

Co-occurrence of Victimization from Five Subtypes of Bullying: Physical, Verbal, Social Exclusion, Spreading Rumors, and Cyber

Jing Wang,¹ PhD, Ronald J. Iannotti,¹ PhD, Jeremy W. Luk,² BA, BS, and Tonja R. Nansel,¹ PhD
¹Eunice Kennedy Shriver National Institute of Child Health and Human Development, and ²University of Washington

All correspondence concerning this article should be addressed to Jing Wang, PhD, Prevention Research Branch, Eunice Kennedy Shriver National Institute of Child Health and Human Development, 6100 Building Room, 7B13 MSC 7510, Bethesda, MD, 20892-7510, USA. E-mail: wangji2@mail.nih.gov

Received December 17, 2009; revisions received March 26, 2010; accepted April 23, 2010

Objective To examine co-occurrence of five subtypes of peer victimization. **Methods** Data were obtained from a national sample of 7,475 US adolescents in grades 6 through 10 in the 2005/2006 Health Behavior in School-Aged Children (HBSC) study. Latent class analyses (LCA) were conducted on victimization by physical, verbal, social exclusion, spreading rumors, and cyber bullying. **Results** Three latent classes were identified, including an all-types victims class (9.7% of males and 6.2% of females), a verbal/relational victims class (28.1% of males and 35.1% of females), and a nonvictim class (62.2% of males and 58.7% of females). Males were more likely to be all-type victims. There was a graded relationship between the three latent classes and level of depression, frequency of medically attended injuries, and medicine use, especially among females. **Conclusions** Increased co-occurrence of victimization types put adolescents at greater risks for poorer physical and psychological outcomes.

Key words cyber victimization; latent class analysis; physical and psychological problems; victimization.

Introduction

Peer victimization has been recognized as a significant problem among children and adolescents because of its negative influence on physical and psychosocial functioning (Gini & Pozzoli, 2009; Hawker & Boulton, 2000). Substantial research indicates that victims of bullying are at higher risks for health-related problems such as increased medicine use (Due, Hansen, Merlo, Andersen, & Holstein, 2007) and injuries (Engstrom, Hallqvist, Moller, & Laflamme, 2005), as well as social and emotional problems such as anxiety and depression (Menesini, Modena, & Tani, 2009).

Several types of peer victimization have been identified in previous studies, including physical attack, verbal harassment, social exclusion, spreading rumors, and cyber bullying (Crick & Grotpeter, 1995; Olweus, 1993; Slonje & Smith, 2008; Williams & Guerra, 2007). Physical attack

and verbal harassment are generally considered a direct form of confrontation, whereas social exclusion and spreading rumors are often considered an indirect (Bjorkqvist, 1994) or relational (Crick & Grotpeter, 1995) form of bullying. Cyber victimization refers to victimization through the use of computers and cell phones. It is a new type of victimization that has received growing interests from researchers (Slonje et al., 2008; Williams et al., 2007). Previous studies have shown that prevalence of verbal and relational victimization are higher than that of physical and cyber victimization (e.g., Wang, Iannotti, & Nansel, 2009).

Empirical evidence thus far suggests that different types of victimization are highly correlated and that the same individuals may be victimized in multiple ways. For instance, Nylund and colleagues (Nylund, Nishina, Bellmore, & Graham, 2007) conducted a latent class

analysis (LCA) approach to explore how different types of victimization were related. Specifically, they included six dichotomous items measuring physical, verbal and rumor types of peer victimization. Based on their observed responses, the adolescents were classified into three ordered latent classes, including a “victimized class,” a “sometimes victimized class,” and a “nonvictimized class.” Their study suggested the existence of a group who may be the targets of multiple types of bullying. Even though this study was limited in their inclusion of traditional forms of victimization only, as well as their use of a local middle school sample, it demonstrated promise for using a LCA approach to study the co-occurrence of various types of victimization.

With the increasing popularity in use of internet and cell phones among children and adolescents, cyber bullying has emerged as a new type of victimization. Recent studies have demonstrated that being a traditional victim increases the risk of cyber victimization (Li, 2007; Raskauskas & Stoltz, 2007; Smith et al., 2008), pointing to the potential existence of a distinct group that is the target of both traditional and cyber bullying. However, as most of the studies analyzing the association between traditional and cyber victimization quantified traditional victimization using a global measure, it remains unclear how cyber victimization and specific types of traditional victimization are associated and might co-occur in the same person. One possible reason for the lack of research addressing this question is that common statistical approaches assessing relations between categorical variables (e.g., chi-square statistics) are restricted to including two to three variables only. To address this gap in research, the first purpose of our study was to examine the co-occurrence of victimization from four main types of traditional bullying (physical, verbal, social exclusion, and spreading rumors) and from cyber bullying through a series of LCA models. LCA is a person-based latent variable approach in which latent classes can be identified based on participants’ observed response to multiple categorical or continuous variables. A previous study has shown the advantages to use LCA models to explore relationships among involvement in several subtypes of victimization (Nylund, Nishina et al., 2007). For instance, it is a model based on probabilities, so the model can be replicated with an independent sample. The current study extends previous studies by examining cyber victimization and most common types of traditional victimization in a nationally representative sample.

Numerous studies suggest that victimization may occur among certain groups of adolescents more than others depending on gender, grade, and race/ethnicity.

