



## Review Article

# The mediating role of school connectedness in the associations between dating and sexual violence victimization and substance use among high school students



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## ABSTRACT

Dating and sexual violence victimization affect a significant portion of teenagers and result in a wide array of negative health and behavioral outcomes, including increased alcohol and drug use. In some cases, students who have been victimized may develop feelings of being unsupported by or disconnected from peers and adults in their school community, placing them at even higher risk for negative health outcomes. Using a prospective design, the present study sought to explore this possibility by examining the direct and indirect associations between dating violence (DV) and sexual violence (SV) victimization, school connectedness, and alcohol and marijuana use at baseline (T1) and 2-month follow-up (T2) in a sample of high school students ( $N = 1752$ ). Results of multiple regression analyses supported a hypothesized mediation model of these associations; both forms of victimization were positively associated with heavy drinking at T1 and marijuana use at T1 and T2, and negatively associated with school connectedness. Furthermore, school connectedness was negatively associated with both forms of substance use at T1 and T2, and partially mediated the effects of DV and SV victimization on heavy drinking at T1, and marijuana use at T1 and T2. These findings elucidate the importance of addressing intermediary cognitive processes such as perceptions of school connectedness in order to improve health and functional outcomes among high school victims of dating and sexual violence.

Dating violence (DV) and sexual violence (SV) occur at an alarming rate among adolescents, with global reports showing approximately one third of 15–19-year-old girls who have ever been in dating relationships have experienced either DV or SV (World Health Organization, 2013). Although research documenting trends in DV and SV has focused largely on their prevalence and consequences in college students, recent data suggests that rates of SV among high school students are also high (Wincentak et al., 2017). As with older populations, the preponderance of physical and sexual violence among adolescents is perpetrated by romantic partners or other acquaintances of the victim (Jackson et al., 2000; Rennison, 2002). A recent study by Hébert et al. (2017) examining the prevalence of DV and SV among high school youth found that 56% of students reported experiencing some form of psychological abuse from a dating partner, 15% reported experiencing some form of physical violence, and 20% reported experiencing some form of SV. An additional survey of DV and SV rates among high school students in the United States likewise found that up to 23% of students had experienced physical DV, SV, or both within the previous 12 months (CDC,

2017). These data illustrate the broad reach of dating and sexual violence early in the lifespan.

The negative impacts of DV and SV on the well-being of teenagers are documented in several studies. Research indicates that DV and SV victimization are associated with myriad adverse outcomes, including depression, low self-esteem, sexual risk behaviors, extreme weight control behaviors, suicidal ideation and attempts, and adult violence victimization (Exner-Cortens et al., 2013). Additionally, DV and SV victimization are associated with increased engagement in a variety of health-risk behaviors, including smoking tobacco, smoking marijuana, engaging in heavy episodic drinking, and taking other illegal drugs (Exner-Cortens et al., 2013; Shorey et al., 2011).

## 1. Victimization and substance use

Extant research indicates that, in many cases, increases in substance use among victims of SV are driven by maladaptive efforts to cope with the emotional and psychological distress caused by their experience of

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violence. According to the self-medication hypothesis (Baker et al., 2004; Khantzian, 2003), individuals who experience traumatic events may resort to substance use as a means of relieving post-traumatic symptoms precipitated by that event; a conjecture that is corroborated by a number of studies showing that episodes of heavy drinking among trauma victims are often motivated by coping-related reasons, such as ameliorating sleep difficulties (Nishith et al., 2001), and reducing negative affect (Littleton et al., 2007) and hyperarousal (Stewart et al., 2000). Examinations of substance use motives among women victims of sexual violence likewise demonstrate that alcohol use is often intended to self-medicate against depression, anxiety, and PTSD symptoms arising from the experience of victimization (Grayson and Nolen-Hoeksema, 2005; Ullman et al., 2005).

