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Examining the link between forms of bullying behaviors and perceptions of safety and belonging among secondary school students

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ABSTRACT

Research suggests that students who bully may perceive the school climate less favorably. Person-centered analyses were used to identify distinct groupings of bullying behaviors and related social-emotional factors (i.e., victimization, internalizing, and perception of school and bullying climate). Latent class analyses were conducted on a sample of 10,254 middle and 2509 high school students and indicated four classes in middle school (Low Involvement, Verbal, High Physical/High Verbal, and High Involvement) and three classes in high school (Low Involvement, Verbal, and High Involvement). A Low Involvement bullying class characterized most students and was related to positive adjustment, whereas a High Involvement bullying class represented the smallest proportion of the sample (1.6% middle school and 7.3% in high school). Students in the High Involvement class reported increased victimization and internalizing problems, feeling less safe and less belonging, and perceiving the school climate to be more supportive of bullying (i.e., perceiving adults' prevention and intervention efforts as ineffective). In middle school, the High Physical/High Verbal class reported significantly higher levels of victimization as compared to the Verbal class. Findings highlight heterogeneity in bullying behaviors and underscore the importance of prevention and intervention programming that addresses safety and belonging.

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1. Introduction

Research suggests that students who perceive their school as unsafe and unsupportive are more likely to engage in bullying behaviors (Bradshaw, Sawyer, & O'Brennan, 2009); this pattern in turn may contribute to a "climate or culture of bullying" (Bradshaw & Waasdorp, 2009; Unnever & Cornell, 2003). Yet there has been limited research on the distinct forms of bullying (e.g., physical aggression, verbal aggression, relational aggression, see Card, Stucky, Sawalani, & Little, 2008 for discussion of the forms) and in relation to aspects of school climate, such as safety and belongingness. The present study examined distinct patterns in the use of a variety of bullying behaviors (physically aggressing, verbally aggressing, relationally aggressing, cyber bullying, stealing, and making sexual comments) and social-emotional factors (victimization, internalizing problems) in relation to two core aspects of school climate (safety and belonging) and bullying climate via person-centered analyses. We explored potential differences in the patterns of bullying perpetration among middle school and high school students, respectively, as prior

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research suggests there would be developmental differences between the bullying behaviors of these two age groups (Swearer, Espelage, Vaillancourt, & Hymel, 2010). The current research may inform prevention and intervention programs: for example, by identifying potential social-emotional problems (e.g., internalizing problems, victimization, and social difficulties) of children who bully that could be addressed through tiered preventive interventions (Ross & Horner, 2009). We also aimed to enhance understanding of intra-individual differences in the forms of bullying and social-emotional factors, which are critical for enhancing indicated interventions.

1.1. Social-emotional attributes of children who bully

A substantive body of research has identified social-emotional problems common among children who bully (for reviews see Carney & Merrell, 2001; Espelage & Swearer, 2004; Juvonen & Graham, 2001; Rodkin & Hodges, 2003). For instance, youth who lack empathy (Endresen & Olweus, 2001), exhibit callous and unemotional traits (Viding, Simmonds, Petrides, & Frederickson, 2009), or are exposed to violence (Baldry, 2003) are more likely to bully. Likewise, aggressive youth tend to have aggressive cognitions, attitudes, and beliefs; perceive aggression as an acceptable and effective response to perceived threats (e.g., support aggressive retaliation; O'Brennan, Bradshaw, & Sawyer, 2009); selectively attend to aggressive cues; and discount situational factors that may have influenced the other person's behavior (for reviews, see Bradshaw & Garbarino, 2004a; Sullivan, Farrell, Bettencourt, & Helms, 2008). Taken together, these hostile attribution biases shade students' interpretations of ambiguous situations, such that they infer greater hostility in others' behavior. These aggressive attitudes may also relate to reactive aggression (Huesmann & Guerra, 1997) and problems with behavior regulation (Goldweber, Bradshaw, Goodman, Monahan, & Cooley-Strickland, 2011).

The bully/victim continuum – bullying others, being bullied, both bullying others and being bullied (i.e., bully/victim), and having low to no involvement in bullying – is a useful framework for describing the multiple roles that youth may play in bullying (Bradshaw, O'Brennan, & Sawyer, 2008; Nansel et al., 2001; O'Brennan et al., 2009; Swearer et al., 2010; Tobin, Schwartz, Gorman, & Abou-ezzeddine, 2005). Although these roles can vary across context and time (Swearer, Wang, Maag, Siebecker, & Frerichs, 2012), research generally suggests that the bully/victim and bully subtypes evidence the most serious types of behavioral and mental health problems (Bradshaw et al., 2008; Nansel et al., 2001; O'Brennan et al., 2009; Swearer et al., 2010; Tobin et al., 2005). Related research indicates that negatively biased attributional styles may also mediate the link between verbal victimization and depressive symptoms, which can lead to hopelessness, anxiety involving schools and social situations, and other adaptive problems for students (Gibb & Alloy, 2006).

Yet, understanding heterogeneity among children who bully is complex given the paradoxical nature of bullying groupings. In line with a social deficit model of bullying, some researchers characterize children who bully as deficient in social problem-solving (Warden & MacKinnon, 2003). Alternatively, other children who bully are characterized by high social intelligence (Kaukiainen et al., 1999) – which enables them to manipulate peers (Garandeau & Cillessen, 2006) – or power, influence, and popularity (Rodkin, Farmer, Pearl, & Van Acker, 2006; Thunfors & Cornell, 2008). For example, in spite of, or perhaps because of, relational aggression, some children who bully are afforded popularity in adolescence (Cillessen & Mayeux, 2004; Cillessen & Rose, 2005; Peeters, Cillessen, & Scholte, 2010; Rodkin et al., 2006) and are perceived by their peers as leaders (Vaillancourt, Hymel, & McDougall, 2003).

Regardless of the social functioning of children who bully, these social-emotional factors do not develop in a vacuum. Instead, the social-emotional attributes of children who bully are shaped at least in part by the child's perceptions and the broader social context in which the bullying occurs. As such, a social-ecological perspective allows for a more holistic approach to understanding factors contributing to bullying (Swearer et al., 2010).

1.2. Perception of safety, belonging, and bullying climate

Research suggests that aggressive youth perceive their environment and peer interactions differently than other youth (Bradshaw & Garbarino, 2004b; Dodge & Pettit, 2003). School climate is a multidimensional construct consisting of shared beliefs, values, and attitudes that shape student-student and student-teacher dynamics and set the tone for behaviors that are acceptable and normative (Kuperminc, Leadbeater, Emmons, & Blatt, 1997). Student-level factors such as sex and race have been linked to perceptions of school climate such that boys and minority students perceive poorer school environments (Griffith, 2000). In particular, research has demonstrated that boys were more likely than girls to exhibit disruptive behavior at school (Putallaz & Bierman, 2004) and thus perceived their environment as less safe. The present study focused on two core aspects of school climate: students' perceptions of safety and belonging in their schools (Haynes, Emmons, & Ben-Avie, 1997; Wilson, 2004). Since the passage of the *No Child Left Behind Act of 2001*, school safety has become a target for school-based interventions. A sense of belonging is also a critical facet of school climate; students with a sense of belonging exhibit greater acceptance of authority and behavior regulation in the classroom (Osterman, 2000).

Conversely, feeling unsafe and as though one does not belong at one's school has been associated with deleterious outcomes (Wilson, 2004). Specifically, disorganized, high-conflict schools can exacerbate externalizing problem behaviors and co-occurring school-related problems, such as academic achievement and truancy (Hawkins, Catalano, & Miller, 1992). Longitudinal research on school climate by Kasen, Berenson, Cohen, and Johnson (2004), indicated that students (ages 6–16) attending high conflict schools (e.g., student-student and teacher-student conflict) evinced greater increases in externalizing problems (Kasen et al., 2004), and 6 years later, they were at increased risk of alcohol abuse and criminality (Kasen, Cohen, & Brook, 1998).