For instance, male adolescents are more likely than female adolescents to experience physical and verbal victimization, whereas female adolescents are more likely to experience relational victimization (Bjorkqvist, 1994; Finkelhor, 2007; Owens, Shute, & Slee, 2000; Peskin, Tortolero, & Markham, 2006). Previous research indicates that the prevalence of victimization decreases with age (Carlyle & Steinman, 2007), and may be lower in African Americans and Hispanics (Juvonen, Graham, & Schuster, 2003; Nansel et al., 2001; Spriggs, Iannotti, Nansel, & Haynie, 2007). Given potential variations by gender, grade, and race/ethnicity, the second purpose of our study was to identify the targets of multiple types of victimization based on adolescents’ demographic characteristics.

Previous studies have consistently suggested that experience with peer victimization increases the risk of a variety of adverse physical and psychological outcomes (Menesini et al., 2009). However, it is not known if victimization from multiple types of bullying would place adolescents at even greater risk for adverse health outcomes. In their latent class analysis, Nylund and colleagues (Nylund, Nishina et al., 2007) presented depression scores across the three latent classes and found that the classification of LCA was superior in terms of predictive validity compared to other methods such as using cutoffs on the composite raw scores. To validate the latent classification obtained in the current study, four health-related outcomes were compared across the extracted latent classes, including depression, medically attended injuries, and medicine use for sleeplessness and nervousness.

The present study applied a series of LCA models with three main purposes: (a) to examine the co-occurrence of five subtypes of victimization, including cyber victimization and four traditional types of victimization; (b) to explore demographic characteristics across the latent classes; and (c) to compare physical and psychological outcomes across the latent classes.

Methods

Participants and Procedure

Data were obtained from the Health Behavior in School-aged Children (HBSC) 2005/2006 study conducted in the United States. The U.S. HBSC is conducted in collaboration with the World Health Organization cross-national study (Currie, Nic Gabhainn, Godeau, & International HBSC Network Coordinating Committee, 2009), which collects information about adolescents’ health behaviors and their social contexts. The U.S. sample was selected through a complex survey design,

including stratification (i.e., census regions and grades as strata), clustering (i.e., school districts as primary sampling units), and weighting (i.e., controlling for nonresponse and oversampling of African American and Hispanic minority groups). The software used for the current study, Mplus 5.1 (Muthén & Muthén, 1998), took into account this sampling design in the analyses by its complex survey data features, including stratification, clustering, and unequal probabilities of selection.

Data were collected through anonymous self-report questionnaires distributed in the classroom, with a student response rate of 85%. Youth assent and parental consent were obtained as required by the participating school districts. The study protocol was reviewed and approved by the Institutional Review Board of the Eunice Kennedy Shriver National Institute of Child Health and Human Development.

Measures

Demographic Variables

Demographic variables included gender, grade (6 through 10), and race/ethnicity (Caucasian, African-American, Hispanic, and other).

Peer Victimization

Experience of victimization was measured by the victim items from the Revised Olweus Bully/Victim Questionnaire (Olweus, 1996). The reliability and validity of this questionnaire have been demonstrated in previous studies and the items used in the present study were described in detail elsewhere (Olweus, 1996; Solberg & Olweus, 2003). The participants were asked how often they were bullied in the past couple of months. Physical victimization was measured by one item—"being hit, kicked, pushed, shoved around, or locked indoors." Verbal victimization was measured by three items—"being called mean names, made fun of, or teased in a hurtful way;" "being called mean names and comments about race or color;" and "being called mean names and comments about religion." Victimization through socially exclusion was measured by one item—"being left out of things on purpose, excluded from their group of friends, or completely ignored." Victimization by rumor spreading was measured with one item—"being the target of other students' lies or false rumors." Cyber victimization was measured by two items—"being bullied by others using computers, e-mail messages, and pictures" and "being bullied by others using cell phones." Response options were "I have not been bullied in this way in the past couple of months," "only once or twice," "2 or 3 times a month," "about once a week," and "several times a week." Based

on these items, five dichotomous victimization variables (physical, verbal, social exclusion, rumor spreading, and cyber victimization) were created with two categories for each variable: involved and noninvolved with uninjured indicating "never" in the last couple of months. These five variables were included in the LCA models.

Depression

Six items were used to measure depressive feelings and behaviors, which were previously validated with this age group (Dahlberg, Toal, Swahn, & Behrens, 2005; Orpinas, 1993). Participants were asked how often in the past 30 days they: (a) were very sad; (b) were grouchy or irritable, or in a bad mood; (c) felt hopeless about the future; (d) felt like not eating or eating more than usual; (e) slept a lot more or a lot less than usual; and (f) had difficulty concentrating on their school work. Responses were coded one to five: "never," "seldom," "sometimes," "often," and "always." This scale showed desirable reliability (Cronbach's $\alpha = .80$). The mean of items was used with a higher score indicating higher level of depressive tendencies.

Medically Attended Injuries

Students were asked how many times during the last 12 months they had been injured and had to be treated by a doctor or nurse. Responses options were coded 1–5: "I was not injured in the past 12 months," "1 time," "2 times," "3 times," and "4 times or more."

Medicine Use for Sleeping Problems and for Nervousness

Students in grades 7–10 were asked about their medicine use during the past month for (a) difficulties in getting to sleep, and (b) nervousness. The response options were "no," "yes, once," and "yes, several times." The each item was dichotomized into yes and no, and percentage of "yes" was compared across latent classes.

