Cumulative bullying victimization: An investigation of the dose–response relationship between victimization and the associated mental health outcomes, social supports, and school experiences of rural adolescents

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ABSTRACT

Bullying victimization is a common experience for adolescents. Past research documents that victims have more negative mental health outcomes, social relationships, and school experiences compared to their non-victimized classmates. However, this research is largely cross-sectional, often lacks youth living in rural areas, and does not explore the longitudinal burden that victimization places on adolescent development. Further, few researchers have examined bullying victimization using a dose–response model; the dose model posits that more exposure to a stimuli presents a greater impact. The current study examines how cumulative experiences of traditional and cyber victimization over a three year period are associated with the mental health, social relationships, and school experiences of 2246 middle and high school students in two low income, rural counties in the south. Regression analysis confirms that increased victimization was associated with more negative mental health functioning, social relationships, and school experiences. Implications are discussed.

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1. Introduction

Bullying victimization is a common experience for adolescents. Bullying is a repeated form of aggressive behavior aimed to harm a less physically and/or socially powerful victim (Olweus, 1993). This behavior includes both direct aggressive acts that occur in the presence of the victim and indirect aggressive acts that occur when the victim is not present, but are aimed to harm the victim. Researchers generally classify victimization experiences into four categories: physical (e.g., being hit, kicked, or shoved), verbal (e.g., oral or written communication like being teased or threatened), relational (e.g., behaviors meant to harm the victims' reputation and relationships such as being excluded, rumor spreading, or electronically posting embarrassing images of the victim), and damage to property (e.g., stealing, altering, or damaging victims' personal property; Gladden et al., 2014). The term traditional bullying refers to all forms of bullying (i.e., physical, verbal, relational, property damage) other than cyberbullying. Cyberbullying refers to bullying conducted using e-mail, instant messaging, chat rooms, web sites,

gaming sites, or cellular phones as a means to harass, insult, intimidate, exclude, and/or ostracize victims (Kowalski, Limber, & Agatston, 2012; Raskaukas & Stoltz, 2007).

The most recent report of Indicators of School Crime and Safety released by the National Center for Education Statistics found that 28% of students ages 12 through 18 endorsed bullying victimization (Robers, Kemp, Truman, & Snyder, 2013). However, rates of victimization vary depending upon the form that is assessed. For example, in a sample of 7182 sixth through tenth graders 41% reported relational victimization at least once over the past two months, 37% reported verbal victimization, 13% reported physical victimization, and 10% reported cyber victimization (Wang, Iannotti, & Nansel, 2009). Although research on the school experiences of rural adolescents is lacking (Witherspoon & Ennett, 2011), findings suggest that rates of victimization may be elevated in rural areas.

One study of 192 rural third through eighth grade students found that 82% reported being bullied at least once over the past three months (Dulmus, Sowers, & Theroit, 2004). In another sample of 211 rural youth ages 10–13, 33% reported traditional bullying victimization and 7% reported cyberbullying victimization (Price, Chin, Higa-McMillan, Kim, & Frueh, 2013). Further, 34% of students in a sample of rural fourth, fifth, and sixth graders reported bullying victimization (Stockdale,

Hangaduambo, Duys, Larson, & Sarvela, 2002). These increased rates coupled with the stressors of a rural environment (e.g., isolation, poverty, lack of resources; U.S. Department of Justice, Office for Victims of Crime, Office of Justice Programs, 2001), point to the need for additional bullying research in rural areas. Further, this body of research indicates that a significant number of rural youth are at risk for negative psychological and relational outcomes associated with bullying victimization.

It is well documented that victims of bullying are at an increased risk for negative mental health, social, and school outcomes (Dake, Price, & Telljohann, 2003; Kvarme, Helseth, Saeteren, & Natvig, 2010; Menesini, Modena, & Tani, 2009; Nation, Vieno, Perkins, & Santinello, 2008). For example, compared to bullies and non-involved youth, victims and bully/victims (i.e., those who are both bullied and bully others) report higher rates of depression, anxiety, and withdrawal (Menesini et al., 2009). Further, victimization is associated with deficits in social competence, feelings of powerlessness, and peer rejection (Kvarme et al., 2010; Nation et al., 2008) as well as lower academic achievement scores (Glew, Fan, Katon, Rivara, & Kernic, 2005). Although longitudinal bullying research on these mental health, social, and school outcomes exists, the majority of bullying research is cross-sectional in nature and relies on correlational analysis or mean differences (Barker, Arseneault, Brendgen, Fontaine, & Maughan, 2008), indicating the need for additional longitudinal studies.

The existing longitudinal research suggests that prolonged exposure to bullying victimization is associated with increased risk for poor mental health and school outcomes (Boulton, Chau, Whitehand, Amataya, & Murray, 2009; Boulton, Smith, & Cowie, 2010; Haddow, 2006). Indeed, it seems that a dose–response relationship between victimization and negative outcomes may exist: as exposure to victimization increases, so does the number of negative physical and mental health symptoms (Natvig, Albreksten, & Qvarnstrom, 2001). Bullying victimization has recently been studied as a form of interpersonal trauma (D'Andrea, Ford, Stolbach, Spinazzola, & van der Kolk, 2012) and research indicates that duration of trauma exposure has a small, but significant negative effect on mental health functioning following a traumatic event (Kaysen, Rosen, Bowman, & Resick, 2010). Using the dose–response model as a guiding framework, the current study seeks to understand how experiencing varying degrees of traditional and cyberbullying victimization over a three year period affects mental health outcomes, social relationships, and school experiences in a sample of rural youth.