## 2. Social Impacts of victimization

In some cases, the self-medicating motives underlying substance use may reflect more general patterns of avoidant coping that develop as a result of trauma, and manifest in a range of maladaptive behaviors, including social disengagement and withdrawal (Foa and Riggs, 1995; Orsillo et al., 2004; Tull et al., 2004). For victims of DV and SV, prolonged engagement in social avoidance may ultimately inhibit healthy adjustment and deteriorate access to support resources (Bonomi et al., 2006; Ullman et al., 2007). These negative outcomes are observed for adolescent victims of DV and SV in several studies (Ellis et al., 2009; Linder et al., 2002), which show that victimization may often lead individuals to feel less connected to their social groups or larger community (Hamby et al., 2018).

School connectedness is defined as the extent to which students feel personally accepted, respected, included, and supported by others in their school community (Goodenow, 1993). School connectedness represents an especially vital source of social support during adolescence, as individuals begin to rely less on their family unit and more on networks of peers and friends found within their school and community environments (Weinstein et al., 2006). The importance of school connectedness in adolescent adjustment is corroborated by a growing body of research demonstrating its protective effects against a range of negative health and functional outcomes (CDC, 2018).

Recent studies suggest that school connectedness may play an important role in the risk trajectories of students who experience DV and SV victimization (Bosworth and Judkins, 2014; Day et al., 2016). Students who feel disconnected from their school community in the aftermath of DV or SV may be at increased risk of substance use and other negative outcomes associated with victimization (Blum, 2005; Bond et al., 2007; CDC, 2018). Conversely, students who maintain a sense of school connectedness following DV or SV victimization may be more likely to utilize available social support resources and engage in adaptive coping behaviors, and thus, be less likely to engage in substance use as a means of self-medication (Chapman et al., 2011).

Taken together, these findings suggest that school connectedness may be an important modifiable factor that can be promoted in high school settings to reduce risks and improve well-being among students who experience DV and SV. As such, it represents a promising intervention target that has received little attention thus-far. Victims' perceptions of general social support may be influenced by a variety of factors across domains that are difficult to access or address in school-based interventions. On the other hand, school connectedness is contingent on proximal factors within school settings that may be feasibly and directly addressed by interventionists to increase support for victims at multiple levels of the social ecology (i.e. school policies, teachers, peers).

## 3. The current investigation

The current study aimed to evaluate empirical support for the utility of addressing school connectedness in school-based DV and SV

interventions by testing its mediating role in the associations between victimization and substance use in a high school sample. The potential for victimization to indirectly influence substance use through its effects on social connectedness is consistent with studies of adult women, which suggest that social withdrawal associated with PTSD may decrease feelings of being socially supported (Laffaye et al., 2008), which in turn could lead to increases in daily drinking (Mohr et al., 2001). To our knowledge, no previous work has directly tested these potential associations in a high school sample using a comprehensive conceptual framework. To address these shortcomings in the literature, the present investigation sought to develop and test a mediation model integrating four hypothesized associations elucidated by previous research:

1. The direct association between victimization and substance use  
**H<sub>1</sub>**. Both forms of victimization will be associated with increased alcohol and marijuana use.
2. The direct association between victimization and school connectedness  
**H<sub>2</sub>**. Both forms of victimization will be associated with decreased school connectedness.
3. The direct association between school connectedness and substance use  
**H<sub>3</sub>**. School connectedness will be associated with decreased alcohol and marijuana use.
4. The mediated association of victimization on substance use through school connectedness  
**H<sub>4</sub>**. Both forms of victimization will indirectly lead to increased alcohol and marijuana use by decreasing school connectedness.

## 4. Method

### 4.1. Participants

The current study included data collected at baseline (T1) and follow-up (T2) periods from a large sample of 10th grade students ( $Mage = 15.38$ ,  $SD = 0.63$ ) across 27 high schools in Rhode Island as part of an ongoing randomized controlled trial (RCT) of a school-based sexual assault prevention program (*citation removed for purpose of masked review*). T1 surveys were administered early in the fall semester, and T2 surveys were administered 2 months later. Although data on participants' race or ethnicity were not collected in the current study due to prohibitions from the state Department of Education, publicly available information on student demographics within each school suggests that approximately 31% of the students across study sites identified as racial/ethnic minorities.

