also hypothesize that substance use at baseline will predict substance use at follow up. Further, we expect that exposure to interparental violence will predict the perpetration of dating violence. Finally, we hypothesize that substance use at baseline will predict the perpetration of dating violence at follow-up, even after accounting for baseline perpetration of violence and exposure to interparental violence. While we anticipate that differences will emerge by gender and race, the inconsistency of previous research on these variables precluded us from making specific hypotheses.

Method

Participants & Procedure

The current data are from the baseline and 1-year follow-up of *Dating it Safe*, an ongoing longitudinal study on teen dating violence and adolescent risk behaviors. Participants were

recruited from seven public high schools in four Houston-area school districts during the spring semester of 2010. Study recruitment occurred during school hours in classes with mandated attendance. All students present in the selected classes were eligible to participate. Parental permission forms, in both English and Spanish, were sent home with students for their parents to review, sign, and return for a \$5 gift card regardless of whether or not they were granted parental permission to participate. Of the 1,702 students present on recruitment days, 1,215 returned parental permission forms (71%), 1,119 obtained parental permission to participate (66% of those recruited; 92% of those who returned permission forms), and 1,046 completed the survey (62% of those recruited; 94% of those who received parental permission). Four surveys were discarded due to overt random responding, which resulted in 1,042 participants recruited and assessed. The mean age of students at baseline was 15.1 years, and 56% were female. Two point five percent of participants reported that their most recent dating partner was of the same gender. The racial distribution was 28% African American, 29% Caucasian, 31% Hispanic, 4% Asian/Pacific Islander, and 8% Mixed/Other. Ninety-three percent of participants completed the 1-year follow-up survey, which was conducted in the spring of 2011. Written parental consent and child assent were obtained and all procedures were approved by the Institutional Review Board of UTMB Health.

Baseline and follow-up assessments occurred during school hours. Students received a \$5 gift card for completing the baseline assessment, and a \$10 gift card for completing the 1-year follow-up assessment. Participants who were no longer at their original school at the 1-year follow-up completed the assessment at an alternate time and location scheduled by research staff.

For the current study, baseline and follow-up data were analyzed and were limited to African American, Caucasian, and Hispanic participants due to the small sample size of other racial groups. Baseline (N = 828) and follow-up (N = 734) analyses included only participants who had begun dating (i.e., endorsed the baseline item, “I have begun dating, going out with someone, or had a boyfriend/girlfriend”).

Measures

Perpetration of teen dating violence—The perpetration of physical dating violence was measured by the Conflict in Adolescent Dating Relationships Inventory (CADRI; Wolfe et al., 2001). Physical perpetration included 4 items in which adolescents responded to questions about their own behavior in their lifetime (Baseline) and in the past year (Time 2): “I threw something at him/her,” “I kicked, hit, or punched him/her,” “I slapped him/her or pulled his/her hair,” and “I pushed, shoved, or shook him/her.” The answer options for the items were dichotomized (yes/no). The four items were combined into a physical violence perpetration variable and dichotomized (yes/no). Developed to address conflict in adolescent relationships, the CADRI has shown good reliability and validity (Wolfe et al., 2001). Percent of adolescents who endorsed each item is presented in Table 1.

Substance use—At baseline, participants were provided with a list of six substances and asked to indicate (Yes/No) whether or not they had, in their lifetime ever used: 1) alcohol; 2) marijuana; 3) cocaine; 4) inhalants; 5) ecstasy; or 6) amphetamines. Adolescents were provided with examples of inhalants (e.g., sniffed glue) and informed that alcohol use referred to “more than just a few sips”. Participants were asked about these same substances at the follow-up assessment, but asked to indicate their use (yes/no) over the previous year (since the last assessment). Due to a low number of responses for specific illicit substances, cocaine, inhalants, ecstasy, and amphetamines were combined to form a “hard drugs” variable. Previous research has generally found that adolescents are valid and reliable

reporters of their substance use behaviors (Johnston, O'Malley, Bachman, & Schulenberg, 2010).

