



Gender-Specific Pathways between Face-to-Face and Cyber Bullying Victimization, Depressive Symptoms, and Academic Performance among U.S. Adolescents

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Abstract

This cross-sectional study employed a syndemic framework to investigate the relationships between face-to-face and cyberbullying victimization, depressive symptoms, academic performance, and gender (female and male) in a nationally representative sample of adolescents who completed the United States 2015 Youth Risk Behavior System Survey. Path analysis results showed that both face-to-face and cyberbullying victimization are associated with low academic performance. Further, depressive symptoms may facilitate declining academic performance for both female and male students. After using a syndemic framework to analyze the joint risk presented by bullying victimization and depression, structural equation modeling showed two different pathways for students who experienced both face-to-face and cyberbullying: (1) for female students, depression fully mediated the relationship between bullying victimization and low academic performance; (2) for male students, depression partially mediated the relationship between bullying victimization and low academic performance. These study findings highlight the need for innovative interventions to address bullying victimization, depression, and low academic performance. Specifically, school health educators, counselors, social workers, and school administrators should work together to initiate programs that address the synergistic nature of bullying through gender-sensitive multicomponent interventions, such as concurrently implementing comprehensive screening protocols and a bullying reporting system in their school system.

Keywords Face-to-face bullying · Cyberbullying · Depressive symptoms · Academic performance · Path analysis · Syndemic framework

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1 Introduction

Bullying is a type of aggressive behavior in which less-powerful individuals are repeatedly harassed, beaten, teased, or excluded by their peers (Gladden et al. 2014; Salmivalli 2010). In the United States in 2015, 21% of adolescents (ages 12–18) in public schools reported being victimized by their peers at school, and 7% reported being cyberbullied at least once a week (Musu-Gillette et al. 2018). A systematic review and meta-analysis of 80 studies reported that the mean prevalence of school bullying victimization (35%) was higher than that of cyberbullying victimization (15%) (Modecki et al. 2014). Students who were bullied showed poor academic performance (Kowalski and Limber 2013; Nakamoto and Schwartz 2010), substance misuse (Hong et al. 2014; Kim et al. 2018), risky sexual behaviors (Hong et al. 2018; Okumu et al. 2017), depressive symptoms, and suicidal ideations (Hinduja and Patchin 2018; Schneider et al. 2012). Demonstrably, the psychosocial health effects of experiencing both face-to-face bullying and cyberbullying can negatively affect students' academic performance, which is contingent upon safe and positive environments in and out of school that are free from the distress caused by violence (Berkowitz et al. 2016; Green et al. 2011). The adverse effects of bullying victimization are likely to continue into adulthood (Espelage et al. 2018).

The fourth United Nations Sustainable Development Goal (SDG) acknowledges that safe, non-violent, and inclusive learning environments are necessary for the educational success of students. To achieve this SDG, researchers and policymakers need further empirical research on synergistic interactions between epidemics to explore how interpersonal (i.e., face-to-face or cyberbullying) and individual (e.g., depressive symptoms) factors influence students' academic performance.

1.1 The Syndemic Framework

A *syndemic framework* of analysis (Singer and Clair 2003; Tsai 2018) enables researchers to study how multiple risk factors interact or connect with each other, synergistically or cumulatively, to affect an individual's wellbeing. The key value of the syndemic framework is that it allows researchers to conduct and compare different analyses of the same data. Syndemic frameworks are particularly useful for examining (1) a mutually causal epidemic (i.e., the mutual causal link between risk factors), (2) synergistically interacting epidemics (i.e., the joint risk presented by multiple risk factors), and (3) serially causal epidemics (i.e., the adverse consequences of accumulating risk factors). This paper employs the second use of the syndemic framework to test whether and to what extent the overlapping and synergistic interaction of multiple risk factors (e.g., bullying victimization and depression) produces stronger adverse effects than if each adverse condition were experienced separately (Singer et al. 2006; Tsai 2018). Extant literature has documented that victims of face-to-face bullying are frequently victims of other forms of bullying, too (Hase et al. 2015; Katzer et al. 2009; Kowalski et al. 2014; Salmon et al. 2018), which contributes to poor academic performance. To further develop this line of inquiry, we need research that explores how multiple risk factors co-occur at multiple levels of the social ecology to influence the academic performance of adolescents. Empirical evidence is critical for developing targeted multi-component interventions designed to address barriers to students' academic performance (e.g., bullying victimization and depressive symptoms).

To date, no known studies have employed syndemic frameworks of analysis to understand how bullying victimization (both face-to-face and cyber) is associated with the academic performance of adolescents. Several research teams have employed a syndemic framework to understand how co-occurring risk factors (e.g., depression, substance use, intimate-partner violence, adverse childhood experiences) increase HIV vulnerability, especially among sexual minorities (Brennan et al. 2012; Dyer et al. 2012; Starks et al. 2014). Other recent studies have conducted a syndemic analysis of various risk behaviors among adolescents specifically. For instance, using a sample of indigenous adolescent females in Canada's Northwestern Territories, Logie et al. (2018) found an association between multiple risk factors (i.e., depression and substance use) and sexual health within this population. Using a pooled dataset of 2005 and 2007 Youth Risk Behavior Surveys, Mustanski et al. (2014) also found that experiencing multiple forms of victimization increased risk for depression among high school students. More recently, using the 2017 Youth Risk Behavior Survey, Okumu et al. (2019) found that multiple risk factors, including mental health problems and substance misuse, were associated with sexual risk practices. Each of these studies testifies to the interpretive benefits that a syndemic framework offers researchers studying interactions between distinct but related risk factors.

Given the need for understanding bullying victimization within a syndemic framework, the current cross-sectional study examines the relationships among face-to-face and cyberbullying victimization, depressive symptoms, academic performance, and gender in a nationally representative sample of adolescents who completed the 2015 Youth Risk Behavior Survey.

1.2 Bullying Victimization and Depressive Symptoms

Bullying victimization, both face-to-face and cyber, has been found to reinforce depressive symptoms (Bowes et al. 2015; Campbell et al. 2012; Kim et al. 2018; Kowalski and Limber 2013; Przybylski and Bowes 2017) and have negative consequences on students' academic performance (Espelage et al. 2013; Nakamoto and Schwartz 2010). Several recent studies have identified depression as a key factor associated with both bullying victimization and academic performance (Davis et al. 2018; Espelage et al. 2013). For instance, a longitudinal observational study conducted among 6719 adolescents in the United Kingdom by Bowes et al. (2015) found that the 29.2% of adolescents who reported being bullied were also more likely to be depressed by the time they reached age eighteen. Moreover, comparing victims of face-to-face and cyberbullying among 3112 Australian youth, Campbell et al. (2012) found that cyberbullying victims had higher rates of depression than face-to-face bullying victims.

Violence researchers are paying increasing attention to the effects of experiences of multiple victimization types, commonly known as *poly-victimization* (Al-Eissa et al. 2019; Logie et al. 2019). Poly-victimization is defined as experiencing multiple forms of interpersonal violence (Dierkhising et al. 2019). Indeed, evidence shows that experiences of interpersonal violence tend to co-occur (Mustanski et al. 2014). Experiencing multiple types of victimization has detrimental effects on individuals' physical and mental health (Feng et al. 2019). For instance, data suggests that experiencing multiple types of bullying victimization is associated with higher depressive symptoms among adolescents (Raskauskas 2010; Wigderson and Lynch 2013).

