Published in final edited form as:

J Sch Violence. 2012 January ; 11(1): 75–93. doi:10.1080/15388220.2011.631447.

Examination of the Predictors of Latent Class Typologies of Bullying Involvement among Middle School Students

PETER J. LOVEGROVE,

University of Virginia; Curry School of Education, Charlottesville, VA, USA

KIMBERLY L. HENRY, and

Colorado State University; Department of Psychology, Fort Collins, CO, USA

MICHAEL D. SLATER

The Ohio State University; School of Communication, Columbus, OH, USA

Abstract

This study employs latent class analysis to construct bullying involvement typologies among 3114 students (48% male, 58% White) in 40 middle schools across the U.S. Four classes were constructed: *victims* (15%); *bullies* (13%); *bully-victims* (13%); and *noninvolved* (59%). Respondents who were male and participated in fewer conventional activities were more likely to be members of the victims class. Students who were African-American and reported being less successful at school had a higher likelihood of membership in the bullies class. Bully-victims shared characteristics with bullies and victims: Students with more feelings of anger toward others and a higher tendency toward sensation-seeking had a higher likelihood of membership in the bullies and bully-victims classes, whereas lower levels of social inclusion was associated with membership in the victims and bully-victims classes.

Keywords

latent class analysis; victimization; bullying

The online campaign “It Gets Better” (www.itgetsbetter.org) was a public response to incidents of suicide by LGBTQ teens that had been the victims of bullying, and is one reason that public focus has shifted onto bullying and victimization in American schools. Scholarly inquiry into bullying is improving in its breadth and depth (Berger, 2007), and there is evidence that bullying is prevalent in most, if not all, schools in the United States. Generally, research indicates that between 10% and 30% of children are involved in bullying in some way (Cook, Williams, Guerra, Kim, & Sadek, 2010). Wang, Iannotti, and Nansel (2009) estimated rates of bullying prevalence in the United States using a nationally representative sample of 7,182 children in Grades 6–10. They found that, in the previous two months, 21% of children reported being involved in physical bullying as either victims or perpetrators, 54% reported being involved in verbal bullying, 51% reported being involved in social bullying, and 14% reported being involved in cyber-bullying.

Studies have shown an association between bullying and negative outcomes for youth. Kumpulainen and Rasanen (2000) found that children who were bullied at the age of 12

Address correspondence to: Peter Lovegrove, Youth Nex – Curry School of Education, University of Virginia, 405 Emmet Street South, P.O. Box 400281, Charlottesville, VA 22904-4281. lovegrove@virginia.edu.

Statement on Conflict of Interest

The authors report no conflict of interest.

years were more likely than children who were neither bullies nor victims to score above the 90th percentile on the Rutter B2 psychiatric disturbances scale (Rutter, 1967) at age 15 years, controlling for psychiatric disturbances at 12 years of age. Others have identified a significant relation between victimization and loneliness and depression, controlling for potential confounds (e.g., Bond, Carlin, Thomas, Rubin, & Patton, 2001). Perpetration of bullying has also been found to have a prospective association with less successful outcomes in youth. For example, Hemphill et al. (2011) found that, net of various controls including gender, impulsivity, family conflict, and peer delinquency, bullying perpetration predicted higher rates of theft, violent behavior, and binge drinking one year later.

In light of such findings, it is important that researchers and practitioners better understand the nature and etiology of bullying perpetration and victimization. This study used latent class analysis (LCA), a method that may provide more valid categorizations of behavior patterns than conventional techniques (Williford, Brisson, Bender, Jenson, & Forrest-Bank, 2011), to construct typologies of involvement in bullying and bullying-victimization among middle school students from across the United States. Second, drawing from a social-ecological perspective (Bronfenbrenner, 1979), this study examined whether individual personality traits and the quality of social relationships between adolescents and school, their peers, and family significantly predict the constructed bullying typologies.

Bullying Involvement from a Social-Ecological Perspective

Espelage and Swearer (2010) have applied the social-ecological perspective (Bronfenbrenner, 1979) to explain bullying involvement. They argued that bullying should be considered as the consequence of a complicated ecological exchange between individuals, parents, peers, and wider social contexts. The current study examined processes within the “microsystem,” wherein, as Swearer and Espelage (2004) state, “The bully, bully-victim, victim, or bystander interacts with others in his or her social environment, and this interaction either exacerbates or mitigates bullying and/or victimization behaviors” (p. 4). According to these theorists, factors affecting the likelihood of bullying or victimization originating within the individual and in the social environment are diverse (Espelage & Swearer, 2010). Examples of individual factors associated with bullying and/or victimization are impulsiveness, anger, depression, anxiety, gender, and drug use. Peer and school factors associated with bullying and/or victimization are delinquent peers, school delinquency, gang involvement, lower school engagement, and low school support (or poor school climate). Family factors associated with bullying and/or victimization are parental imprisonment, negative family environment and sibling conflict.

The importance of considering a variety of individual level predictors, as well as predictors associated with multiple components of the social environment, has been demonstrated empirically. Studies find that the inclusion of measures from multiple realms—combining family- and individual-related factors, for example—significantly improves the quality of the explanatory model (Ahmed & Braithwaite, 2004; Baldry, 2003).

