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Examining the Moderating Role of Social Bonds in the Relationship between School Victimization and Educational Attainment

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Abstract

School victimization affects a relatively small proportion of students each year, but this victimization may have long-term effects on a child's life trajectory, including graduating high school and enrolling in college. Social bond theory posits that bonds – like commitment and involvement – may buffer the harmful effects of victimization. This research uses the Education Longitudinal Study of 2002 (n = 16,197) to examine the moderating role of social bonds between school victimization and these measures of educational attainment. The results of the study using moderation showed that student victimization does not affect graduating high school nor enrolling in college. The relationship between student victimization and these educational outcomes is partially moderated by involvement, but not commitment.

Keywords

Experiencing victimization at school can have consequences that significantly alter a student's educational outcomes. One national study found that the theft victimization rate was 10.6 per 1000 students and violent crime victimization was 16.0 per 1000 students aged 15 to 18 (Musu-Gillette et al., 2018). Additionally, 21% of 10th graders reported being bullied in 2015 (Musu-Gillette et al., 2018). These victimization experiences are important outcomes on their own, but they can also influence a range of important academic outcomes and milestones. For example, among students ages 12–15, 13.3% of victimized students reported that the victimization affected their schoolwork "somewhat" or "a lot" (Musu-Gillette et al., 2018). Again, while this does not reflect a majority of students' experiences, the consequences may be severe. Extant research has tied school-based victimization to decreased grade point average (Wang et al., 2014), lower academic performance (Schwartz et al., 2005), and diminished school engagement (Ripski & Gregory, 2009).

Although there is broad recognition that school-based victimization can decrease some academic outcomes, existing studies have focused almost exclusively on student grades, standardized test scores, and school avoidance (Nakamoto & Schwartz, 2010). However, given the established link between victimization and school attainment, it is likely that victimization may also delay – or prevent – high school graduation and enrollment in secondary education. Understanding the extent to which victimization influences graduation and college enrollment is pressing because these two academic milestones have been linked to longer-term life experiences such as criminal offending (Natsuaki et al., 2008; Sprott et al., 2005), association with deviant peers (Staff & Kreager, 2008), mental health (Liem et al., 2010), and income and employment (Fernandez et al., 2015).

In addition to understanding the link between school-based victimization and graduation and college enrollment, there is a concurrent need to focus on factors that may buffer, or reduce, the negative impacts of victimization on students' educational attainment. One useful perspective is Hirschi's (1969) theory of social bonds. According to Hirschi (1969), four components of social bonds (i.e., attachment, commitment, belief, and involvement) can act in a protective capacity when they are present in a juvenile's life. These bonds encourage juveniles to make positive, prosocial decisions that preserve their relationships with individuals and institutions with which they have bonded. This perspective has been fruitful in understanding school-based outcomes. For example, Stewart (2003) found that students with greater bonds to school reported lower levels of misbehavior than students lacking bonds. Moreover, a recent meta-analytic review found that bonds were a strong protective factor against later bullying behaviors (Ttofi et al., 2014).

Drawing from a social bonds perspective (Hirschi, 1969), this study will examine the link between student victimization in school and two understudied academic outcomes. Specifically, this study extends prior research by examining the relationship between several forms of school victimization and completing high school and enrolling in college. Additionally, this study examines the extent to which two key social bonds – commitment and involvement – might moderate these outcomes for 10th grade victims of school victimization.

Victimization and life outcomes

Prior research on victimization suggests that can significantly influence life outcomes (see, broadly, Sampson & Laub, 1993; Takizawa et al., 2014). For example, research has tied victimization to a variety of negative external processes including antisocial behavior, criminal justice system contact, violence, suicidal ideation, and depression (Brunstein Klomek et al., 2013; Seals & Young, 2003; Ttofi et al., 2014, 2012). Specific to this study, high school graduation and post-secondary education are key milestones in a person's trajectory, but school victimization may prevent students from attaining these milestones.

Considering educational outcomes specifically, studies examining the relationship between school victimization and academic attainment have shown relationships of varying magnitudes. Synthesizing this body of literature, one meta-analysis examined the relationship between victimization and academic outcomes including grades (self-report and

official), standardized test scores, and teacher ratings of student academic achievement (Nakamoto & Schwartz, 2010). This study found a small but significant negative correlation, showing that victimization can result in poorer academic attainment. Some scholars speculate that decreased educational attainment among victims stems from the fact that they receive less education than non-victims (Fernandez et al., 2015), perhaps because of missing school or a lack of concentration in classes due to fear of victimization.

However, this meta-analysis did not address the impact of victimization on graduating high school and enrolling in post-secondary education. A few existing studies have examined the likelihood of high school graduation following violent school victimization. These studies have found that violent victimization is negatively correlated with both high school graduation and college enrollment (Grogger, 1997; Wilczak, 2014). In an examination of Black 10th grade students, Minor and Benner (2018) found that students who perceived their schools to be safe were more likely to enroll in college and were 47% more likely to attend a 4-year institution within 2 years of graduating high school compared to enrolling in a 2-year institution. Still, in these studies, the role of nonviolent experiences of victimization in relation to high school graduation and college enrollment was not examined. Consequently, research provides little insight into the link between less serious forms of victimization and these educational outcomes.

Social bonds as potential protective factors

Although studies have found that students are negatively affected by victimization, students may have protective factors in their lives that mitigate the negative educational outcomes resulting from victimization. Social bond theory (Hirschi, 1969) suggests that strong bonds can act in a protective capacity, potentially protecting students from the negative educational effects of school victimization. In the original formulation, the components of social bonds are attachment, commitment, involvement, and belief (Hirschi, 1969). Attachment refers to a person's connectedness with others and the strength of those relationships. According to the theory, the people to whom juveniles have strong attachments help them understand society's expectations and hold them accountable to follow society's norms. Commitment is related to believing in the importance of conforming to society's rules regarding prosocial behavior and goal achievement, including education. Involvement includes participating in activities including work, sports, family activities, recreation, and hobbies. In its application to juveniles, involvement leads to less likelihood of engaging in crime because being involved in these conventional activities does not leave time for non-conventional activities. Belief involves the adherence to a common value system between an individual and his society. In the United States, this belief system often includes graduating high school and enrolling in post-secondary education.