Still, the literature on poly-victimization has yet to explore the role of *poly-bullying* (experiencing multiple types of bullying) in the wellbeing of adolescents. More generally, studies of poly-victimization in particular stand to benefit from applications of syndemic frameworks, which can help researchers map the synergistic or cumulative effects of different forms of victimization on different outcomes for individuals.

The negative effects of bullying victimization on youth are well-documented. Several studies have identified depression as a potential mediator between bullying victimization and poor academic performance (Juvonen et al. 2000; Schwartz et al. 2005). For instance, in a study conducted among 199 elementary school children, Schwartz and colleagues (2005) found that depression mediated the association between bullying victimization and low academic performance. Juvonen et al.' (2000) study also revealed that self-perceived peer harassment significantly predicted depressive symptoms, loneliness, and lower self-worth, which subsequently predicted lower grade-point averages and school attendance. These study findings contribute significantly to our understanding of the association between bullying victimization and its impact on academic performance.

1.3 Gender Differences in Bullying Victimization, Depression, and Academic Performance

School bullying researchers are increasingly employing gender-based analyses (GBA) of bullying patterns and outcomes to inform gender-based intervention development and implementation (Stark et al. 2019). Using GBA (Johnson et al. 2009), researchers can assess the different associations that bullying victimization has on females and males. Gender helps researchers to understand the power relations between males and females and the types of vulnerability that might tend to affect each gender category (Fredrick and Demaray 2018). Applying GBA, researchers can expand their understanding of whether and how males and females differentially respond to incidences of bullying, and in turn, how this bullying affects their participation in academic school activities.

Empirical literature shows that the relationship between bullying victimization, depressive symptoms, and academic performance appears to differ by gender. In terms of gender differences in bullying patterns (face-to-face and cyberbullying), findings have been primarily inconsistent. Some studies found no gender differences in bullying patterns (Kowalski et al. 2014; Williams and Guerra 2007), while other studies found that females in elementary school were more likely than their male counterparts to experience cyberbullying victimization (Mishna et al. 2010). By contrast, Merrin et al.'s (2018) study of 12,185 high school students found that male adolescents reported more face-to-face bullying victimization compared to their female counterparts.

Findings on gender differences in depressive symptoms associated with bullying victimization are also inconsistent. For instance, Kaltiala-Heino et al. (2009) examined whether bullying victimization at school predicted depression in a sample of Finnish adolescents. They found that bullying victimization predicted later depression among boys only. Using a sample of 242 Malaysian teenagers, Uba et al. (2010) found significant gender differences in bullying victimization among their study sample, although the difference in depressive symptoms by gender was non-significant. On the other hand, Kowalski et al.' (2014) review and meta-analysis of 131 studies found that female respondents who were cyberbullied reported higher levels of depression, leading these authors to suggest that females might experience greater susceptibility to

adverse effects from cyberbullying victimization. Their suggestion is corroborated by other studies' findings that bullying victimization had a significantly stronger impact on the academic performance of females than on that of males (Popp et al. 2014; Wang et al. 2011). For instance, in their study of a nationally representative sample of U.S. tenth graders, Popp et al. (2014) found that victimization was negatively related to academic outcomes, and that females who were victims of bullying showed significantly lower academic self-efficacy.

1.4 The Current Study

The current study tested for synergistically interacting epidemic factors to examine associations between contextual factors (face-to-face and cyberbullying) and individual-level health outcomes (depression and academic performance) among a population-based sample of adolescents in the United States. Specifically, the objectives of the current study were to examine (1) whether and how the pathways between bullying victimization (face-to-face and cyber) and academic performance differ by gender, (2) the synergistic effect of bullying (with indicators of face-to-face and cyberbullying) pathways to depression and academic performance by gender, and (3) the cumulative effect of bullying victimization (i.e., experiencing both face-to-face and cyberbullying) pathways to depression and academic performance by gender. Based on extant literature, we anticipate that the co-occurrence of both face-to-face and cyberbullying will have the strongest effect on depression and academic performance in both males and females.

2 Method

2.1 Sample and Design

Data were derived from the Centers for Disease Control and Prevention's 2015 Youth Risk Behavior Surveillance Systems (YRBSS), a dataset consisting of six health-related categories describing behaviors of U.S. public high school students: injury and violence, sexual risk behaviors, alcohol and other drug use, tobacco use, nutrition, and physical activity (Kann et al. 2016). The YRBSS is administered biennially by the CDC as self-reported surveys, using a three-stage cluster sample design stratified by racial/ethnic concentration and metropolitan statistical area status to generate a representative sample of high school students in grades 9 through 12. The target population included private and public school students in the United States. The primary sampling unit included counties, groups of smaller adjacent counties, or sub-areas of very large counties. The secondary sampling unit was the school attended. Students ($N = 15,765$) in 125 public and private schools completed self-administered questionnaires. The sampling strategies and psychometric properties of the YRBSS are described in Brener et al. (2013).

2.2 Measures

Academic performance was assessed based on the participants' self-reported grades in school. Response options ranged from mostly F's (1) to mostly A's (5) (see Table 1). Studies have found self-reported grades to be a reliable indicator of academic

Table 1 Demographic characteristics of the sample ($N = 15,624$)

| Variable | Total sample n (%) | Female 50.1 (7821) | Male 49.9 (7803) |
|--------------------------------------|-------------------------|-----------------------|---------------------|
| Age | | | |
| 14 years old or younger | 11.2 (1751) | 12.1 (941) | 10.4 (810) |
| 15 years old | 24.5 (3832) | 24.8 (1937) | 24.3 (1895) |
| 16 years old | 25.9 (4052) | 25.9 (2028) | 25.9 (2024) |
| 17 years old | 24.6 (3846) | 24.7 (1935) | 24.5 (1911) |
| 18 years old or older | 13.7 (2142) | 12.5 (979) | 14.9 (1163) |
| Race/ethnicity | | | |
| Black or African American | 10.9 (1701) | 10.7 (839) | 11.0 (862) |
| White | 44.8 (7001) | 45.4 (3549) | 44.2 (3452) |
| Hispanic/Latino | 15.5 (2422) | 15.4 (1204) | 15.6 (1218) |
| Multiple-Hispanic | 18.1 (2827) | 18.1 (1414) | 18.1 (1413) |
| Multiple-non-Hispanic | 4.8 (756) | 5.1 (402) | 4.5 (354) |
| Other | 5.9 (916) | 5.3 (412) | 6.4 (504) |
| Face-to-face bullying | | | |
| No | 80.8 (12,622) | 77.4 (6052) | 84.2 (6570) |
| Yes | 19.2 (3001) | 22.6 (1768) | 15.8 (1233) |
| Cyberbullying | | | |
| No | 85.2 (13,316) | 80 (6253) | 90.5 (7063) |
| Yes | 14.8 (2307) | 20 (1567) | 9.5 (740) |
| Depression | | | |
| No | 69 (10,774) | 59.2 (4631) | 78.7 (6143) |
| Yes | 31 (4849) | 40.8 (3189) | 21.3 (1660) |
| Academic performance (grades) | | | |
| Mostly Fs | 1.8 (282) | 1.6 (128) | 2.0 (154) |
| Mostly Ds | 4.0 (623) | 3.1 (244) | 4.9 (379) |
| Mostly Cs | 21.6 (3367) | 17.7 (1387) | 25.4 (1980) |
| Mostly Bs | 40.0 (6250) | 39.4 (3080) | 40.6 (3170) |
| Mostly As | 32.7 (5101) | 38.1 (2981) | 27.2 (2120) |

achievement (e.g., Kuncel et al. 2005). For instance, Kuncel et al.' (2005) meta-analysis, which included 37 studies ($N = 60,929$) examining the accuracy of student-reported grades, found that self-reported grades were highly correlated with actual grades.