1.1. A rural context

The rural context of the current study is a unique aspect that distinguishes it from the majority of existing studies of bullying. Rural areas expose residents to stressors absent from urban environments (U.S. Department of Justice, Office for Victims of Crime, Office of Justice Programs, 2001) such as limited public transportation and geographic isolation. A lack of public transportation is especially problematic for adolescents as it limits their ability to maintain positive social connections with non-family members and to participate in prosocial extracurricular activities. The stress of rural living likely contributes to the higher rates of risky behavior in rural youth. Compared to urban and suburban youth, rural youth are more likely to use substances (i.e., alcohol, drugs, or tobacco), bring weapons to school, and have sexual intercourse (Atav & Spencer, 2002). Rural youth are also at an increased risk of poor educational outcomes (Witherspoon & Ennett, 2011), resulting in higher high school dropout rates in impoverished rural communities compared to impoverished suburban areas and cities (Provasnik et al., 2007). These stressors infiltrate family life and rural parents reported higher levels of cumulative risk factors (e.g., parent–child conflict, adolescent problem behaviors; Spoth, Goldberg, Neppl, Trudeau, & Ramisetty-Mikler, 2001). The multiple and cumulative risk factors present in rural environments might serve to exacerbate experiences of bullying victimization and rural youth who are bullied might

be even more affected by this negative experience than their urban counterparts.

1.2. Dose–response relationship and bullying

The term "dose–response" refers to the notion that varying degrees of exposure (i.e., dose) to a stimuli, will result in varying outcomes (i.e., response; Waddell, 2010). Although this term has historically been used in natural scientific research (Waddell, 2010), it is currently being used in social sciences research on experiences of interpersonal trauma (Freer, Whitt-Woosley, & Sprang, 2010; Kelleher et al., 2013; Natvig et al., 2001; Singer, Anglin, Song, & Lunghofer, 1995). For example, exposure to stress and/or trauma over time results in increased psychological impairments. "Sequential stressors can have a cumulative effect…Chronic and unpredictable stress may be more likely to…disrupt an individual's basic sense of trust in relationships and confidence in the future" (McFarlane & de Girolamo, 1996, pp. 132, 138). This points to the utility of using the dose–response relationship to understand how cumulative experiences of bullying victimization might negatively affect adolescent developmental outcomes.

In general, the more harassment and violent victimization that is experienced, the worse the developmental outcomes. In other words, the higher the dose of victimization, the more negative the developmental response. For example, a longitudinal study that followed 223 semi-rural middle school students into high school found that students who were frequently verbally and physically harassed in middle school had higher levels of aggression, antisocial behavior, deviant peer associations, and tobacco use in middle and high school compared to their less frequently and non-harassed peers (Rusby, Forrester, Biglan, & Metzler, 2005). Specifically, frequent physical harassment in middle school accounted for 5% of the variance in high school associations with deviant peers. A cross sectional study of 3735 high school students found that increased exposure to violence (i.e., threats, slapping/hitting/punching, beatings, knife attacks, and shootings) as a victim or witness at home, school, or in the neighborhood was associated with increased trauma symptoms (Singer et al., 1995). The greater the exposure to violence, the higher participants scored on scales of depression, anxiety, anger, posttraumatic stress, and dissociation.

In support of the above studies, a few bullying researchers have found a dose–response relationship between bullying and negative developmental outcomes. A cross sectional study using data from a sample of 856 Norwegian adolescents ages 13–15 from rural schools found that youth who reported more frequent bullying victimization reported increased physical (i.e., headache, stomachache, backache, feeling dizzy) and psychological (i.e., feeling low, irritable, nervous) symptoms compared to youth who were not victimized or who were victimized less frequently (Natvig et al., 2001). Researchers concluded that a dose–response relationship was present.

In a longitudinal study of a nationally representative sample of 1112 thirteen through sixteen year old students, bullying victimization and psychotic experiences were assessed at baseline, 3-month, and 12-month follow ups. Results confirmed a dose–response relationship and the more bullying victimization items an adolescent endorsed, the more likely it was that he or she experienced psychotic symptoms at all three time points. For example, adolescents endorsing three or more victimization items on the six-item scale had an odds ratio (OR) of 7.94 for endorsing psychotic experiences at the 12-month follow up compared to adolescents endorsing two items who had an OR of 4.14 and those endorsing one item who had an OR of 3.80 (Kelleher et al., 2013). The authors concluded that this supported a dose–response relationship between bullying victimization and negative outcomes. The limited bullying research examining a dose–response relationship examines a minimal number of developmental outcomes, making the current study an important addition to the literature.

1.3. Bullying victimization and mental health

A significant body of research documents the association between bullying victimization and negative mental health outcomes. Victims typically report higher rates of depression and anxiety and lower rates of self-esteem in comparison to bullies and non-involved youth. For example, in a sample of 1985 U.S. sixth graders, victims reported the highest rates of depression, social anxiety, and loneliness compared to bullies, bully/victims and uninvolved youth (Juvonen, Graham, & Schuster, 2003). These findings were replicated in a sample of 537 Italian youth ranging in age from 13 to 20 years old: victims reported significantly higher levels of internalizing symptoms (i.e., depression, anxiety, withdrawal) compared to bullies and non-involved youth (Menesini et al., 2009). These differences were particularly pronounced for anxious and depressed symptoms and victims had a mean score of 9.35 compared to a mean score of 5.49 for bullies and 6.41 for non-involved youth. In a sample of 16,410 Finnish adolescents ages 14–16, bully/victims and victims were more likely than bullies and non-involved youth to report depression and suicidal ideation (Kaltiala-Heino, Rimpela, Marttunen, Rimplea, & Rantanen, 1999).