Although social bond theory was developed to understand the link between bonds and delinquency, it is also a fruitful perspective to understand non-crime related outcomes such as school success (Hirschi, 1969). According to the theory, strong social bonds lower the likelihood of engaging in negative or harmful behaviors because a person does not want to risk losing these bonds. Since its original application to delinquency, the theory has been applied to multiple maladaptive social outcomes including student misbehavior, dropping

out, violent behavior, and substance abuse (Neely & Vaquera, 2017). In the context of victimization, social bonds may protect juveniles from the negative outcomes that often accompany school victimization experiences.

To date, only a handful of studies have examined the role of social bonds in the relationship between peer victimization and negative outcomes for high school students; however, these studies tend to examine non-educational outcomes and focus primarily on attachment. For example, studies have shown that having peer support – a form of attachment – mediated the link between victimization and depressive symptoms (Brendgen & Poulin, 2018; Holt & Espelage, 2007), and victimization and anxiety (Reid et al., 2016), although Holt and Espelage (2007) found that only those with a moderate degree of peer support were protected. In another study, feeling connected to the school – also a form of attachment – led to lower levels of depression and suicidal ideation among bullying victims aged 12–15 years (Arango et al., 2018). Peer support has also been shown to moderate the effect of victimization on socioemotional wellbeing such that students reported greater wellbeing when they had more peer support (Cuadros & Berger, 2016). Considering educational outcomes, having prosocial peers has been shown to mitigate the negative effects of victimization (Ttofi et al., 2014). In one study, school engagement (containing behavioral, cognitive, and emotional components) also mediated the effect of peer victimization on attendance and GPA (Dunkle, 2009).

Conversely, others have not found support for some components of the social bond theory. In two studies, having a friend – a form of attachment – at school did not affect a victim's decision to avoid school (Hutzell, 2014; Hutzell & Payne, 2018). In another study, participation in school activities and closeness to peers and adults was not found to be safeguard against school avoidance among bullying victims (Sobba, 2017). Quality of friendship did not mitigate the relationship between peer victimization and academic engagement, GPA, or depression (Abou-Ezzeddine, 2008). In studies examining belief, there was no significant relationship between victimization and belief in future achievement (Hutzell, 2014; Hutzell & Payne, 2018).

A focus on commitment and involvement

Although research examining the potential moderating role of social bonds on victimization provides mixed results, one key limitation is that prior studies examining social bonds tend to focus less on involvement and commitment as potential moderators. This is perhaps surprising given existing studies that link both involvement and commitment to prosocial outcomes among students, which we turn to now.

Involvement in the school often includes participating in honor societies, student government, and athletics programs (Peguero et al., 2016). Existing studies on the role of involvement in promoting prosocial outcomes among students tend to reveal that greater levels of involvement correspond to better outcomes (e.g., Bryan et al., 2012; Huebner & Betts, 2002; Miller, 2011). For example, in a study of 7th to 12th grade students, Huebner and Betts (2002) found that involvement within the school reduced delinquency, and that the effect of involvement was similar for both male and female students. In a similar vein, a study of 12th graders in the United States revealed that greater levels of school involvement

related to significantly higher levels of academic achievement (Bryan et al., 2012). Miller (2011) found that students with greater participation in recreational sports reported greater levels of integration into the school than students with lower levels of recreational sport participation. Studies have also found that students who dropped out of school reported lower levels of meaningful participation in school activities – a form of involvement – compared to peers who did not drop out of school (Orpinas & Raczynski, 2016). Other studies mirror this finding as involvement in school activities correlates with lower odds of dropping out (Neely & Vaquera, 2017; Neu, 2017; Orpinas & Raczynski, 2016; Peguero, 2011; Peguero et al., 2016) and skipping school (Hutzell & Payne, 2018).

Within the context of school, commitment refers to "… students' personal investment in the schoolwork, including plans for future achievement and striving for good grades" (Peguero et al., 2016, p. 321). Much like involvement, research on student commitment to school tends to reveal a positive relationship between involvement and prosocial outcomes. For example, an analysis of high school seniors revealed that greater levels of commitment were strongly related to lower levels of school-based offending (Bryan et al., 2012). Hart and Mueller (2013) found that commitment to a wide-range of school functions (e.g., athletic and non-athletic events) was significantly related to lower levels of offending among a sample of 10th graders in the United States. Using a social bond perspective, Peguero et al. (2016) found that commitment to the school decreases odds of dropping out of school for students regardless of race and ethnicity. Likewise, a study examining the relationship between liking school and enrolling in college among Black students found that those who liked high school were significantly more likely to enroll in college (Minor & Benner, 2018). In this sense, liking school is a clear indicator of commitment to the institution and future success.

Overall, then, although there is research linking victimization to poor academic outcomes, and research examining social bonds to poor academic outcomes, these mixed results raise more questions regarding social bonds as moderators of the victimization and educational attainment relationship for high school students. And more specifically, much less is known about the specific components of involvement and commitment within this process. Given the findings on the importance of involvement and commitment more generally (e.g., Bryan et al., 2012; Hart & Mueller, 2013), it is possible that greater levels of involvement and commitment might protect students from the negative consequences often associated with school-based victimization, thus raising attention to the goals of the current study.

Current study

Existing literature demonstrates that peer victimization can result in poorer educational outcomes for high school students. However, the extent to which bonds to the school might protect against these negative pathways remains unknown. The goal of the current study it to examine multiple measures of peer victimization, the social bonds of commitment and involvement, and two important academic outcomes. Drawing on social bond theory (Hirschi, 1969), we offer four hypotheses:

1. Students who experience more victimization will be less likely to graduate high school.

2.   Students who experience more victimization will be less likely to enroll in post-secondary education.

3.   The relationship between victimization and high school graduation will be weaker among students with higher levels of commitment and involvement.