Recent research on middle school youth has linked greater bullying and victimization with fewer positive peer influences and fewer perceived caring parent–child relationships (Espelage & Swearer, 2009). However, positive school climate appeared to buffer against the potentially negative impact of parents and peers on bullying perpetration and victimization. Similarly, school bonding, akin to a sense of belonging at one's school, also buffers against negative influences and has been associated with lowered risk for substance use, truancy, and misconduct (Hawkins et al., 1992).

High school youth who perceived teachers and other school staff as supportive are more willing to seek help for bullying (Eliot, Cornell, Gregory, & Fan, 2010). Furthermore, in schools with more perceived support, there was less of a discrepancy between boys and girls seeking help for bullying. Thus, perceptions of safety and belonging as well as perceptions of supportive teachers and staff may be a key entry points for leveraging interventions. Yet, these efforts should also be sensitive to potential developmental differences (Eccles, Lord, Roeser, & Barber, 1997).

1.3. Developmental differences

Although bullying generally peaks during middle school (Bradshaw, Sawyer, & O'Brennan, 2007), less research has included both middle- and high-school-aged youth, which is needed to contrast the two age groups. Given the differing dynamics of each of these settings (Eccles et al., 1997), it is important to investigate bullying at different school levels (Pepler, Jiang, Craig, & Connolly, 2008). In addition to contextual issues, “within-person” developmental issues should be considered. The developmental demands of adolescents to engage in bullying as a means for establishing social status or dominance may vary by middle and high school (Swearer et al., 2010). For instance, research has illustrated that physical aggression is less common among older adolescents as compared to younger adolescents (Pettit, 1997), whereas relational forms of aggression may be more common after youth transition from middle to high school, as their peer relationships increase in intensity, intimacy, and complexity (Ladd, 2005). Moreover, with development comes enhanced social–cognitive skills, making it easier for youth to bully and damage others by manipulating social relationships (Sutton, Smith, & Swettenham, 1999). As some research suggests girls' social–cognitive skills are more developed than boys, and that this discrepancy may account for gender differences in relational forms of bullying (Crick, Bigbee, & Howes, 1996), the role of gender also must be taken into account.

1.4. Gender differences

Although a robust literature has indicated that boys are more likely to engage in physical forms of bullying than girls (e.g., Espelage, Bosworth, & Simon, 2000), gender differences in other forms of bullying have been less consistent. Meta-analytic findings have demonstrated gender invariance in relational forms of aggression (Card et al., 2008). Yet findings from research focused specifically on bullying behaviors are less clear. Results from a 2005 nationally representative study of 6th through 10th graders in the United States found that boys were more involved in physical, verbal, and cyber bullying, whereas girls were more involved in relational bullying (Wang, Iannotti, & Luk, 2012; Wang, Iannotti, & Nansel, 2009). A study of German 5th through 10th graders found that significantly more boys reported physical and verbal bullying than girls. Unlike the United States sample, in the German sample boys reported more relational, indirect bullying than girls (Scheithauer, Hayer, Petermann, & Jugert, 2006). Still other research, using data from a regional census of high school students in the United States, reported higher rates of cyber bullying among girls than boys but found similar overall levels of bullying for both genders (Schneider, O'Donnell, Stueve, & Coulter, 2012). Factors such as age, racial and cultural context, and the definition and assessment of bullying may account for discrepant findings regarding gender differences in bullying behaviors. Although the study of bullying behaviors has grown, attention to specific forms perpetrated in conjunction with the use of person-centered analytic approaches is lacking.

1.5. Types of bullying behaviors perpetrated

Olweus (1993) was among the first to identify subclassifications of children who bully. Since then, most studies have created subgroups using means, standard deviations, and percentiles as cut points. Only recently have researchers begun to use person-centered latent variable approaches, such as latent class analysis (LCA) or general growth mixture modeling, to investigate potentially unique bullying groupings. However, much of the work to date has focused on broad categories (e.g., bully, victim, bully/victim; Lovegrove, Henry, & Slater, 2012; Nansel et al., 2001; Williford, Brisson, Bender, Jensen, & Forrest-Bank, 2011) or frequency of involvement (e.g., Pepler et al., 2008) rather than distinguishing between the forms of bullying behaviors perpetrated (i.e., physical, relational, verbal, cyber bullying, stealing, and making sexual comments).

LCA allows one to identify differential patterns of bullying forms perpetrated (e.g., co-occurrence of several forms of bullying and predominant use of a certain form of bullying) with greater precision than most variable-centered methods (Walrath et al., 2004). However, the extraction of classes from LCA depends largely on the factors entered into the model; much of the LCA research to date has explored the broad categories of victim, bully, bully/victim, and noninvolved classes rather than exploring specific typologies of bullying behavior. Despite focusing on victimization rather than perpetration, one study assessed five specific forms of victimization (physically victimizing, verbally victimizing, socially excluding, spreading rumors, and cyber bullying). Using nationally representative data from the Health Behavior in School-aged Children (HBSC) study, Wang, Iannotti, Luk, and Nansel (2010) used LCA to detect the co-occurrence of victimization. Three latent classes were identified: all-types victims, verbal/relational victims, and nonvictims. More recently, using a sample of 6th through 10th graders, Wang et al. (2012), used LCA to identify three patterns of bullying behaviors: all-types bullies, verbal/social bullies, and an uninvolved class.

1.6. Overview of the current study

The primary aim for the current study was to identify discrete classes of youth with distinct patterns or groupings of the forms of bullying perpetrated. The second aim examined whether specific classes were differentially associated with increased victimization and internalizing problems. Finally, the association between the classes and perceptions of safety, belonging, and bullying climate in school were explored. This study is the first to examine patterns of bullying behaviors using LCA and account for self-reported forms of bullying – physically aggressing, relationally aggressing, verbally aggressing, cyber bullying, stealing, and making sexual comments – while simultaneously estimating relations to varying forms of adjustment (victimization, internalizing problems, safety, and belonging) and perceived school bullying climate. The present study also adds to the literature by constructing a latent model of bullying groupings using a larger sample, across a broader range of grades (middle and high school students) than many other studies using an LCA approach (e.g., Wang et al., 2010, 2012; Williford et al., 2011).

Given the co-occurrence of different forms of bullying (Wang et al., 2009, 2012), it seems unlikely that an exclusively physical or exclusively relational aggression subtype would emerge. Rather, it was hypothesized that students who bully would be highly involved in multiple forms of bullying. It was also expected that there would be significant associations between bullying class membership and adjustment. For example, being highly involved in multiple forms of bullying would be associated with poor adjustment; more victimization and internalizing problems, poor perception of safety and belonging in general, and poor perception of school bullying climate. Based on Wang and colleague's LCA findings, it was expected that a verbal/relational subgroup and a low or nonbullying subgroup would also be identified.

As the physical forms of bullying tend to be less common among high school youth, it was anticipated that there would be some differences by school level in the classification of bullying behavior (e.g., with more subgroups involving physical aggression in middle school than in high school). Similarly, some gender differences in the patterns of bullying perpetrated were anticipated. Based on previous research, it was expected that boys would be more likely to perpetrate more physical forms of bullying than girls; gender differences in relational forms of bullying were not expected.

2. Method

2.1. Data source

Data for this study come from an anonymous on-line bullying survey conducted in a large Maryland public school district. This project began as a community-based participatory research effort collaboratively developed between the research team and the school district, and has resulted in multiple publications examining the intersection of bullying and school climate (e.g., Bradshaw et al., 2007, 2008, 2009; O'Brennan et al., 2009). The school district administered the annual on-line survey in order to assess the prevalence and characteristics of bullying. The data for the current study come from the school district's 18 urban (55%), 11 suburban (32%), and 4 rural (13%) middle and high schools. The surveys were completed by 12,763 6th through 12th graders. Approximately 76% of the students in the targeted grades throughout the district participated in this study. Relatively few (i.e., less than 5%) of the youth did not participate due to parental nonconsent. Rather, the majority of the nonparticipation (15–18%) was due to minor deviation in the schools' administration of the survey, whereby schools were not able to get all eligible students into the computer lab to complete the survey during the administration window. The remaining nonparticipation was due to student factors (i.e., absences and students not assenting to participation). Nevertheless, the overall participation rate was relatively high for a survey of this type, and the overall number of participants provides sufficient power to conduct the hypothesized tests. On average, the 33 schools had 24.3% of students receiving free and reduced meals (which is a proxy for socio-economic status); 9.6% of the students received special education services, and the average mobility rate (i.e., number of students newly entering and those leaving the school divided by the entire school enrollment) was 31.7%.