Interparental Violence—To examine adolescents' exposure to interparental violence at baseline, they were asked how often they witnessed violence from their mother-to-father (1 question) and from their father-to-mother (1 question) in their lifetime. Adolescents were provided with examples of different types of violence, ranging from moderate to severe (e.g., pushed, grabbed, or shoved; slammed against wall; choked), and asked to indicate the number of times they witnessed violence from their mother-to-father and father-to-mother using the following four options: never, once or twice, 3–20 times, and more than 20 times. Total scores were obtained for mother-to-father violence and father-to-mother violence by dichotomizing responses as witnessed versus did not witness.

Data Analytic Strategy—We used two programs for statistical analyses. Descriptive statistics among study variables were obtained using SPSS 18.0. The links between substance use, interparental violence, and the perpetration of physical dating violence over time were examined using path models in Structural Equation Modeling (SEM) in Mplus Version 5.0. Relative to regression models, path models are preferred since only one model needs to be estimated and comparisons among different groups (e.g., males and females) are easily conducted (Kline, 2010). As recommended by the broader literature on SEM, all path models were estimated using full information estimation (FIE). With FIE, all available data is used to estimate parameters and does not exclude observations with missing data (Kline, 2010). Relative to pairwise and listwise deletion, FIE has demonstrated more efficiency and less bias with missing data (Arbuckle, 1996).

Because all outcome variables were dichotomous, weighted least squares estimate with a mean and variance adjusted chi-square statistic (WLSMV) was specified for all SEM path analyses. WLSMV supplies standard errors, unbiased estimates, and model fit tests for dichotomous outcome variables and non-normal data (Muthén, 1984; Muthén & Muthén, 2006). Model fit was evaluated using the weighted root-mean square residual (WRMR) statistic, with values falling below .90 demonstrating good model fit (Muthén & Muthén, 2006; Yu & Muthén, 2001). The WRMR is the only fit statistic available when examining dichotomous outcome variables (Muthén & Muthén, 2006).

A path model in which T2 perpetration and T2 substance use were regressed on T1 perpetration, interparental violence, and substance use was first estimated in order to examine the impact of T1 variables on T2 variables. Following procedures outlined by Aiken and West (1991), we then examined whether T1 physical perpetration interacted with T1 substance use (alcohol, marijuana, and hard drug use, respectively) and interparental violence in predicting T2 physical perpetration by adding product terms (T1 Perpetration X T1 Alcohol; T1 Perpetration X T1 Marijuana; T1 Perpetration X T1 Hard Drugs; T1 Perpetration X Mother-to-Father Violence, T1 Perpetration X Father-to-Mother Violence) to the model. This was done to determine whether individuals with or without a history of physical perpetration at T1 had different associations between T1 substance use and interparental violence and T2 physical perpetration. No interactions between T1 variables in predicting T2 substance use were specified, as we had no theoretical or empirical reason to believe that there would be an association between T1 perpetration and T2 substance use.

We further examined whether any structural path varied as a function of gender or race (Caucasian, Hispanic, or African American) using the multiple group model (MGM) approach (Muthén & Muthén, 2006). The MGM approach involved two steps. The first step involved estimating an unrestricted model where all structural paths were free to vary across gender [race]. Step two involved estimating a model where the structural paths among

variables were constrained to be equal across gender [race]. A chi-square difference test ($\Delta\chi^2$), as described by Muthén and Muthén (2006) for use with WLSMV, was then estimated to determine whether constraining paths across gender [race] resulted in a significant decrement in the model chi-square. If constraining the paths to be equal resulted in a significant decrement to the model chi-square it can then be assumed that the relationships among variables varied among gender [race] (Byrne, 2001).