4.   The relationship between victimization and post-secondary enrollment will be weaker among students with higher levels of commitment and involvement.

Method

Data

This study uses multiple waves of the Education Longitudinal Study of 2002 (ELS: 2002). This research was conducted by the U.S. Department of Education and focused on students' transition from secondary education to post-secondary education and work. The ELS is a longitudinal study focusing on 10th grade students nationwide beginning in 2002 (the base year). Additional follow-ups were made with the same group of students in 2004, 2006, and 2012. Although it is not panel data in which the exactly the same measures are collected in each wave, the same students are included in each follow-up. The students' parents, math and English teachers, principals, and heads of the school media facilities were also interviewed in the base year. Participants were asked for information on their social and educational background, support system, educational experiences, plans for and enrollment in post-secondary education, employment, and academic and work outcomes (Ingels et al., 2004).

In the base year, 750 schools were selected nationally using a probability proportional to size process. Tenth-grade students were randomly selected within those schools, creating a nested sample. Students from nonpublic schools and Asian-American students were over-sampled so the sample size for those two groups would be large enough to support comparisons with public schools and other racial groups (National Center for Education Statistics, n.d.). When considering survey weights, this created a nationally representative sample comprising 16,197 students in the base year. Participants completed questionnaires and took cognitive tests in reading and math. For the first follow-up, during the spring of the students' senior year of high school, questionnaires were again distributed to the previous participants, regardless of whether they were still enrolled in school, had dropped out or transferred, or had graduated early. Additional students who were not included in the base year were able to participate in the first follow-up. The second follow-up, conducted in 2006, included questionnaires or interviews with all previous participants, most of whom would have graduated high school by that time. A third follow-up was conducted in 2012 (Ingels et al., 2004)

Descriptive statistics of the students in the sample revealed that the sample was 50% male and 43% white. Ninety percent of students were born in the United States, and 13% had at least one Hispanic parent. The majority of the students (78.81%) attended public school. Full descriptive statistics of the sample are included in Table 1.

Measures

Dependent variables—The dependent variables representing academic attainment were from the second follow-up wave. These variables were (a) "high school completion status in 2006" (0 = did not graduate high school, 1 = graduated high school); and (b) "ever attended a postsecondary institution" (0 = *no postsecondary enrollment*, 1 = *some postsecondary enrollment*).

Independent variable—The independent variable for this study is an index capturing school-based victimization experiences drawn from the base year data. This index was created from five separate variables measuring victimization: (a) "someone forced money/things from 10th grader"; (b) "someone damaged belongings"; (c) "someone hit 10th grader"; (d) "had something stolen at school"; and (e) "someone threatened to hurt 10th grader at school." The original coding of these variables was 1 = *never*, 2 = *once or twice*, and 3 = *more than twice*. Given the low frequency of students who reported victimization of each kind more than twice, each of these measures was recoded to be dichotomous (0 = *did not experience this form of victimization*, 1 = *did experience this form of victimization*), regardless of the number of incidents.[1] The index was created by summing each of the five binary measures of victimization to create a victimization scale of 0 to 5.

Moderating variables—The moderating variables for this study include components of two social bonds: commitment and involvement. The potential measures of each social bond were selected by reviewing the codebook for the ELS for items related to these two theoretical constructs.

The first measure of social bonds is commitment. After review of the codebook, we identified 11 variables that were theoretically representative of commitment. According to Hirschi (1969, p. 162), adolescents have three "career lines": educational, occupational, and passage to adult status. These aspirations constrain delinquency since juveniles know they cannot achieve these career lines if they are delinquent, and Hirschi noted that those who are committed to higher school and career aspirations are less likely to be delinquent (p. 171). Using this information, we focused on commitment in terms of career lines and examined students' commitment toward studying and completing educational goals in order to better their futures in terms of job opportunity and finances.

Using these 11 items, we conducted an exploratory factor analysis with oblique rotation that yielded four factors, but only one with an eigenvalue above 1.0 and meaningfully large factor loadings (in this case, above 0.50). Next, using the variables with the largest factor loadings, we ran a confirmatory factor analysis (CFA) and found that a four-item CFA model fit the data well.[2] The four items were: (a) "studies to increase job opportunities"; (b) "studies to get a good grade"; (c) "works as hard as possible when studies"; and (d) "studies to ensure financial security." All these questions were measured on a four-point Likert scale (1 = *almost never*, 2 = *sometimes*, 3 = *often*, 4 = *almost always*). The factor loadings for the four variables ranged from 0.70 to 1.00 (the factor loading of 1.00 was fixed). This model

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[1]·We also conducted two alternative analyses using the victimization index. See more information in the Results section.

[2]·RMSEA: 0.051; CFI: 0.997; TLI: 0.991; chi-square: 57.22 ($p < 0.001$); Cronbach's alpha: 0.85.

was used to generate a factor score for commitment. The factor scores were calculated following the CFA using the regression-based method suggested by Thomson (1951). Conceptually, whereas calculating a scale score gives equal weight to each item that constitutes the scale (typically through addition or an unweighted mean), factor scores give greater weight to items that contribute more "information" to the underlying factor (as indicated by larger factor loadings in a CFA). In this way, factor scores provide a more accurate estimate of an observation's value on the underlying construct than scale scores.

The second measure of social bonds was involvement. The measures of involvement were a list of different activities in which participants could be involved. As such, rather than generating factor scores, we created an index of involvement. All variables used in the analysis were recoded to be dichotomous (0 = *did not participate in the activity or the school did not offer the activity* and 1 = *did participate in the activity*). The items chosen for the index were based on prior research (Mowen & Manierre, 2017). A student was given a score of 1 if they participated in any competitive interscholastic sport, including: baseball, basketball, football, cheerleading/drill team, soccer, softball, individual sport, or other team sport. A student was also coded as 1 if they participated in any of these sports on an intramural level. Additionally, variables were coded 1 each if the student participated in science/math fair; vocational/tech skills competition; band or chorus; play or musical; student government; yearbook or newspaper; service clubs; academic clubs; hobby clubs; vocational clubs; and if the student held a paid job during the 2001–2002 school year. This yielded a continuous variable ranging from 0 to 13 measuring participation in various activities. Note that the measure of involvement (an index) differs from that of commitment (a factor score).