2.2. Participants

There were 12,763 participants, and 80% were in middle school. Fifty percent of the sample were boys, and the majority (62.5%) were Caucasian, followed by 19.1% African American, 5.6% Hispanic/Latino, 3.8% Asian/Pacific Islander, and 9.0% Other (see Table 1 for breakdown by school level).

2.3. Measures

2.3.1. Demographic information

Students responded to select demographic questions regarding their race/ethnicity, sex, and grade.

2.3.2. Forms of perpetration of bullying

Consistent with the World Health Organization's definition (Nansel et al., 2001), bullying was defined on the survey as occurring “when a student or group of students repeatedly say or do mean or hurtful things to someone on purpose. Bullying includes things like threatening, teasing, calling names, ignoring, and leaving someone out on purpose” (Olweus, 1993; Sawyer, Bradshaw, & O'Brennan, 2008). Participants responded to multi-response formatted questions regarding their engaging in bullying behaviors. Participants self-reported up to 10 bullying behaviors that they had engaged in. Specifically, the question read

Table 1

Characteristics of participants by school level.

Sample characteristics	Middle school		High school		Total
	%	<i>n</i>	%	<i>n</i>	<i>n</i>
Gender					
Boys	50.2	5151	49.6	1245	6396
Girls	49.8	5103	50.4	1264	6367
Race/ethnicity					
Caucasian	62.4	6403	62.5	1568	7971
African American	19.0	1952	19.6	492	2444
Hispanic/Latino	5.6	571	5.5	138	709
Asian/Pacific Islander	3.6	370	4.5	114	484
Other	9.3	958	7.9	197	1155

“Within the last month, have you repeatedly tried to hurt or make someone feel bad by... calling them bad names; threatening to hurt or hit them; teasing, picking on, or making fun of them; pushing or shoving them; hitting, slapping, or kicking them; emailing, instant messaging, text messaging someone or posting a blog about them on the Internet; spreading rumors or lies about them; ignoring or leaving them out on purpose; making sexual comments or gestures; and stealing their things?” Self-report responses resulted in a dichotomous variable (0 = no, 1 = yes) for each of the 10 items. Similar measurement schemes have been used and validated in previous studies (e.g., Centers for Disease Control & Prevention [CDC], *in press*; Sawyer et al., 2008; Solberg & Olweus, 2003).

2.4. Adjustment

2.4.1. Internalizing problems

Participants completed a self-report scale including five items from the Baltimore How I Feel Child measure (BHIF; Ialongo, Kellam, & Poduska, 1999): “I am sad;” “I am lonely;” “I feel like I belong” (reverse-scored); “I am worried something bad is going to happen;” and “I feel afraid.” Participants responded on a scale from 1 (strongly disagree) to 4 (strongly agree) for each item. The BHIF was derived from conceptually similar measures, such as the Brief Symptom Inventory (Derogatis, 1993) and earlier versions of the Youth Self Report (Achenbach & Rescorla, 2001) and includes some similarly worded items in order to assess internalizing problems. The BHIF is supported by convergent and predictive validity evidence generated through longitudinal studies (e.g., prognostic value of self-reports of anxious symptoms in first graders with respect to anxious symptoms and adaptive functioning in the late elementary school years; Ialongo, Edelsohn, Werthamer-Larsson, Crockett, & Kellam, 1995). Although the design of the present study precluded use of a clinical measure of internalizing problems or the entire BHIF measure; a subset of items with the highest factor loadings was used (Ialongo et al., 1999). A confirmatory factor analysis specifying a one-factor model and using the internalizing problems data from the current study (from these five items) indicated adequate model fit (the comparative fit index = .99, the root mean square error of approximation = .04, and the standardized root mean square residual = .01). Item scores were averaged to create a single subscale score ($\alpha = .76$), such that higher scores indicated more internalizing problems.

2.4.2. Victimization

Participants completed a self-report, single-item indicator of bullying victimization: “How often have you been bullied during the last month?” and indicated either “4 = several times a week,” “3 = once a week,” “2 = 2–3 times during the month,” “1 = 1 time during the month,” or “0 = not at all (i.e., I was not bullied)” (Nansel et al., 2001; Solberg & Olweus, 2003). Higher scores indicated increased frequency of victimization. Solberg and Olweus (2003) previously validated the use of this single-item indicator of bullying victimization; a predictive validity approach demonstrated a functional association between the frequency of involvement in bullying and related behavioral and mental health concerns.

2.4.3. Perceptions of safety and belonging

Participants also completed a two-item, self-report form regarding safety and belonging: “I feel safe at this school,” and “I feel like I belong at this school”. Participants responded on a scale from 1 (strongly disagree) to 4 (strongly agree) for each item. Higher scores indicated a greater sense of safety and belonging. These items were derived from commonly used and previously validated measures of school climate. The full measure has demonstrated strong psychometric properties including an established factor structure and internal consistency (see Haynes et al., 1997; Koth, Bradshaw, & Leaf, 2008).

2.4.4. Perceptions of the school's bullying climate

Participants responded by self-report to six items measuring their perceptions of several aspects of the bullying climate at their school. These items have been previously used in published studies (e.g., Bradshaw et al., 2007; Waasdorp, Pas, O'Brennan, & Bradshaw, 2011). Items were coded – reverse coded in most cases – such that higher scores indicate a more positive climate.

Bullying is not a problem was measured by a single item: “Bullying is a problem at this school” rated on a 4-point scale from 1 (strongly agree) to 4 (strongly disagree) (Bradshaw et al., 2007).

Not witnessing bullying was measured by a single item: “I have witnessed bullying” rated 1 (yes) or 0 (no) (Bradshaw et al., 2007).

Adults do enough to prevent bullying was measured by a single item: “Adults are doing enough to prevent bullying from occurring” rated 1 (yes) or 0 (no) (Bradshaw et al., 2007).

Adults intervene when they see bullying was measured by a single item: “I have seen adults watch bullying and do nothing” rated 1 (yes) or 0 (no) (Bradshaw et al., 2007).

Adult interventions are effective was measured by a single item: “Adults who intervene with bullying make it worse” rated on a 4-point scale from 1 (strongly agree) to 4 (strongly disagree) (Bradshaw et al., 2007).

Reported bullying and adult responded was measured by a single item: “Have you ever reported bullying to an adult at school and he or she did nothing” rated 1 (yes) or 0 (no) (Bradshaw et al., 2007).

2.5. Procedure

All schools within the district were eligible for participation in the survey. The survey was administered by the school district with technical assistance provided by the university-based research partner. The survey was administered over a 3-week period in late November through December of 2008. The schools informed parents that the district was conducting a district-wide anonymous survey of bullying behavior and a passive consent process was used. The approximately 50-item survey was completed by the participants in a group format (including 15 to 25 students) during school hours through a password-protected website; the survey took approximately 7 min on average to complete. Staff administering the survey received written instructions for administering the survey to students. The survey was administered by the teacher and proctored by the guidance counselor or school psychologist to ensure that students did not discuss their answers. The teachers read aloud the definition of bullying, indicated that all answers would remain anonymous, and then read the survey. The nonidentifiable data were obtained from the school district and have been approved for analysis by the Institutional Review Board at the researchers' institution. There were no missing data, as the on-line survey required a response to each question in order to advance the questionnaire to the next question. For additional information on the survey or its administration procedures, see Bradshaw et al. (2007, 2008, 2009) and O'Brennan et al. (2009).