Victims also commonly suffer from low self-esteem (Olweus, 1994). In a sample of 418 U.S. seventh graders, compared to non-victimized youth, victims reported significantly lower self-worth, a construct similar to self-esteem (Graham & Juvonen, 1998). Self-esteem is closely tied to future optimism — the ability to picture a positive and successful future (Nurmi, 1991). Adolescents with a current positive view of themselves (i.e., high self-esteem) would be more likely to have a positive future view of themselves and vice versa. Thus, victims, who commonly suffer from low self-esteem, may find it difficult to maintain optimism about the future. The authors are unaware of any current research that examines the future optimism of bullying victims, highlighting a unique aspect of the current study.

Although aggression is typically associated with bullying perpetration (Olweus, 1993), it may also be related to victimization. For example, some victims may respond to bullying with reactive aggression — a defensive aggressive reaction in response to ongoing bullying. In one study of 1062 children ages 10–12, bully/victims had the highest levels of proactive and reactive aggression compared to pure bullies, pure victims, and non-involved youth (Salmivalli & Nieminen, 2002). Further, pure victims displayed higher rates of reactive aggression than non-involved youth, a trend supported by other researchers (Camodeca & Goossens, 2005; Camodeca, Goossens, Terwogt, & Mschuengel, 2002), suggesting that as victimization experiences increase, so might reactive aggression.

1.4. Bullying victimization and social support

Social support is a protective factor that often serves as a buffer for stressful life events. Indeed, researchers reported that peer support decreased the negative impact of victimization experiences (Flaspoler, Elfstrom, Vanderzee, Sink, & Birchmeier, 2009). However, victims tend to report lower levels of teacher support (Berkowitz & Benbenishty, 2012; Furlong, Chung, Bates, & Morrison, 1995), peer support (Demaray & Malecki, 2003; Furlong et al., 1995; Holt & Espelage, 2007), and maternal support (Holt & Espelage, 2007) compared to their non-victimized classmates.

Victims perceive teachers as unable to protect them from bullying (Cunningham, 2007), which partially explains why victims perceive low levels of teacher support. Victims rarely receive support from peers during a bullying episode, which impacts victims' overall perception of peer support. Peer bystanders are present for almost 90% of bullying episodes (Frey et al., 2005; Hawkins, Pepler, & Craig, 2001), however, they rarely intervene. A two-year longitudinal study of 189 adolescents found that when the participants were in sixth grade, 17% of bystanders intervened to defend the victim, and in eighth grade, 20% intervened to support the victim (Salmivalli, Lappalainen, & Lagerspetz, 1998). This finding, coupled with victims' perceived lack of teacher support, explains why victims view school as a hostile and unsupportive environment.

1.5. Bullying victimization and school experiences

Given that bullying often occurs in the school context, victims frequently report increased negative school experiences compared to non-victimized youth. For victims, school is often viewed as a dangerous and unsafe place. Victims reported higher mean scores on a measure of school disorder (i.e., presence of fighting, problem behavior, gang involvement) compared to students not involved in bullying. Victims also reported lower school bonding (Totura et al., 2008) and connectedness (You et al., 2008) and higher levels of school dissatisfaction (Dulmus, Sowers, & Theriot, 2006) compared to non-victimized youth. These results appear to hold worldwide. In a study of over 200,000 youth ages 11–15 across 40 countries, negative school perceptions were significantly related to victimization (Harel-Fisch et al., 2011). Specifically, victims of bullying viewed school as unsafe and students as unsupportive and unaccepting. These negative perceptions of school result in higher rates of school avoidance for victims (Berkowitz & Benbenishty, 2012; Hutzell & Payne, 2012). It seems that a dose–response relationship would apply to the school setting: the more that a student is involved in bullying, the more negatively he or she would perceive the school environment (Harel-Fisch et al., 2011). However, in another study of 11,033 sixth through tenth grade students, victimized youth and non-victimized youth did not differ in terms of levels of school satisfaction (Spriggs, Iannotti, Nansel, & Haynie, 2007), indicating the need for additional research on this connection.

Race/ethnicity often plays a role in the bullying dynamic. For example, self-reported racial discrimination was positively associated with increased peer nominations for victimization for African American and Latino youth (Seaton, Neblett, Cole, & Prinstein, 2013), suggesting that racial minorities who are bullied are at an increased risk of perceiving racial discrimination. Further, racial minorities are more often bullied due to their race. In a sample of 1682 Dutch, Turkish, Moroccan, and Surinamese children, Dutch participants reported higher rates of personal victimization while the ethnic minority groups were more likely to report racial discrimination (Verkuyten & Thijs, 2006). Given the high number of minority youth in the current sample, it follows that increased victimization would also be associated with increased perceived discrimination.

Based on the existing literature, we hypothesized that a dose–response relationship would exist between bullying victimization and negative mental health outcomes, social support, and school experiences. Students who experienced both traditional and cyberbullying victimization across all three years would report the worst outcomes, followed by those who experienced victimization across two years, and students experiencing no victimization or victimization in year one only, would have the best outcomes. In line with the dose–response relationship, it was hypothesized that increased victimization would be associated with poor mental health outcomes (i.e., high levels of depression, anxiety, and aggression and low levels of future optimism and self-esteem), insufficient social support (i.e., low parent, teacher, and friend support, and high levels of peer rejection), and negative school experiences (i.e., high levels of perceived discrimination and school hassles, and low levels of school satisfaction).