Bullying victimization was assessed using two variables, each representing face-to-face bullying and cyberbullying victimization. Participants responded to the following questions: (1) "During the past 12 months, have you ever been bullied on school property?" (2) "During the past 12 months, have you ever been electronically bullied?" (Count such things as being bullied through e-mail, chat rooms, instant messaging websites, or texting.)

Depressive symptoms were measured using a single dichotomous item based on participants' responses to the following question: "During the past 12 months, did you

ever feel so sad or hopeless, almost every day for two weeks or more in a row, that you stopped doing some usual activities?” Responses were coded 0 (no) or 1 (yes).

School safety was measured on a 5-point Likert scale based on the participants’ responses to the following question: “During the past 30 days, on how many days did you not go to school because you felt you would be unsafe at school or on your way to or from school?” Responses ranged from 1 (zero days) to 5 (six or more days). Prior research has shown that a safer school environment was significantly associated with higher levels of academic performance (e.g., Berkowitz et al. 2016).

2.3 Analytic Techniques

Before conducting the structural equation modeling, multiple imputations and bivariate analyses were conducted using Statistical Package for Social Science (SPSS) Version 24. All variables had less than 2% missing values except for academic performance (5.5%). Multiple imputations were used to address the missing data. We used gender-based analyses (Johnson et al. 2009) to address all our study objectives. We calculated descriptive statistics and independent t-tests. Using Mplus Version 7 (Muthén and Muthén 2015), we first examined the independent associations of two bullying indicators (face-to-face and cyberbullying) with depression and academic performance (Fig. 1). Secondly, using structural equation modeling (SEM), we developed a latent bullying construct (with indicators of face-to-face and cyberbullying) that accounted for students who experienced both face-to-face and cyberbullying, and tested pathways to depression and academic performance (Fig. 2). Thirdly, we created a variable for adolescents who experienced both face-to-face and cyberbullying and tested pathways to depression and academic performance (Fig. 3). In each model, we disaggregated our analysis by gender, with depression as a mediator of the association between bullying and academic performance. We examined differences in the pathways and strength of the associations in each model to determine whether face-to-face and cyberbullying were synergistically interacting epidemics associated with depression and academic performance. Model fit was assessed using the Root Mean Square Error of Approximation (RMSEA; scores < .08 considered acceptable) and Comparative Fit Index (CFI; scores greater than .80 considered acceptable).

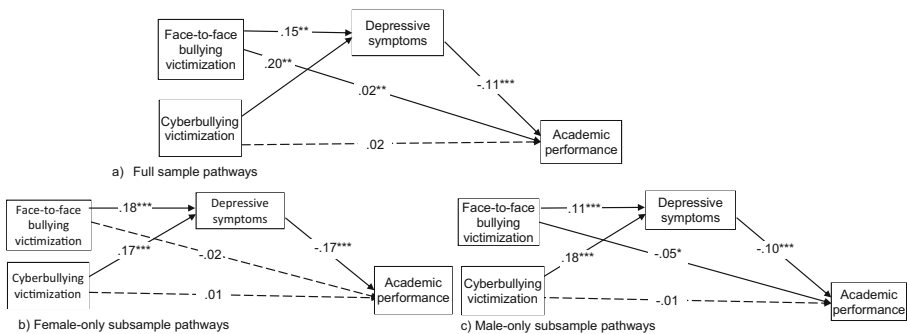


Fig. 1 Hypothesized gender-specific pathways from face-to-face and cyberbullying victimization to depression and academic performance. * $p < .05$, ** $p < .01$, *** $p < .001$. Note: Covariates include school climate and race

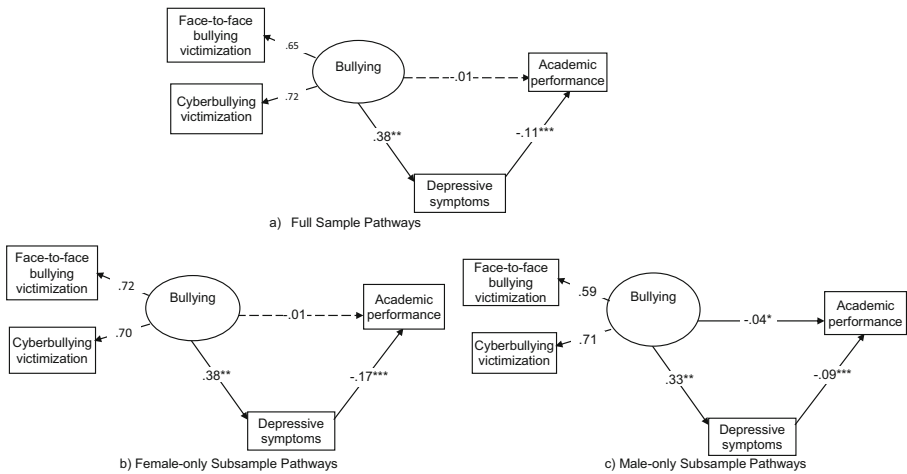


Fig. 2 Hypothesized gender-specific pathways from the latent construct of bullying victimization to depression and academic performance. * $p < .05$, ** $p < .01$, *** $p < .001$; Note: Covariates include school climate and race

3 Results

3.1 Sample Characteristics

Most participants were female ($n = 7821$; 50.1%) and most were aged 16 years ($n = 4052$; 25.9%). Among female respondents, slightly less than one-quarter (22.6%; $n = 1768$) reported experiencing face-to-face bullying and 20% ($n = 1567$) reported experiencing cyberbullying. In terms of academic performance, the most