Statistical Analysis

A series of latent class models were used and all analyses were conducted using Mplus version 5 (Muthén & Muthén, 1998). The first step was to choose the optimal number of classes by specifying separate LCA models with various numbers of classes. Model solutions on choosing the appropriate number of classes were evaluated based on a comparison between several statistical criteria, including Akaike information criterion (AIC), Bayesian information criterion (BIC), sample-size-adjusted Bayesian information criterion (ABIC), bivariate residuals (i.e., residuals >1.96), and entropy. Suggested by a recent simulation study, we

gave the most weight to the BIC as it may provide the most reliable indicator of true number of classes (Nylund, Asparouhov, & Muthén, 2007). To explore if there were different classes or different number of classes extracted from male and female populations, the analyses were initially conducted separately by gender. After the optimal number of classes was chosen, grade, gender, and race/ethnicity were included as covariates. With class membership as outcome and demographic variables as indicators, the model is analogous to a logistic regression or multinomial logistic regression model. In the same model of LCA with covariates, the AUXILIARY option with the e-setting was used to test the equality of the means of the four outcome variables across classes (Muthén & Muthén, 1998). The posterior probability-based multiple imputations were used to conduct paired mean comparisons. For binary variables such as the two medicine use variables, proportions were computed and compared across latent classes. As the medicine use variables were only included in the survey for grades 7 through 10, youth in grade 6 were treated as missing in these comparisons.

Results

Sample Characteristic

Among the 7,508 adolescents who completed the survey with the victimization items, 33 were excluded due to missing information on demographic variables, resulting in an analytic sample of 7,475. The sample consisted of 48.5% males, 42.2% Caucasian Americans, 18.7% African-Americans, and 26.4% Hispanic Americans. The mean age of the sample was 14.2 years, with a *SD* of 1.42.

Descriptive Statistics: Prevalence Rates and Co-occurrence of Any Two Forms of Victimization

The prevalence rates of involvement in the five types of victimization were 13.2% (male: 17.8%; female: 8.8%) for physical, 36.9% (male: 38.5%; female: 35.5%) for verbal, 25.8% (male: 24.0%; female: 27.6%) for social exclusion, 32.1% (male: 27.6%; female: 36.3%) for rumor spreading, and 10.1% (male: 9.9%; female: 10.4%) for cyber form. Among the victims of each type, the percentages of involvement in other types of victimization are reported in Table I. The descriptive statistics of co-occurrence of traditional and cyber victimization showed that among victims of traditional bullying (i.e., if one was bullied by at least one type of traditional bullying), 17.8% also reported experience with cyber victimization

(male: 20.4%; female: 15.4%). Conversely, among cyber victims, 95.1% were also traditional victims (male: 96.1%; female: 93.8%).

Latent Classes Indicating Patterns of Victimization Bullying Forms

LCAs were conducted on the five victimization variables with two, three and four classes specified. The model fit statistics are reported in Table II, which includes AIC, BIC, ABIC, number of significant bivariate residuals, and entropy. The best fitting models, as indicated by the BIC, were the three-class models, both for all individuals and for subgroup analyses by gender. Other criteria such as ABIC and entropy values for the three-class models were also acceptable.

The prevalence of each class and the item probabilities for the three-class models are shown in Figure 1. For each class, the item probability indicates the probability of an individual being victimized by the specific bullying behavior. The following three classes were extracted: Class 1: all-types victims—a class of individuals with high probabilities of being victimized by the four traditional bullying behaviors and a moderately high probability of being victimized by cyber bullying; Class 2: verbal/relational victims—a class of individuals with a moderately high probability of verbal, social exclusion, and rumor spreading type of victimization and relatively low probabilities of physical and cyber victimization; and Class 3: Non-victims—a class of individuals with minimal probabilities of being victimized by any bullying behavior.

Figure 1 shows that the overall pattern of involvement in the five types of victimization was same across gender in each latent class. For both genders, the three latent classes were ordered classes (Nylund, Asparouhov et al., 2007), in that the probabilities for all of the items were highest for Class 1, followed by Class 2 and Class 3. The group of all-types victims, i.e., Class 1, were more likely to be targets of all five bullying behaviors, including verbal/relational, than the Class 2 verbal/relational victims, while the Class 1 group had the lowest probability across all bullying behaviors.

Demographic Characteristics of Each Latent Class

The results of the 3-class LCA with demographic covariates are reported in Table III, with model fit statistics reported in Table II. In the model for all individuals, covariates included gender (male as referent), grade (grade 10 as referent), and race/ethnicity (Caucasian as referent). In the model for males and females separately, covariates included grade and race/ethnicity. As there were a total of three