2. Methods

2.1. Procedure

The current study used data from the North Carolina Academic Center for Excellence in Youth Violence Prevention's Rural Adaptation Project (RAP). This is a 5-year longitudinal panel study of more than 6000 middle and high school students from 40 public schools in two

rural, economically disadvantaged counties in North Carolina. The current data were collected in the spring of 2011, 2012, and 2013 (i.e., years 1, 2, and 3 of the 5-year project). All middle school students in sixth through eighth grade in county 1 were included in the sample. Because county 2 was larger both geographically and in terms of student population, a random sample of 40% of middle school students were included from county 2. The current study only analyzed students with data from all three years, so new sixth graders added to the study in years 2 and 3 were excluded. Thus, year 1 data contained only middle school students, year 2 data contained seventh through ninth grade students, and year 3 data contained eighth through tenth grade students.

Following IRB approval, data were collected using an online assessment tool that students completed in school computer labs. In accordance with school district policies, county 1 incorporated the assessment as a part of normal procedures and all students were included on the study roster. Parents from county 2 received a letter explaining the study. If they did not want their child to participate, they returned the letter requesting non-participation and their child was removed from the study. All students electronically signed an assent screen prior to completing the online assessment. Each participating student received an incentive (i.e., a $10 gift card in year 1 and a $5 gift card in years 2 and 3) for his/her participation in the study. To maintain confidentiality, student assessments had an identification number attached and no identifying data were collected.

2.2. Participants

The sample for the current study consisted of 2426 students. The racial/ethnic composition of the final sample was representative of the diverse community: 26.55% (n = 644) of participants identified as Caucasian, 29.10% (n = 706) identified as American Indian (Lumbee), 23.78% (n = 577) identified as African American, 8.12% (n = 197) identified as Latino, and 12.45% identified as Mixed race/Other (n = 302). The sample was almost evenly divided by gender, with 52.6% (n = 1277) of participants identifying as female. The mean age of the sample was 12.63 years. Two thirds of the sample (66.27%; n = 1698) received free/reduced price lunch, and 93.49% (n = 2268) spoke English at home. In terms of family structure, 18.93% (n = 459) lived with a family with one adult, 74.14% (n = 1799) lived with a family with two adults, and 6.89% (n = 167) lived in a different type of family situation.

2.3. Measures

The School Success Profile (SSP; Bowen & Richman, 2008) is a 220-item youth self-report that measures attitudes and perceptions about school, friends, family, neighborhood, self, health, and well-being. The SSP has been administered to tens of thousands of students and has well documented validity and reliability (Bowen, Rose, & Bowen, 2005). The current study used a modified version of the SSP, the School Success Profile Plus (SSP+), which included 152 of the original SSP items and four additional scales: a modified version of the Rosenberg Self-esteem Scale (Rosenberg, 1965), the Perceived Discrimination Scale (Gil & Vega, 1996; Gil, Vega, & Dimas, 1994; Gil, Wagner, & Vega, 2000), and two subscales (i.e., externalizing behavior and anxiety from the Youth Self Report (YSR); Achenbach & Rescorla, 2001). In total, the SSP+ contained 198 items.

2.3.1. Bullying victimization

In accordance with the Center for Disease Control's Youth Risk Behavior Survey (Center for Disease Control, 2013), bullying victimization was measured with two items: "During the past 12 months have you ever been bullied on school property?" and "During the past 12 months have you ever been electronically bullied? (Being bullied through e-mail, chat rooms, instant messaging, Web sites, or texting)." Response options were Yes and No. These two items were combined to create a

sub-scale with scores ranging from 0 (not bullied in year 1, year 2, or year 3) to 6 (traditionally bullied and electronically bullied in all three years).

2.3.2. Demographic variables

Students reported on demographic variables including gender, receipt of free/reduced price lunch, language spoken at home (i.e., English or another language), age, and living situation (i.e., two parent family, single parent family, some other living situation).

2.3.3. Self-esteem

Self-esteem (M = 2.62, SD = .52) was assessed using a five-item scale adapted from the Rosenberg Self-Esteem scale (Rosenberg, 1965). For brevity on a long assessment, five of the items from the original Rosenberg Self-Esteem scale were deleted and other items were reworded for a low-literacy middle-school population. For example, superfluous and confusing words were removed from items to make them more easily understood. The item: "On the whole I am satisfied with myself" was re-worded to read: "I am satisfied with myself." Example items included, "I feel good about myself" and "I am able to do things as well as most other people." Each item was rated on a 3-point Likert-like scale (Not Like Me, a Little Like Me, or a Lot Like Me) and the Cronbach's alpha reliability was .93 in this sample.

2.3.4. Future optimism

Future optimism (M = 3.38, SD = .61) was assessed with the 12-item SSP future optimism scale (Bowen & Richman, 2008) that measures attitudes and expectations for future success. Example items included, "When I think about my future, I feel very positive" and "I see myself accomplishing great things in life." Each item was rated on a 4-point Likert scale (Strongly Disagree, Disagree, Agree, and Strongly Agree) and the Cronbach's alpha reliability was .96 in this sample.