Control variables.: We also included a set of control variables that measured personal characteristics and demographics of students and their families, student discipline at school, feelings toward the school, and characteristics of schools. First, reflecting research finding key differences in educational outcomes across gender, race, ethnicity, and immigration status (for an overview of these trends, see Heckman & LaFontaine, 2010), we included variables that capture: (a) gender (0 = *female*, 1 = *male*); (b) race (0 = *white*, 1 = *nonwhite*); (c) if at least one of the students' parents is Hispanic (0 = *no*, 1 = *yes*); and (d) birthplace (0 = *United States*, 1 = *not United States*).

Several control variables measured characteristics of the students' families. Prior research has established that socioeconomic factors such as parental educational level and family income are key correlates of educational outcomes (Melby et al., 2008; Thompson et al., 1988). To account for family background factors, we include two variables that capture (a) family composition (0 = *does not live with two adults*, 1 = *lives with two adults*); and, (b) a measure of familial socioeconomic status that was constructed from parents' education, family income, occupation, and occupational prestige. Parental involvement and expectations for school performance are also related to educational success (Davis-Kean, 2005; Fan & Chen, 2001). To account for these influences, we include a variable capturing (a) "family [has] rules for 10th grader about maintaining grade average" (0 = *no*, 1 = *yes*); and (b) "family [has] rules for 10th grader about doing homework" (0 = *no*, 1 = *yes*).

Research has also established that student problem behavior is related to a wide range of educational outcomes (Nelson et al., 2004; for a review, see Reid et al., 2004). Several variables captured students' behavior while at school including: (a) "10th grader ever had a behavioral problem at school" (0 = *no*, 1 = *yes)*; (b) "how many times the school contacted the parent about poor performance" (0 = *none*, 1 = *1 or more)*; (c) "how many times the school contacted parent about problem behavior" (0 = *none*, 1 = *1 or more)*; (d) "how many times the school contacted parent about positive/good behavior" (0 = *none*, 1 = *1 or more)*; (e) 10th grader ever held back a grade (0 = *no*, 1 = *yes)*; (f) how many times that a student was put on in-school suspension (0 = *Never*, 1 = *1 or more times*); and (g) how many times that a student was suspended or put on probation (0 = *Never*, 1 = *1 or more times*).

To account for the influence of the school environment on educational outcomes (Haynes et al., 1997; Wang & Holcombe, 2010), five variables are used including: (a) "the student does not feel safe at this school" (1 = *strongly disagree*, 2 = *disagree*, 3 = *agree*, 4 = *strongly agree*); (b) "disruptions get in the way of learning" (1 = *strongly disagree*, 2 = *disagree*, 3 = *agree*, 4 = *strongly agree*); and (c) "misbehaving students often get away with it" (1 = *strongly disagree*, 2 = *disagree*, 3 = *agree*, 4 = *strongly agree*). Students further identified: (d) "type of high school program" (0 = *General*, 1 = *College preparatory-academic or Vocational-including technical/business*); and (e) if they had "ever been in an Advanced Placement program" (0 = *no*, 1 = *yes*).

Existing studies on student achievement have also marked a number of school-level factors as key to understanding student success and academic outcomes including school urbanicity (e.g., Sandy & Duncan, 2010), school performance (Felter, 1989), school control (e.g., public vs. private, see Marsh & Grayson, 1990), economic status of the school (Armor et al., 2018), and grade span/school enrollment (Fowler & Walberg, 1991; Gershenson & Langbein, 2015). As a result, we control for each of these factors by including variables that capture: (a) urbanicity (1 = *urban*, 0 = *suburban or rural*); (b) standardized composite test quartile (1 = *lowest quartile*, 2 = *second quartile*, 3 = *third quartile*, 4 = *fourth quartile*); (c) school type (1 = *Public*, 2 = *Catholic*, 3 = *Other private*); (d) grade span (1 = *PK,K*,1, 2, 3, 4, or 5 through 12 or higher, 2 = 6, 7, or 8 through 12 or higher, 3 = 9 through 10, 11, 12 or higher, 4 = 10 through 11, 12, or higher); (e) grade 10%-free lunch (1 = 6–10%, 2 = 11–20%, 3 = 21–30%, 4 = 31–50%, 5 = 51–75%, 6 = 76–100%); and (f) school enrollment (0 = 1–999 students, 1 = 1000 students or more). All categorical variables were dummy coded for analyses using Stata's i. prefix.

Data analysis

Our analysis began with descriptive statistics to get an overall picture of the distribution of the data and the average student represented by the data. To assess the relationship between victimization experiences reported in 10th grade and subsequent high school graduation and college enrollment, as well as the potential moderating influence of the various measures of social bonds, we ran a series of four logistic regression models for each outcome. First, we examined the relationship between victimization and each outcome measure (i.e., graduation and college enrollment) including the full set of control variables but without any moderators. This first model was used to assess Hypotheses 1 and 2. Next, for Model 2, we

predicted the relationship between with victimization and both measures of social bonds including the full set of covariates listed above. These models were used to measure the relationship between victimization and each outcome controlling for a series of potentially confounding variables, providing further insight into Hypotheses 1 and 2. Next, two subsequent models (Models 3 and 4) incorporated multiplicative interaction terms between victimization and both measures of social bonds in turn. These models were used to assess the extent to which students' reported commitment and involvement might moderate the relationship between victimization and each outcome, as described in Hypotheses 3 and 4. We estimated these moderation models regardless of the statistical significance of victimization because moderation can still be present in a nonsignificant relationship between two variables.