2.6. Data analysis

Descriptive and bivariate analyses were conducted in SPSS. Latent class analysis (LCA; McCutcheon, 1987; Nylund, Asparouhov, & Muthén, 2007) was conducted using the *Mplus* 6.1 statistical package (Muthén & Muthén, 1998–2011) in order to group participants into discrete classes based on their pattern of responding to the set of 10 different (dichotomous) forms of bullying behaviors. Specifically, LCA is a model-based probabilistic method of classifying individuals to latent classes based on their response variable score and estimated posterior probabilities. Posterior probabilities reflect a participant's most likely latent class membership according to the requested LCA model under consideration and based on the individual's pattern of response variable scores.

An individual is assigned to the class for which their posterior probability is the highest. Good classification results from a high separation of the classes, meaning that there is a higher posterior probability value for one class and lower values for the others and low levels of within-latent-class variation (Muthén, 2004). Therefore, this person-centered approach groups participants into different classes based on the extent to which they share a common pattern of responses to the 10 bullying behaviors, yet remain different from the individuals in other classes (McCutcheon, 1987).

The aim of LCA is to identify the most parsimonious number of classes (Nylund et al., 2007) that describes the association between the selected 10 bullying behaviors. LCA is largely an exploratory technique whereby no parameters are specified a priori (Finch & Bronk, 2011). The extraction of classes depends on a variety of factors such as sample size and variables included in the model (Clark & Muthén, submitted for publication).

Selection of the model requires consideration of substantive theory as well as fit statistics (Nylund et al., 2007). Four indices of model fit were computed: the Akaike Information Criterion (AIC; Akaike, 1974), the Bayesian Information Criterion (BIC), the Sample Size Adjusted Bayesian Information Criterion (SSA BIC; Schwarz, 1978), and the sample size adjusted Lo–Mendell–Rubin likelihood ratio test (LMR–LRT; Lo, Mendell, & Rubin, 2001; Muthén & Muthén, 1998–2011). Models with the lowest AIC, BIC, and SSA BIC values suggest the best fit (Sclove, 1987). The LMR–LRT compares the fit of the estimated model to a model with one less class ($k - 1$). Thus, a nonsignificant p value from the LMR–LRT suggests that the additional class does not result in a significant improvement in fit (Lo et al., 2001). The BIC has been a favored information criterion; however, the LMR–LRT has proven to be a consistent indicator in terms of supporting the fit of the model with the correct number of classes (Nylund et al., 2007).

The estimation for a model was stopped in one or more of the following instances: when none of the fit indices demonstrated further improvement, when the indices began to level off, when the extra class was not qualitatively different than the classes already extracted (i.e., it largely replicated the classes already seen). For models with the same or similar levels of goodness of fit, the more parsimonious model is favored (Loehlin, 1998). An entropy score was also calculated for each model to assess the model's classification accuracy (Ramaswamy, Desarbo, Reibstein, & Robinson, 1993). Although the entropy score is not used to

determine model fit, this score represents an estimate of the percentage of the sample that was accurately classified using a given class model (Ramaswamy et al., 1993).

After fitting the most appropriate number of classes through the process outlined above, the association between the resultant bullying classifications and concurrent adjustment (i.e., victimization, internalizing, safety, and belonging) and perceptions of the school's bullying climate were examined. All LCAs used a Huber–White adjustment of the standard errors in order to account for the clustering of students within schools (Muthén & Muthén, 1998–2011). Specifically, the standard error computation with Type = Complex uses a “sandwich” procedure, thereby taking clustering of students within schools into account (Muthén & Muthén, 1998–2011).

Based on the preliminary descriptive and bivariate results, along with previous research indicating developmental differences in bullying behaviors (Bradshaw et al., 2009; O'Brennan et al., 2009; Pepler et al., 2008; Smith et al., 2002), it was determined that the LCA analyses would be run separately by school level (i.e., middle vs. high school). To further substantiate examining middle and high school students separately, preliminary LCA analyses were conducted to examine the model fit on the combined middle and high school samples. These models failed to adequately fit the data (e.g., model convergence was not achieved), and thus the subsequent LCA analyses were run stratified by school level.

3. Results

3.1. Descriptive analyses

Table 2 provided key study variables by school level. The data indicated that 4194 students reported engaging in one form of bullying. On average, middle school students reported engaging in approximately two bullying behaviors ($M = 1.81$, $SD = 2.28$), whereas high school students reported engaging in approximately three bullying behaviors ($M = 2.84$, $SD = 3.22$), which was significantly more bullying behaviors than the middle school students, $t(12,761) = -14.9$, $p < .001$. Among middle school students, calling other students names and teasing/making fun of were the most commonly reported forms of bullying, whereas making sexual comments and stealing were the least commonly reported among this age group (see Table 3). Similarly, among high school students, calling other students names and teasing/making fun of were the most commonly reported, whereas stealing and cyber bullying were the least common forms. These variations in findings by school level, along with preliminary LCA analyses substantiated the decision to stratify the analyses by school level. As a reminder, these classes refer to the perpetrators of bullying behaviors, not the victims.

3.2. Model selection and description

A series of latent class models was examined to determine if there were discrete classes of youth with different patterns of bullying behaviors. Based on several fit statistics (Nylund et al., 2007), theory, and empirical research (Wang et al., 2009, 2010), the four-class model for middle school students and the three-class model for high school students provided the best fit to the data (see Table 4). For middle school youth, the LMR-LRT indicated that a five-class model did not significantly improve in fit over the four-class model, thereby providing support for the more parsimonious four-class model. Additionally, the reductions in BIC, SSA BIC, and AIC were diminishing. Finally, the addition of new classes did not provide any new information or new patterns; instead, the fifth class represented a variation on the existing theme and pattern (i.e., the fifth class was simply a variation of the verbal class). Posterior probabilities were high (class 1 = .93; class 2 = .99; class 3 = .98; class 4 = .98) suggesting high separation of the classes.

Table 2
Key study variables by school level.

Measures	Middle school	High school
	%(N)	M(SD)
Social-emotional factors		
Victimization ^a	0.96 (1.36)	0.99 (1.47)
Internalizing ^a	1.76 (0.64)	1.96 (0.73)
Safety and belonging		
Safety ^a	2.96 (0.91)	2.72 (0.99)
Belonging ^a	3.13 (0.92)	2.89 (1.03)
School bullying climate		
Bullying is not a problem ^a	2.59 (0.94)	2.54 (1.01)
Not witnessing bullying	36.0 (3690)	34.5 (865)
Adults do enough to prevent bullying	45.2 (4630)	36.0 (904)
Adults intervene when they see bullying	62.8 (6438)	49.6 (1245)
Adult interventions are effective ^a	2.54 (1.01)	2.20 (0.98)
Reported bullying and adult responded	26.4 (2705)	27.0 (677)

Note.

^a This variable was continuous, for which the mean and standard deviation (reported in parentheses) are provided.

Table 3

Percentage of respondents who reported perpetrating each form of bullying, disaggregated by school-level.

Form of bullying	Middle school	High school
	<i>n</i> = 10,254	<i>n</i> = 2509
Threatening to hurt or hit	9.4	11.0
Pushing or shoving	11.9	10.8
Hitting/slapping/kicking	8.6	9.7
Making sexual comments	4.0	7.0
Stealing	4.3	5.9
Spreading rumors	7.2	7.1
Ignoring	12.5	11.4
Cyber bullying	5.0	6.0
Calling names	18.5	15.6
Teasing/making fun of	18.6	15.6

Note. Numbers represent the percentage of youth who reported that they engaged in the form of bullying specified (i.e., responded “yes”).

For high school students, the LMR-LRT indicated that the four-class model did not significantly improve on the fit of the three-class model, providing support for the more parsimonious three-class model. As with the middle school LCA, reductions in BIC, SSA BIC, and AIC were diminishing. In fact, the largest difference in BIC was between the two- and three-class solutions. Thus, by plotting the BICs for each class (i.e., “elbow plots;” Petras & Masyn, 2010), one can clearly see where class enumeration should stop where there are diminishing returns in the addition of classes. Similar to the middle school LCA, the additional classes did not contribute new information or patterns, just variations on the extant theme (i.e., the fourth class was a variation of the second class). Posterior probabilities were high (class 1 = .94; class 2 = .88; class 3 = .94; class 4 = .90) suggesting highly separate, distinctive classes.