Bully-Victims

Research finds that victimization and perpetration are not mutually exclusive, and for a subgroup of youth, they overlap (Olweus 1993). Studies commonly identify four distinct groups of children with different patterns of bullying involvement: noninvolved children bullies, victims, and bully-victims (Schwartz Proctor, & Chien 2001). Research tends to find that groups of bully-victims are of a comparable size, or slightly smaller, than groups of bullies and victims. For example, using a nationally representative sample of over 15,000 students in Grades 6–10, Nansel and colleagues (2001) estimated that, while around 20% of students bullied others sometimes or weekly, around 17% were bullied sometimes or

weekly, and 6.3% of students were both victims and bullies. Bully-victims are commonly found to be the most at-risk group for concurrent and future maladjustment (Unnever, 2005). They tend to share both the social isolation and withdrawn behavioral patterns of victims, and the aggressive tendencies of perpetrators (e.g., Bowes et al., 2009).

Individual Personality

Children who behave aggressively toward others at school are, unsurprisingly, more likely to have antisocial personality traits and tendencies. For example, Olweus (1993) found that bullies were more aggressive and had more positive attitudes toward violence. In their meta-analysis, Cook et al. (2010) found that externalizing behaviors had an effect size of 0.34 on the likelihood of being a bully. At the same time, peer influence and cognitions regarding others reduced externalizing behaviors, both having an effect size of -0.34. Eliot and Cornell (2009) found that higher levels of aggressive attitudes were significantly related to greater frequency of self-reported bullying behaviors. Further, when differentiations between victims and aggressive victims are made, studies typically find that victims do not tend to have aggressive personalities (e.g., Bowes et al., 2009), but bully-victims are frequently characterized by higher levels of aggressive personality traits (e.g., Olweus, 1993; Unnever, 2005).

Relationship with Family

Perpetrators of bullying report receiving lower levels of parental support compared to other children (e.g., Haynie et al., 2001). For instance, Bowers, Smith, and Binney (1994) found that bullies had more disengaged relationships with parents. Net of controls, Flouri and Buchanan (2003) found that both mother and father involvement shared a significant negative association with bullying behaviors. Similar to bullying, various aspects of child-parent relations are associated with victimization. Troy and Sroufe (1987) found that children who were victimized by peers had a history of insecure attachment to parents. Earl and Burns, (2009) observed that parental attachment shared a moderately-sized negative correlation (-0.26) with peer victimization. Ladd and Ladd (1998) found that observational measures of parental responsiveness and intrusive demandingness were significantly correlated with teacher-rated child victimization.

When considered separately from nonperpetrating victims, bully-victims have been found to have higher levels of avoidant attachment with parents (Ireland & Power, 2004). Demaray and Malecki (2003) observed that, compared to bullies, victims, and noninvolved children, bully-victims report the lowest level of parental support. Additionally, Schwartz, Dodge, Pettit, and Bates (1997) found that young males who were identified as bully/victims by their peers at school were more frequently exposed to parental aggressive strategies, marital conflict, and maternal hostility than other boys before starting kindergarten..

Peer Relationships

Victims are typically characterized by isolation from peers, or a lack of peer acceptance. Empirical evidence of the association between poor and infrequent peer interactions and victimization is documented in the literature. For instance, Schwartz Dodge, Pettit, and Bates (2000) found that peer acceptance and total number of reciprocated friendships were both negatively correlated with peer victimization. In their meta-analysis, Cook et al. (2010) found that peer status had a weighted effect of -0.35 on the likelihood of victimization, which was the largest effect across all potential predictors. Additionally, social competence had the second-largest effect size (-0.30) in the study. Similar to victims, aggressive victims are similar to more passive victims in their levels of peer rejection. For example, Unnever

(2005) found that, net of controls, bully-victims and victims did not significantly differ in the number of friendships.

Relationship with Teachers and School

Children who bully others tend to have lower levels of school bonding, poorer school achievement, and higher levels of truancy. Forero, McLellan, Rissel, and Bauman (1999) found that, net of controls, those who bullied others liked school less, were less likely to think school was a nice place to be, and were more likely to have skipped four or more days of school in the past month. Similarly, Haynie et al. (2001) found that bullies had lower levels of school bonding and school adjustment than victims and noninvolved youth. Ma (2002) observed that bullying behaviors toward others were negatively associated with a composite measure of school liking and achievement, net of various controls. At the same time, victims have been found to have lower levels of school bonding compared to noninvolved youth. For example, Graham, Bellmore, and Mize (2006) found that victims had significantly lower GPAs and levels of school involvement than noninvolved youth. Aggressive victims had significantly lower GPAs and school involvement than bullies, victims, and noninvolved children.

Hypotheses

This study's primary research questions were twofold. Based on the literature, it was expected that a four-class model would best fit the data, containing one class where neither victimization nor aggression were likely, one class where only victimization was likely, one class where the perpetration of bullying was likely, and a last class where both perpetration of bullying and victimization were likely. Would the best fitting LCA model comprise these groups? Second, which individual-, family-, and school-related factors served to mitigate or exacerbate bullying involvement when measured in an LCA framework? Drawing from a social-ecological perspective to explain bullying, it was hypothesized that, while the bullying class would be characterized by higher levels of anger and risk-taking tendencies (as indicators of aggressive personality), members in the victimization class would share poorer relations with family and school, as well as lower levels of peer involvement and less involvement in extracurricular activities. It was also expected that more frequent feelings of anger and sensation-seeking behaviors as well as lower levels of bonding to family and school, and lower levels of social inclusion would characterize members of the bully-victims class.