Recent empirical work has noted that in examining questions of moderation with nonlinear outcomes, as is done here, the p-value associated with the interaction coefficient is an unsatisfactory measure of the significance of the interaction (e.g., Norton et al., 2004). As Mustillo et al. (2018) boldly stated: "The case is closed: don't use the coefficient of the interaction term to draw conclusions about statistical interaction in categorical models such as logit, probit, Poisson, and so on." Given the untrustworthiness of the p-value associated with the interaction coefficient, we plotted and probed the interactions and examined the regions of significance, an approach for which multiple scholars have advocated (Mize, 2019; Preacher et al., 2006). Specifically, each interaction across all the models was plotted and probed using the online utilities accompanying Preacher et al. (2006) regardless of the statistical significance of the interaction term, which is a bad indicator of the significance of the interaction. This online utility provides the exact values of the regions of significance of an interaction (if there are any), which allows for a more accurate and specific interpretation of the interaction than relying on a p-value and regression coefficients.

All models used survey weights provided in the ELS data that allow for the data to be nationally representative of 10th-grade students in 2002 eligible for participating in the ELS, thereby accounting for the lack of independence of observations due to the clustering of students within schools.

Missing data

As is common with secondary data, there were a few variables with missing data. Dropping cases with missing data can lead to biased estimates and is thus frequently an inappropriate technique for handling missing data. Here, we used two techniques to handle missing data. In the confirmatory factor analyses that we used to generate factor scores for the moderators, we used full information maximum likelihood (FIML; Allison, 2001). This technique allows for the generation of model estimates using the data from all observations without missing data on a given variable. FIML avoids deleting observations with missing data and provides estimates without imputing any data. Second, we used multiple imputation by chained equations to handle missing data in the regression models. This technique makes no distributional assumptions about the data and readily accommodates both continuous and categorical variables (Allison, 2001). For the continuous variables, we used predictive mean matching using data from each observation's five nearest neighbors. For the categorical

variables, we used logit imputation for dichotomous variables and multinomial logit imputation for polytomous variables. This procedure generated 20 datasets with complete data. All analyses were conducted with these imputed data sets and used Rubin's rules to combine results across data sets.

Results

Table 1 shows the descriptive statistics for all the variables included in the study. As shown, 91% of students graduated high school by 2006 and 87% of students in the sample attended a postsecondary institution. The mean score on the victimization index was 1.01 (SD = 1.19), showing that the average student reported one type of victimization. About 55% of students reported at least one form of victimization at least once.

The mean value of the commitment factor score was 0.03 (SD = 0.65) with a range of −1.59 to 1.29. In interpreting the substantive meaning of this value, it is useful to keep in mind that the factor scores are not interpreted on the same scale as the original item. Specifically, the original coding for each question used to calculate the factor scores for commitment was 1 = *almost never*, 2 = *sometimes*, 3 = *often*, 4 = *almost always* with individual item means ranging from 2.67 to 2.73, indicating substantive values between "sometimes" and "often." Thus, the factor score mean of 0.03 can substantively be interpreted as "often;" a factor score one standard deviation below the mean (−0.62) can substantively be interpreted as "sometimes;" and a factor score one standard deviation above the mean (0.68) can substantively be interpreted as "almost always." Involvement was measured as an index; the average student was involved in 2.38 activities (SD = 1.74).

Regression results of high school completion by 2006

As previously mentioned, we estimated four logistic regression models to examine high school completion by 2006 in accordance with Hypothesis 3 (see Table 2).[3] The first model examined the relationship between victimization and high school completion by 2006, with control variables but no moderators. The second model examined the relationship between victimization and high school completion status including both social bonds as control variables in addition to the full set of control variables. Models 3 and 4 examined the interactions between victimization and commitment and involvement, respectively.

Examining Model 1 of Table 2, the regression coefficient for victimization was negative and nonsignificant. This shows that there was not a significant relationship between victimization and completing high school, which does not support Hypothesis 1. In Model 2 which added both measures of social bonds, commitment was significant and positively related to high school completion status. For every one unit increase in commitment, there was 21% higher odds of graduating high school (p = .002, 95% CI [0.07, 0.32]). Additionally, involvement was significant and positively related to high school completion status; for every additional activity in which a student was involved, there was 15% higher odds of graduating high school (p < .001, 95% CI [0.08, 0.20]).

[3.]For clarity, we have suppressed the statistics for the control variables in Tables 2 and 3, although the full set of controls was included. Full tables are available upon request.

For Models 3 and 4 of Table 2, we examined interaction terms between victimization and commitment, and victimization and involvement. As noted above, given the untrustworthiness of p-values associated with interaction coefficients in regression models with nonlinear outcomes, we plotted and probed both interactions to identify simple slopes and determine if there were regions of significance within the interactions. The plotting and probing technique involved plotting simple slopes for each interaction with 95% confidence bands showing regions of significance. Regions within the confidence bands that did not include zero indicated that the interaction had statistical significance within that region. The results of this process revealed one interaction term with a region of significance, namely, the interaction between victimization and involvement.

Figure 1 displays the interaction plot and confidence bands for the region of significance of the interaction between victimization and involvement. The graph on the left shows the simple slopes of victimization at varying levels of involvement. As shown, the relationship between victimization and high school graduation depended on students' level of involvement at school. In particular, at low levels of victimization, the likelihood of graduation was higher for students who were more involved than students who were less involved (it should be noted that the bulk of students were at lower levels of victimization given that the mean victimization score was 1.01). However, at higher levels of victimization, this gap closed, suggesting that involvement mattered less when students experienced more victimization. The graph on the right shows the region of significance at which this interaction was statistically significant. As shown, the interaction was significant for values on the involvement index between 3.42 and 6.35 (please note that these values should be interpreted with caution, particularly considering the involvement measure ranges from 0 to 13). The finding that the effect of victimization was conditioned by involvement in this range offers partial support for Hypothesis 3.