Table 1. *Percentage of Co-occurrence of Five Subtypes of Victimization^a*

| All (Total <i>N</i> = 7,475) | Traditional | | | | Cyber (%) |
|---------------------------------|--------------|-------------------|-------------------|-------------------|----------------------------|
| | Physical (%) | Verbal (%) | Exclusion (%) | Rumor (%) | |
| | | | | | (Overall ^b , %) |
| Traditional (<i>n</i> = 3,464) | | | | | 17.8 |
| Physical (<i>n</i> = 1,081) | – | 84.2 ^c | 61.3 ^c | 42.3 ^c | 36.2 ^c |
| Verbal (<i>n</i> = 2,812) | 32.7 | – | 48.5 | 26.9 | 20.3 |
| Exclusion (<i>n</i> = 1,803) | 37.0 | 75.3 | – | 34.8 | 26.0 |
| Rumor (<i>n</i> = 904) | 51.1 | 83.1 | 69.4 | – | 44.3 |
| Cyber (<i>n</i> = 648) | 61.0 | 87.4 | 71.9 | 61.1 | 95.1 |
| Male (<i>N</i> = 3,572) | | | | | |
| Traditional (<i>n</i> = 1,684) | | | | | 20.4 |
| Physical (<i>n</i> = 684) | – | 85.1 | 61.1 | 42.8 | 36.3 |
| Verbal (<i>n</i> = 1,431) | 41.1 | – | 49.5 | 28.5 | 22.9 |
| Exclusion (<i>n</i> = 859) | 49.2 | 82.3 | – | 40.2 | 31.9 |
| Rumor (<i>n</i> = 453) | 65.8 | 89.6 | 76.1 | – | 55.5 |
| Cyber (<i>n</i> = 357) | 70.3 | 91.0 | 76.1 | 69.2 | 96.1 |
| Female (<i>N</i> = 3,903) | | | | | |
| Traditional (<i>n</i> = 1,781) | | | | | 15.4 |
| Physical (<i>n</i> = 397) | – | 82.6 | 61.7 | 41.4 | 36.0 |
| Verbal (<i>n</i> = 1,381) | 24.0 | – | 47.4 | 25.2 | 17.6 |
| Exclusion (<i>n</i> = 944) | 26.0 | 67.0 | – | 30.0 | 20.6 |
| Rumor (<i>n</i> = 451) | 36.5 | 76.5 | 62.6 | – | 33.2 |
| Cyber (<i>n</i> = 291) | 49.7 | 82.8 | 66.7 | 51.2 | 93.8 |

^aAmong victims of each type, the percentages of involvement in other types of victimization are reported in this table.

^bAn individual was coded to be an overall traditional victim if he/she reported victimization in one or more types of the four traditional bullying: physical, verbal, social exclusion, or rumor spreading.

^cFor example, among the 1,081 physical victims, 84.2%, 61.3%, 42.3%, and 36.2% were also victims of verbal, social exclusion, rumor spreading, and cyber types of bullying, respectively.

classes, the model was analogous to a multinomial logistic regression of latent classes on demographic variables. Class 3, the category of non-victims, was set as the reference group.

Gender

Compared to females, males were more likely to be all-types victims (Class 1). There was a trend for higher proportion of Class 2 compared to Class 3 among females, but the gender difference only approached significance ($p < .10$).

Grade

Compared to adolescents in grade 10, students in grade 6 through 8 were more likely to be in Class 1 than Class 3. Similar results were found for males and females except that the difference between 10th and 9th grade was also significant in males. There was no grade difference in Class 2 between grade 10 and any other grade for all individuals. However, gender differences were found when males and females were analyzed separately. Specifically, males in grade 6 through 8 and females in

grade 6 were more likely to be in Class 2 compared to grade 10.

Race/Ethnicity

No racial/ethnic differences were found with the only exception that Hispanic adolescents were less likely to be in Class 2 compared to Class 3 when males and females were analyzed together.

Health-related Outcomes

The means of the four health outcome variables for the three latent classes are plotted in Figure 2. For each variable, three mean or percentage paired comparisons were conducted: the comparison of nonvictims (Class 3) with verbal/relational victims (Class 2); comparison of non-victims (Class 3) with all-types victims (Class 1); and comparison of verbal/relational victims (Class 2) with all-types victims (Class 1).

Depression

For both males and females, all three paired mean comparisons showed strong evidence of significant differences in

Table II. Model Fit Statistics by Number of Classes

| Criteria | Number of Classes | | | Number of Classes | | |
|--|------------------------------------|----------|----------|-----------------------------------|----------|----------|
| | 2 | 3 | 4 | 2 | 3 | 4 |
| | All (N = 7,475) w/o covariates | | | All (N = 7,475), w/ covariates | | |
| Akaike (AIC) ^a | 32,975.3 | 32,683.3 | 32,651.3 | 32,651.3 | 32,230.7 | 32,022.5 |
| Bayesian (BIC) ^b | 33,051.5 | 32,801.0 | 32,810.6 | 32,782.7 | 32,459.1 | 32,347.8 |
| Sample size Adjusted BIC | 33,016.5 | 32,746.9 | 32,737.5 | 32,722.4 | 32,354.2 | 32,198.4 |
| Bivariate residuals (>1.96) ^c | 8 | 1 | 0 | 5 | 1 | 0 |
| Entropy | .774 | .698 | .693 | .776 | .720 | .685 |
| | Male (N = 3,572), w/o covariates | | | Male (N = 3,572), w/ covariates | | |
| Akaike (AIC) | 15,359.5 | 15,203.1 | 15,196.1 | 15,186.0 | 15,029.8 | 14,990.9 |
| Bayesian (BIC) | 15,427.5 | 15,308.3 | 15,338.3 | 15,297.3 | 15,221.4 | 15,262.9 |
| Sample size Adjusted BIC | 15,392.6 | 15,254.3 | 15,265.3 | 15,240.1 | 15,122.9 | 15,123.1 |
| Bivariate residuals (>1.96) | 5 | 0 | 0 | 9 | 0 | 0 |
| Entropy | .812 | .714 | .705 | .816 | .737 | .607 |
| | Female (N = 3,903), w/o covariates | | | Female (N = 3,903), w/ covariates | | |
| Akaike (AIC) | 17,255.1 | 17,119.9 | 17,110.8 | 17,135.7 | 16,983.8 | 16,962.3 |
| Bayesian (BIC) | 17,324.1 | 17,226.5 | 17,255.1 | 17,248.5 | 17,178.2 | 17,238.1 |
| Sample-Size Adjusted BIC | 17,289.1 | 17,172.5 | 17,182.0 | 17,191.3 | 17,079.7 | 17,098.3 |
| Bivariate Residuals (>1.96) | 5 | 0 | 0 | 6 | 3 | 0 |
| Entropy | .742 | .704 | .752 | .743 | .716 | .673 |

^aAIC, Akaike's Information Criteria.