Data and Method

Study Design

The data used in this study were collected during the evaluation of a media- and community-based marijuana use prevention intervention in 40 middle schools from 20 communities across the U.S. Recruited communities were located in California, Oregon, Texas, Louisiana, South Carolina, Kentucky, Virginia, Minnesota, South Dakota, Missouri, Ohio, Pennsylvania, and New Jersey. Within the selected communities, schools were recruited based on National Center for Educational Statistics (NCES) district listings. Eligible districts were not in the largest urban category because of the long delays required to obtain clearance in such districts, and had at least two middle schools of comparable size. Because of the demands of implementation, data collection for schools was staggered across three groups, beginning in the fall of 2005, and concluding in spring of 2009. Four waves of data over two years were collected in each school, using an identical questionnaire each time: at the beginning of seventh grade, the end of seventh grade, the beginning of eighth grade, and the end of eighth grade. Paper surveys were administered in classrooms during normal

school hours by trained research staff. The survey instrument drew almost entirely from the American Drug and Alcohol Survey (ADAS; Oetting, Beauvais, & Edwards (1984)— which is one of the instruments listed in the Substance Abuse and Mental Health Services Administration's (n.d.) Measures & Instruments Resource guide—and the Prevention Planning Survey (Oetting et al., 1996).

Participants

A total of 3,237 students, approximately 35% of those eligible, participated in at least one survey; active parental consent and youth assent were given for such participation as required by the responsible Institutional Review Boards. The final analysis sample ($N=3114$) was 48% male, and the race ethnicity of the sample was diverse: 58% of respondents were White, 11% were African American, 23% were Hispanic, and 8% were of another race/ethnicity, including multiracial. All participants were in seventh grade at the start of the study.

Measures

Bullying involvement—Six items were used to measure *bullying involvement*; three of these measured victimization, while the remaining three items measured perpetration. Students' responses were given on a four-point scale with the stem: "How much do you agree with the following?" with response categories ranging from, *not at all*, to, *a lot*. The items used were: (a) People my age from school act like they want to hurt me; (b) *People my age have pushed me around at school*; (c) *People my age at school have beaten me up*; (d) *I like to scare other people my age*; (e) *I've pushed around other people my age at school*; and (f) *I've beaten up other people my age*. Cronbach's alpha for the three bullying items (a)—(c) was .86, and was .87 for the victimization items (d)—(f). To further validate these scales, bivariate relations were examined using OLS regression. Respondent's average score across the victimization items were significantly higher ($p < .05$) when the respondent was male, African American, reported more feelings of anger toward others, and reported more alcohol and marijuana use in the past 30 days. They were significantly lower when students reported being more included with peers. These relations were similarly significant, and in the same direction, for respondents' mean score on the bullying items.

The bullying involvement items were dichotomized before inclusion in the LCA in order to compare individuals who selected, *not at all* (coded at 0 in subsequent analyses) with those who selected *a lot*, *some*, or *not much* (coded at 1 in subsequent analyses). In order to determine if the results of the model would differ if a different categorization strategy was chosen, two additional unconditional LCA models were examined. First, an LCA was constructed using the perpetration and victimization items in their original form, that is, ordinal measures with four categories. Second, we used an alternative dichotomization scheme, where a score of one indicated a response of, "Some" or, "A lot," and a score of zero indicated "Never," and "Not much." These models produced latent class solutions that were less consistent with theory and expectation, and the classes were much less clearly defined than the final model chosen. The dichotomization used in this study is similar to that performed by Williford et al. (2011). In this study, bullying and victimization items from the Revised Olweus Bully/Victim Questionnaire (Olweus, 1996) were dichotomized such that a score of zero indicated *it hasn't happened to me*, and a score of one indicated, only once or twice, two or three times a month, about once a week, or *several times per week*. Table 1 details the proportion of respondents who scored one and zero on each bullying and victimization item in this study.

Covariates—Race/ethnicity and gender, both self-reported, were both included as covariates. Two race/ethnicity items were asked on the survey, one which asked whether the

respondent was of Hispanic background, and a second which asked whether the respondent was White, Black or African American, American Indian or Native American, Alaskan Native, Asian American, Multiracial, or Other. The mutually exclusive race/ethnicity categories constructed using these two items were White, African American, Hispanic, and Other. Students' race and gender were measured at the first data collection, unless this information was missing. In these cases, the data from the earliest possible wave were used.

Responses to items in the school bonding, family bonding, social inclusion, and feelings of anger toward others scales were measured on a four-point scale ranging from *I do not agree at all* to *I agree a lot*. *School bonding* (Cronbach's alpha = .85) was measured using four items, including: *I like school* and *I like my teachers*. *Family bonding* (Cronbach's alpha = .85) was measured using four questions, such as: *My family cares about me* and *I get along with my family*. *Social inclusion* (Cronbach's alpha = .84) was measured using four items, including, *I feel like an outsider at school* and *It seems that kids don't like me*. Feelings of anger toward others (Cronbach's alpha = .84) was measured using four items asking about sentiment toward peers and other adults, such as: *I'm usually angry toward my friends* and *I'm usually angry at my teachers*.