Once these models were selected, given the literature on possible gender differences in the forms of bullying used, gender was included as a covariate in the model (i.e., regressing class membership on gender). Results indicated that adding gender to the model did not substantively change the patterns of the classes, further illustrating the stability of the classes (Lubke & Muthén, 2007). Specifically, the overall distribution of participants across the classes did not change as a result of including gender. Similarly, the predicted probabilities resulting from the models did not change as a result of the inclusion of this covariate. Gender differences in class membership are detailed in the social-emotional factors of the bullying classes subsection that follows.

As demonstrated in Fig. 1a and b, for both middle and high school students, there was a large Low Involvement class that did not engage in any form of bullying behavior (76.3% and 71.8%, respectively) and a small High Involvement class that reported engaging in numerous forms of bullying (1.6% and 7.3%, respectively). In middle school, there were two additional classes, which were labeled Verbal and High Physical/High Verbal based on the forms of bullying that were most perpetrated by each group. The Verbal class (16.6%) had a higher probability of reporting engaging in verbal bullying strategies (i.e., .53 for calling names and .54 for teasing) and ignoring (.33) more than the other bullying strategies. Over 70% of the students in the High Physical/High Verbal class (5.5%) reported engaging in physical bullying strategies (range of .75 to .89, see Fig. 1a) and verbal bullying strategies (range of .78 to .81, see Fig. 1a).

Like the middle school students, the high school LCA yielded Low and High Involvement classes. Unlike the middle school students, the high school data yielded three instead of four classes. Among high school students, the third remaining mid-involvement class was labeled Verbal, with over 70% of these youth reported engaging in verbal bullying behaviors, between 40 and 47% of youth reported engaging in physical bullying behaviors, and 41% reported engaging in ignoring others (see Fig. 1b).

Table 4

Fit indices for latent class analyses of middle and high school youth.

Number of classes	BIC	AIC	SSA BIC	Adjusted LMR-LRT <i>p</i> -value	Entropy	Smallest class size
<i>Middle school (n = 10,254)</i>						
1 class	59,506.47	59,434.12	59,474.69	–	–	–
2 classes	45,423.97	45,272.03	45,423.97	<.0001	.91	1514 (14.7)
3 classes	43,694.57	43,463.03	43,592.88	.0002	.87	487 (4.8)
4 classes	43,124.08	42,791.25	42,977.89	.04	.87	166 (1.6)
5 classes	42,957.40	42,566.69	42,785.796	.20	.84	145 (1.4)
<i>High school (n = 2509)</i>						
1 class	21,875.89	21,817.62	21,844.12	–	–	–
2 classes	14,395.89	14,273.51	14,329.17	<.0001	.95	488 (19.5)
3 classes	13,190.64	12,992.50	13,082.62	.01	.94	182 (7.3)
4 classes	12,899.64	12,649.05	12,763.02	.10	.91	158 (6.3)

Note. Bayesian Information Criterion (BIC; Schwarz, 1978), Akaike Information Criterion (AIC), sample size adjusted Bayesian Information Criterion (SSA BIC; Schlove, 1987), sample size adjusted Lo–Mendell–Rubin adjusted likelihood ratio test (LMR-LRT; Lo et al., 2001). Bolded model indicates best fitting model. In the far right column, numbers represent number of participants in the smallest latent class, with the percentages in parentheses.

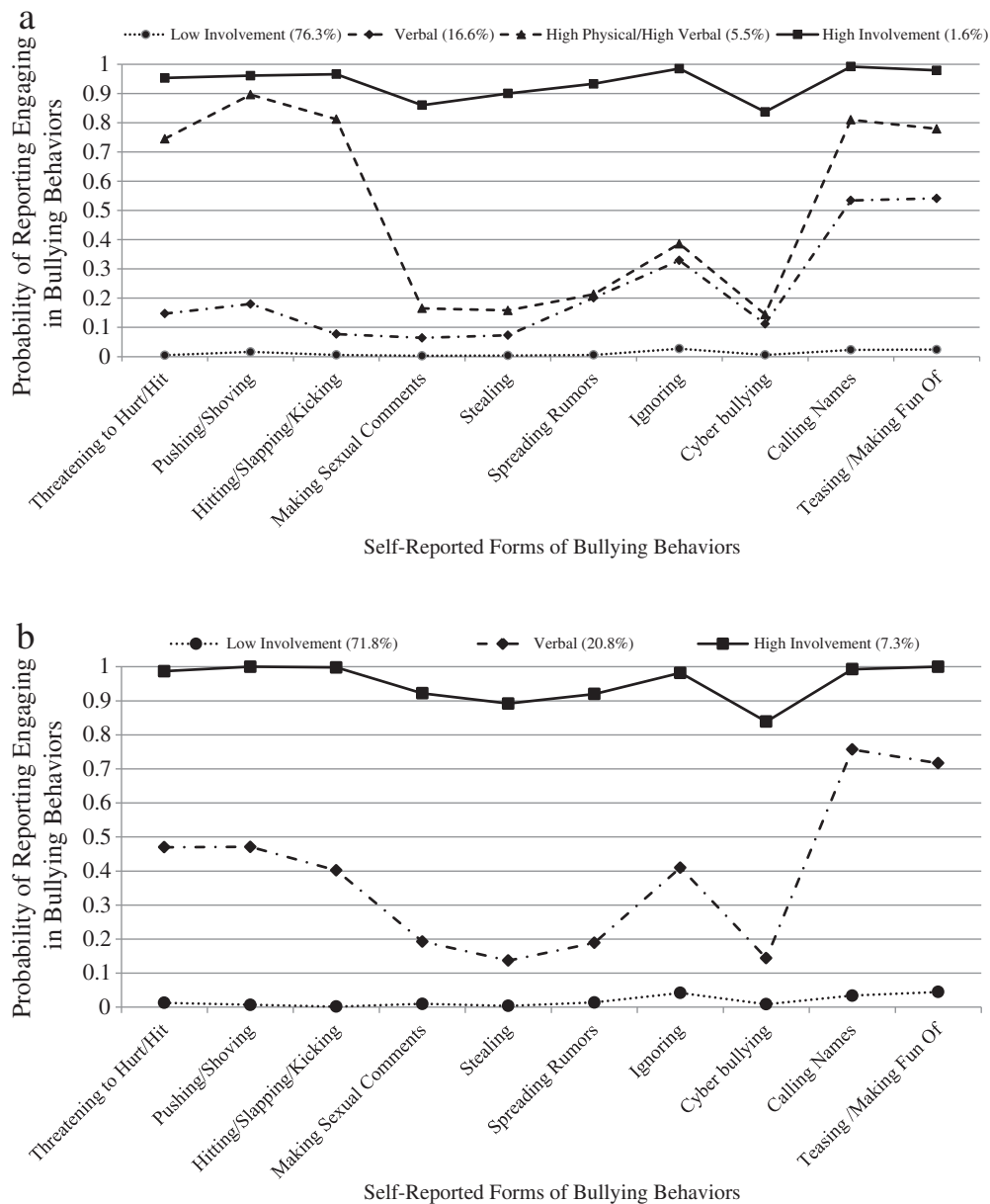


Fig. 1. a. Latent class profiles of bullying behaviors for middle school students ($n = 10,254$). b. Latent class profiles of bullying behaviors for high school students ($n = 2509$).

3.3. Social-emotional factors of the bullying classifications

As stated previously, gender was included as a covariate in the LCA model. All class comparison estimates presented are in reference to the Low Involvement class. An alpha of .05 was used for all tests of statistical significance. In middle school, girls were significantly more likely than boys were to be in the Verbal class (Adjusted Odds Ratio [AOR] = 1.36) and less likely to be in the other classes as compared to boys (AOR_{High Involvement} = 0.63 and AOR_{High Physical/Verbal} = 0.76). In high school, girls were significantly less likely to be in the High Involvement class as compared to boys (AOR = 0.63). There were no other significant gender differences. Race/ethnicity and urbanicity (urban vs. rural and suburban) were also included as covariates in the LCA model. The pattern of LCA classes did not differ by race/ethnicity or urbanicity; however, African American students were significantly more likely to be in the High Involvement class as compared to the other classes.