^bBIC, Bayesian Information Criteria.

^cBivariate residuals with >1.96. Model fit statistics were reported for models with or without covariates (gender, grade, and race/ethnicity). For separate models of males and females, all BIC, ABIC, and bivariate residuals had lowest values for the model with three classes.

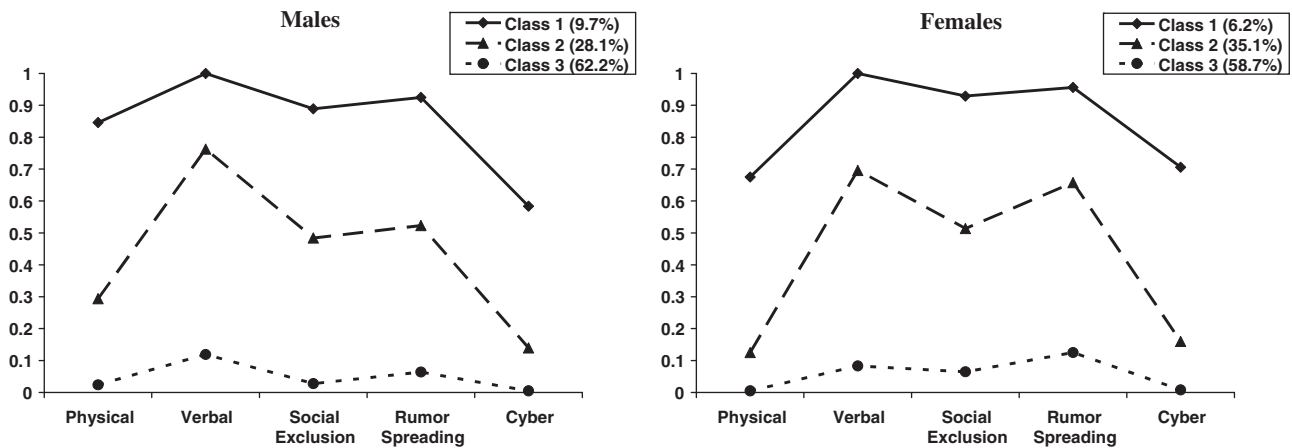


Figure 1. Item probability for each latent class. *Note.* For both males and females, Class 1 (all-types victims) is a group of adolescents who have high probabilities of experiencing victimization by all five bullying behaviors; Class 2 (verbal/relational victims) a group of adolescents who have moderately high probability of verbal, social exclusion, and rumor spreading victimization and relatively low probabilities of other types of victimization; and Class 3 (nonvictims) is a group of adolescents who have minimal chance of victimization in any bullying behavior.

level of depressive symptoms between any two latent classes (all $p \leq .001$).

Medically Attended Injuries

For both males and females, all-types victims or verbal/relational victims reported a higher frequency of medically attended injuries than the group of nonvictims. In

addition, compared to verbal/relational victims, all-types victims had a higher frequency of overall injuries for females only.

Medicine Use for Sleeping Problems

For both males and females, more all-types victims (males: 24.1%; females: 30.3%) reported using medicines for

Table III. Results of LCA with Covariates—Multinomial Logistic Regressions

| Categories ^a | All (N = 7,475) | | Male (N = 3,572) | | Female (N = 3,903) | |
|-------------------------|--------------------|--------------|---------------------|--------------|-----------------------|--------------|
| | OR | 95% CI | OR | 95% CI | OR | 95% CI |
| Class 1 vs. Class 3 | | | | | | |
| Female | 0.49 | (0.33–0.72) | – | – | – | – |
| Grade | | | | | | |
| Grade 6 | 6.95 | (3.38–14.30) | 6.81 | (2.87–16.17) | 8.01 | (1.96–32.64) |
| Grade 7 | 5.29 | (2.18–12.82) | 5.19 | (2.39–11.25) | 6.31 | (1.30–30.43) |
| Grade 8 | 3.91 | (1.78–8.60) | 3.26 | (1.38–7.71) | 5.20 | (1.03–26.20) |
| Grade 9 | 2.24 | (0.96–5.21) | 2.42 | (1.16–5.05) | 2.92 | (0.73–11.56) |
| Grade 10 (ref) | | | | | | |
| Race/Ethnicity | | | | | | |
| African-American | 1.20 | (0.74–1.95) | 1.56 | (0.80–3.03) | 1.08 | (0.45–2.62) |
| Hispanic | 1.14 | (0.76–1.73) | 1.38 | (0.80–2.40) | 1.20 | (0.61–2.34) |
| Other Races | 1.36 | (0.93–1.97) | 1.32 | (0.82–2.14) | 1.59 | (0.76–3.33) |
| Caucasian (ref) | | | | | | |
| Class 2 vs. Class 3 | | | | | | |
| Female | 2.27 | (0.94–5.45) | – | – | – | – |
| Grade | | | | | | |
| Grade 6 | 1.62 | (0.86–3.07) | 2.68 | (1.73–4.15) | 1.72 | (1.20–2.47) |
| Grade 7 | 1.23 | (0.79–1.90) | 2.14 | (1.34–3.43) | 1.21 | (0.84–1.75) |
| Grade 8 | 1.13 | (0.71–1.80) | 1.82 | (1.13–2.96) | 1.11 | (0.79–1.57) |
| Grade 9 | 0.87 | (0.69–1.10) | 1.21 | (0.78–1.88) | 0.75 | (0.56–1.01) |
| Grade 10 (ref) | | | | | | |
| Race/Ethnicity | | | | | | |
| African-American | 0.68 | (0.46–1.010) | 0.70 | (0.46–1.06) | 0.72 | (0.46–1.14) |
| Hispanic | 0.77 | (0.60–1.00) | 0.69 | (0.47–1.02) | 0.89 | (0.66–1.21) |
| Other Races | 1.00 | (0.73–1.37) | 0.98 | (0.59–1.62) | 1.05 | (0.76–1.46) |
| Caucasian (ref) | | | | | | |