Regression results of postsecondary education enrollment

We also estimated four logistic regression models to examine student enrollment in a postsecondary institution in accordance with Hypotheses 2 and 4 (see Table 3). The regression coefficient for victimization in Model 1 was not significant, which is not consistent with Hypothesis 2 predicting that students who are more victimized will be less likely to enroll in college. Model 2 showed two significant terms: commitment and involvement were both significant predictors of college enrollment. For every one unit increase in commitment, there was 25% higher odds of enrolling in college ($p < .001$, 95% CI [0.01, 0.30]). Additionally, for every one unit increase in involvement, there was 12% higher odds of enrolling in college ($p < .001$, 95% CI [0.06, 0.17]).

Examining Models 3 and 4, the interaction terms were nonsignificant and further exploration of the interaction effects using the plotting and probing techniques did not identify additional regions of significance.

Alternative analyses—We recognize that the correlates of violent and nonviolent victimization might differ. To test for robustness in the results, we also separated the victimization items into two indices for violent and nonviolent items. The violent

victimization index included (a) "someone threatened to hurt 10th grader at school"; (b) "someone forced money/things from 10th grader"; and (c) "someone hit 10th grader." The property victimization index included (a) "had something stolen at school"; and (b) "someone damaged belongings." For each index, we conducted the same series of four logistic regression models for each outcome variable, as previously described.

The results of the separated victimization indices were substantively very similar to the combined index, with the exception of each victimization index being significant in some models. The same social bond measures were significant in the separated and combined indices. For the violent victimization index examining high school completion status, the victimization index was significant for Models 2 (with no moderation), 3 (commitment as a moderator), and 4 (involvement as a moderator). The regression coefficient was small and negative for each model. In several models, the coefficients for commitment and involvement were identical in the violent victimization index and the combined victimization index. There were no new significant findings for the violent victimization index examining attendance at a postsecondary institution.

There were no new significant findings for the property victimization index examining high school completion status. Again, in several models, the coefficients for commitment and involvement were identical in the property victimization index and the combined victimization index. For the property victimization index examining attendance at a postsecondary institution, the victimization index was significant for Models 1 (with no moderation or social bond measures), 2 (with no moderation), and 3 (commitment as a moderator). The regression coefficient was small and positive for each model. Full models of the results from the models using the violent or property victimization indices can be provided upon request.

Discussion

This study helps illuminate the relationship between victimization and educational attainment by examining victimization rates and the likelihood of graduating high school and enrolling in college for a nationally representative sample of over 16,000 10th grade students. Based on existing research connecting victimization to poorer educational outcomes (see, for example, Peguero, 2011), this study's hypotheses predicted that students who were victimized in school would be less likely to graduate high school and/or enroll in college. Contrary to our hypotheses, victimization was not significantly related to either outcome. This is consistent with some studies that found only small percentages of students avoided school because of victimization (Devoe & Kaffenberger, 2005; Dunkle, 2009; Musu-Gillette et al., 2018).

Because victimization is thought to potentially impact a juvenile's educational outcomes and life-course progression, this study also sought to try to identify some circumstances in which the negative effects of victimization might be buffered. This research examined if two social bonds, commitment, and involvement moderated the relationship between school victimization and the likelihood of graduating high school and enrolling in college. The results showed that for students who reported lower levels of victimization, the likelihood of

graduation was higher for those involved in more activities than students who were involved in fewer activities. This is supportive of social bond theory which implies that involvement contributes to prosocial outcomes.

Taken together, these findings suggest that involvement in extracurricular activities may be able to counteract peer victimization in increasing high school graduation rates for victims, but only at low levels of victimization. These findings do partially support that the relationship between victimization and educational attainment changes based on social bonds, but only in the expected direction for high school graduation. This shows some support for Hypothesis 3 but not 4. Contrary to some studies which found that victimization is related to dropping out of school (Peguero, 2011), this study did not show a significant relationship between school victimization and graduating high school or enrolling in college. This may be because the five measures of school victimization included in this study are too narrow to encompass all the reasons why students do not complete high school and/or choose to not enroll in college. There may be many reasons behind these decisions other than school victimization, including financial problems, strained familial relationships, and justice system involvement. The effects of victimization may also be nonsignificant because students react to victimization in different, personalized ways: some may avoid school, some may continue to attend school but not perform as well, and some may persevere and succeed in school despite victimization. Additionally, the measures of victimization in this study did not include the most severe forms of victimization, such as personal violence, which may be more closely tied to these educational goals (for example, see Grogger, 1997). The reason that students do not complete high school or do not enroll in college may be so complex that the effects of social bonds in this sample are not statistically meaningful.

This study contributes to the body of literature regarding student victimization and academic attainment in several ways. Contrary to many of its predecessors, this study includes a large, nationally representative sample that was followed over time. Many other studies are focused on specific regions or cross-sectional in design, making them less generalizable and limiting conclusions about the time ordering of variables. This study is also unique in that it follows students beyond high school, compared to many studies that focus on K-12 and measures of educational attainment of only those ages. From a life-course perspective (Sampson & Laub, 1993), it is clear that victimization may function as a turning point–or a significant life event–that alters life-outcomes. Given that the likelihood of victimization changes through a person's life (DeCamp & Zaykowski, 2015), it is important to examine victimization at all educational levels and across different outcomes. Although we did not find evidence that school victimization represents a turning point toward decreased educational outcomes as youth progress into secondary education, it is possible that victimization may function as a turning point toward antisocial outcomes such as substance use, diminished mental wellbeing, and offending. Future research should employ a life-course perspective to examine these possibilities (e.g., Sampson & Laub, 1993).

The current research also contributes via its examination of two moderator variables that can help generate a more complete picture of how social bonds might be related to educational attainment and student victimization. However, that was not the case in this study, because most of the moderator relationships were nonsignificant. It may be that graduating high

school and enrolling in college are common outcomes and that victimization has little effect on these outcomes in this sample, given that 44.96% of the sample did not report victimization.