Preliminary analyses were conducted to confirm that exposure to prevention programming had no confounding effects on follow-up measures used in this study. Participants who identified as transgender (0.5% of total  $N$ ), reported not being in any romantic relationships in the previous year (62.7% of total  $N$ ), or did not complete T2 measures of alcohol or marijuana use were excluded from analyses. The resulting final sample included 1752 participants (47.5% Boys, 52.5% Girls).

### 4.2. Measures

#### 4.2.1. T1 DV and SV victimization

Participants' experiences of DV and SV victimization by a romantic partner over the previous year were assessed using the Physical Abuse and Sexual Abuse subscales of the Conflict in Adolescent Dating Relationship Inventory (CADRI; Wolfe et al., 2001). Each subscale comprised of 4-items that asked participants how often in the past year a romantic partner had engaged in different forms of physical abuse

(e.g. slapped them or pulled their hair) or sexual abuse (e.g. coerced them into having sex) towards them. Participants responded to each item using the following 4-point scale: 0 (“Never”), 1 (“Seldom; 1-2 times”), 2 (“Sometimes; 3-5 times”), or 3 (“Often; 6 or more times”). Scores for DV victimization were computed using the four Physical Abuse subscale items. Responses to each item were summed to create a total DV score, which was then dummy coded (0 = no victimization, 1 = at least 1 instance of victimization) in accordance with established procedures for including dichotomous variables in a univariate regression model (Cohen, Cohen, West, & Aiken, 2003). Scores for SV victimization were computed with the four Sexual Abuse subscale items using the same procedure. Previous research on the CADRI (Wolfe et al., 2001) found internal consistency reliability to be good for the Physical Abuse items (Chronbach's  $\alpha = 0.83$ ) and poor for the Sexual Abuse items (Chronbach's  $\alpha = 0.51$ ). In the present sample, internal consistency reliability was good for both the Physical Abuse (Chronbach's  $\alpha = 0.87$ ) and Sexual Abuse (Chronbach's  $\alpha = 0.80$ ) items.

#### 4.2.2. T1 school connectedness

Participants' feelings of school connectedness were assessed using seven items adapted from the California Healthy Kids Survey and the California School Climate Survey (Austin et al., 2013), and the National Longitudinal Study of Adolescent Health (McNeely et al., 2002). Each item asked participants to rate how much they agreed with a statement regarding their feelings of school connectedness (e.g. “I feel close to people at my school”; “This school is a safe place for students”) on a 5-point Likert scale ranging from 0 (strongly disagree) to 4 (strongly agree). Items demonstrated strong internal consistency reliability in the current study sample (Chronbach's  $\alpha = 0.93$ ) and were summed to create a school connectedness score.

#### 4.2.3. T1 and T2 alcohol and marijuana use

Participants' engagement in alcohol and marijuana use at T1 and T2 was assessed using 2 items adapted from the CDC's Youth Risk Behavior Survey (CDC, 2013). For the alcohol item, participants were asked: “During the past month, on how many days did you have 4 or more (if you are a female) or 5 or more (if you are a male) drinks of alcohol in a row within a couple of hours? A drink of alcohol is a 12-ounce beer, a 5-ounce glass of wine, or a 1.5 ounce shot of liquor”. For the marijuana item, participants were asked “During the past month, on how many days did you use marijuana to get high?”. Participants responded to both items using the following scale: 0 (“Never”); 1 (“1 or 2 days”); 2 (3 to 9 days); 3 (10 to 19 days); or 4 (20 to 31 days).

#### 4.3. Statistical analysis

Preliminary analyses were conducted in SPSS version 23 to examine descriptive statistics, basic correlations among study variables, and group differences on dependent measures to establish conditions for further modeling. The hypothesized associations among the study variables were then assessed in a series of linear multiple regression analyses. As shown in Fig. 2, our first set of analyses examined direct and indirect associations of DV victimization with substance use in separate mediation models for alcohol and marijuana. In each model, T1 and T2 measures of substance use were regressed on the mediating variable of school connectedness and the independent variable of DV victimization respectively, with school included as a cluster-level variable. Each model was then retested with SV Victimization entered as the independent variable (see Fig. 3). This approach allowed us to examine: (a) the direct effects of each form of victimization on school connectedness and each form of substance use; (b) the direct effects of school connectedness on each form of substance use after accounting for each form of victimization; (c) the indirect effects of each form of victimization through school connectedness on each form of substance use at T1 and T2.