Note. Class 3 was set as the reference group for the multinomial logistic regressions. For gender, grade, and race/ethnicity, the reference groups were female, grade 10, and Caucasian adolescents.

sleeping problems than verbal/relational victims (males: 11.4%; females: 18.1%), or nonvictims (males: 8.8%; females: 12.6%). Furthermore, the comparison between female verbal/relational victims and female nonvictims also lead to significant difference.

Medicine Use for Nervousness

Similar results were found for medicine use for nervousness. All three comparisons showed significant differences except for the comparison of verbal/relational victims and non-victims for males.

Discussion

The current study is the first study to examine the co-occurrence of five subtypes of victimization, including cyber victimization and four traditional victimization subtypes in a nationally representative sample of US adolescents. We found that different types of victimization do co-occur among certain individuals and these patterns

could be best described by a three-class model, with one class of adolescents who were targets of all five bullying behaviors (Class 1), another class who were marked by verbal/relational victimization (Class 2), and a final class that had minimal experience of any victimization (Class 3). The demographic characteristics of each latent class were described accordingly. As a validation of the classification, level of depression, frequency of medically attended injuries, medicine use for sleeping problems, and medicine use for nervousness were compared across the three latent classes. In general, the all-types victims reported higher depression, more injuries, and more medicine use for sleeping problems and nervousness than the verbal/relational victims, followed by the nonvictims.

Class 1 adolescents were more likely to be victimized by all five bullying behaviors, thus they can be considered as “all-types victims.” The proportion of Class 1 was 9.7% for males and 6.2% for females. Further results of LCA with demographic covariates showed that males were more likely to be all-types victims than females. The gender

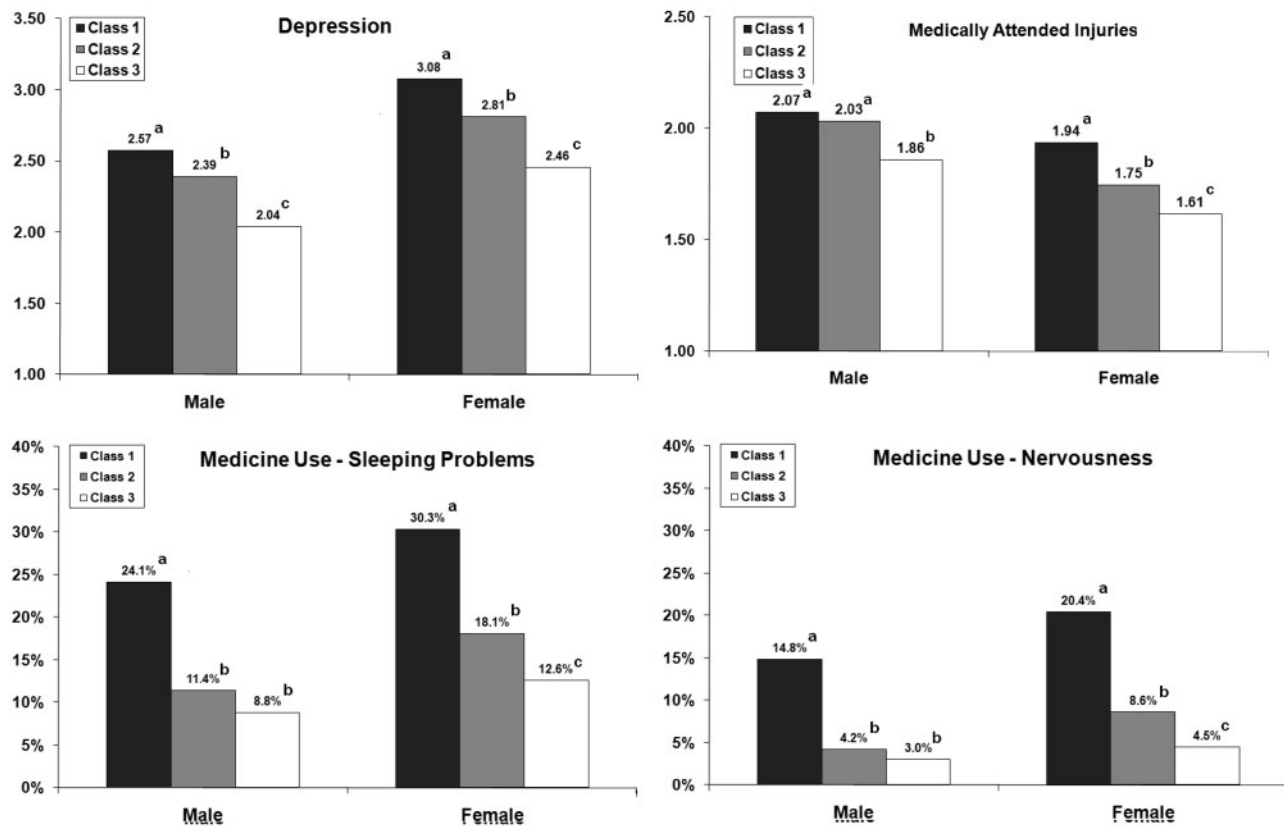


Figure 2. Comparisons on health-related outcomes across class. *Note.* Class 1, all-types victims; Class 2, verbal/relational victims; Class 3, nonvictims; categories with different letters in the superscript were significantly different at α of .05.

difference may reflect a higher prevalence of physical victimization among males (Owens et al., 2000). For both genders, the overall age trend was a decrease from grade 6 to 10, which was consistent with previous studies (Carlyle & Steinman, 2007). No racial/ethnic differences were found in involvement of victimization in Class 1.