In Figure 1, the results imply that for students at low levels of victimization, schools may be able to counteract the potential negative effects of victimization on achievement by increasing student involvement in activities. This may be done by creating school or community programs for students to attend. Existing research suggests that improving community partnerships or activities improves student attendance (Brown, 2017; Epstein & Sheldon, 2002; Sheldon, 2007). If getting students access to activities is an obstacle to participation, providing transportation to events, having them located in a centralized and easily accessible area, and providing activities free of charge may encourage participation. If the events are created with a mind to strengthen communities and bonds, this may help increase the likelihood of high school graduation.

The results of this study suggest that involvement might increase the likelihood of students forming important social relationships, including with prosocial peers and adult role models, that might counteract the negative effects of victimization at lower levels. Because most students do not report repeated victimization, these relationships formed through involvement may help the majority of students who are victimized achieve their educational goals. In this way, the attachment to peers and role models that students gain through involvement in activities might be important in helping victimized students. It is possible that increasing involvement increases attachment as well, which in turn affects educational achievement. A better measure of attachment than what is available in this dataset might be able to detect this relationship. Because students who experienced more victimization did not appear to benefit from involvement the same way as those who were victimized less often, more formal interventions beyond involvement in activities may be needed for students experiencing extensive or repeated school victimization. More formal responses to victimization can perhaps use school counselors, support groups, guidance counselors, or therapeutic programming. Especially in schools where victimization is high, school administrators may be able to add programs or change policies to reduce the likelihood of victimization. Some have found that school-wide bullying prevention programs (e.g., Orpinas et al., 2003) can be effective at reducing student aggression and victimization. Schools may also choose to revisit their discipline policies to determine if stricter policies should be implemented, especially regarding victimization that can be criminal such as physical violence and theft of belongings. Students at all levels of victimization may be able to benefit from revisiting these policies.

Despite its strengths, this study does have its limitations. The design cannot control for all factors that might affect educational outcomes. These include personal, familial, financial, and school characteristics. For example, personal characteristics including self-control, resilient personalities, and the use of appropriate mechanisms are likely to affect an individuals' tolerance of and response to school victimization. Unfortunately, the dataset prohibits the testing of these factors because they were not measured. Other factors, including more complex personal financial and familial circumstances, are not included as variables in the data, but these factors may weigh heavily on educational outcomes. An

additional limitation of this study is that the data set was not intended to measure social bonds, so the measures may not be as clearly reflective of the theoretical concepts as if original data were gathered with the intended purpose of measuring social bonds. The dataset does not have measures that appear to appropriately measure belief or attachment, prohibiting an examination of how these social bonds potentially interact with involvement or commitment in determining these educational outcomes.

This study also does not measure the frequency or duration of victimization. Based on the data, it is not possible to differentiate if the students who respond to the victimization questions are pure victims or bully-victims. Some studies suggest that these two groups suffer effects of victimization differently (Lovegrove & Cornell, 2014; Valdebenito et al., 2017). The data was originally gathered over 15 years ago, and more recent data could have different results. Additionally, regional differences exist in the prevalence of victimization rates, which may be reflective of the large variation in educational practices across different countries (Stassen Berger, 2007). Therefore, this research has focussed on studies conducted in the United States. The results are not likely to be generalizable to other educational systems in other countries. These are areas that could be improved in future studies.

The results of this study do show that there is hope for victimized students to graduate high school and enroll in college. Students in this study were largely still able to achieve educational goals despite experiencing victimization, especially for those at lower levels of victimization who were involved in activities. Failing to graduate high school or enroll in college is not an inevitable conclusion following experiences of school-based victimization.

Acknowledgments

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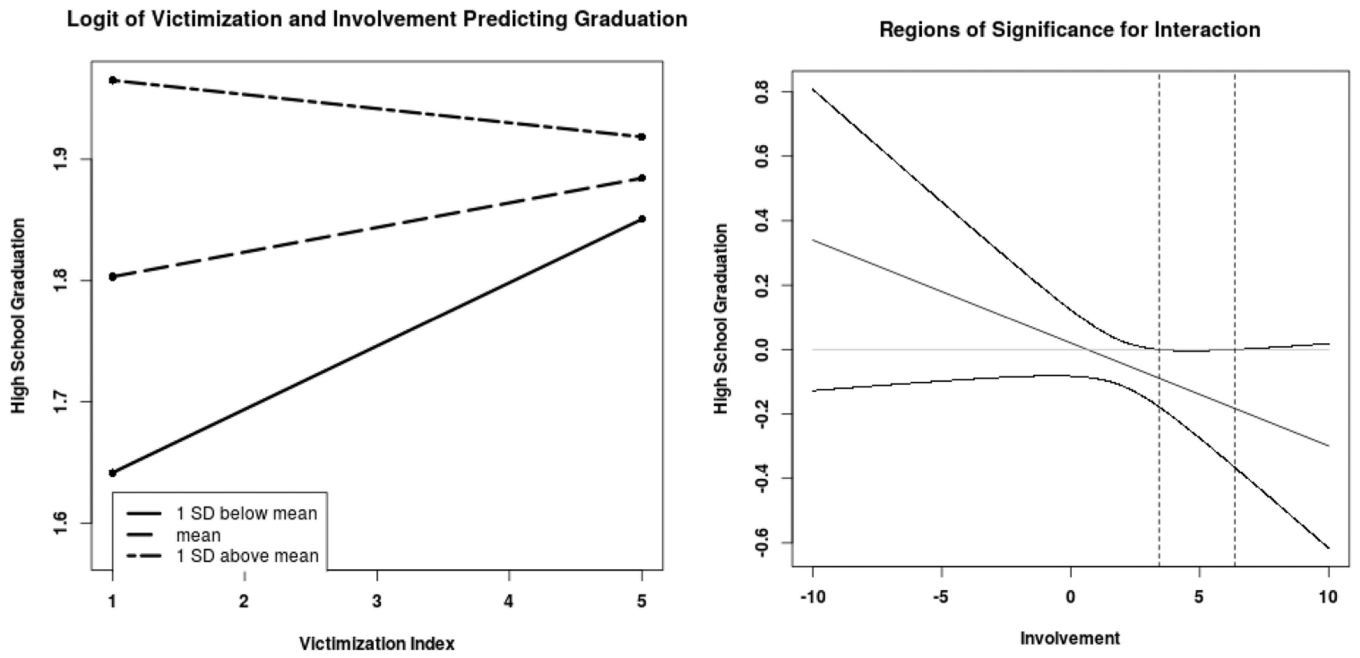
Figure 1.
Logistic regression of victimization and involvement-predicting graduation.