To further validate the latent classifications obtained in the current study, five outcomes were compared across the latent classifications: victimization, internalizing problems, perceived safety, belonging, and bullying climate. The results indicated that those in the High Involvement class had significantly higher levels of victimization and internalizing problems than all other classes; this pattern held for both middle school (see Table 5) and high school (see Table 6) students.

For middle school students, a more nuanced pattern of findings emerged with respect to the High Physical/High Verbal and Verbal classes. Specifically, the High Physical/High Verbal class reported significantly higher levels of victimization as compared to

Table 5

Comparison of latent classes of forms of bullying behavior by demographic characteristics social–emotional factors, safety, belonging, and school bullying climate in middle school ($n = 10,254$).

	Latent classes of forms of bullying behavior			
	Low involvement	Verbal	High physical/high verbal	High involvement
Demographic characteristic				
Boys	44.4%	50.4%	57.5%	65.0%
White	65.5%	51.8%	47.1%	44.6%
Urban	54.3%	65.7%	66.0%	56.1%
Grade	7.02 (0.93)	7.10 (0.87)	7.31 (0.87)	7.74 (1.34)
Social–emotional factors				
Victimization	0.81	1.35	1.52	2.58
Internalizing	1.71	1.89 ^A	1.97 ^A	2.33
Safety	3.03	2.79 ^A	2.68 ^{AB}	2.47 ^B
Belonging	3.18	2.99 ^{AC}	2.93 ^{BC}	2.79 ^{AB}
School bullying climate				
Bullying is not a problem	2.68	2.35	2.21 ^A	1.98 ^A
Not witnessed bullying [†]	0.41	0.20 ^A	0.16 ^{AB}	0.11 ^B
Adults do enough to prevent bullying [†]	0.48 ^A	0.38 ^{BC}	0.34 ^{BD}	0.43 ^{ACD}
Adults intervene when they see bullying [†]	0.68	0.50	0.39	0.22
Adult interventions are effective	2.48	2.18 ^A	1.98 ^B	1.95 ^{AB}
Reported bullying and adult responded [†]	0.77	0.63 ^A	0.64 ^A	0.40

Note. Means in rows sharing superscripts are NOT significantly different at $p < .05$.

Bolded = mean (standard deviation).

[†] Dichotomous variables. Numbers represent percent of individuals in the class who reported “yes” in response to the school bullying climate item. All other variables are mean scores.

the Verbal class; however, they reported similar levels of internalizing problems (no significant difference). Recall that the Verbal class included significantly more girl than boy middle school students. The Verbal class tended to report significantly lower levels of victimization as compared to the High Physical/High Verbal class, which suggests that girls who reported using verbal bullying techniques and ignoring may have experienced less victimization than their highly physical and verbal bullying (predominantly boy) counterparts. The similar levels of internalizing problems across the High Physical/High Verbal and Verbal classes suggests that internalizing problems are a robust characteristic of bullying, and are evident for both boys and girls.

Additionally, the High Physical/High Verbal class differed from the High Involvement class. Their differential relations to social–emotional factors further validated them as distinct classes. Specifically, compared to the High Involvement class, students characterized by the High Physical/High Verbal class reported significantly less victimization and internalizing problems.

Table 6

Comparison of latent classes of forms of bullying behavior by social–emotional factors, safety, belonging, and school bullying climate in high school ($n = 2509$).

	Latent classes of forms of bullying behavior		
	Low involvement	Verbal	High involvement
Demographic characteristic			
Boys	49.9%	44.9%	60.2%
White	64.0%	61.8%	49.2%
Urban	52.1%	55.1%	63.5%
Grade	9.77 (0.97)	9.70 (0.93)	9.87 (1.13)
Social–emotional factors			
Victimization	0.70	1.42	2.71
Internalizing problems	1.88	2.01	2.58
Safety	2.80	2.61	2.30
Belonging	2.92 ^A	2.89 ^A	2.61
School bullying climate			
Bullying is not a problem	2.69	2.29	1.71
I have not witnessed bullying [†]	0.42	0.20	0.07
Adults do enough to prevent [†]	0.36 ^{AB}	0.32 ^A	0.44 ^B
Adults intervene [†]	0.58	0.34	0.09
Adult interventions are effective	2.26	2.11 ^A	1.89 ^A
I reported and adult responded [†]	0.80	0.67	0.27

Note. Means in rows sharing superscripts are NOT significantly different at $p < .05$.

Bolded = mean (standard deviation).

[†] Dichotomous variables. Numbers represent percent of individuals in the class who reported “yes” in response to the school bullying climate item. All other variables are mean scores.

3.4. Perceptions of safety and belonging

3.4.1. Middle school

As indicated in Table 5 (see social-emotional factors), the middle school students in the Low Involvement class reported feeling the safest and reported the highest levels of belonging as compared to the other three classes ($ps < .05$). However, the Verbal class and the Low Involvement class did not significantly differ on reports of safety. The Verbal class reported significantly more safety than the High Involvement class, yet was not significantly different when compared to the High Physical/High Verbal class. Moreover, the High Physical/High Verbal class and the High Involvement class did not significantly differ on reports of safety, thereby suggesting potentially comparable risk as these two classes felt the least safe. The youth in all three bullying classes (High Involvement, Verbal, and High Physical/High Verbal) reported similarly low levels of belonging (did not significantly differ); highlighting the association between any bullying and feeling that one does not belong. In sum, compared to those in the Low Involvement class, those in the remaining three bullying classes (High Involvement, Verbal, and High Physical/Verbal) viewed the bullying climate as poor – feeling less safe and less belonging.

In terms of school bullying climate (Table 5), students in the High Physical/High Verbal and High Involvement classes did not significantly differ from each other on the item “bullying is not a problem;” both classes perceived bullying as problematic. Alternatively, individuals in the Low Involvement and Verbal classes tended to report “bullying is not a problem” significantly more than students characterized by the High Physical/High Verbal and High Involvement classes. The findings regarding “Not witnessing bullying” mirrored those of perceived safety. Importantly, individuals in the Verbal class reported “I have not witnessed bullying” significantly more than individuals in the High Involvement class but were as likely to have reported this item as individuals in the High Physical/High Verbal class (no significant difference). Those in the High Physical/High Verbal and the High Involvement class were not significantly different on reports of not witnessing bullying. Across the safety and witnessing bullying findings, a pattern emerged such that individuals in the High Involvement class fared the worst, followed by those in the High Physical/High Verbal and then Verbal classes.

When asked if they think that “adults do enough to prevent bullying,” students in the classes with higher self-reported aggressive bullying (i.e., Verbal, High Physical/High Verbal, and High Involvement) responded somewhat similarly (no significant differences, see Table 5). Importantly, less than half of all students – Low Involvement bullying class included – reported that “adults do enough to prevent bullying.” Thus, irrespective of bullying classification, most middle school youth were dissatisfied with adults' bullying prevention efforts. Perceptions that “adults intervene when they see bullying” aligned with bullying classes such that the Low Involvement class perceived the most intervention, followed by the Verbal class, the High Physical/High Verbal, and then the High Involvement class, who perceived the least intervention ($ps < .05$). Youth across the bullying classes (Verbal, High Physical/High Verbal, and High Involvement) there were no significant differences in response to the item “adult interventions are effective.” When students reported bullying behaviors to an adult, those in the Low Involvement class were significantly more likely than all other classes to report that the adult responded, whereas those in the High Involvement class were significantly less likely than all other classes to report that the adult responded.