Results

Descriptive Statistics

The prevalence of substance use and physical perpetration at both T1 and T2, for males and females and the three racial groups, is presented in Table 2. From the overall sample, 21.7% indicated they had perpetrated physical aggression at T1 and 17.1% at T2. At T1, the lifetime prevalence of substance use for the overall sample was 69.6% (alcohol), 34.2% (marijuana), and 11.1% (hard drugs). At T2, the previous year prevalence of substance use for the total sample was 56.0% (alcohol), 30.9% (marijuana), and 7.6% (hard drugs).

Chi-square tests were used to examine differences between males and females, and the three racial groups, in the prevalence of the perpetration of physical dating violence and substance use at both T1 and T2. As displayed in Table 2, females reported a greater prevalence of physical perpetration at both T1 and T2. Males reported a higher prevalence of marijuana use at T1 and a higher prevalence of past year marijuana and hard drug use. Also displayed in Table 2, there were significant differences between the three racial groups on substance use and dating violence. Results demonstrated that Caucasian adolescents had greater past year alcohol and marijuana use than Hispanic adolescents. Caucasian adolescents reported greater substance use prevalence for all substances at both time points relative to African American adolescents. Hispanic and African American adolescents reported a higher prevalence of perpetrating physical dating violence at both T1 and T2 than Caucasian adolescents. Hispanic adolescents reported a higher prevalence of past year hard drug use relative to African American adolescents. Finally, African American adolescents reported a higher prevalence of perpetrating physical dating violence than Hispanic adolescents at both time points.

We also estimated the prevalence of T2 perpetration and substance use for adolescents with and without histories of perpetration/substance use at T1. For adolescents who had perpetrated physical aggression at T1, 52% reported perpetration at T2. For adolescents who reported never having perpetrated physical aggression at T1, 10.8% reported having perpetrated physical aggression at T2. For substance use, adolescents who had used alcohol at T1 reported a prevalence of 76.9% for alcohol use at T2, in contrast to a prevalence of 26.5% at T2 for adolescents who had not used alcohol at T1. Adolescents who reported marijuana use at T1 reported a prevalence of 75.2% for marijuana use at T2, in contrast to a prevalence of 14% at T2 for adolescents who had not used marijuana at T1. Finally, adolescents who reported hard drug use at T1 reported a prevalence of 43.2% for hard drug use at T2, in contrast to a prevalence of 4.2% at T2 for adolescents who had not used hard drugs at T1.

Associations between T1 Physical Perpetration and Substance Use and T2 Physical Perpetration and Substance Use

We first examined the relationship between T1 physical perpetration, T1 substance use (alcohol, marijuana, and hard drugs), T1 parental violence, and T2 physical perpetration and T2 substance use using SEM (see Figure 1). As mentioned earlier, the initial path model did not examine any potential gender or racial differences in paths. Results demonstrated that

this model fit the data well (WRMR = .173). The standardized path coefficients (Table 3; covariances among variables are not presented for clarity purposes) demonstrated that T1 physical perpetration significantly predicted T2 physical perpetration. In addition, both lifetime alcohol use and hard drug use, as assessed at T1, were significant predictors of T2 physical perpetration. Lifetime marijuana use was not a significant predictor of T2 physical perpetration. Exposure to mother-to-father violence at T1 was also a significant predictor of T2 physical perpetration. In addition, lifetime alcohol and marijuana use were significant predictors of all types of substance use at T2. Lifetime hard drug use was a significant predictor of T2 illicit substance use (marijuana and hard drugs), but not alcohol use. Interparental violence did not predict substance use at T2.

We next examined whether any of the structural paths varied as a function of gender or race using the MGM approach. We first allowed paths to vary freely across gender (then race). Paths were then constrained to be equal across gender (then race). The chi-square difference tests showed that paths did not vary by gender $\Delta\chi^2(16) = 19.31, p > .05$, but that paths did vary by race, $\Delta\chi^2(30) = 58.39, p < .01$. Results demonstrated that for Caucasian adolescents, exposure to mother-to-father violence was a significant predictor of T2 physical perpetration ($\beta = .24, p < .01$). In addition, marijuana use was associated negatively with T2 physical perpetration for African American adolescents ($\beta = -.27, p < .01$).