Table 1.

Descriptive statistics for sample (n = 16,197).

	M	SD	% missing	Minimum	Maximum
High school completion status in 2006	0.91	0.29	0.00	0	1
Whether has ever attended a postsecondary institution	0.87	0.34	18.19	0	1
Victimization index	1.01	1.19	11.34	0	5
Had something stolen at school	0.40	0.49	10.08	0	1
Someone threatened to hurt 10th grader at school	0.22	0.42	10.32	0	1
Someone hit 10th grader	0.21	0.41	10.58	0	1
Someone forced money/things from 10th grader	0.02	0.15	10.08	0	1
Someone damaged belongings	0.15	0.35	10.21	0	1
Commitment [a]	0.03	0.65	0.00	−1.59	1.29
Studies to increase job opportunities	2.67	0.97	31.35	1	4
Studies to get a good grade	2.73	0.93	31.21	1	4
Works as hard as possible when studies	2.73	0.88	31.46	1	4
Studies to ensure financial security	2.73	0.96	32.53	1	4
Involvement	2.38	1.74	27.02	0	13
Socio-economic Status	0.04	0.75	5.88	−2.11	1.82
Family Composition	0.77	0.42	5.38	0	1
High school program-student self-report	0.65	0.48	11.96	0	1
Ever in Advanced Placement program	0.18	0.38	11.29	0	1
Student's sex (1 = male)	0.50	0.50	5.11	0	1
Student's race (1 = nonwhite)	0.43	0.50	5.88	0	1
Parent is Hispanic	0.13	0.34	17.64	0	1
Whether 10th grader's birthplace in US or elsewhere	0.10	0.31	17.10	0	1
10th grader ever held back a grade	0.13	0.34	23.34	0	1
10th grader ever had behavior problem at school	0.08	0.27	23.09	0	1
School contacted parent about poor performance	0.26	0.44	23.65	0	1
School contacted parent about problem behavior	0.13	0.33	24.29	0	1
School contacted parent about positive/good behavior	0.36	0.48	24.41	0	1
Family rules for 10th grader about maintaining GPA	0.82	0.38	24.09	0	1
Family rules for 10th grader about doing homework	0.93	0.26	24.03	0	1
Does not feel safe at this school	3.27	0.72	11.13	1	4
Disruptions get in way of learning	2.55	0.83	10.74	1	4
Misbehaving students often get away with it	2.44	0.80	10.67	1	4
How many times put on in-school suspension	0.12	0.32	10.35	0	1
How many times suspended/put on probation	0.08	0.27	10.63	0	1
Urbanicity	0.34	0.47	0.00	0	1
School Enrollment	0.54	0.50	0.39	0	1
	n	%			
Standardized composite test quartile					
Lowest Quartile	3581	22.11			

	M	SD	% missing	Minimum	Maximum
Second Quartile	3924	24.23			
Third Quartile	4195	25.90			
Fourth Quartile	4192	25.88			
School type control					
Public	12765	78.81			
Catholic	1973	12.18			
Other Private	1459	9.01			
Grade span					
PK, K, 1, 2, 3, 4, or 5 through 12 or higher	1149	7.08			
6, 7, or 8 through 12 or higher	1503	9.28			
9 through 10, 11, 12 or higher	12787	78.95			
10 through 11, 12 or higher	587	3.62			
Grade 10% free lunch					
0–5%	4805	29.67			
6–10%	1393	8.60			
11–20%	2463	15.21			
21–30%	1856	11.46			
31–50%	2140	13.21			
51–75%	1323	8.17			
76–100%	854	5.27			

Note:

[a]The variable labeled Commitment is a factor score created from the four items listed below it. These four items are each presented in their original scale.

Table 2.

Regression results for high school completion status in 2006 for victimization index ($n = 16{,}197$).

	Model 1			Model 2			Model 3			Model 4		
	b	*SE*	*OR*	*b*	*SE*	*OR*	*b*	*SE*	*OR*	*b*	*SE*	*OR*
Victimization index	−0.02	0.04	0.98	−0.04	0.04	0.96	−0.01	0.04	0.99	0.02	0.05	1.02
Commitment				0.19[***]	0.06	1.21	0.16[*]	0.08	1.18			
Involvement				0.14[***]	0.03	1.15				0.20[***]	0.05	1.22
Interaction							0.05	0.05	1.04	−0.03	0.02	0.97

Note:

[*]
p <.05,

[**]
p <.01,

[***]
p <.001

Note: We have suppressed the statistics for the control variables in Table 2, although the full set of controls was included. A full table is available upon request.

Table 3.

Regression results for attending a postsecondary institution for total victimization index ($n = 16{,}197$).

	Model 1			Model 2			Model 3			Model 4		
	b	*SE*	*OR*	*b*	*SE*	*OR*	*b*	*SE*	*OR*	*b*	*SE*	*OR*
Victimization index	0.02	0.03	1.02	0.01	0.03	1.01	0.02	0.03	1.02	0.05	0.05	1.05
Commitment				0.23[***]	0.05	1.25	0.32	0.07	1.38			
Involvement				0.11[***]	0.03	1.12				0.15[***]	0.04	1.16
Interaction							−0.06	0.04	0.94	−0.02	0.02	0.98

Note:

[*] p <.05,

[**] p <.01,

[***] p <.001

Note: We have suppressed the statistics for the control variables in Table 3, although the full set of controls was included. A full table is available upon request.