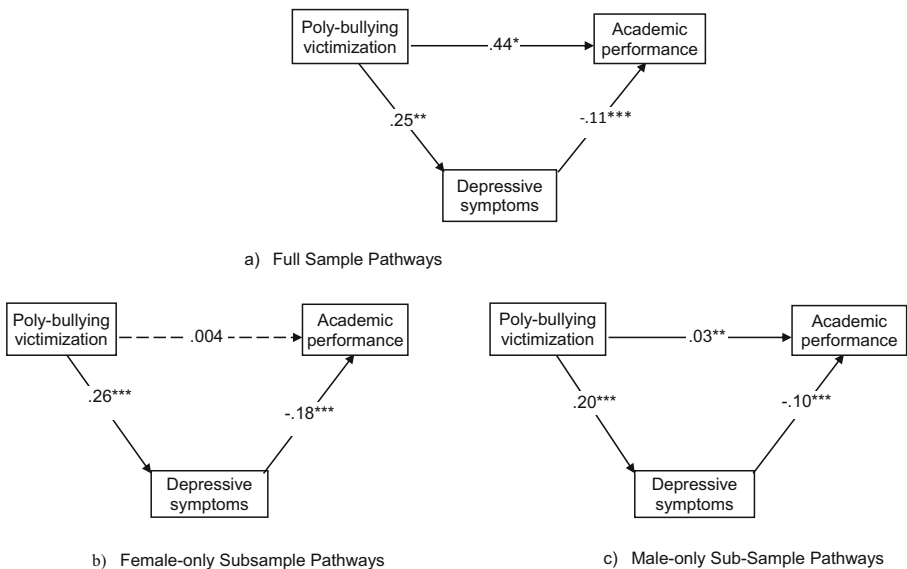


Fig. 3 Hypothesized gender-specific pathway from poly-bullying victimization to depression and academic performance. * $p < .05$, ** $p < .01$, *** $p < .001$. Note: Covariates include school climate and race

frequently reported grade was a B average (39.4%; $n = 3080$ females; 40.6%; $n = 3170$ males) (see Table 1).

3.2 Bivariate Results

Table 2 shows the results of chi-square independence tests examining the association between depressive symptoms and face-to-face and cyberbullying victimization for both female and male adolescents. Depression was positively associated with both face-to-face (female: $\chi^2 = 562.2$, $p < .001$; male: $\chi^2 = 282.7$, $p < .001$) and cyberbullying victimization (female: $\chi^2 = 539.3$, $p < .001$; male: $\chi^2 = 418.1$, $p < .001$). Compared to participants who did not experience face-to-face bullying victimization, close to two-thirds of female adolescents (65.2%) and over one-third of male adolescents (39.3%) who experienced face-to-face bullying victimization also reported depressive symptoms. The majority of female (66.6%) and male (50.5%) adolescents who experienced cyberbullying victimization reported depressive symptoms, compared to their counterparts who did not experience cyberbullying (34.3% female; 18.2% male).

Mean differences in academic performance among the study participants differed by each type of bullying victimization and gender: face-to-face bullying victimization (female: $t = 6.90$, $p < 0.001$; male: $t = 4.52$, $p < .001$) and cyberbullying victimization (female: $t = 5.89$, $p < .001$; male: $t = 4.29$, $p < .001$) (see Table 2). Participants who experienced face-to-face bullying victimization (female: $M = 3.95$; male: $M = 3.74$) reported lower academic performance compared to non-victims (female: $M = 4.13$; male: $M = 3.88$). Similarly, participants who experienced cyberbullying victimization (female: $M = 3.97$; male: $M = 3.70$) reported lower academic performance than non-victims (female: $M = 4.12$; male: $M = 3.88$).

3.3 Pathways from Face-to-Face and Cyberbullying to Depression and Academic Performance

Although we adjusted for covariates (school safety and student race) in the analysis, we did not include them in Fig. 1. Model fit indices suggested our model fit the data well for the female-only sample (RMSEA = 0.07 (90% confidence interval [CI] = [.05, .08], CFI = .95) and the male-only sample (RMSEA = 0.06 (90% CI = [.05, .07], CFI = .93).

3.3.1 Face-to-Face Bullying Victimization

Face-to-face bullying victimization was positively associated with depressive symptoms for both females ($\beta = 0.18$, $p < .001$) and males ($\beta = 0.11$, $p < .001$). Depressive symptoms were directly associated with academic performance for both females ($\beta = -.17$, $p < .001$) and males ($\beta = -.10$, $p < .001$). Depressive symptoms fully mediated the association between face-to-face bullying victimization and academic performance for females (indirect effect: $\beta = -0.03$, $p < .001$) and partially mediated the same relationship for males (indirect effect: $\beta = -0.01$, $p < .001$).

3.3.2 Cyberbullying Victimization

Results showed that cyberbullying victimization was positively associated with depressive symptoms for both females ($\beta = 0.17$, $p < .001$) and males ($\beta = 0.18$, $p < .001$).

Table 2 Associations between bullying (Face-to-Face, Cyber) victimization, depression, and academic performance by gender

| | Depression (Female) | | χ^2 | Depression (Male) | | χ^2 | Academic Performance (Female) | | t | Academic Performance (Male) | | t |
|-----------------------|---------------------|----------------------|----------|---------------------|----------------------|----------|-------------------------------|---------------|---------|-----------------------------|---------------|---------|
| | No [%] (<i>n</i>) | Yes [%] (<i>n</i>) | | No [%] (<i>n</i>) | Yes [%] (<i>n</i>) | | <i>M</i> (SD) | <i>M</i> (SD) | | <i>M</i> (SD) | <i>M</i> (SD) | |
| Face-to-face bullying | | | | | | | | | | | | |
| No | 66.3 (4015) | 33.7 (2017) | 562.2*** | 82.1 (5394) | 17.9 (1176) | 282.7*** | 4.13 (0.87) | 4.13 (0.87) | 6.90*** | 3.88 (0.92) | 3.88 (0.92) | 4.52*** |
| Yes | 34.8 (616) | 65.2 (1152) | | 60.7 (749) | 39.3 (484) | | 3.95 (1.01) | 3.95 (1.01) | | 3.74 (1.01) | 3.74 (1.01) | |
| Cyberbullying | | | | | | | | | | | | |
| No | 65.7 (4107) | 34.3 (2146) | 539.3*** | 81.8 (5777) | 18.2 (1286) | 418.1*** | 4.12 (0.89) | 4.12 (0.89) | 5.89*** | 3.88 (0.92) | 3.88 (0.92) | 4.29*** |
| Yes | 33.4 (524) | 66.6 (1043) | | 49.5 (366) | 50.5 (374) | | 3.97 (0.97) | 3.97 (0.97) | | 3.70 (1.09) | 3.70 (1.09) | |

* $p < .05$, ** $p < .01$, *** $p < .001$

There was no direct association between cyberbullying victimization and academic performance for either female or male adolescents. Instead, cyberbullying victimization had an indirect effect on academic performance through the mediating effect of depressive symptoms for both females ($\beta = -.17$, $p < .001$) and males ($\beta = -.10$, $p < .001$). Depression fully mediated this relationship for both females and males.

3.4 Pathways from the Latent Construct of Bullying to Depression and Academic Performance

In Fig. 2, we use SEM to create a latent variable for bullying to test the synergistic effect of bullying on academic performance for females and males, using depression as a mediator and controlling for school climate and students' race.

3.4.1 Females

The model fit the data: $\chi^2(7) = 493.52$, $p < .001$; RMSEA = .09, 90% CI [.09, .10], CFI = .88. Face-to-face bullying (.72) contributed more to the bullying construct than cyberbullying (.70). There was a positive direct relationship between bullying victimization and depressive symptoms ($\beta = .38$, $p < .001$). Depressive symptoms were, in turn, negatively associated with academic performance ($\beta = -.17$, $p < .001$). Depressive symptoms fully mediated the relationship between bullying victimization and academic performance (indirect effect: $\beta = -.06$, $p < .001$).