Lastly, we examined whether any of the structural paths from T1 substance use and interparental violence to T2 physical perpetration varied depending on whether adolescents had perpetrated physical aggression at T1. To examine this question, we added interaction terms between T1 physical perpetration and each type of substance use and interparental violence, as assessed at T1, into the model (Aiken & West, 1991). While this model fit the data well (WRMR = .292), none of the interactions were significant predictors of T2 physical perpetration (see Table 4). The MGM approach also demonstrated that none of the structural paths in the moderation model varied by gender $\Delta\chi^2(3) = 3.46, p > .05$, or race, $\Delta\chi^2(4) = 1.47, p > .05$. Thus, the relationship between T1 substance use and T2 physical perpetration were similar for adolescents with and without a history of perpetration at T1, regardless of their gender or race.

Discussion

The present study examined the longitudinal relationship between the perpetration of physical teen dating violence and substance use (alcohol, marijuana, and hard drugs) among a large ethnically diverse sample of adolescents. Per expectations, we found that baseline alcohol and hard drug use predicted the perpetration of physical dating violence 1 year later, even after accounting for exposure to interparental violence and the effects of the perpetration of dating violence at baseline. Marijuana use at baseline, however, was not related to subsequent perpetration of dating violence. These findings are consistent with a majority of the cross sectional literature (Shorey et al., 2011), and add to the limited number of existing longitudinal studies. In their review of the literature on alcohol and dating violence perpetration (adolescents and college students), Rothman and colleagues (2012) determined that although alcohol and teen dating violence were concurrently related, a consensus on whether or not alcohol use predicted future violence perpetration has yet to be established. Results from the current study provide evidence in the affirmative, and extend knowledge by finding a longitudinal relationship between the use of hard drugs and teen dating violence.

Although additional research is needed, these findings suggest that targeting alcohol and drug use may be a viable approach to preventing teen dating violence. This is not to imply that substance use *causes* dating violence, as these behaviors may be related only by a

shared underlying factor (e.g., child maltreatment; Wekerle & Wolfe, 1998). Further, as found in other samples (Reyes et al., 2011; 2012), it is possible that the association between substance use and dating violence diminishes in strength with time. Current results reflect the first 2 years of an ongoing 6-year study, so this will be tested in future analyses.

Slightly over half of the adolescents who reported perpetrating dating violence at baseline reported perpetrating past year dating violence at follow-up. Conversely, only 11% of youth who did not perpetrate dating violence at baseline reported perpetrating past year dating violence at follow-up. While not surprising that violent youth were more likely than their nonviolent peers to be violent at follow up (Stith, White, Penn, Ward, & Tritt, 2004), this finding nonetheless carries several important implications. The limited number of new cases of dating violence perpetration suggests that primary prevention programs be developed for and administered to youth prior to entering high school (Foshee et al., 2001). Moreover, teen dating violence prevention programs developed for high school students may consider identifying and targeting adolescents already engaging in, or at high risk for engaging in (e.g., substance users; adolescents exposed to parental violence), relationship violence. Second, nearly half of the adolescents desisted from dating violence perpetration between baseline and the 1-year follow-up. In line with recent studies showing that dating violence decreases with age (Reyes et al., 2011; 2012), additional research is needed to identify factors that differentiate stable perpetrators of dating violence from those who discontinue this behavior. This research may be especially important for preventing the evolution of violence in the adolescent relationship to violence in adult relationships.

Notably, a similar pattern of behavior was observed for substance use. Specifically, adolescents who reported using alcohol, marijuana, and hard drugs at baseline were substantially more likely to report using these substances at follow-up. For example, 75% of baseline marijuana users reported marijuana use 1 year later, relative to 14% of those who did not report marijuana use at baseline. This difference was especially striking with respect to hard drugs, where 43% of baseline users reported past year use at follow-up, compared to only 4% of non-users at baseline. These findings reiterate the importance of implementing substance use prevention programs with younger adolescents (Gottfredson & Wilson, 2003), and given the results of the current study, before they begin dating. Given the association between alcohol, drugs, and dating violence observed in this study, this study also carries important implications for the substance use literature. Specifically, our findings suggest that substance using adolescents may be ideal targets for the implementation of dating violence prevention programs (Temple, O'Farrell, & Stuart, 2008).