All models were constructed and tested in Mplus version 8 (Muthén

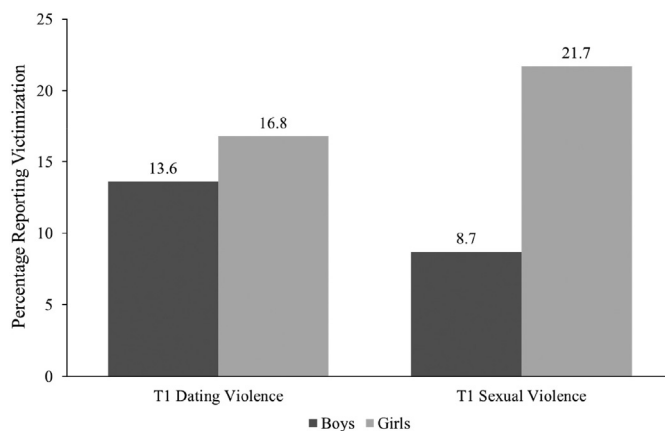


Fig. 1. Bar graph of T1 victimization rates by gender.

and Muthén, 2017) using maximum likelihood estimation with robust standard errors (MLR). MLR provides an alternative method for potential heteroskedasticity and non-normality of data and has been shown to produce parameter estimates and standard errors identical to those obtained in bootstrapping in simulation studies (Muthén and Muthén, 2017). Bias-corrected 95% confidence intervals were used as a criterion for identifying significant parameters among the terms of the models (Williams and MacKinnon, 2008).

## 5. Results

### 5.1. Descriptive statistics

Percentages of boys and girls who reported experiencing DV or SV victimization within the past year are displayed by gender in Fig. 1. Means, standard deviations, and bivariate correlations of the study variables are presented in Table 1. The significance and direction of associations among the study variables were consistent with hypotheses and confirmed conditions were met for mediational analyses. Gender differences in base rates of each form of victimization were consistent with previous research (Edwards et al., 2015; Marshall, 1992; Wolfe et al., 2001), and provided a basis for examining each form of violence individually.

### 5.2. Preliminary analyses

Group differences on dependent measures were assessed to inform primary analyses of the hypothesized models. A pair of one-way ANOVAs was used to assess potential confounding effects of exposure to sexual assault prevention programming being implemented at each school as part of the larger RCT from which the current study derived. Comparisons indicated no significant differences between participants in the treatment versus control groups on measures of alcohol ( $p = .152$ ) and marijuana use at T2 ( $p = .115$ ). Thus, participants in both groups were retained in the final sample. A pair of MANOVAs was conducted to assess Gender differences on dependent measures of each type of substance use at T1 and T2. Results indicated no significant differences between boys and girls in rates of heavy drinking at T1 ( $p = .143$ ) or T2 ( $p = .538$ ), or in marijuana use at T1 ( $p = .590$ ) or T2 ( $p = .439$ ). Thus, gender was not included as a covariate in the subsequent analyses.

### 5.3. Path analyses

Direct paths and corresponding standardized coefficients for the DV and SV models are presented in Figs. 2 and 3 respectively. Standardized and unstandardized coefficients and standard errors for direct paths in