2.3.5. Depressive symptoms

Depressive symptomology (M = 1.43, SD = .58) was measured using a four-item scale (Bowen & Richman, 2008). Example items included, "I often feel sad" and "I often wonder whether anyone really cares about me." Each item was rated on a 3-point Likert scale (Not Like Me, a Little Like Me, or a Lot Like Me) and the Cronbach's alpha reliability was .90 in this sample.

2.3.6. Anxiety symptoms

Symptoms of anxiety (M = 1.44, SD = .57) were measured by the three-item anxiety subscale from the YSR (Achenbach & Rescorla, 2001). Example items included, "I often worry about my future" and "I often feel nervous or tense." Each item was rated on a 3-point Likert scale (Not Like Me, a Little Like Me, or a Lot Like Me) and the Cronbach's alpha reliability was .82 in this sample.

2.3.7. Externalizing behavior

Aggression (M = 1.33, SD = .37) was assessed using 12 items from the YSR (Achenbach & Rescorla, 2001). Example items include: "I get in many fights," and "I have a hot temper." Items were rated on a 3-point Likert scale (Not Like Me, a Little Like Me, or a Lot Like Me). Cronbach's alpha reliability was .82 in this sample.

2.3.8. Social support variables

Three social support variables (i.e., friend support, parent support, teacher support; Bowen & Richman, 2008) assessed participant's perceived social support. A five-item friend-support scale (M = 2.44, SD = .60) measured a student's perception of friends' supportiveness. Example items include, "I can count on my friends for support" and "I can trust my friends." Responses for each item used a 3-point scale (Not Like Me, a Little Like Me, or a Lot Like Me) and Cronbach's alpha reliability was .94 for this sample.

The five-item parent-support scale ($M = 2.56$, $SD = .59$) measured the frequency with which an adult in the household provided emotional support to the student over the past 30 days. Example items include, "How often did the adults in your home let you know you were loved?" and "How often did the adults in your home make you feel special?" Responses to each item used a 3-point scale (*Never, Once or Twice*, and *More Than Twice*). Cronbach's alpha reliability was .94 for this sample.

The eight-item teacher-support scale ($M = 3.06$, $SD = .62$) measured students' perceptions of their teachers' supportive behavior. Example items include, "My teachers give me a lot of encouragement" and "My teachers care whether or not I come to school." Responses for each item used a 4-point (*Strongly Agree, Agree, Disagree, Strongly Disagree*). Cronbach's alpha reliability was .93 in this sample.

2.3.9. Friend rejection

Friend rejection was measured with three items ($M = 1.20$, $SD = .40$; Bowen & Richman, 2008) assessing how rejected participants felt by their friends. Example items include: "I am made fun of by my friends" and "I am picked on by my friends." Each item was rated on a 3-point Likert scale (*A Lot Like Me, A Little Like Me, Not Like Me*) and the Cronbach's alpha reliability was .76 in the current sample.

2.3.10. School satisfaction

School satisfaction ($M = 2.28$, $SD = .52$; Bowen & Richman, 2008) was measured with a seven-item scale that assessed a participant's level of satisfaction with his or her school experience. Example items include, "I am happy that I attend this school" and "I am getting a good education at this school." Responses for each item used a 3-point scale (*Not Like Me, a Little Like Me*, or *a Lot Like Me*) and Cronbach's alpha reliability was .87 in this sample.

2.3.11. Perceived discrimination

The three-item perceived discrimination scale ($M = 1.43$, $SD = .56$) (Gil et al., 1994) assessed the frequency of participants' experiencing or witnessing unfair treatment based on race/ethnicity. Example items include, "How often do people dislike you because of your race or ethnicity?" and "How often are you treated unfairly because of your race or ethnicity?" Each item was rated on a 3-point Likert scale (*Never, Sometimes, Frequently, Always*) and Cronbach's alpha reliability was .78 in this sample.

2.3.12. School hassles

School hassles ($M = 1.35$; $SD = .43$; Bowen & Richman, 2008) measured the frequency with which students endured harassment in school over the last 30 days. Example items include: "someone treated you in a disrespectful way" and "someone at school pushed, shoved, or hit you." Each item was rated on a 3-point Likert scale (*Never, Once or Twice, More than Twice*) and the Cronbach's alpha reliability was .92 in the current sample.

2.4. Analysis

An incremental victimization variable combining traditional and cyberbullying victimization was created. This variable ranged from 0 to 6. A score of 0 indicated that a participant was neither traditionally nor cyberbullied at any time over the three year study window, while a score of 6 indicated that a participant was both traditionally and cyberbullied each year over the three year study window. Scores from 1 to 5 indicated various combinations of traditional and cyberbullying. For example, a score of 1 indicated that a participant was either traditionally or cyberbullied during one year of the study. A score of 2 indicated that a student was either traditionally bullied and cyberbullied during one year of the study or was bullied in some way over two years of the study. We were not interested in determining different outcomes associated with traditional versus cyberbullying, thus if a student

received a score of 1, for the purposes of this study, it did not matter whether the student was traditionally or cyberbullied. The focus of this study was to determine how the cumulative experiences of being bullied, regardless of the form of bullying (i.e., traditional or cyber), was associated with mental health outcomes, perceived social support, and school experiences. Given that the focus of this study was on the dose–response relationship of victimization, a 2 could indicate that both types of victimization were experienced in one year or that victimization was experienced over two consecutive years. Both scenarios represent the accumulation of victimization experiences and test the dose–response relationship.