Gender and Race

Although longitudinal associations between the perpetration of teen dating violence and substance use did not vary by gender, there were some noteworthy findings with potential implications for prevention. Adolescent girls were more likely than adolescent boys to report the perpetration of dating violence at both time points. While this difference was substantial (e.g., 29% to 13% at baseline), it is consistent with rates found in other studies (e.g., Rothman et al., 2011; Walton et al., 2009). Although these gender differences may relate, in part, to how male and female adolescents think about and report violence (Currie, 1998), they nevertheless emphasize the importance of teen dating violence prevention programs addressing both male-to-female *and* female-to-male violence (Langhinrichsen-Rohling, 2010).

Our findings regarding race were consistent with the literature (Foshee et al., 2001; Walton et al., 2009). Specifically, we found that Caucasian adolescents were less likely to report the perpetration dating violence at both time points relative to their African American and Hispanic counterparts. Given the premise that substance use is predictive of the perpetration

of dating violence, coupled with our finding that Caucasian adolescents reported more substance use, this result may seem counter to expectations. Rather, this seeming discrepancy illustrates the importance of considering a broad range of potential predictors of dating violence beyond substance use. In fact, as reported by Foshee and colleagues (2008), differences by race may be the result of differences in attitudes about violence and gender, communication skills, and exposure to family violence; all of which are potentially modifiable. Indeed, we found that exposure to mother-to-father violence was predictive of physical dating violence perpetration over time, but only for Caucasian adolescents. Interestingly, we also found marijuana use to be inversely related to dating violence perpetration among African American adolescents. Clearly, additional longitudinal research on racially diverse populations that examines multiple risk factors is warranted.

Limitations and Future Directions

As with any study, our findings should be interpreted in light of several limitations. First, we relied on retrospective self-reports of the perpetration of dating violence, exposure to interparental violence, and substance use, which may impact the accuracy of the results (Schnurr, Lohman, & Kaura, 2010). Second, although this study does provide evidence for a temporal relationship between substance use and dating violence, we are unable to make any conclusions about acute effects that alcohol and drugs may have on the perpetration of dating violence. Research that takes into account event level data, such as the daily diary methods, is needed (Rothman et al., 2012; Shorey et al., 2011). Third, we chose to focus exclusively on the *perpetration of physical* teen dating violence. While dating violence victimization is incredibly important and strongly related to the perpetration of dating violence, we wanted to assess risk factors that could be specifically targeted in prevention programs aimed at eliminating the *perpetration of dating violence*. In addition to considering victimization, future longitudinal studies should examine the role of alcohol and drugs in predicting other forms of dating violence such as psychological abuse and sexual aggression. Fourth, we could not adequately distinguish between heterosexual and homosexual relationships. Given the dearth of information related to sexual orientation and teen dating violence, future research should make this area of inquiry a priority. Fifth, we limited our sample to participants who had begun dating at Time 1, and only consider substance use as a risk factor for dating violence perpetration in the dating context. Finally, and perhaps most importantly, we sought to identify only two potential predictors of the perpetration of teen dating violence (i.e., substance use and exposure to parental violence). As demonstrated by Bell and Naugle's (2008) conceptual model, this is only one piece of the relationship violence puzzle. Future research should build on the current findings to test other aspects of their promising theory. Further, it is possible that the relationship, even longitudinal relationship, between dating violence and substance use is spurious and a byproduct of a third underlying variable (e.g., conduct disorder). Despite these limitations, this study adds to the growing literature on the longitudinal predictors of teen dating violence

Conclusion

The importance of preventing teen dating violence is highlighted by its rate of occurrence, health consequences, and potential for adolescents to carry this pattern of relating to future intimate relationships. Longitudinal studies of risk factors for teen dating violence are critically needed for the development of effective prevention programs. Thus, the current study built on limited existing research by finding that the use of alcohol and hard drugs predicted the perpetration of dating violence across time, even after accounting for baseline levels of dating violence and exposure to interparental violence. While additional research is needed, current findings suggest that targeting adolescent substance use may be a viable approach to preventing teen dating violence and subsequent domestic violence.