School success was measured using two items: *What kind of grades do you get?* and *What kind of student are you?* The responses were given on a four-point scale ranging from *very good* to *poor*. *Students' sensation-seeking* (Cronbach's alpha = .88) was measured using three items, to which students responded on a five-point scale ranging from *very often* to *not at all*. Examples of items in this scale are: *How often do you do dangerous things for fun?* and *How often do you do exciting things even if they are risky?*

Scale scores for school bonding, family bonding, social inclusion, feelings of anger toward others, school success and sensation-seeking were formed by first reverse-coding necessary items and then taking the average of the items in the scale. *Involvement in conventional activities* was measured using 10 items inquiring how many times in an average week students participated in a variety of activities. Examples of activities used in the scale were team sports, other activities such as running, swimming, doing theatre or drama, and participating in school and nonschool clubs. Responses, which ranged from *none* to *four or more* times per week, were dichotomized such that a score of one on each item indicated that the student participated in that activity to some degree. The sum of the dichotomous scores was calculated to provide an index of the number of conventional activities the student participated in each week.

Because all respondents were in the same grade at the beginning of data collection, these analyses hold respondent's age constant. Conditional models also controlled for treatment condition, with three dummy coded variables to adjust for the four treatment conditions.

Timing of measures—Race and gender were measured at the beginning of seventh grade, unless responses were missing, in which case, later responses were used. All the other covariates were measured at the end of seventh grade. Bullying involvement was measured at the beginning of eighth grade.

Data Analysis Plan

Once the bullying involvement items were dichotomized and scales were constructed, all covariate scales, except conventional activities, were standardized around their means to improve the interpretability of results. Multiple imputation (Enders, 2010) was then used to replace missing values in the dataset. The results presented here are averaged over 10 multiply-imputed datasets, each of which contained 3,114 cases.

Next, the LCA procedure was conducted. The first step in the procedure was to run successive latent class models specifying an ascending number of classes and assessing the following fit statistics for each solution: BIC, sample-adjusted BIC, AIC, and Log-likelihood. Null hypothesis statistics, which compare a model with k classes to a model with $k-1$ classes, were not available when analyses were performed using multiple imputed datasets. The entropy and posterior probabilities of latent class membership for each solution was also examined. Finally, each latent class solution was examined to determine the extent to which it was congruent with theory and past empirical work.

Once the best unconditional LCA model was selected, covariates were introduced to the analysis to determine which variables significantly predicted class membership. To do this, the model utilized a multivariate multinomial logistic regression where one class was specified as the reference class, and by which all covariates were examined simultaneously.

The scale construction procedures were performed using the SAS statistical package, while the multiple imputation and both unconditional and conditional LCA was conducted using Mplus, Version 6.11 (Muthén & Muthén, 1998-2010). All results reported here are averaged over 10 imputed datasets. For all models, a sandwich estimator was utilized to adjust for the nesting of students in schools (Asparouhov, 2005).

Results

Number of classes in the LCA model

Figure 1 provides details of how the AIC, BIC, sample-adjusted BIC, and log-likelihood changed as the number of classes specified in the model increased. For all statistics, the elbow of the chart occurs at four groups, indicating that this was the best number of classes (Masyn, in press). The four-class model produced a high entropy value (.866), and high average posterior probabilities for membership in each of the latent classes (.925, .956, .944, and .840 for classes 1 through 4 respectively). This model also made most substantive sense, providing a good match to both theory and past empirical work.

A description of the four-class model is presented in Table 2. Members of the first class had a relatively high probability of endorsing the victimization items, but a low probability of endorsing the bullying items. Based on this response pattern, this class was termed the “victims” class. Members of the second class had a high probability of endorsing the bullying items, but a low probability of endorsing the victimization items. This class was thus termed the “bullies” class. Members of the third class in the model had a high probability of endorsing the bullying and victimization items. Based on this response pattern, this class was termed the “bully-victims” class. Lastly, members of the fourth class had a low probability of endorsing both the victimization and the bullying items. This class was thus termed the “noninvolved” class.

Based on the estimated posterior probabilities of membership for each class, 15.2% of respondents were best classified as victims, 12.5% of respondents were best classified as bullies, 13.1% of respondents were best classified as bully-victims, and 59.2% of respondents were best classified as noninvolved.

Conditional Model

Next, latent class membership was regressed on the covariates of interest. The results are presented in Table 3. The odds ratios indicated the predicted change in the odds of membership in a particular class *compared to the noninvolved class* for a one unit increase in the covariate, holding constant all other variables in the model. Alpha for significance was set at .05.

First, consider predictors of membership in the bullies class. The odds of being in the bullies class compared to the noninvolved class were over two times higher for African American students as compared to White, non-Hispanic students ($OR = 2.19$). An increase of one standard deviation in the school bonding scale significantly decreased the odds of membership in the bullies class by 32%, while an increase of one standard deviation in the social inclusion scale significantly increased the odds of membership in the bullies class by 38%. An increase of one standard deviation in the feelings of anger toward others scale significantly increased the odds of membership in the bullies class by 88%, while an increase of one standard deviation in the school success scale significantly predicted a 18% decrease in the odds of membership in the bullies class. Finally, an increase of one standard deviation in the sensation seeking scale significantly increased the odds of membership in the bullies class by 89%.

Next, consider predictors of membership in the victims class. Males were more likely to be members of this class compared to the noninvolved class ($OR = 2.36$), and African American students compared to White students were less likely to be members of the victims class ($OR = 0.38$). An increase of one standard deviation in the school bonding scale significantly decreased the odds of membership in the victim class by 30%, and an increase of one standard deviation in the social inclusion scale was significantly associated with a 58% decrease in the odds of membership in the victim class. An increase of one conventional activity significantly reduced the odds of membership in the victim class by 9%, and an increase of one standard deviation in the school success scale significantly increased the odds of membership in the victims class by 31%.