**Table 1**  
Means, standard deviations, and bivariate correlations of study variables.

Variable	M	SD	1	2	3	4	5	6	7	8
1. Gender	-	-	1	-	-	-	-	-	-	-
2. DV	0.16	0.36	0.04	1	-	-	-	-	-	-
3. SV	0.17	0.37	0.18**	0.33**	1	-	-	-	-	-
4. SC	2.40	0.94	-0.06**	-0.19**	-0.10**	1	-	-	-	-
5. T1A	0.18	0.58	0.03	0.19**	0.13**	-0.14**	1	-	-	-
6. T2A	0.23	0.71	0.02	0.10*	0.08	-0.10**	0.42**	1	-	-
7. T1M	0.32	0.89	0.03	0.22**	0.17**	-0.18**	0.46**	0.35**	1	-
8. T2M	0.41	1.03	-0.02	0.22**	0.16**	-0.14**	0.30**	0.49**	0.64**	1

Note. DV = Time 1 dating violence victimization; SV = Time 1 sexual violence victimization; SC = Time 1 school connectedness; T1A = Time 1 heavy drinking; T2A = heavy drinking at 2-month follow-up; T1M = Time 1 marijuana use; T2M = marijuana use at 2-month follow-up.

\*  $p < .05$ .  
\*\*  $p < .01$ .

all models are presented in Table 2. Fit indices are not reported since all paths in the model were tested, ensuring model saturation (Kline, 2011).

5.3.1. Effects of victimization on substance use

DV victimization was associated with more frequent heavy drinking and more frequent marijuana use at both T1 and T2. SV victimization was associated with more frequent marijuana use at both T1 and T2, and more frequent heavy drinking at T1, but not at T2.

5.3.2. Effects of victimization on school connectedness

DV victimization and SV victimization were both negatively associated with school connectedness in the heavy drinking and marijuana use models.

5.3.3. Effects of school connectedness on substance use

In both the DV and SV models, school connectedness was negatively associated with heavy drinking and marijuana use at T1 and T2.

5.3.4. Indirect effects of victimization on substance use

DV victimization had a significant indirect effect on heavy drinking through school connectedness at T1 ( $B = 0.02$ ,  $SE = 0.01$ , 95% CI [0.009, 0.038]), but not at T2 ( $B = 0.02$ ,  $SE = 0.02$ , 95% CI [-0.005, 0.054]). DV victimization also had significant indirect effect on marijuana use through school connectedness at both T1 ( $B = 0.05$ ,  $SE = 0.01$ , 95% CI [0.026, 0.079]) and T2 ( $B = 0.05$ ,  $SE = 0.02$ , 95% CI [0.014, 0.085]). SV victimization had a significant indirect effect on heavy drinking through school connectedness at T1 ( $B = 0.02$ ,  $SE = 0.01$ , 95% CI [0.006, 0.038]), but not at T2 ( $B = 0.02$ ,  $SE = 0.01$ , 95% CI [-0.001, 0.044]). SV victimization also had significant indirect