Class 2 adolescents had moderately high probability of being victimized by verbal, social exclusion or rumor spreading types of behaviors and low probability of physical or cyber victimization, thus they can be considered as “verbal/relational victims.” When males and females were analyzed separately, 28.1% of males and 35.1% of females were classified as verbal/relational victims. Compared to 10th-grade males, males in grades 6, 7, and 8 had a higher relative proportion of Class 2 than Class 3 males. Among females, on the other hand, only females in grade 6 had a significantly higher relative proportion of Class 2 to Class 3 females compared to females in grade 10. Only one racial/ethnic difference was found in involvement of victimization in Class 2 where Hispanics were less likely than Caucasians to be verbal/relational victims.

Results of paired comparisons on four physical and psychological outcomes were consistent with previous

studies showing that experience with victimization was associated with higher level of depression, increased injuries and medicine use (Due et al., 2007; Engstrom et al., 2005; Menesini et al., 2009). More important, our results suggest that the more types of victimization the adolescents experienced, the poorer physical and psychological distress they may demonstrate, especially for girls (Figure 2). For both genders, there was strong evidence that the all-types victims reported higher depression than the verbal/relational victims, followed by the nonvictims. Strikingly, 24.1% of all-types male victims and 30.0% of all-types female victims reported using medicines for sleeping problems, which was much higher than the other two latent classes. Similar results were also found for medicine use for nervousness. These results suggest the severe effects of experiencing victimization from multiple types of bullying.

The classification observed suggest three patterns of relationship with regard to cyber victimization and the four types of traditional victimization. First, involvement in any two different types of victimization are correlated, given the existence of Class 1, a group that is the target of all types of bullying behaviors. Second, the associations among verbal and relational types of victimization are

highly correlated, given the high or moderately high item probabilities for verbal and relational victimization in both Class 1 and Class 2. As verbal victimization (measured by name calling in the current study), social exclusion and rumor spreading types of victimization are not mutually exclusive, the results suggest that many verbal types of bullying such as being called names and teased may be experienced by victims who are socially excluded from a group. Third, our results suggest that if a student is victimized by physical or cyber bullying (either in Class 1 or Class 2), it is very likely that s/he is also victimized by verbal and relational bullying. However, a student may experience verbal and relational bullying without being subjected to physical or cyber bullying.

It is important to note several limitations in this study. First, due to the cross-sectional nature of the survey, we cannot make causal inferences on the associations between the classification of the three groups and the health-related outcomes. Longitudinal studies are needed to examine involvement in latent classes over time and to determine the temporal sequence of the classification and their correlates. Second, we assessed injuries due to all causes, not specifically bullying; future studies should differentiate the causes of injuries. Finally, we only examined latent classes of victimization in the current study. Left unanswered is whether there are groups of individuals (latent classes) that differentially participate in particular types of both bullying perpetration and victimization and, if so, the characteristics of individuals in these groups. Future studies should examine the co-occurrence of different types of bullying perpetration and victimization.

The three-class results of the LCA models found in this study provides a different but complimentary view to that obtained by Nylund, Asparouhov et al. (2007), which identified a victimized class, a sometimes victimized class and a nonvictimized class based on physical, verbal and rumor types of victimization. The current study contributes to the literature and extends previous studies in at least four ways. First, we examined the co-occurrence of victimization in five different types, including four main types of traditional victimization, and a relatively new form, i.e., cyber victimization. Second, we used a large-scale nationally representative sample with sufficient representation from multiple age and racial/ethnic groups. The sample allowed us to analyze demographic variability in extracted latent classes and plot the proportion of each class by demographic characteristics. Third, the LCA analytical strategy applied in the current study is a person-centered analysis, which is well suitable for examining patterns of relations among involvement in a set of behaviors. Fourth, we compared a variety of physical and psychological

outcomes across the latent classes. The result of graded association demonstrates the predictive validity of the classification in the current study.

Conclusions

Different types of bullying victimization appear to co-occur among US adolescents. The patterns of involvement in victimization can be best represented by a three-class model, with one class of all-types victims, a class of verbal/relational victims, and a class of non-victims. Victimization from all types of bullying (Class 1) was more common in younger and male adolescents and decreased with age in both males and females. Developmental patterns for victimization from verbal/relational bullying (Class 2) differed across gender and there was only marginal significance for gender differences. Given the positive association between involvement in types of victimization and physical and psychological problems, intervention efforts should address various symptoms among victims of bullying and especially those who suffer from multiple types of victimization.

Funding

The US HBSC was supported by the Intramural Research Program of the Eunice Kennedy Shriver National Institute of Child Health and Human Development, and the Maternal and Child Health Bureau of the Health Resources and Services Administration with the second author (R.J.I.) as principal investigator.

Conflict of interest: None declared.