Finally, consider the predictors of membership in the bully-victims class. The odds of being in the bully-victims class compared to the noninvolved class were over 3 times higher for males ($OR = 3.38$). An increase of one standard deviation in school and family bonding both significantly decreased the odds of membership in the bully-victims class by about 25% ($OR = 0.74$ and 0.79 , respectively). An increase of one standard deviation in the social inclusion scale decreased the odds of membership in the bully-victims class by 42%, while an increase of one standard deviation in the feelings of anger toward others scale significantly increased the odds of membership in the bully-victims class by 77%. Lastly, an increase of one standard deviation in the sensation seeking scale significantly increased the odds of membership in the bully-victims class by 68%.

Discussion

This study's primary research objective were to examine: (a) whether the use of LCA to model typologies of bullying involvement would find a similar number of groups and entailing similar behavior patterns as studies using more conventional techniques; and (b) whether individual, peer, school, and family factors significantly predicted these typologies of bullying involvement in either an exacerbating or mitigating capacity. Our findings add to the literature by constructing a categorical latent model of bullying involvement using data taken from a larger and more diverse sample than other studies using the LCA technique with measures of bullying perpetration and victimization simultaneously (Giang & Graham, 2009; Williford et al., 2011). Also, this study examined potential predictors of bullying involvement typologies considering perpetration and victimization items simultaneously, which other studies have yet to do.

The four-class model that best fit the data, and the response pattern entailed by membership in each class, both supported our hypotheses, and is in accordance with the latent classes of school aggression involvement constructed in two other studies (Giang & Graham, 2009; Williford et al., 2011). The latter study found that responses on bullying and victimization

items in fourth grade were best explained using a four-class model. Notably, they also found that a three-class model fit the data better at fifth and sixth grades. Giang and Graham (2009) constructed a five-class model, but two of these classes constituted two subtypes of aggressive victims, high-aggressive, and high-victimized. The relative class size, qualitative differences in response patterns entailed by each class in this analysis resemble those of these other studies. Each model found that the largest class was a noninvolved class, where respondents had a low probability of endorsing either victimization or bullying/aggression items. Our estimate that 59% of students were in the noninvolved class compares to Williford and colleagues' model, where 45% of students were best defined as "uninvolved" and where 75% of students were classified by Giang and Graham (2009) as "socially-adjusted." The apparent robustness of the categorization of youth as bullies, bully-victims, victims, and noninvolved youth across multiple studies is marked. Possibly the most surprising aspect is that a four-group model best fits observed data when bullying involvement is measured using a large number of items, and when those items concern multiple subtypes of bullying.

Reflecting upon our use of a social-ecological perspective, these findings support the use of this orientation in explaining bullying, in so far as varied components of the individual and the social environment were found to significantly predict latent class membership. For instance, this study observed that members of the bullying class reported more feelings of anger toward others and higher levels of sensation-seeking behaviors, which also supported our hypotheses. In addition, this study found that members of the victims class were significantly less likely to report high levels of social inclusion and family bonding. Thus, studies will provide more limited explanations of bullying involvement if they neglect individual-, school-, peer-, and/or family-related factors. However, this study only draws from one particular component of the social-ecological model, the microsystem, and it remains to be seen whether the interactions of these systems—including the macrosystem—also serve to mitigate or exacerbate bullying involvement. This is an interesting question to be posed in future research.

Two findings, in particular, surprised us. First, this study found inconsistent results concerning school-related predictors of membership in the victims class. In this study, while members of the victims class participated in significantly fewer conventional activities and had lower levels of school bonding, it was also found that victims reported a higher degree of academic success controlling for all other variables in the model. At the beginning of the study, it was hypothesized that victims would be lower on all three measures. The latter finding is perhaps in accordance with the perception many have that appearing clever in class or being strongly engaged at school frequently leads to a child's being targeted by bullies, and with studies that find that victims have levels of school achievement and bonding comparable to that of other youths (e.g., Woods & Wolke, 2004). It would be of interest whether other researchers examining school-related predictors of class membership replicate this finding. This finding warrants further probing to determine under what circumstances high achievement may be associated with victimization and under what circumstances it may not.

Secondly, analyses found that higher feelings of anger toward others significantly predicted a higher likelihood of membership in the victims class. This was unexpected, since it is bullies who are more consistently found in the literature to have aggressive personality traits and tendencies, including externalizing behaviors, while victims are found to be more likely to exhibit internalizing tendencies (Card & Hodges, 2008). However, our hypotheses perhaps did not sufficiently incorporate the complexity of how angry emotions are expressed by youth. Some studies have found a significant association between feelings of anger and internalizing behavior (e.g., Eisenberg et al., 2007), and one possibility our findings might

be suggesting is that, for some individuals, higher levels of feelings of anger are associated with higher rates of internalizing behaviors, and that this is increasing the likelihood of membership in the victims class. It would be interesting to confirm whether internalizing problems significantly mediate the association between feelings of anger and membership in the victims class. However, since internalizing behaviors were not measured in the dataset, this serves as a question to be addressed in future research.