3.4.2. High school

As depicted in Table 6, findings for high school students' perceptions of safety and belonging were somewhat similar to middle school students; those in the Low Involvement class felt the safest, followed by those in the Verbal and the High Involvement class ($p < .05$). The High Involvement class reported feeling significantly lower levels of belonging than the Verbal and Low Involvement classes, whereas the Verbal and the Low Involvement class reported similar levels of belonging (no significant difference). This result is unlike the finding for middle school students' self-reported belonging; all three bullying classes (Verbal, High Physical/High Verbal, and High Involvement) reported similarly low levels of belonging. For the high school students, individuals in the Verbal class – in spite of their bullying behaviors – enjoyed a sense of belonging comparable to individuals in the Low Involvement class.

Similar to the findings for middle school, high school students in the Low Involvement class reported the most positive view of the school's bullying climate relative to the more bullying classes (Verbal and High Involvement). Students in the Low Involvement class were significantly more likely to report “bullying is not a problem” and “not witnessing bullying” compared to student characterized by the Verbal and High Involvement classes. Students characterized by the Verbal class were significantly more likely to report “bullying is not a problem” and “not witnessing bullying” as compared to students characterized by the High Involvement class.

Consistent with the middle school students, less than half of the high school youth reported that “adults do enough to prevent bullying”. Perceptions of adults intervening aligned with the classes; the Low Involvement class perceived the most intervention, followed by the Verbal class and the High Involvement class ($ps < .05$). Youth across the Verbal and High Involvement classes reported that “adult interventions are effective.” When students reported bullying behaviors to an adult, those in the Low Involvement class were the most likely to report that the adult responded (followed by those in the Verbal class), whereas those in the High Involvement class were the least likely to report that the adult responded ($ps < .05$).

4. Discussion

The present study aimed to advance understanding of the involvement in various forms of bullying and related adjustment among a large sample of middle and high school students by using the person-centered LCA approach. This analytic approach

allowed us to uniquely contribute to the research in this area by examining heterogeneity in the perpetration of bullying, while simultaneously estimating its relation with concurrent adjustment among middle and high school students. Consistent with the primary study hypotheses and previous research (Wang et al., 2009, 2012), multiple, distinct latent classes of perpetration of bullying best fit the data. The findings are also consistent with Wang et al. (2012) LCA results: the High Involvement classes were similar to their all-types bullies group; the middle school Verbal class was similar to their verbal/social bullies group; and the Low Involvement classes were similar to their noninvolved class. The results are also in accord with Wang et al. (2012) previous LCA on victimization experiences. In light of the association between bullying and victimization (Schwartz, Dodge, Pettit, & Bates, 1997), it follows that Wang and associates' findings regarding victimization also relate to the present study's findings regarding bullying perpetration.

The present findings for middle school students indicated a fourth class, High Physical/High Verbal, which Wang et al. (2012) study did not detect. This subgroup is interesting because its physical and verbal bullying behaviors are comparable to those of the High Involvement class. Yet, self-reports of children making sexual comments, stealing, spreading rumors, ignoring, and cyber bullying were relatively low. Perhaps including 10 forms of bullying in the LCA allowed for enhanced ability to detect subgroups. It is interesting that for the High Physical/High Verbal class, physical and verbal bullying did not also co-occur with cyber bullying, as these forms tend to correlate (Juvonen & Gross, 2008; Raskauskas & Stoltz, 2007; Wang et al., 2012). These findings suggest that cyber bullying may co-occur with more traditional bullying (Wang et al., 2012) for some students, as in the case of the High Involvement class, but not others.

As hypothesized, there were significant associations between class membership and adjustment. As suggested by previous literature demonstrating that bullying peaks in middle school (Bradshaw et al., 2007; Nansel et al., 2001; Swearer et al., 2010; Wang et al., 2012) and decreases with age (Björkqvist, 1994; Owens, 1996), the present study found that physical forms of bullying were employed less in high school. However, not all youth followed this pattern. Importantly, across both middle and high school, students in the high involvement in bullying subgroup reported the most internalizing problems and victimization – perhaps via fights they initiated retaliatory fights, or both. Further, these students reported feeling less safety, less belonging and a poor school bullying climate in particular. In particular, they reported that adults do not do enough to prevent bullying, effectively intervene, or respond to youths' reports of bullying. The inverse pattern of findings emerged for youth characterized by the Low Involvement bullying subgroup. These findings are consistent with the results of O'Brennan and Furlong's (2010) study of 8th, 10th, and 12th graders, which linked school connectedness to less victimization, and Eliot et al. (2010) study, which linked perceived adult support and attitudes toward seeking help for bullying. The present findings are also in accord with Pepler et al. (2008) study that demonstrated an association between bullying and elevated risks in individual, parent, and peer relationship domains.

It is important to note that students who bullied – and indeed engaged in multiple types of bullying behaviors – were concerned about their safety. The social cognitive literature suggests that these perceptions may be related to a hostile attribution bias (Crick & Dodge, 1994). For instance, concern over retaliatory aggression may relate to anxiety, and, in turn, hostile or aggressive interpretations of potentially benign situations. Interestingly, students in the High Involvement class reported that bullying is a problem, and yet they are a key part of this problem. It is critical to understand the dynamics underlying youth in the High Involvement bullying classes, as students in this class also had the highest scores, indicating that they were bullied most frequently. This finding is consistent with previous research (Nansel et al., 2001; Schwartz, 2000) and also suggests that these students may be at risk for a host of related negative outcomes, such as internalizing problems, poor perception of safety and belonging, and negative perceptions of the bullying climate. Students characterized by the High Involvement bullying subgroup also held less favorable perceptions of adult intervention. These findings highlight the importance of adults consistently intervening in bullying situations.

Additional findings regarding the more nuanced bullying subtypes make this study particularly unique. For example, middle school students in the Verbal class and Low Involvement class reported comparable safety, suggesting that youth in the Verbal class, particularly girls, may feel perhaps somewhat protected from retaliation. Alternately, it may be the case that there is a degree of overlap between bullying behaviors perpetrated by students characterized by the Verbal class and the perpetration of relational forms of bullying. Spreading rumors, ignoring others, cyber bullying, calling names, teasing, and making fun of others may be considered verbal aggression as well as relational aggression.

It is also possible that students were reflecting on bullying behavior in general when answering these questions, rather than their personal experience with bullying – what it was like at their school in general. In these cases, the majority of students characterized by the Low Involvement subtype may have considered bullying not to be a problem, as they did not engage in this behavior and may not have witnessed the perpetration of bullying. Yet even if students were thinking about their own bullying behaviors, they might not have considered their particular method of bullying especially damaging; students in the Verbal class were as likely as students in the Low Involvement class to report that bullying is not a problem. Moreover, school staff and parents may be less likely to intervene with relational forms of bullying, such as ignoring, as it often goes unnoticed by adults, creating an environment where these behaviors are inadvertently condoned (Leff, Kupersmidt, Patterson, & Power, 1999; Waasdorp et al., 2011). Therefore, there may be an issue of underreporting relational aggression, as youth may not perceive this type of bullying to be as harmful as physically aggressive forms of bullying.

One curious and unexpected finding occurred with regard to the variation in feelings of belonging by school level and bullying grouping. Results indicated that all bullying classes reported that they felt less belonging as compared to the Low Involvement class in middle school. In high school, however, the Verbal class reported that they felt similar belonging to that of the Low Involvement class. One possible interpretation is that youth in the Verbal class are adeptly using aggression in high school. This aggression might be rewarded socially and might foster feelings of belonging (e.g., Cillessen & Mayeux, 2004; Estell, Farmer, &

Cairns, 2007; Xie, Farmer, & Cairns, 2003). Yet, the uniformly high aggression employed by the High Involvement class did not relate to feelings of belonging. Thus, in accord with previous research, capitalizing on social Machiavellianism – using other people as targets of exploitation for personal gain; (Hawley, 2003) – but being less physically aggressive may be a somewhat beneficial strategy in high school.