After the victimization variable was created, a series of 12 ordinary least squares regressions were run with mental health outcomes (i.e., depression, anxiety, aggression, self-esteem, future optimism), social support variables (i.e., friend support, teacher support, parent support, friend rejection), and school experiences (i.e., school satisfaction, school hassles, perceived discrimination) as the dependent variables. Each dependent variable was from year 3, however year 1 and year 2 dependent variables were added into the regression as independent variables to control for their effects. Demographic variables were also added into the analysis to control for their effects.

2.5. Handling clustered data

One methodological issue that needs to be addressed in the current study is clustering effects. Students are clustered within schools and students coming from the same school might share common characteristics on an outcome variable, which would violate the independent-observation assumption embedded in a regression model. This could result in an incorrect test of statistical significance of predictor variables. Using the intraclass correlation coefficient (ICC; Raudenbush & Bryk, 2002), we tested the clustering effect of the outcome.

The ICC is defined by the following equation:

$$ICC = \frac{\sigma_u^2}{\sigma_u^2 + \sigma_e^2}$$

where σ_u^2 is the between-group variance, and σ_e^2 is the within-group variance. Results show that for 10 of the 12 dependent variables the ICC ranged from .007 to .024 indicating that no more than 2.4% of the variation in the dependent variable lies between schools. Two dependent variables (i.e., school satisfaction and teacher support) had an ICC of .044 and .045 respectively, indicating that a little over 4% of the variation in these dependent variables lies between schools. These low ICC's indicate that independent observations can be assumed and that the independence assumption of ordinary least squares regression was not violated. Individual VIF's ranged from 1.02 to 1.56, indicating that multicollinearity was not an issue.

2.6. Missing data

The analyzed sample consisted of 2426 participants, which was 36% of the original sample. The analyzed sample was a small subset of the total sample because we only analyzed participants who had data for all three years and we dropped all participants missing year 2 or year 3 data. Each year a new cohort of 500 sixth grade students were added to the data set, but were excluded from the current analysis because they did not have all three years of data. Once we dropped all of the participants who did not have data for all three waves, we followed Allison (2002) and employed a listwise deletion of participants who had missing data for each dependent variable. A series of bivariate analysis (i.e., t-test, chi-square tests) were used to assess differences between the analyzed and unanalyzed samples. Compared with the unanalyzed sample, the analyzed sample was older (1.24 years, $p < .001$), had a significantly higher proportion of females (3.31% higher, $p < .01$) and Native American students (7.26% higher, $p < .001$) and a significantly

lower proportion of African American (3.45% lower, $p < .01$) and Caucasian (3.41% lower, $p < .01$) students.

3. Results

The majority of the sampled students (n = 1442, 59.44%) were not victimized in any way over the three year study period. The remainder of the sample reported being victimized once over the three years (n = 449, 18.51%), twice (n = 288, 11.87%), three times (n = 128, 5.28%), four times (n = 77, 3.17%), five times (n = 25, 1.03%), or six times (n = 17, .70%). For ease of interpretation, the various regressions are grouped by mental health outcomes, perceived social support, and school experiences, but each variable (e.g., depression, anxiety) represents a separate dependent variable.

3.1. Mental health outcomes

Results for the five mental health outcomes are listed in Table 1 and are displayed in Fig. 1. Cumulative victimization was significantly negatively associated with future optimism (Beta = −.035, $p < .001$) and self-esteem (Beta = −.020, $p < .001$) and significantly positively associated with depression (Beta = .047, $p < .001$), anxiety (Beta = .064, $p < .001$), and aggression (Beta = .029, $p < .001$). All year 1 and year 2 dependent variables were significantly related with the year 3 mental health outcomes and had as strong an impact as cumulative victimization. Further, females had significantly higher levels of future optimism (Beta = .097, $p < .001$), depression (Beta = .134, $p < .001$), and anxiety (Beta = .113, $p < .001$) and lower levels of self-esteem (Beta = −.052, $p < .001$) compared to males. The R square values indicate that the included variables explain 17%–32% of the variation in mental health outcomes.

3.2. Social support

Results of the four social support variables are listed in Table 2. Cumulative victimization was significantly negatively associated with parent support (Beta = −.030, $p < .01$), teacher support (Beta = −.033, $p < .01$), and friend support (Beta = −.038, $p < .001$) and was positively associated with friend rejection (Beta = .065, $p < .001$). All year 1 and year 2 dependent variables were significantly associated with year 3 social support scores and had as strong an impact as cumulative victimization. Females reported significantly higher levels of teacher support (Beta = −.061, $p < .01$) and friend support (Beta = .063, $p < .01$) and significantly lower levels of friend rejection (Beta = −.065, $p < .05$) compared to males. Students receiving free/reduced lunch reported significantly less friend support compared to those not receiving free/reduced lunch (Beta = −.086, $p < .001$). The R square values indicate that the included variables explain 15%–29% of the variance in social support variables.
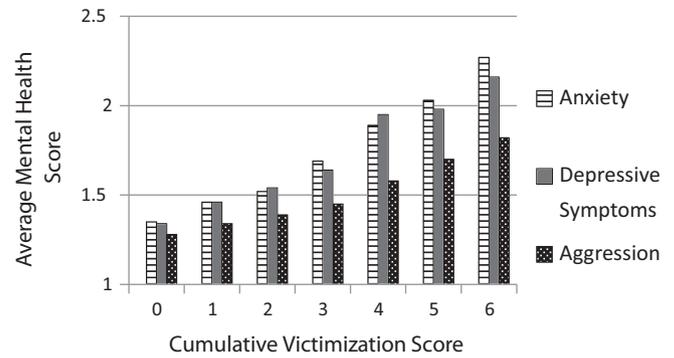

Fig. 1. Cumulative victimization and mental health outcomes.