Two additional studies would follow on from this investigation to further improve understanding of bullying involvement. Firstly, it would be beneficial to consider what outcomes are significantly predicted by class membership. Secondly, it would be interesting to document the stability of the classes constructed here over time, as well as the consistency of membership patterns over time using Latent Transitions Analysis (Collins & Lanza, 2010).

Study Limitations

Despite attempts to conduct a study with as many implications for the literature as possible, some important methodological limitations concerning our sample and measures should also be acknowledged. The sample used here did not include respondents from the largest urban districts, which limits generalizability. This study has incorporated as many potential predictors of class membership as was feasible given the measures available in the data, but not considered in this analysis are children's depression, exposure to domestic violence, maltreatment, child coping skills and frequency of contact with parents. Also, our measure of school success only included two items. Of particular interest are the bullying involvement items. Although similar to items conventionally used in the field to measure bullying, the items used in this study do not have the same degree of demonstrated validity as such scales as the Revised Olweus Bully/Victim Questionnaire (Olweus, 1996). One other difference between the measure used in this study and Olweus' measure is that the measure of bullying involvement used in this study did not include measures of all types of relational, verbal, and social aggression. However, it should be noted the findings of this study do bear distinct similarities to those of Williford et al. (2011), whose analysis is performed using Olweus' bully/victim items.

Conclusion

These findings have important implications for prevention efforts. Firstly, it is hoped that these findings serve as evidence that effective prevention programs will seek to address not just individual-level factors associated with bullying, but with family- and school-related processes as well (Swearer & Espelage, 2004). In their review of effective bullying prevention programs, Vreeman and Carroll (2007) found that interventions that teach interpersonal skills are most consistently among those programs that successfully reduce aggression and victimization in schools. By demonstrating that relationships between youth and their peers, school and teachers, as well as family significantly predict patterns of school aggression involvement, we hope that this study adds momentum to evidence-based programs designed to reduce aggression and bullying in schools through the improvement of interpersonal skills and relationships. As interest in school aggression and victimization continues to grow, and understanding of the ecology of these phenomena improves, tools for its prevention will, no doubt, become more numerous, more diverse, and more effective.

Acknowledgments

We acknowledge the efforts of project manager Linda Stapel, the Tri-Ethnic Center for Prevention Research, Colorado State University, and the students and staff of participating schools, who together made this research possible.

Statement on Funding

This research was supported by grant DA12360 from the National Institute on Drug Abuse to Michael Slater.

References

- Ahmed E, Braithwaite V. Bullying and victimization: cause for concern for both families and schools. *Social Psychology of Education*. 2004; 7:35–54. doi:10.1023/B:SPOE.0000010668.43236.60.
- Asparouhov T. Sampling weights in latent variable modeling. *Structural Equation Modeling*. 2005; 12:411–434. doi:10.1207/s15328007sem1203_4.
- Baldry AC. Bullying in schools and exposure to domestic violence. *Child Abuse and Neglect*. 2003; 27:713–732. doi:10.1016/S0145-2134(03)00114-5. [PubMed: 14627075]
- Berger KS. Update on bullying at school: Science forgotten? *Developmental Review*. 2007; 27:90–126. doi:10.1016/j.dr.2006.08.002.
- Bond L, Carlin JB, Thomas L, Rubin K, Patton G. Does bullying cause emotional problems? A prospective study of young teenagers. *British Medical Journal*. 2001; 323:480–484. doi:10.1136/bmj.323.7311.480. [PubMed: 11532838]
- Bowers L, Smith PK, Binney V. Perceived family relationships of bullies, victims, and bully/victims in middle childhood. *Journal of Social and Personal Relationships*. 1994; 11:215–232. doi:10.1177/0265407594112004.
- Bowes L, Arseneault L, Maughan B, Taylor A, Caspi A, Moffitt TE. School, neighborhood, and family factors are associated with children's bullying involvement: A nationally representative longitudinal study. *Journal of the American Academy of Child and Adolescent Psychiatry*. 2009; 48:545–553. doi:10.1097/CHI.0b013e31819cb017. [PubMed: 19325496]
- Bronfenbrenner, U. *The ecology of human development*. Harvard University Press; Cambridge, MA: 1979.
- Card N, Hodges EVE. Peer victimization among schoolchildren: Causes, and considerations in assessment and intervention. *School Psychology Quarterly*. 2008; 23:451–461. doi:10.1037/a0012769.
- Collins, LM.; Lanza, ST. *Latent class and latent transition analysis*. Wiley; Hoboken, NJ: 2010.
- Cook CR, Williams KR, Guerra NG, Kim TE, Sadek S. Predictors of bullying and victimization in childhood and adolescence: A meta-analytic investigation. *School Psychology Quarterly*. 2010; 25:65–83. doi:10.1037/a0020149.
- Demaray MK, Malecki CK. Perceptions of the frequency and importance of social support by students classified as bullies, victims, and bully/victims in an urban middle school. *School Psychology Review*. 2003; 32:471–489.
- Earl RM, Burns NR. Experiences of peer aggression and parental attachment are correlated in adolescents. *Personality and Individual Differences*. 2009; 47:748–752. doi:10.1016/j.paid.2009.06.014.
- Eisenberg N, Ma Y, Chang L, Zhou Q, West SG, Aiken L. Relations of effortful control, reactive undercontrol, and anger to Chinese children's adjustment. *Development and Psychopathology*. 2007; 19:385–409. doi:10.1017/S0954579407070198. [PubMed: 17459176]
- Eliot M, Cornell DG. Bullying in middle school as a function of insecure attachment and aggressive attitudes. *School Psychology International*. 2009; 10:201–214. doi:10.1177/0143034309104148.
- Enders, CK. *Applied missing data analysis*. Guilford; New York, NY: 2010.
- Espelage, DL.; Swearer, SM. A social-ecological model for bullying prevention and intervention: Understanding the impact of adults in the social ecology of youngsters.. In: Jimerson, SR.; Swearer, SM.; Espelage, DL., editors. *Handbook of bullying in schools: An international perspective*. Routledge; New York, NY: 2010. p. 61-72.
- Flouri E, Buchanan A. Life satisfaction in teenage boys: The moderating role of father involvement and bullying. *Aggressive Behavior*. 2002; 28:126–133. doi:10.1002/ab.90014.
- Forero R, McLellan L, Rissel C, Bauman A. Bullying behaviour and psychosocial health among school students in New South Wales, Australia: Cross sectional survey. *British Medical Journal*. 1999; 319:344–348. [PubMed: 10435953]