3.4.2 Males

The model fit the data: $\chi^2(7) = 388.18$, $p < .001$; RMSEA = .08, 90% CI [.08, .09], CFI = .85. Cyber bullying (.59) contributed more to the bullying construct than face-to-face bullying (.71). There was a negative direct association between bullying victimization and academic performance ($\beta = .33$, $p < .001$) and a positive direct association with depressive symptoms ($\beta = .33$, $p < .001$). Depressive symptoms, in turn, were negatively associated with academic performance ($\beta = -.09$, $p < .001$). Depressive symptoms partially mediated the association between bullying victimization and academic performance (indirect effect: $\beta = -.03$, $p < .001$).

3.5 Pathways from Poly-Bullying Victimization to Depression and Academic Performance

In Fig. 3, rudimentary methods were used to create an observed cumulative variable for poly-bullying victimization (including only adolescents who reported experiencing both forms of bullying simultaneously) to test the pathways from bullying victimization to depression and academic performance, adjusting for school climate and student's race.

3.5.1 Females

The model fit the data: $\chi^2(2) = 92.46$, $p < .001$; RMSEA = .08, 90% CI [.06, .09], CFI = .92. There was a positive direct relationship between experiencing poly-bullying

victimization and depression ($\beta = .26, p < .001$); in turn, depressive symptoms were negatively associated with academic performance ($\beta = -.18, p < .001$). The Sobel test indicated that depressive symptoms fully mediated the association between poly-bullying and academic performance (indirect effect: $\beta = -.05, p < .001$).

3.5.2 Males

The model fit the data: $\chi^2(2) = 67.46, p < .001$; RMSEA = .07, 90% CI [.05, .08], CFI = .88. There was a negative direct relationship between poly-bullying victimization and academic performance ($\beta = -.03, p < .010$) and a positive direct relationship between poly-bullying victimization and depressive symptoms ($\beta = .20, p < .001$). Depressive symptoms were in turn negatively associated with academic performance ($\beta = -.10, p < .001$). Given the significant direct pathways from poly-bullying victimization, depressive symptoms partially mediated the relationship between poly-bullying victimization and academic performance (indirect effect: $\beta = -.02, p < .001$).

4 Discussion

The current study applied a syndemic framework to examine gender-specific pathways between bullying victimization (both face-to-face and cyber), depressive symptoms, and academic performance in a sample of U.S. high school students.

4.1 Indicators of Bullying Victimization

Using the indicators of bullying victimization (Fig. 1), our findings showed that face-to-face and cyberbullying victimization were not directly associated with academic performance for female-only subsample, contradicting the findings of previous studies (Hoglund 2007; Mundy et al. 2017). A meta-analytic study conducted by Nakamoto and Schwartz (2010) found no conclusive gender differences due to the inconsistent ways of measuring cyberbullying and academic performance across studies. For the indirect relationships, we found that face-to-face bullying victimization was associated with depression, and depression was negatively associated with academic performance for both genders. Our findings on the association between cyberbullying victimization and depression were consistent with previous study findings (e.g., Wang et al. 2009). Our analyses also showed that depression mediated the relationship between bullying victimization and depression for both genders. As studies have shown, bullying victimization may heighten depressive symptoms (Bowes et al. 2015; Campbell et al. 2012; Kim et al. 2018; Kowalski and Limber 2013; Przybylski and Bowes 2017), which can adversely affect students' academic performance (Davis et al. 2018; Espelage et al. 2013; Nakamoto and Schwartz 2010).

4.2 Synergistic Effect of Bullying Victimization

When we applied a syndemic framework by creating a latent variable of bullying victimization, we found gender-specific pathways. Evidence from the path analysis model suggests that there is no direct relationship between bullying victimization and

academic performance for females (Fig. 2). For males, by comparison, bullying victimization was negatively associated with academic performance. Our results show that bullying victimization was associated with depression for both genders. Interestingly, bullying victimization was found to have a larger impact on depression than the face-to-face and cyberbullying victimization indicators.

Viewing these results through a syndemic lens, the combined effects of face-to-face and cyberbullying victimization were found to be associated with an adverse psychosocial state, which worsened when adolescents also experienced depression and adverse academic performance. The synergistic effect of bullying victimization can undermine an adolescent's sense of self, isolating them from their peers and reducing their ability to fully engage in their learning environment (Kowalski et al. 2014; Sticca and Perren 2013; Waasdorp and Bradshaw 2015), as they are unable to disengage from non-academic activities or initiate strategies to mitigate the problem in their learning environment (Modecki et al. 2014; Sticca and Perren 2013). Other scholars have argued that the cyberspace is necessary for students' socialization (Hamm et al. 2015) and academic success (Okumu et al. 2016), but our findings show that the synergistic interaction of bullying victimization may have adverse effects on males more than on females. For females, the synergistic effect of bullying victimization on depression was high, and the effect of depression on academic performance was higher than for males. Evidence shows that there are gender-based differences in cognitive symptoms of depression, and that depression among young people is a marker for bullying victimization. When adolescents lack the necessary skills to cope with bullying victimization, they may lose confidence in themselves, isolate from their peers and school, and feel lonely about their current situation, which will in turn negatively affect their academic performance.

4.3 The Cumulative Effect of Bullying Victimization

When we used rudimentary methods to create an observed variable of the poly-bullying victimization score (considering only adolescents who experienced both face-to-face and cyberbullying; see Fig. 3), the direction of the results was similar to the synergistic findings in Fig. 2. We noticed that the direct path from poly-bullying victimization to academic performance among males was positive, which is theoretically inaccurate. Tsai (2018) recommends the use of latent factors while exploring co-occurrences of behaviors in order to provide acceptable estimates.

Our study contributes to bullying research by demonstrating how three different ways of estimating bullying victimization produce varied results. Collectively, these findings highlight the importance of addressing syndemic interactions between bullying victimization and depression in interventions aimed at improving the academic performance and wellbeing of high school students. These findings also underscore the urgent need for effective mental health services within schools, which are common sites of adolescent bullying.

4.4 Study Limitations

Our study findings should be interpreted with caution. First, due to the cross-sectional nature of the data, conclusions on the causal pathways are limited. We also acknowledge that statistical significance does not necessarily imply meaningfulness, especially

dealing with cross-sectional data. Future studies using longitudinal data are needed to determine the causal inferences of our mediational model. Second, we only used single items to measure face-to-face bullying, cyberbullying, and depression, with a limited number of control variables. Future studies building on our data should use multi-dimensional measures and include more contextual variables such as socioeconomic status, parental involvement, and school policies. Third, our use of a single measure for academic performance is not sufficiently robust. Reliance on adolescents' self-reported grades might not be entirely representative of their academic performance. Other determinants, such as student engagement, school commitment, and motivation, might be associated with face-to-face bullying, cyberbullying, and depression in distinct ways.