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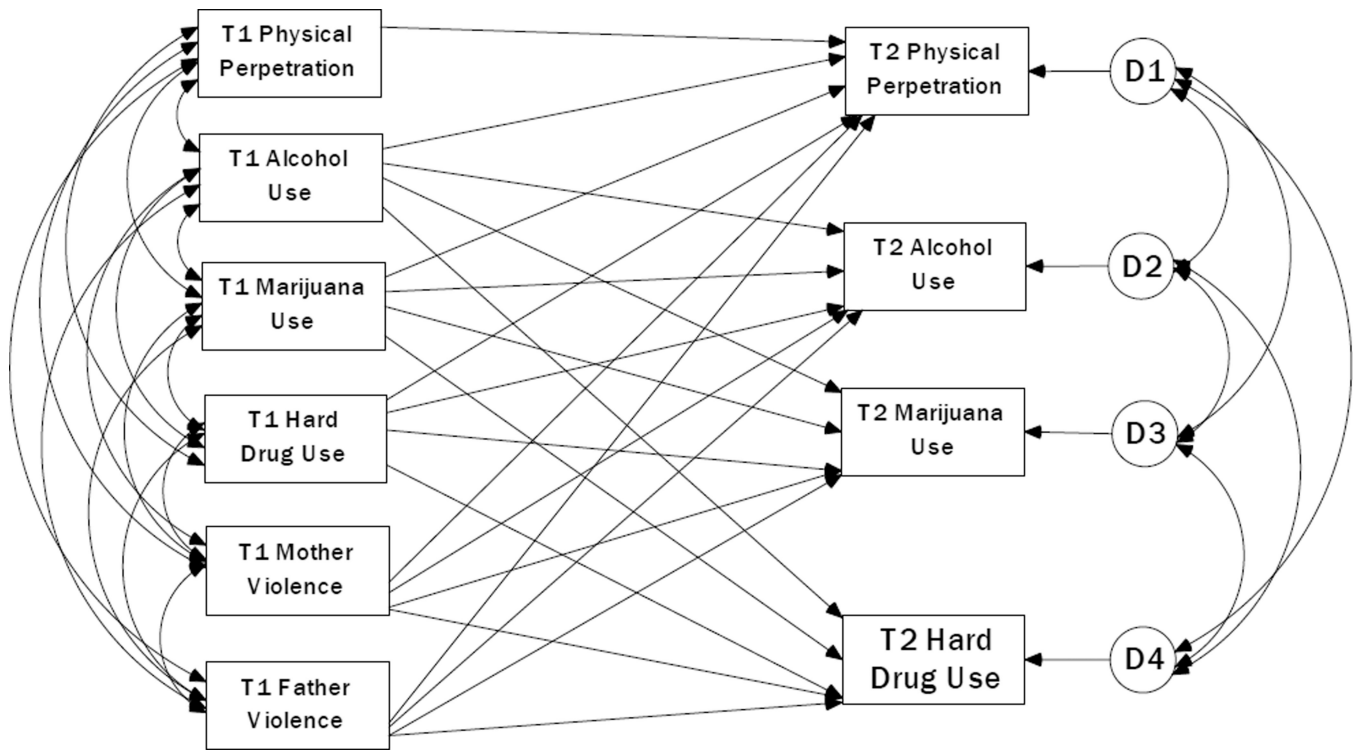


Figure 1. Proposed longitudinal model of substance use and parental violence on physical perpetration and substance use one year later.