- Giang MT, Graham S. Using latent class analysis to identify aggressors and victims of peer harassment. *Aggressive Behavior*. 2008; 34:203–213. doi:10.1002/ab.20233. [PubMed: 17828767]
- Graham S, Bellmore AD, Mize J. Peer victimization, aggression, and their co-occurrence in middle school: Pathways to adjustment problems. *Journal of Abnormal Child Psychology*. 2006; 34:363–378. doi:10.1007/s10802-006-9030-2. [PubMed: 16648999]
- Haynie DL, Nansel T, Eitel P, Davis Crump A, Saylor K, Kai Y, Simons-Morton B. Bullies, victims, and bully/victims: Distinct groups of at-risk youth. *Journal of Early Adolescence*. 2001; 21:29–49. doi:10.1177/0272431601021001002.
- Hemphill SA, Kotevski A, Herrenkohl TI, Bond L, Kim MJ, Toubourou JW, Catalano RF. Longitudinal consequences of adolescent bullying perpetration and victimization: A study of students in Victoria, Australia. *Criminal Behavior and Mental Health*. 2011; 21:107–116. doi:10.1002/cbm.802.
- Ireland JL, Power CL. Attachment, emotional loneliness, and bullying behaviour: A study of adult and young offenders. *Aggressive Behavior*. 2004; 30:298–312. doi:10.1002/ab.20035.
- Kumpulainen K, Rasanen E. Children involved in bullying at elementary school age: Their psychiatric symptoms and deviance in adolescence. An epidemiological sample. *Child Abuse and Neglect*. 2000; 24:1567–1577. doi:10.1016/S0145-2134(00)00210-6. [PubMed: 11197035]
- Ladd GW, Kochenderfer Ladd B. Parenting behaviors and parent-child relationships: correlates of peer victimization in kindergarten? *Developmental psychology*. 1998; 3:1450–1458. doi:10.1037/0012-1649.34.6.1450. [PubMed: 9823524]
- Ma X. Bullying in middle school: Individual and school characteristics of victims and offenders. *School Effectiveness & School Improvement*. 2002; 13:63–89. doi:10.1076/sesi.13.1.63.3438.
- Masyn, KE. Latent class analysis and finite mixture modeling.. In: Little, T., editor. *Oxford Handbook of Quantitative Methods*. Oxford University Press; New York, NY: In press
- Muthén, LK.; Muthén, B. *Mplus: Statistical Analysis with Latent Variables, User's Guide*. Muthén & Muthén; Los Angeles: 2001-2010.
- Nansel TR, Overpeck M, Pilla RS, Ruan WJ, Simons-Morton B, Scheidt P. Bullying behaviors among U.S. youth: Prevalence and association with psychosocial adjustment. *Journal of the American Medical Association*. 2001; 285:2094–2100. doi:10.1001/jama.285.16.2094. [PubMed: 11311098]
- Oetting, ER.; Beauvais, F.; Edwards, R. *The American Drug and Alcohol Survey*. Rocky Mountain Behavioral Science Institute; Fort Collins, CO: 1984.
- Oetting, ER.; Edwards, R.; Beauvais, F. *The Prevention Planning Survey*. Rocky Mountain Behavioral Science Institute; Fort Collins, CO: 1996.
- Olweus, D. *Bullying at school: What we know and what we can do?*. Blackwell; Malden, MA: 1993.
- Olweus, D. *The revised Olweus Bully/Victim Questionnaire for students*. University of Bergen; Bergen, Norway: 1996.
- Rutter M. A children's behaviour questionnaire for completion by teachers: Preliminary findings. *Journal of Child Psychology and Psychiatry*. 1967; 8:1–11. [PubMed: 6033260]
- Schwartz D, Dodge KA, Pettit GS, Bates JE. The early socialization of aggressive victims of bullying. *Child Development*. 1997; 68:665–675. doi:10.2307/1132117. [PubMed: 9306645]
- Schwartz D, Dodge KA, Pettit GS, Bates JE. Friendship as a moderating factor in the pathway between early harsh home environment and later victimization in the peer group. *Development Psychology*. 2000; 36:646–662. doi:10.1037/0012-1649.36.5.646.
- Schwartz, D.; Proctor, LJ.; Chen, DH. The aggressive victim of bullying: Emotional and behavioral dysregulation as a pathway to victimization by peers.. In: Juvonen, J.; Graham, S., editors. *Peer harassment in school: The plight of the vulnerable and victimized*. Guilford; New York, NY: 2001. p. 147-174.
- Substance Abuse and Mental Health Services Administration. [October 5, 2011] Measures& instruments resource. n.d.from https://preventionplatform.samhsa.gov/macro/csap/mir_search_create/redesign/records_view.cfm
- Swearer, SM.; Espelage, DL. Introduction: A social-ecological framework of bullying among youth.. In: Espelage, DL.; Swearer, SM., editors. *Bullying in American schools: A social-ecological perspective on prevention and intervention*. Erlbaum; Mahwah, NJ: 2004. p. 1-12.