4.5 Implications for Practice

Despite these limitations, our findings support the view that students' social relationships in school and cyberspace are associated with their academic performance. When adolescents experience bullying, it has a significant impact on their academic achievement, which is often negatively affected by depression, too. Additional research is warranted to understand the mechanics of this relationship. Research suggests that depression may diminish a student's ability to engage in school, yet active participation in school is critical in their academic success (Ansong et al. 2017). School health educators, counselors, social workers, and school administrators should collaboratively implement programs to reduce bullying (e.g., through comprehensive screening protocols and a bullying reporting system in the school [Mucherah et al. 2018; Unnever and Cornell 2004]). Implementing these programs should be part of an overarching agenda to improve school environments, as students who have a negative perception of their school environment are less likely to report bullying at all (Lam et al. 2015; Mucherah et al. 2018; Van Zoeren and Weisz 2018). Therefore, school counselors working with bullied adolescents need to pay close attention to nonverbal warning signs of bullying victimization (e.g., depression) in order to prevent a decline in academic performance, particularly in male students who are victims of poly-bullying. Our findings demonstrate the need for prevention programs that simultaneously address both face-to-face and cyberbullying, the impact of bullying on students' mental health (i.e., depression), and their individual and collective impacts on students' academic performance.

5 Conclusion

A syndemic framework has meaningful implications for developing violence prevention interventions within school settings in the United States. The study findings contribute to bullying literature by elucidating the interrelations between victimization (face-to-face bullying and cyberbullying), depressive symptoms, gender, and academic performance among U.S. adolescents. The identification of depression as a mediating factor in both male and female adolescent path models may provide valuable information to guide future bullying prevention efforts. Overall, our results underline the importance of addressing bullying in all its forms, as well as depressive symptoms in both male and female victims of cyberbullying and face-to-face bullying, in order to minimize poor academic performance and maximize students' learning in school.

Compliance with Ethical Standards

Conflict of Interest On behalf of myself and my coauthors, I certify that we have no affiliations with or involvement in any organization or entity with any financial or non-financial interests in the subject matter or materials discussed in this manuscript.

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References

- Al-Eissa, M. A., Saleheen, H. N., Almuneef, M., Al-Sulaiman, S., & AlBuhairan, F. S. (2019). Poly-victimization among secondary high school students in Saudi Arabia. *Journal of Child and Family Studies*, 28(8), 2078–2085. <https://doi.org/10.1007/s10826-018-1285-z>.
- Ansong, D., Okumu, M., Bowen, G. L., Walker, A. M., & Eisensmith, S. R. (2017). The role of parent, classmate, and teacher support in student engagement: Evidence from Ghana. *International Journal of Educational Development*, 54, 51–58. <https://doi.org/10.1016/j.ijedudev.2017.03.010>.
- Berkowitz, R., Moore, H., Astor, R. A., & Benbenishty, R. (2016). A research synthesis of the associations between socioeconomic background, inequality, school climate, and academic achievement. *Review of Educational Research*, 87, 425–469. <https://doi.org/10.3102/0034654316669821>.
- Bowes, L., Joinson, C., Wolke, D., & Lewis, G. (2015). Peer victimisation during adolescence and its impact on depression in early adulthood: Prospective cohort study in the United Kingdom. *BMJ (Clinical Research Ed.)*, 350, h2469. <https://doi.org/10.1136/BMJ.H2469>.
- Brener, N. D., Kann, L., Shanklin, S., Kinchen, S., Eaton, D. K., Hawkins, J., & Flint, K. H. (2013). Methodology of the youth risk behavior surveillance system – 2013. *MMWR. Recommendations and Reports: Morbidity and Mortality Weekly Report. Recommendations and Reports / Centers for Disease Control*, 62(RR-1), 1–20.
- Brennan, J., Kuhns, L. M., Johnson, A. K., Belzer, M., Wilson, E. C., Garofalo, R., & Adolescent Medicine Trials Network for HIV/AIDS Interventions. (2012). Syndemic theory and HIV-related risk among young transgender women: The role of multiple, co-occurring health problems and social marginalization. *American Journal of Public Health*, 102, 1751–1757. <https://doi.org/10.2105/AJPH.2011.300433>.
- Campbell, M., Spears, B., Slee, P., Butler, D., & Kift, S. (2012). Victims' perceptions of traditional and cyberbullying, and the psychosocial correlates of their victimisation. *Emotional and Behavioural Difficulties*, 17, 389–401. <https://doi.org/10.1080/13632752.2012.704316>.
- Davis, J. P., Dumas, T. M., Merrin, G. J., Espelage, D. L., Tan, K., Madden, D., & Hong, J. S. (2018). Examining the pathways between bully victimization, depression, academic achievement, and problematic drinking in adolescence. *Psychology of Addictive Behaviors*, 32, 605–616. <https://doi.org/10.1037/adb0000394>.
- Dierkhising, C. B., Ford, J. D., Branson, C., Grasso, D. J., & Lee, R. (2019). Developmental timing of polyvictimization: Continuity, change, and association with adverse outcomes in adolescence. *Child Abuse & Neglect*, 87, 40–50. <https://doi.org/10.1016/j.chiabu.2018.07.022>.
- Dyer, T. P., Shoptaw, S., Guadamuz, T. E., Plankey, M., Kao, U., Ostrow, D., Chmiel, J. S., Herrick, A., & Stall, R. (2012). Application of syndemic theory to black men who have sex with men in the multicenter AIDS cohort study. *Journal of Urban Health*, 89, 697–708. <https://doi.org/10.1007/s11524-012-9674-x>.
- Espelage, D. L., Hong, J. S., Rao, M. A., & Low, S. (2013). Associations between peer victimization and academic performance. *Theory Into Practice*, 52, 233–240. <https://doi.org/10.1080/00405841.2013.829724>.
- Espelage, D. L., Van Ryzin, M. J., & Holt, M. K. (2018). Trajectories of bully perpetration across early adolescence: Static risk factors, dynamic covariates, and longitudinal outcomes. *Psychology of Violence*, 8, 141–150. <https://doi.org/10.1037/vio0000095>.