References

- Bjorkqvist, K. (1994). Sex differences in physical, verbal, and indirect aggression: A review of recent research. *Sex Roles, 30*, 177–188.
- Carlyle, K. E., & Steinman, K. J. (2007). Demographic differences in the prevalence, co-occurrence, and correlates of adolescent bullying at school. *Journal of School Health, 77*, 623–629.
- Crick, N. R., & Grotpeter, J. K. (1995). Relational aggression, gender, and social-psychological adjustment. *Child Development, 66*, 710–722.
- Currie, C, Nic Gabhainn, S., & Godeau, E. (2009). International HBSC Network Coordinating Committee. The Health Behaviour in School-aged Children: WHO Collaborative Cross-National (HBSC) study: Origins, concept, history and development

- 1982-2008. *International Journal of Public Health*, 54, S131-139.
- Dahlberg, L. L., Toal, S. B., Swahn, M., & Behrens, C. (2005). *Measuring violence-related attitudes, behaviors, and influences among youths: A compendium of assessment tools*. Atlanta, GA: The National Center for Injury Prevention and Control.
- Due, P., Hansen, E. H., Merlo, J., Andersen, A., & Holstein, B. E. (2007). Is victimization from bullying associated with medicine use among adolescents? A nationally representative cross-sectional survey in Denmark. *Pediatrics*, 120, 110-117.
- Engstrom, K., Hallqvist, J., Moller, J., & Laflamme, L. (2005). Do episodes of peer victimization trigger physical injury? A case-crossover study of Swedish school children. *Scandinavian Journal of Public Health*, 33, 19-25.
- Finkelhor, D. (2007). Prevention of sexual abuse through educational programs directed toward children. *Pediatrics*, 120, 640-645.
- Gini, G., & Pozzoli, T. (2009). Association between bullying and psychosomatic problems: A meta-analysis. *Pediatrics*, 123, 1059-1065.
- Hawker, D. S. J., & Boulton, M. J. (2000). Twenty years' research on peer victimization and psychosocial maladjustment: A meta-analytic review of cross-sectional studies. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 41, 441-455.
- Juvonen, J., Graham, S., & Schuster, M. A. (2003). Bullying among young adolescents: The strong, the weak, and the troubled. *Pediatrics*, 112, 1231-1237.
- Li, Q. (2007). New bottle but old wine: A research of cyberbullying in schools. *Computers in Human Behavior*, 23, 1777-1791.
- Menesini, E., Modena, M., & Tani, F. (2009). Bullying and victimization in adolescence: Concurrent and stable roles and psychological health symptoms. *Journal of Genetic Psychology*, 170, 115-133.
- Muthén, L. K., & Muthén, B. O. (1998). *Mplus User's Guide. Fifth Edition*. Los Angeles: Muthén & Muthén.
- Nansel, T. R., Overpeck, M., Pilla, R. S., Ruan, W. J., Simons-Morton, B., & Scheidt, P. (2001). Bullying behaviors among US youth: Prevalence and association with psychosocial adjustment. *Journal of American Medical Association*, 285, 2094-2100.
- Nylund, K., Nishina, A., Bellmore, A., & Graham, S. (2007). Subtypes, severity, and structural stability of peer victimization: What does latent class analysis say? *Child Development*, 78, 1706-1722.
- Nylund, K. L., Asparouhov, T., & Muthén, B. O. (2007). Deciding on the number of classes in latent class analysis and growth mixture modeling: A Monte Carlo simulation study. *Structural Equation Modeling*, 14, 535-569.
- Olweus, D. (1993). *Bullying at school what we know and what we can do*. Cambridge, MA: Blackwell.
- Olweus, D. (1996). *The revised Olweus bully/victim questionnaire. [N-5015]*. Bergen, Norway: Research Center for Health Promotion (HIMIL), University of Bergen.
- Orpinas, P. (1993). *Skills training and social influences for violence prevention in middle schools: A curriculum evaluation*. Unpublished doctoral dissertation. Houston, TX: University of Texas Health Science Center.
- Owens, L., Shute, R., & Slee, P. (2000). "Guess what I just heard!": Indirect aggression among teenage girls in Australia. *Aggressive Behavior*, 26, 67-83.
- Peskin, M. F., Tortolero, S. R., & Markham, C. M. (2006). Bullying and victimization among black and hispanic adolescents. *Adolescence*, 41, 467-484.
- Raskauskas, J., & Stoltz, A. D. (2007). Involvement in traditional and electronic bullying among adolescents. *Developmental Psychology*, 43, 564-575.
- Slonje, R., & Smith, P. K. (2008). Cyberbullying: Another main type of bullying?: Personality and Social Sciences. *Scandinavian Journal of Psychology*, 49, 147-154.
- Smith, P. K., Mahdavi, J., Carvalho, M., Fisher, S., Russell, S., & Tippett, N. (2008). Cyberbullying: Its nature and impact in secondary school pupils. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 49, 376-385.
- Solberg, M. E., & Olweus, D. (2003). Prevalence estimation of school bullying with the Olweus Bully/Victim Questionnaire. *Aggressive Behavior*, 29, 239-268.
- Spriggs, A. L., Iannotti, R. J., Nansel, T. R., & Haynie, D. L. (2007). Adolescent bullying involvement and perceived family, peer and school relations: Commonalities and differences across race/ethnicity. *Journal of Adolescent Health*, 41, 283-293.
- Wang, J., Iannotti, R. J., & Nansel, T. R. (2009). School Bullying Among Adolescents in the United States: Physical, Verbal, Relational, and Cyber. *Journal of Adolescent Health*, 45, 368-375.
- Williams, K. R., & Guerra, N. G. (2007). Prevalence and predictors of internet bullying. *Journal of Adolescent Health*, 41, S14-S21.