3.3. School experiences

The results for the three school experiences variables are listed in Table 3. Cumulative victimization was significantly negatively associated with school satisfaction (Beta = −.025, $p < .01$) and was positively associated with school hassles (Beta = .088, $p < .001$), and perceived discrimination (Beta .045, $p < .001$). All year 1 and year 2 dependent variables were significantly associated with the year 3 values and had as strong an impact as cumulative victimization. The R square values indicate that the included variables explain 24%–35% of the variation in school experiences.

4. Discussion

The hypotheses of the current study were supported. Over all, cumulative bullying victimization was associated with negative developmental outcomes. These findings confirm a dose–response relationship: higher doses of victimization result in decreased mental health functioning (see Fig. 1), poor social relationships, and negative school experiences. In line with our hypotheses, students who experienced no victimization or one year of victimization had the best outcomes and as victimization experiences increased, so did negative developmental outcomes. This finding supports past research (Kelleher et al., 2013; Natvig et al., 2001; Rusby et al., 2005; Singer et al., 1995) suggesting that prolonged bullying victimization may be a form of interpersonal trauma with long-standing deleterious consequences.

Results for the five mental health outcomes were in the expected direction and increased victimization was associated with increased rates of depression, anxiety, and aggression and decreased self-esteem and future optimism. The link between bullying victimization and poor mental health is well established (Camodeca et al., 2002; Graham & Juvonen, 1998; Juvonen et al., 2003; Menesini et al., 2009). Repeatedly experiencing bullying both in person or over the internet exposes

Table 1
Cumulative victimization and mental health.

	Future optimism	Self-esteem	Depression	Anxiety	Aggression
Gender (male)	0.097***	−0.052**	0.134***	0.113***	0.025
Free/reduced lunch (no)	−0.009	0.001	0.047*	0.028	0.007
Two parent family (no)	0.001	0.01	−0.015	−0.021	−0.025
Age	−0.037**	−0.016	0.008	0.013	0.005
Dependent variable-Yr 1	0.249***	.215***	0.208***	0.157***	0.201***
Dependent variable-Yr 2	0.279***	0.439***	0.358***	0.357***	0.401***
Cumulative victimization	−0.035***	−0.020***	0.047***	0.064***	0.029***
R-square	0.167	0.2679	0.308	0.259	0.3237

Note: reference group in parenthesis.
DV's are year 3 variables.
  * $p < .05$.
 ** $p < .01$.
*** $p \le .001$.

Table 2
Cumulative victimization and social support.

	Parent support	Teacher support	Friend support	Friend rejection
Gender (male)	0.018	0.061**	0.063**	−0.065*
Free/reduced lunch (no)	−0.026	−0.027	−0.086***	0.017
Two parent family (no)	0.06*	0.03	0.051*	0.028
Age	−0.012	−0.038**	−0.037**	0.002
Dependent variable-Yr 1	0.231***	0.171***	0.178***	0.111***
Dependent variable-Yr 2	0.445***	0.387***	0.374***	0.188***
Cumulative victimization	−0.030**	−0.033**	−0.038***	0.065***
R-square	0.292	0.215	0.252	0.1517

Note: reference group in parenthesis.
DV's are year 3 variables.
* $p < .05$.
** $p < .01$.
*** $p \leq .001$.

adolescents to a deluge of harmful comments and hurtful actions. Youth suffering from both traditional and cyberbullying have no respite from this cruel behavior as school bullying follows them home in the form of nasty text messages and spiteful internet postings. This constant humiliation may slowly erode mental health functioning. Constant mistreatment is related to feelings of inadequacy, sadness, hopelessness, fear, and worry all of which feed depression, anxiety, low self-esteem, and hopelessness about the future. In addition, many victims become so fed up with being bullied that reactive aggression occurs out of desperation. Indeed, many studies note the high rates of reactive aggression displayed by victims of bullying (Camodeca & Goossens, 2005; Camodeca et al., 2002; Salmivalli & Nieminen, 2002). This reactive aggression may actually reinforce the bullying behavior as bullies could view it as a form of provocation and a sign that further bullying is justified. In extreme cases, this reactive aggression has led to homicide and/or suicide. The significant association between increased experiences of victimization and aggression in the current study highlights the need to help victims more effectively handle bullying situations. Ideally bullying behaviors should be prevented, but in the event that teachers fail to intervene, which they often do (Cunningham, 2007), victims need to be equipped with more successful coping strategies that will not exacerbate the bullying situation or end tragically.

The lack of research on how bullying victimization affects future optimism is a gap that the current study fills. Increased victimization is significantly associated with decreased hope and optimism about the future. Bullying victimization erodes self-esteem (Graham & Juvonen, 1998; Olweus, 1994), which means that victims are left feeling like failures. The present research extends this past research and found that victimization not only is related to decreased current self-esteem, but also influences hope about future successes. This suggests that bullied youth feel so despondent and worthless in the present that they are unable to imagine ever being successful. Perhaps this creates a self-fulfilling prophecy. Indeed, the effects of victimization endure

and a meta-analysis of 29 studies found that bullying victimization in childhood was associated with increased rates of depression an average of 6.9 years post victimization and up to 36 years post victimization (Ttofi, Farrington, Losel, & Loeber, 2011). Additionally, adults who were bullied in childhood were at increased risk for experiencing internalizing disorders such as anxiety (Gladstone, Parker, & Malhi, 2006). The negative impact of victimization, coupled with the stressors of rural living (e.g., lack of transportation, limited access to health care), put rural victims of bullying at extreme risk for poor developmental outcomes. Taken together, these findings highlight the need to protect victims as soon as bullying behavior occurs so they do not suffer from the negative effects of bullying for years or decades of their lives.