- Feng, J. Y., Hsieh, Y. P., Hwa, H. L., Huang, C. Y., Wei, H. S., & Shen, A. C. T. (2019). Childhood poly-victimization and children's health: A nationally representative study. *Child Abuse & Neglect*, *91*, 88–94. <https://doi.org/10.1016/j.chiabu.2019.02.013>.
- Fredrick, S. S., & Demaray, M. K. (2018). Peer victimization and suicidal ideation: The role of gender and depression in a school-based sample. *Journal of School Psychology*, *67*, 1–15. <https://doi.org/10.1016/j.jsp.2018.02.001>.
- Gladden, R. M., Vivolo-Kantor, A. M., Hamburger, M. E., & Lumpkin, C. D. (2014). *Bullying surveillance among youths: Uniform definitions for public health and recommended data elements, version 1.0*. Atlanta, GA: National Center for Injury Prevention and Control, Centers for Disease Control and Prevention and U.S. Department of Education.
- Green, J. G., Dunn, E. C., Johnson, R. M., & Molnar, B. E. (2011). A multilevel investigation of the association between school context and adolescent nonphysical bullying. *Journal of School Violence*, *10*, 133–149. <https://doi.org/10.1080/15388220.2010.539165>.
- Hamm, M. P., Newton, A. S., Chisholm, A., Shulhan, J., Milne, A., Sundar, P., Ennis, H., Scott, S. D., & Hartling, L. (2015). Prevalence and effect of cyberbullying on children and young people. *JAMA Pediatrics*, *169*, 770–777. <https://doi.org/10.1001/jamapediatrics.2015.0944>.
- Hase, C. N., Goldberg, S. B., Smith, D., Stuck, A., & Campaign, J. (2015). Impacts of traditional bullying and cyberbullying on the mental health of middle school and high school students. *Psychology in the Schools*, *52*, 607–617. <https://doi.org/10.1002/pits.21841>.
- Hinduja, S., & Patchin, J. W. (2018). Connecting adolescent suicide to the severity of bullying and cyberbullying. *Journal of School Violence*, *18*(3), 333–346. <https://doi.org/10.1080/15388220.2018.1492417>.
- Hoglund, W. L. G. (2007). School functioning in early adolescence: Gender-linked responses to peer victimization. *Journal of Educational Psychology*, *99*, 683–699. <https://doi.org/10.1037/0022-0663.99.4.683>.
- Hong, J. S., Davis, J. P., Sterzing, P. R., Yoon, J., Choi, S., & Smith, D. C. (2014). A conceptual framework for understanding the association between school bullying victimization and substance misuse. *American Journal of Orthopsychiatry*, *84*, 696–710. <https://doi.org/10.1037/ort0000036>.
- Hong, J. S., Voisin, D. R., Kim, J. W., Allen-Meares, P., & Espelage, D. L. (2018). Pathways from peer victimization to sexual risk-taking behavior among African American adolescents in Chicago's Southside. *Psychology of Violence*, *9*(1), 88–97. <https://doi.org/10.1037/vio0000164>.
- Johnson, J. L., Greaves, L., & Repta, R. (2009). Better science with sex and gender: Facilitating the use of a sex and gender-based analysis in health research. *International Journal for Equity in Health*, *8*, 14. <https://doi.org/10.1186/1475-9276-8-14>.
- Juonen, J., Nishina, A., & Graham, S. (2000). Peer harassment, psychological adjustment, and school functioning in early adolescence. *Journal of Educational Psychology*, *92*, 349–359. <https://doi.org/10.1037/0022-0663.92.2.349>.
- Kaltiala-Heino, R., Frojd, S., & Marttunen, M. (2009). Involvement in bullying and depression in a 2-year follow-up in middle adolescence. *European Child & Adolescent Psychiatry*, *19*, 45–55. <https://doi.org/10.1007/s00787-009-0039-2>.
- Kann, L., McManus, T., Harris, W. A., Shanklin, S. L., Flint, K. H., Hawkins, J., Queen, B., Lowry, R., Olsen, E. O. M., Chyen, D., Whittle, L., Thornton, J., Lim, C., Yamakawa, Y., Brener, N., & Zaza, S. (2016). Youth risk behavior surveillance United States, 2015. *MMWR. Surveillance Summaries*, *65*(6), 1–174. <https://doi.org/10.15585/mmwr.ss6506a1>.
- Katzer, C., Fetschenhauer, D., & Belschak, F. (2009). Cyberbullying: Who are the victims? A comparison of victimization in internet chatrooms and victimization in school. *Journal of Media Psychology*, *21*, 25–36. <https://doi.org/10.1027/1864-1105.21.1.25>.
- Kim, Y. K., Okumu, M., Small, E., Nikolova, S. P., & Mengo, C. (2018). The association between school bullying victimization and substance use among adolescents in Malawi: The mediating effect of loneliness. *International Journal of Adolescent Medicine and Health*. <https://doi.org/10.1515/ijamh-2017-0229>.
- Kowalski, R. M., & Limber, S. P. (2013). Psychological, physical, and academic correlates of cyberbullying and traditional bullying. *Journal of Adolescent Health*, *53*, S13–S20. <https://doi.org/10.1016/j.jadohealth.2012.09.018>.
- Kowalski, R. M., Giumetti, G. W., Schroeder, A. N., & Lattanner, M. R. (2014). Bullying in the digital age: A critical review and meta-analysis of cyberbullying research among youth. *Psychological Bulletin*, *140*, 1073–1137. <https://doi.org/10.1037/a0035618>.
- Kuncel, N. R., Credé, M., & Thomas, L. L. (2005). The validity of self-reported grade point averages, class ranks, and test scores: A meta-analysis and review of the literature. *Review of Educational Research*, *75*, 63–82. <https://doi.org/10.3102/00346543075001063>.