Although the study's main hypotheses were supported – heterogeneous classes, a High Involvement class, a High Involvement in bullying and poor adjustment link, school level differences in classes of bullying behavior – few gender differences were identified. One exception was that boys were more likely to be in the highest bullying classes and to use all forms of bullying, whereas girls tended to be in the classes that used less physical aggression. These results are in agreement with findings from Espelage et al. (2000) and akin to those findings from Wang et al. (2009, 2012). However, even middle school students in the Verbal class, which can be thought of as relational in nature, still reported engaging in physical aggression (i.e., threatening to hurt, kick, and pushing, shoving). These findings remind us that, consistent with meta-analyses of aggression (Archer, 2004; Card et al., 2008), boys and girls both engage in relational aggression. As previous research has demonstrated, there is a robust correlation between physical and relational aggression, although they are distinct constructs (Murray-Close & Ostrov, 2009).

4.1. Limitations and strengths

It is important to note some limitations when interpreting these results. First, reliance on exclusively self-report data raises the issue of shared method variance, which may inflate correlations and may be subject to recall and self-presentation biases. As such, these findings should be interpreted with caution. Further research would be enhanced by including data from multiple informants (e.g., peer nomination and teacher report). Nonetheless, self-report data collected via anonymous web-based surveys have been found to have both test–retest reliability and convergent validity (Wang et al., 2005). Further, youth-reports of aggression may be more reliable than official records (Farrington et al., 2003) and tend to correlate with teacher-reports (Boxer, Edwards-Leeper, Goldstein, Musher-Eizenman, & Dubow, 2003).

There are other potential limitations associated with measure of bullying. For example, the definition used in this study did not directly address issues related to power (Olweus, 1993); although this limitation is clear, many studies of bullying similarly fall short of one or more elements of bullying (Furlong, Sharkey, Felix, Tanigawa, & Greif-Green, 2010). Unlike aggression and peer victimization, the construct of bullying is characterized by three key components: frequency or persistence, intention to harm, and a power differential (CDC, in press; Olweus, 1993). Conflating aggression, peer victimization, and bullying is problematic as it reduces the ability to compare findings across studies and effectively advance the research on bullying. Further research should be diligent in meeting the definition of bullying set forth by the World Health Organization (Nansel et al., 2001) and CDC (in press) and used in the present study but should also be sure to include details describing that the person being bullied has a difficult time defending him or herself. Additionally, given the scale and scope of the study, an efficient data collection procedure was needed. Therefore, a limitation is that some of the constructs – victimization, perceptions of safety, and perceptions belonging – were assessed using individual items. As this approach has some limitations such as the absence of reliability evidence, additional research is needed to replicate these findings using more comprehensive measures.

Further, the sample sizes for middle and high school students were discrepant. A direct statistical comparison was not made by school level, therefore, future research would benefit from more congruent sample sizes across school levels. Although the sample is large for a study of this type, is not a nationally representative sample. The negative association between safety and belonging in relation to the youths' reports of their displaying physical forms of aggression for a subgroup of high school youth should be replicated using a prospective longitudinal sample. Concurrent, longitudinal measures of these safety, belonging, and bullying behaviors would allow for a dynamic investigation of transactional relations and an exploration of underlying causal mechanisms. There also may be additional factors that influence perceptions of safety and belonging not examined in this study. For instance, it may be the case that the transition from middle to high school affords some individuals a shift in their social network or social status. Future research could address these issues by longitudinally assessing dimensions of social status, such as popularity, in conjunction with safety and belonging, using a latent transitional or auto-regressive, cross-lagged analytic framework.

Finally, as noted, LCA is largely an exploratory technique that can depend on various factors such as sample size and variables included. However, the large sample size, inclusion of 10 binary bullying behaviors, and further validation of classification using five outcomes, inspires confidence that the data were well suited to this widely used modeling technique for identifying heterogeneous subgroups (Nylund et al., 2007). Simulation studies have demonstrated that the BIC provided the most reliable indicator of true model fit and that LMR-LRT proved to be a very consistent indicator of class enumeration (Nylund et al., 2007).

Despite these limitations, there are a number of strengths of this study, including the large sample of urban, suburban, and rural middle and high school students. Another strength is the examination of the role of safety and belonging in conjunction with bullying classes, which, as noted above, has important implications for leveraging preventive interventions. Results benefit from sensitivity to a variety of complex ways in which youth engage in bullying behaviors. The present study focused on distinct and specific patterns of bullying perpetrated rather than broad categories based on degree or frequency. These features give us greater confidence that the study findings are relatively robust and may generalize to other students, particularly students who bully.

4.2. Implications for practice and future directions

Across school levels and subtypes, most youth reported that bullying prevention efforts were subpar, with youth from bullying groupings reporting that teacher's interventions were ineffective. This finding aligns with recent research indicating that there

may be more bullying in contexts where it is ignored or minimized by teachers and staff (Holt, Keyes, & Koenig, 2011). Despite heterogeneity in the bullying groupings, these results suggest that universal preventive interventions focused on safety and belonging are critical (for a review see Jimerson & Furlong, 2006; Wilson, 2004). Nonetheless, targeting High Involvement bullying students and their co-morbid problems may be essential for improving safety and belonging. In particular, the ability to engage in prosocial behavior toward one's peers and to enjoy a sense of belonging may be critical areas for leveraging effective interventions. Specifically, an intervention approach that addresses comorbid problems related to being both a bully (e.g., externalizing problems) and a victim (e.g., internalizing problems) is needed. Given the association observed between the High Involvement bullying subgroup and negative perceptions of safety and belonging, early interventions may need to be tailored to individual students who bully as well as address perceptions of safety and belonging in order to prevent subsequent maladaptive outcomes.

As African American students were more likely to be in the High Involvement class, interventions should be sensitive to racial, cultural, and socio-contextual differences that may be at play (Graham & Juvonen, 2002). Although outside the scope of the present study, this issue is examined in greater detail in our recent paper which found that irrespective of urbanicity (urban vs. nonurban), African American youth were more likely to be members of either victim or bully-victim classes than a low involvement class (Goldweber, Waasdorp, & Bradshaw, 2013). Further, urbanicity was associated with having been racially bullied.

Ideally, programs should aim to effectively change youth behavior and internalizing problems in tandem with modifying aggressive social-information processing. Given the link between increasingly hostile attribution biases and poor behavior regulation (Goldweber et al., 2011), programs should aim to improve executive functioning. The Bullying Intervention Program (BIP; Swearer, Wang, Collins, Strawhun, & Fluke, in press) addresses social-cognitive perceptions and the role they play in perpetuating and exacerbating bullying interactions (Doll & Swearer, 2006). The BIP incorporates assessment, psychoeducation, and feedback for children who bully. Yet, there is a need for more research examining the effectiveness of both individual level approaches and other schoolwide bullying prevention and intervention strategies (Merrell, Guedner, Ross, & Isava, 2008).

Additionally, study findings are in accord with recent research (e.g., Pergolizzi et al., 2011) that demonstrates that most youth have witnessed or been the victim of bullying and acknowledge it is a problem. Yet many youth think that teachers are not doing enough to prevent bullying (Bradshaw et al., 2007). Enhancing student perceptions of safety and belonging and teachers' efforts via prevention, intervention, and feeling as though their concerns have been heard and addressed is critical. As several factors may help to reduce bullying including enhanced executive functioning, resilience, attachment to school, and greater perceptions of safety; accordingly, researchers and interventionists may need to address these factors across individual, classroom, and school levels (Bradshaw & Waasdorp, 2011; Espelage & Swearer, 2010).

Perhaps the most important conclusion to be drawn from this study is that although there are distinct bullying subgroups and related social-emotional factors, particularly in middle school, it is critical to focus on enhancing perceptions of safety and belonging in general and bullying experiences in particular. Efforts to reduce school violence and peer victimization may stem from fostering feelings of belonging, which the present study found to be a possible protective factor against more physical types of bullying in high school. Future research should extend upon the person-centered approach used in the present study to examining patterns of bullying behaviors by using latent transition analysis, as this research would enhance understanding of longitudinal developmental change and stability in bullying groupings and related social-emotional factors, such as safety and belonging and bullying experiences. Additional rigorous evaluations are needed of universal prevention programs with sensitivity to within group differences in order to determine which patterns of bullying behavior are amenable to different types of prevention programs (Swearer et al., 2010).

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