Table 1

Perpetration of teen dating violence at each time point

TDV Perpetration	Time 1	Time 2
I threw something at him/her	9.9%	8.1%
I kicked, hit, or punched him/her	10.56%	9.1%
I slapped him/her or pulled his/her hair	9.2%	8.8%
I pushed, shoved, or shook him/her	13.3%	12.6%
TOTAL	21.7%	17.1%

Table 2

Prevalence (%) of physical perpetration and substance use at T1 and T2.

	Male	Female		$\chi^2 (1)$
T1 Physical Perpetration (lifetime)	12.8	29.3		32.21 ***
T2 Physical Perpetration (past year)	7.8	28.8		49.67 ***
T1 Alcohol Use (lifetime)	68.0	71.3		1.06
T2 Alcohol (past year)	60.1	62.3		.40
T1 Marijuana (lifetime)	40.4	29.6		10.68 ***
T2 Marijuana (past year)	40.3	28.6		11.44 ***
T1 Hard Drug (lifetime)	11.2	11.1		.00
T2 Hard Drug (past year)	11.4	5.9		7.16 (1) **

	Caucasian	Hispanic	African American	$\chi^2 (2)$
T1 Physical Perpetration (lifetime)	12.9 ^a	20.0 ^b	33.7 ^c	34.39 ***
T2 Physical Perpetration (past year)	11.8 ^a	19.5 ^b	28.4 ^c	20.17 ***
T1 Alcohol Use (lifetime)	74.9 ^a	69.6 ^{a,b}	64.8 ^b	6.36 *
T2 Alcohol (past year)	71.5 ^a	60.2 ^b	51.1 ^c	21.56 ***
T1 Marijuana (lifetime)	39.8 ^a	34.3 ^{a,b}	29.0 ^b	6.93 *
T2 Marijuana (past year)	40.4 ^a	31.6 ^{a,b}	29.1 ^b	7.94 *
T1 Hard Drug (lifetime)	15.5 ^a	10.6 ^{a,b}	7.2 ^b	9.27 **
T2 Hard Drug (past year)	11.3 ^a	9.2 ^a	4.0 ^b	8.77 **

Notes:

* p < .05

** p < .01

*** p < .001

Different superscripts denote significant differences between groups.

Table 3

Standardized Path Estimates for Overarching Model.

Predictors (T1)	Dependent Variables (T2)			
	Physical Perpetration $R^2 = .26$	Alcohol $R^2 = .33$	Marijuana $R^2 = .45$	Hard Drugs $R^2 = .46$
Physical Perpetration	.44 (.04) ***	---	---	---
Alcohol (Lifetime)	.11 (.05) *	.44 (.04) ***	.18 (.04) ***	.36 (.08) ***
Marijuana (Lifetime)	-.09 (.06)	.17 (.05) ***	.53 (.03) ***	.28 (.06) ***
Hard Drugs (Lifetime)	.10 (.48) *	.09 (.07)	.10 (.04) *	.26 (.07) ***
Mother Violence (Lifetime)	.11 (.05) *	-.02 (.05)	.04 (.05)	-.04 (.07)
Father Violence (Lifetime)	.01 (.05)	.03 (.05)	.03 (.04)	.10 (.07)

*Note:** $p < .05$ ** $p < .01$ *** $p < .001$

Standard errors are in parentheses.

Table 4

Standardized Path Estimates for Interactions in Main Models.

Predictors (T1)	Physical Perpetration (T2)
Alcohol (Lifetime) × Physical Perpetration	-.01 (.11)
Marijuana (Lifetime) × Physical Perpetration	-.07 (.08)
Hard Drugs (Lifetime) × Physical Perpetration	.03 (.10)
Mother Violence (Lifetime) × Physical Perpetration	-.04 (.08)
Father Violence (Lifetime) × Physical Perpetration	-.11 (.08)

Note: Standard errors are in parentheses. All *p* values > .10