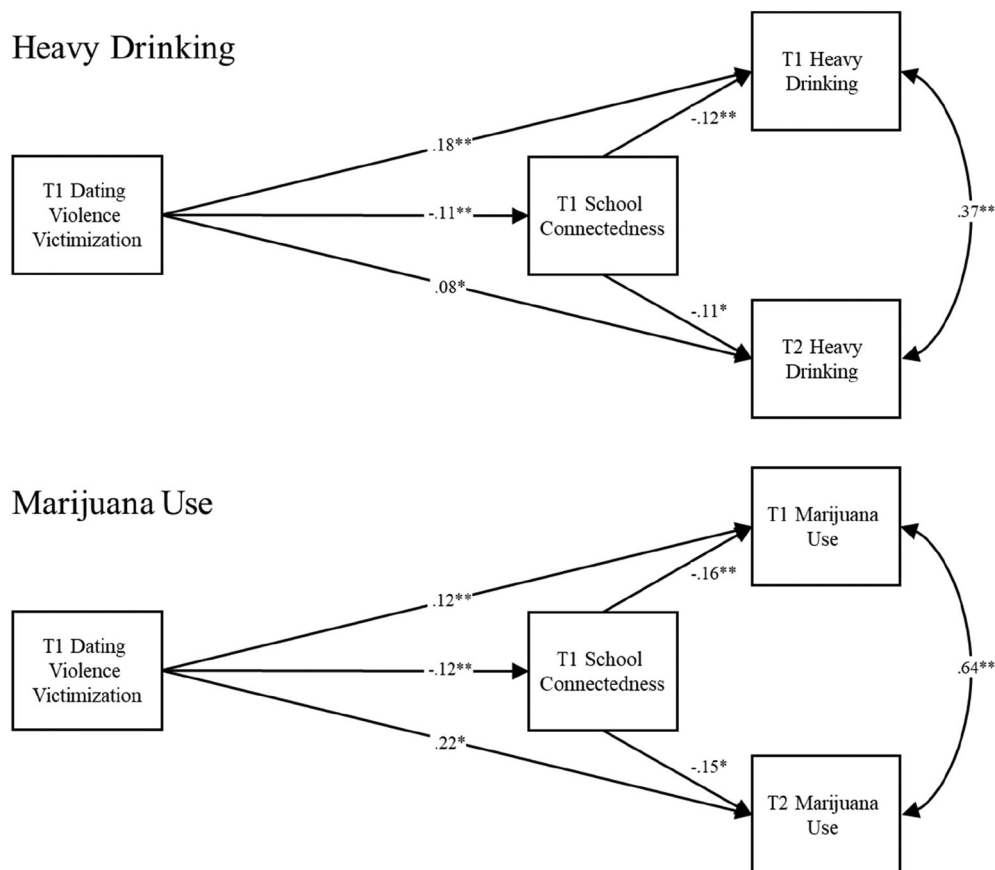


Fig. 2. Dating violence models for heavy drinking and marijuana use showing direct paths and corresponding standardized coefficients.

\*  $p < .05$ . \*\*  $p < .001$ .