In terms of social support, findings were also in the expected direction. Further confirming the dose–response relationship: increased bullying victimization was significantly associated with decreased teacher, parent, and friend support and increased peer rejection. The lack of perceived teacher responsiveness to bullying (Cunningham, 2007) and the low numbers of peer bystanders who intervene to defend victims (Salmivalli et al., 1998) help to explain why bullied youth perceive low levels of teacher and peer support. Rates of peer rejection increased as victimization increased. The act of bullying is a strong and public form of rejection so this finding is not surprising, especially given the fact that few peers intervene to help victims. For parent support, perhaps youth do not tell their parents about bullying incidents, thus they are unable to receive support from their parents and perceive them as unsupportive (Smokowski, Cotter, Robertson, & Guo, 2013). Indeed, one study of 2766 Dutch children found that only 67% told a parent when they were bullied (Feekes, Pijpers, & Verloove-Vanhorick, 2005). Taken together, these findings confirm that increased experiences of victimization result in feelings of social isolation and rejection, which might be exacerbated by the social isolation of rural life. This creates a feedback loop with poor mental health outcomes: the more rejected and alone victims feel, the more depressed and anxious they

Table 3
Cumulative victimization and school experiences.

	School satisfaction	School hassles	Perceived discrimination
Gender (male)	−0.013	0.014	−0.002
Free/reduced lunch (no)	−0.047*	−0.002	−0.027
Two parent family (no)	0.031	−0.013	−0.004
Age	0.018*	0.01	0.016
Dependent variable-Yr 1	0.152***	0.153***	0.201***
Dependent variable-Yr 2	0.462***	0.271***	0.324***
Cumulative victimization	−0.025**	0.088***	0.045***
R-square	0.299	0.348	0.238

Note: reference group in parenthesis.
DV's are year 3 variables.
* $p < .05$.
** $p < .01$.
*** $p \leq .001$.

become and the less their peers want to spend time with them, exacerbating victims' social isolation. Based on this feedback loop there are various points of intervention. Improving victims' mental health is vital and is certainly one point of intervention. However, increasing students' acceptance of diverse peers is also important. Further, reinforcing social inclusivity could also be beneficial. Based on the lack of teacher and peer support and the high levels of peer rejection associated with victimization, it follows that increased victimization was also associated with negative school experiences.

As victimization increased, school satisfaction decreased and school hassles (e.g., degree of physical and verbal harassment) and perceived discrimination increased. Victims perceive school as an unsafe and hostile place, which clearly decreases their school satisfaction. Ultimately, it is logical that these negative feelings about school would influence academic achievement (Glew et al., 2005). Even if the victim is academically competent, it is understandable why he or she would disengage from a hostile, unsupportive, and rejecting social environment in school. This disengagement, although sensible, is developmentally disastrous because it cuts off the adolescent from prosocial peers, adults, and educational social structures that are supposed to nurture youth through this challenging transition to adulthood. Consequently, psychological, social, and scholastic functioning is profoundly impacted by chronic victimization. Finally, in addition to cumulative victimization, year 1 and year 2 measures of mental health, social support, and school experiences were also significantly related to the year 3 measures, indicating that negative outcomes are often perpetuated over time. Youth suffering from poor mental health, low levels of support, and negative school experiences need immediate support and intervention in order to prevent ongoing issues.

5. Limitations

The current results must be considered within the study limitations. First, adolescents taking the survey may not have been completely honest when filling out surveys, due in part to the presence of their classmates. It would have been ideal to have participants fill out surveys alone in a room, but due to space and time limitations this was not possible. However, every precaution was taken to maintain participant privacy and the risk of social desirability and false responding is present in any study using surveys as a means of data collection. Second, results of the current study must be generalized with caution given the unique study setting in an impoverished, rural area. Results might not apply to high income, urban areas or elementary school aged youth. Third, two items were used to assess traditional and cyber bullying victimization in each year. The two dichotomous variables make it difficult to interpret the meaning of victimization experiences as it is impossible to ascertain the intensity or form of bullying that occurred. Thus, it would have been ideal to include a more comprehensive measure of victimization. However, this was not possible given space restrictions on the survey. Further, the Center for Disease Control's Youth Risk Behavior Survey uses single items to assess traditional and cyber bullying victimization (Center for Disease Control, 2013).

6. Conclusion

The current study confirms a dose–response relationship for bullying victimization. Findings indicate that increased experiences of victimization over a three-year period were significantly associated with negative mental health functioning, poor social relationships, and problematic school experiences. This highlights the need for school personnel to intervene immediately in episodes of bullying. Ongoing bullying victimization leads to poor developmental outcomes and may result in interpersonal trauma that has lasting negative effects on victims. Conversely, victims of bullying may be spared from the severe developmental consequences associated with chronic bullying if appropriate prevention programs are put into place and/or adult interventions occur immediately after the bullying begins. This highlights the importance of increased adult supervision and awareness in the school setting, the need for heightened support from parents and peers, and access to needed mental health services.

Acknowledgements

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