- Lam, S., Law, W., Chan, C.-K., Wong, B. P. H., & Zhang, X. (2015). A latent class growth analysis of school bullying and its social context: The self-determination theory perspective. *School Psychology Quarterly*, 30, 75–90. <https://doi.org/10.1037/spq0000067>.
- Logie, C. H., Lys, C., Okumu, M., & Leone, C. (2018). Pathways between depression, substance use and multiple sex partners among northern and indigenous young women in the Northwest Territories, Canada: Results from a cross-sectional survey. *Sexually Transmitted Infections*, 94(8), 604–606.
- Logie, C. H., Okumu, M., Mwima, S., Hakiza, R., Irungi, K. P., Kyambadde, P., Kironde, E., & Narasimhan, M. (2019). Social ecological factors associated with experiencing violence among urban refugee and displaced adolescent girls and young women in informal settlements in Kampala, Uganda: A cross-sectional study. *Conflict and Health*, 13(1), 60.
- Merrin, G. J., Espelage, D. L., & Hong, J. S. (2018). Applying the social-ecological framework to understand the associations of bullying perpetration among high school students: A multilevel analysis. *Psychology of Violence*, 8, 43–56. <https://doi.org/10.1037/vio0000084>.
- Mishna, F., Cook, C., Gadalla, T., Daciuk, J., & Solomon, S. (2010). Cyber bullying behaviors among middle and high school students. *American Journal of Orthopsychiatry*, 80(3), 362–374. <https://doi.org/10.1111/j.1939-0025.2010.01040.x>.
- Modecki, K. L., Minchin, J., Harbaugh, A. G., Guerra, N. G., & Runions, K. C. (2014). Bullying prevalence across contexts: A meta-analysis measuring cyber and traditional bullying. *Journal of Adolescent Health*, 55, 602–611. <https://doi.org/10.1016/j.jadohealth.2014.06.007>.
- Mucherah, W., Finch, H., White, T., & Thomas, K. (2018). The relationship of school climate, teacher defending and friends on students' perceptions of bullying in high school. *Journal of Adolescence*, 62, 128–139. <https://doi.org/10.1016/j.adolescence.2017.11.012>.
- Mundy, L. K., Canterford, L., Tucker, D., Bayer, J., Romaniuk, H., Sawyer, S., & et al. (2017). Academic performance in primary school children with common emotional and behavioral problems. *Journal of School Health*, 87, 593–601. <https://doi.org/10.1111/josh.12531>.
- Mustanski, B., Van Wagenen, A., Birkett, M., Eyster, S., & Corliss, H. L. (2014). Identifying sexual orientation health disparities in adolescents: Analysis of pooled data from the youth risk behavior survey, 2005 and 2007. *American Journal of Public Health*, 104, 211–217. <https://doi.org/10.2105/AJPH.2013.301748>.
- Musu-Gillette, L., Zhang, A., Wang, K., Zhang, J., Kemp, J., Diliberti, M., et al. (2018). *Indicators of school crime and safety: 2017* (NCES 2018–036/NCJ 251413). Washington, DC: National Center for Education Statistics, U.S. Department of Education, and Bureau of Justice Statistics, Office of Justice Programs.
- Muthén, L. K., & Muthén, B. O. (2015). *Mplus user's guide* (7th ed.). Los Angeles: Muthén & Muthén.
- Nakamoto, J., & Schwartz, D. (2010). Is peer victimization associated with academic achievement? A meta-analytic review. *Social Development*, 19, 221–242. <https://doi.org/10.1111/j.1467-9507.2009.00539.x>.
- Okumu, M., Kato, H., & Chalise, N. (2016). A system dynamics approach to process evaluation of pen-based digital media-making projects. In T. Hammond, S. Valentine, & A. Adler (Eds.), *Revolutionizing education with digital ink* (pp. 209–221). New York, NY: Springer.
- Okumu, M., Mengo, C., Ombayo, B., & Small, E. (2017). Bullying and HIV risk among high school teenagers: The mediating role of teen dating violence. *Journal of School Health*, 87, 743–750. <https://doi.org/10.1111/josh.12547>.
- Okumu, M., Ombayo, B. K., Small, E., & Ansong, D. (2019). Psychosocial Syndemics and sexual risk practices among US adolescents: Findings from the 2017 US youth behavioral survey. *International Journal of Behavioral Medicine*, 26(3), 297–305.
- Popp, A. M., Peguero, A. A., Day, K. R., & Kahle, L. L. (2014). Gender, bullying victimization, and education. *Violence and Victims*, 29, 843–856. <https://doi.org/10.1891/0886-6708.VV-D-13-00047>.
- Przybylski, A. K., & Bowes, L. (2017). Cyberbullying and adolescent well-being in England: A population-based cross-sectional study. *The Lancet: Child & Adolescent Health*, 1, 19–26. [https://doi.org/10.1016/S2352-4642\(17\)30011-1](https://doi.org/10.1016/S2352-4642(17)30011-1).
- Raskauskas, J. (2010). Multiple peer victimization among elementary school students: Relations with social-emotional problems. *Social Psychology of Education*, 13(4), 523–539. <https://doi.org/10.1007/s11218-010-9124-0>.
- Salmivalli, C. (2010). Bullying and the peer group: A review. *Aggression and Violent Behavior*, 15, 112–120. <https://doi.org/10.1016/j.avb.2009.08.007>.
- Salmon, S., Turner, S., Taillieu, T., Fortier, J., & Afifi, T. O. (2018). Bullying victimization experiences among middle and high school adolescents: Traditional bullying, discriminatory harassment, and cybervictimization. *Journal of Adolescence*, 63, 29–40. <https://doi.org/10.1016/j.adolescence.2017.12.005>.

- Schneider, S. K., O'Donnell, L., Stueve, A., & Coulter, R. W. S. (2012). Cyberbullying, school bullying, and psychological distress: A regional census of high school students. *American Journal of Public Health, 102*, 171–177. <https://doi.org/10.2105/AJPH.2011.300308>.
- Schwartz, D., Gorman, A. H., Nakamoto, J., & Toblin, R. L. (2005). Victimization in the peer group and children's academic functioning. *Journal of Educational Psychology, 97*(3), 425–435. <https://doi.org/10.1037/0022-0663.97.3.425>.
- Singer, M., & Clair, S. (2003). Syndemics and public health: Reconceptualizing disease in bio-social context. *Medical Anthropology Quarterly, 17*, 423–441. <https://doi.org/10.1525/maq.2003.17.4.423>.
- Singer, M. C., Erickson, P. I., Badiane, L., Diaz, R., Ortiz, D., Abraham, T., & Nicolaysen, A. M. (2006). Syndemics, sex and the city: Understanding sexually transmitted diseases in social and cultural context. *Social Science & Medicine, 63*, 2010–2021. <https://doi.org/10.1016/j.socscimed.2006.05.012>.
- Stark, A. M., Tousignant, O., & Fireman, G. D. (2019). Gender-based effects of frames on bullying outcomes. *The Journal of Psychology, 153*, 555–574. <https://doi.org/10.1080/00223980.2019.1578192>.
- Starks, T. J., Millar, B. M., Eggleston, J. J., & Parsons, J. T. (2014). Syndemic factors associated with HIV risk for gay and bisexual men: Comparing latent class and latent factor modeling. *AIDS and Behavior, 18*, 2075–2079. <https://doi.org/10.1007/s10461-014-0841-9>.
- Sticca, F., & Perren, S. (2013). Is cyberbullying worse than traditional bullying? Examining the differential roles of medium, publicity, and anonymity for the perceived severity of bullying. *Journal of Youth and Adolescence, 42*, 739–750. <https://doi.org/10.1007/s10964-012-9867-3>.
- Tsai, A. C. (2018). Syndemics: A theory in search of data or data in search of a theory? *Social Science & Medicine, 206*, 117–122. <https://doi.org/10.1016/j.socscimed.2018.03.040>.
- Uba, I., Yaacob, S. N., & Juhari, R. (2010). Bullying and its relationship with depression among teenagers. *Journal of Psychology, 1*, 15–22. <https://doi.org/10.1080/09764224.2010.11885441>.
- Unnever, J. D., & Cornell, D. G. (2004). Middle school victims of bullying: Who reports being bullied? *Aggressive Behavior, 30*, 373–388. <https://doi.org/10.1002/ab.20030>.
- Van Zoeren, S., & Weisz, A. N. (2018). Teachers' perceived likelihood of intervening in bullying situations: Individual characteristics and institutional environments. *Journal of School Violence, 17*, 258–269. <https://doi.org/10.1080/15388220.2017.1315307>.
- Waasdorp, T. E., & Bradshaw, C. P. (2015). The overlap between cyberbullying and traditional bullying. *Journal of Adolescent Health, 56*, 483–488. <https://doi.org/10.1016/j.jadohealth.2014.12.002>.
- Wang, J., Iannotti, R. J., & Nansel, T. R. (2009). School bullying among adolescents in the United States: Physical, verbal, relational, and cyber. *Journal of Adolescent Health, 45*, 368–375. <https://doi.org/10.1016/j.jadohealth.2009.03.021>.
- Wang, J., Iannotti, R. J., & Luk, J. W. (2011). Peer victimization and academic adjustment among early adolescence: Moderation by gender and mediation by perceived classmate support. *Journal of School Health, 81*, 386–393. <https://doi.org/10.1111/j.1746-1561.2011.00606.x>.
- Wigderson, S., & Lynch, M. (2013). Cyber-and traditional peer victimization: Unique relationships with adolescent well-being. *Psychology of Violence, 3*(4), 297–309. <https://doi.org/10.1037/a0033657>.
- Williams, K. R., & Guerra, N. G. (2007). Prevalence and predictors of internet bullying. *Journal of Adolescent Health, 41*, S14–S21. <https://doi.org/10.1016/j.jadohealth.2007.08.018>.

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