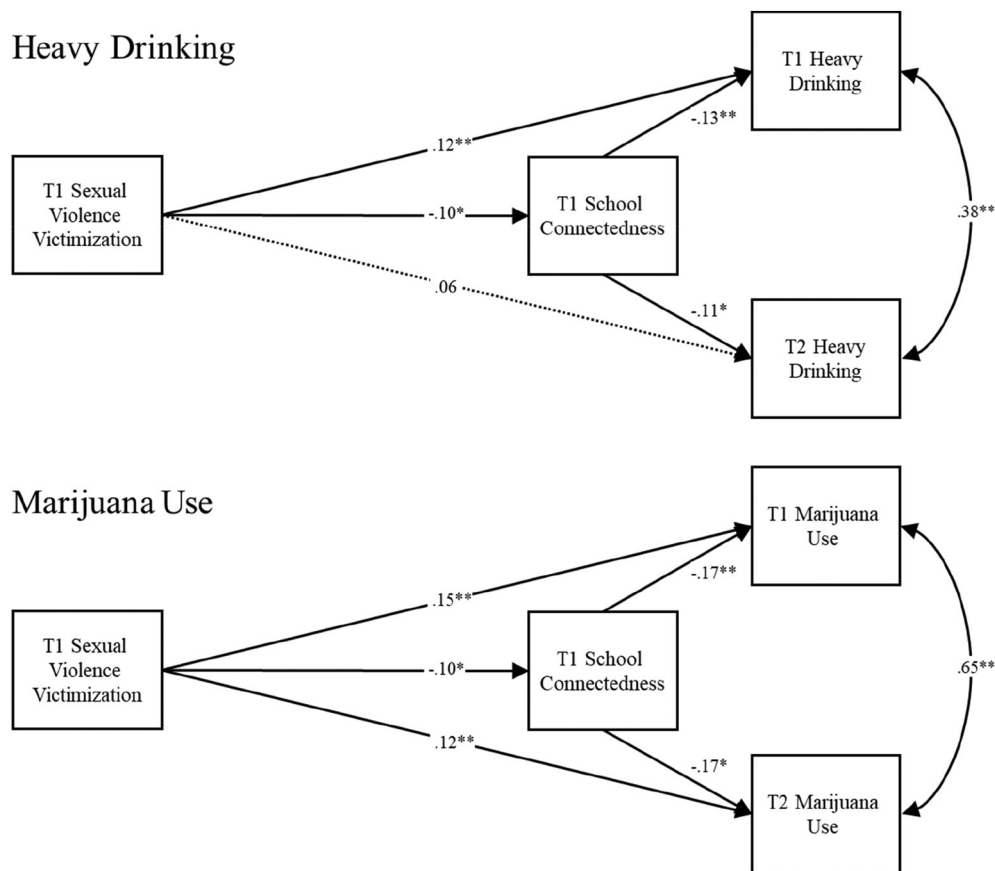


Fig. 3. Sexual violence models for heavy drinking and marijuana use showing direct paths and corresponding standardized coefficients. \*  $p < .05$ . \*\*  $p < .001$ .

Table 2 Standardized coefficients, unstandardized coefficients, and standard errors for direct paths in dating violence and sexual violence models.

Model	Dating violence				Sexual violence			
	Path	$\beta$	<i>B</i>	<i>SE</i>	Path	$\beta$	<i>B</i>	<i>SE</i>
Heavy drinking	DV → T1A	0.18**	0.33**	0.07	SV → T1A	0.12**	0.20**	0.05
	DV → T2A	0.08*	0.16*	0.06	SV → T2A	0.06	0.11	0.09
	DV → SC	-0.11**	-2.13**	0.39	SV → SC	-0.10*	-1.85*	0.65
	SC → T1A	-0.12**	-0.01**	0.00	SC → T1A	-0.13**	-0.01**	0.00
	SC → T2A	-0.11*	-0.01*	0.01	SC → T2A	-0.11*	0.01*	0.00
Marijuana use	DV → T1M	0.12**	0.56**	0.11	SV → T1M	0.15**	0.42**	0.06
	DV → T2M	0.22**	0.61**	0.15	SV → T2M	0.12**	0.31**	0.08
	DV → SC	-0.12**	-2.20**	0.38	SV → SC	-0.10*	-1.84*	0.65
	SC → T1M	-0.16**	-0.02**	0.00	SC → T1M	-0.17**	-0.02**	0.00
	SC → T2M	-0.15**	-0.02**	0.01	SC → T2M	-0.17**	-0.03**	0.00

Note. DV = Time 1 dating violence victimization; SV = Time 1 sexual violence victimization; SC = Time 1 school connectedness; T1A = Time 1 heavy drinking; T2A = heavy drinking at 2-month follow-up; T1M = Time 1 marijuana use; T2M = marijuana use at 2-month follow-up.

\*  $p < .05$ .  
\*\*  $p < .01$ .

effect on marijuana use through school connectedness at both T1 ( $B = 0.05$ ,  $SE = 0.02$ , 95% CI [0.008, 0.081]) and T2 ( $B = 0.05$ ,  $SE = 0.02$ , 95% CI [0.002, 0.089]).

### 6. Discussion

The present study extends the extant literature on dating and sexual violence among teenagers by addressing the mediating role of school connectedness in victims' likelihood of engaging in substance use. Recent studies of DV and SV among teenagers suggest that the

experience of victimization may lead students to feel less connected to their school community (Ellis et al., 2009; Hamby et al., 2018). Other work suggests that lower perceptions of social support may place victims of DV and SV at higher risk of engaging in substance use as a means of self-medicating against the distress associated with the experience of violence (Sigurvinsdottir and Ullman, 2015; Bond et al., 2007). The present study is the first to synthesize and extend these findings by integrating and testing the direct and indirect associations between DV and SV victimization, school connectedness, and substance use in a large longitudinal sample of high school students.

The pattern of results revealed by our analyses replicates several associations observed in previous research on the effects of DV and SV victimization. In accordance with other studies on adolescents (Exner-Cortens et al., 2013; Shorey et al., 2011), our results show that students experienced DV and SV victimization within the past year reported higher rates of heavy drinking and marijuana use at baseline than non-victims. Furthermore, both forms of victimization were associated with higher rates of marijuana use over the 2-month follow up period, and DV victimization was also associated with higher rates of heavy drinking at 2-month follow up.