- Troy M, Sroufe LA. Victimization among preschoolers: Role of attachment relationship history. *Journal of the American Academy of Child and Adolescent Psychiatry*. 1987; 26:166–172. doi: 10.1097/00004583-198703000-00007. [PubMed: 3584012]
- Unnever JD. Bullies, aggressive victims, and victims. Are they distinct groups? *Aggressive Behavior*. 2005; 31:153–171. doi:10.1002/ab.20083.
- Vreeman RC, Carroll AE. A systematic review of school-based interventions to prevent bullying. *Archives of Pediatric & Adolescent Medicine*. 2007; 161:78–88. doi:10.1001/archpedi.161.1.78.
- Wang J, Iannotti RJ, Nansel TR. School bullying among adolescents in the United States: Physical, verbal, relational, and cyber. *Journal of Adolescent Health*. 2009; 45:368–375. doi:10.1016/j.jadohealth.2009.03.021. [PubMed: 19766941]
- Williford AP, Brisson D, Bender KA, Jenson JM, Forrest-Bank S. Patterns of aggressive behavior and peer victimization from childhood to early adolescence: A latent class analysis. *Journal of Youth and Adolescence*. 2011; 40:644–655. doi:10.1007/s10964-010-9583-9. [PubMed: 20740308]
- Woods S, Wolke D. Direct and relational bullying among primary school children and academic achievement. *Journal of School Psychology*. 2004; 42:135–155. doi:10.1016/j.jsp.2003.12.002.

Figure 1.
Class enumeration fit statistics (number of latent classes on x-axis, $N = 3114$).

Table 1

Prevalence Rates of the School Aggression Perpetration and Victimization Indicators (N = 3114).

	Proportion
People my age from school act like they want to hurt me	0.29
People my age have pushed me around	0.31
People my age from school have beaten me up	0.13
I like to scare other people my age	0.32
I've pushed around other people my age at school	0.30
I've beaten up other people my age	0.23

Note. Score of one indicated a response of 'A Lot,' 'Some,' or 'Not Much,' versus a response of 'Not at All' (scored zero).

Table 2

Probabilities of Victimization and Bullying Items as a Function of Latent Class Membership (N = 3,114)

	Victims	Bullies	Bully-Victims	Non-involved
Estimated Proportion	15.2%	12.5%	13.1%	59.2%
Probability of Score of 1				
Others act like they want to hurt me	0.70	0.28	0.96	0.04
Others have pushed me around	0.93	0.12	0.97	0.05
Others have beaten me up	0.16	0.02	0.79	0.00
I like to scare others	0.35	0.81	0.94	0.08
I've pushed others around	0.31	0.90	0.95	0.02
I've beaten up others	0.06	0.64	0.88	0.04

Note. Score of one indicated a response of 'A Lot,' 'Some,' or 'Not Much,' versus a response of 'Not at All' (scored zero).

Table 3

Latent Class Analysis with Covariates: Multinomial Logistic Regression (N = 3114).

	Bullies	Victims	Bully-Victims
	<i>OR</i> (95% CI)	<i>OR</i> (95% CI)	<i>OR</i> (95% CI)
Male	1.45 (0.96-2.21)	2.36* (1.74-3.21)	3.38* (2.53-4.50)
White			
African American	2.19* (1.21-3.95)	0.38* (0.16-0.88)	1.26 (0.79-2.01)
Hispanic	1.14 (0.80-1.63)	0.95 (0.60-1.49)	0.95 (0.68-1.33)
Other	0.86 (0.50-1.50)	1.11 (0.76-1.63)	1.17 (0.72-1.90)
School attachment	0.68* (0.58-0.80)	0.70* (0.58-0.84)	0.74* (0.62-0.89)
Family attachment	0.88 (0.75-1.02)	0.91 (0.77-1.08)	0.79* (0.67-0.92)
Social inclusion	1.38* (1.13-1.69)	0.42* (0.35-0.50)	0.58* (0.50-0.69)
Feelings of anger toward others	1.88* (1.58-2.25)	1.12 (0.92-1.37)	1.77* (1.50-2.09)
Number of conventional activities	1.00 (0.91-1.09)	0.91* (0.85-0.98)	0.99 (0.93-1.06)
School success	0.82* (0.70-0.97)	1.31* (1.09-1.56)	0.90 (0.75-1.08)
Sensation-seeking	1.89* (1.53-2.33)	1.06 (0.90-1.25)	1.68* (1.41-2.00)

Note. Noninvolved class is the reference class; school attachment, family attachment, social inclusion, feelings of anger, school success, and sensation-seeking scales were standardized such that the unit is one standard deviation. Bolded Odds Ratios (*ORs*) are significant.