In congruence with previous work on adult populations (Sigurvinsdottir and Ullman, 2015; Ullman et al., 2007), our results also showed that students who experienced DV or SV victimization within the prior year reported significantly lower feelings of school connectedness compared to non-victims. Furthermore, lower school connectedness was associated with increases in heavy drinking and marijuana use at both T1 and T2, consistent with recent work demonstrating its protective effects against other health-risk behaviors (Blum, 2005; Bond et al., 2007).

By integrating the series of replicated associations described above within an innovative conceptual model, the present study was also able to assess the mediated influence of victimization on substance use through school connectedness. Our analyses showed that both DV and SV victimization were indirectly associated with higher rates of T1 marijuana use and heavy drinking, as well as higher rates of T2 marijuana use through decreases in school connectedness. These results generally support the hypothesized conceptual model the present study sought to evaluate. However, in contrast to our predictions, SV victimization did not have a significant effect on heavy drinking at T2, and neither form of victimization had a significant indirect effect on heavy drinking at T2. One possibility is that the dependent measures of heavy drinking used in the current study did not capture variation in alcohol use below 4/5 drinks per sitting. In many cases, victimization may lead to significant increases in the frequency and amount of alcohol use that do not meet criteria for an episode of drinking. Another explanation for these findings is that adolescents may use some forms of substance use (i.e. marijuana use) to cope with victimization-related distress more than others (i.e. alcohol use). Moreover, the extent to which coping motives play a role in substance use behaviors may shift over time (Mohr et al., 2013; Simpson et al., 2014). For instance, it is possible that baseline rates of heavy drinking among victims of DV and SV were primarily driven by coping motives, whereas heavy drinking at 2-month follow-up may have been more reflective of drinking habits and social motives that emerged or increased during the interval period. However, these possibilities could not be addressed with the measures included in the current study.

## 7. Limitations

The inconsistencies noted above reflect several methodological shortcomings of the present study. First, because school connectedness was assessed at T1 rather than an intermediary timepoint between T1 and T2, true mediation could not be inferred. Additionally, the dependent measures of alcohol use used in this study only assessed episodes of heavy drinking, and were thus not sensitive to increases in alcohol use that were below the threshold of 4/5 drinks per sitting. Furthermore, our study did not include measures of other theoretically important constructs. Based on the self-medication hypothesis (Baker et al., 2004), we presumed that increases in substance use among victims of SV and DV were reflective of efforts to self-medicate against post-traumatic distress. However, the lack of measures assessing post-traumatic symptomology among participants in the current study undermined our ability to make this inference. The generalizability of the present findings is also limited by the restricted demographic and geographic range of the study sample.

## 8. Conclusion

Taken together, results of the present study provide novel evidence that reductions in feelings of school connectedness are an important, modifiable process through which DV and SV victimization may contribute to substance use among high school students. As such, they bear several important clinical implications. First, they underscore the utility of assessing students' perceptions of school connectedness in violence prevention programming. Early assessment of school connectedness may help to identify ways in which school support resources for victims could be improved at different socioecological levels (e.g. teacher supportiveness, campus awareness). Second, the present study suggests that promoting students' feelings of school connectedness may be a valuable strategy for increasing students' awareness and use of support resources that may help to buffer their risk of engaging in substance use. Future research incorporating measures of victimization-related symptoms and coping-motives related to substance use may help to further confirm the theoretical sequence of processes presumed by our model. Additionally, the use of qualitative methods may also be extremely useful for providing insight into how experiences of SV and DV may affect students' feelings of school connectedness, and elucidating specific school-level targets for promoting resilience among victims.

## CRedit authorship contribution statement

**Mazheruddin M. Mulla:** Conceptualization, Methodology, Formal analysis, Validation, Writing - original draft, Visualization. **Katherine W. Bogen:** Investigation, Data curation, Project administration, Writing - original draft, Writing - review & editing. **Lindsay M. Orchowski:** Funding acquisition, Methodology, Investigation, Resources, Project administration, Supervision, Writing - review & editing.

## Declaration of competing interest

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