AGGRESSIVE BEHAVIOR
Volume 33, pages 1–11 (2007)

Using Latent Class Analysis to Identify Aggressors and Victims of Peer Harassment

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This study used latent class analysis (LCA) to identify and classify individuals into aggressor and victim latent classes. Participants were over 2,000 sixth grade students who completed peer nomination procedures that identified students who had reputations as perpetrators and/or victims of physical, verbal, or relational harassment. Results showed five latent classes. Consistent with previous research, LCA identified latent classes of victims, aggressors, and socially adjusted students. However, rather than a single aggressive-victim subgroup, LCA identified latent classes of highly-victimized aggressive-victims and highly-aggressive aggressive-victims. Comparisons showed differences in mean profiles and classification criteria between LCA and traditional dichotomization approaches. Adjustment outcomes showed that highly-victimized aggressive-victims generally experienced greater negative psychological and social adjustment outcomes than highly-aggressive aggressive-victims. Implications of these findings for better assessment of victim and aggressor subgroups were discussed. Aggr. Behav. 33:1–11, 2007. © 2007 Wiley-Liss, Inc.

Keywords: peer harassment; victimization; latent class analysis

INTRODUCTION

Approaches to identifying aggressors and victims in schools have been plentiful. From self-reports to peer or teacher nominations, researchers have devised numerous measures to identify traditional subgroups of aggressors, victims, aggressive victims, and socially adjusted (neither aggressor nor victim) students [e.g., Juvonen and Graham, 2001]. Analytically, however, the most common identification approach has been the dichotomization of continuous data. That is, participant responses were often categorized into low (non-victims, non-aggressors) or high (victims, aggressors) subgroups based on a midpoint split and standard deviation adjustment. This study advocated the use of latent class analysis (LCA) as an alternative approach for identifying and classifying students into aggressor and/or victim latent classes.

PEER HARASSMENT OVERVIEW: TRADITIONAL SUBGROUPS

Beginning with Olweus's [1978] seminal analysis of "whipping boys," research on peer harassment has increased dramatically in the past 30 years. Bullying has often been defined as a negative action (e.g., physical, verbal, or relational aggression) experienced repeatedly by a victim over a long period. The critical features that distinguish bullying from simple conflict between peers are that there is an imbalance of power between the aggressor (perpetrator) and victim and the aggressor's intent is to harm the victim. Peer harassment studies have since identified several correlates of victim and aggressor status. Prototypical victims have been shown to be physically weak, socially withdrawn, and suffering from a cluster of internalizing symptoms, including anxiety, loneliness, depression, and low self-esteem [Hodges and Perry, 1996; Olweus, 1978, 1993; Whitney and Smith, 1993]. Victimized children also experience greater peer rejection and lesser popularity compared with non-victims and aggressors [Boulton, 1995; Cairns et al., 1988; Graham and Juvonen, 2002; Juvonen et al., 2003].

Prototypical aggressors have been shown to be physically stronger, less anxious and depressed,

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Received 26 January 2007; Revised 31 May 2007; Accepted 4 June 2007

Published online in Wiley InterScience (www.interscience.wiley.com). DOI: 10.1002/ab.20233

and/or more assertive, relative to victims and non-victims [Juvonen et al., 2003; Olweus, 1978; Whitney and Smith, 1993; Xu et al., 2003]. Aggressive reputations have also been linked to externalizing problems, such as antisocial behavior, conduct problems, and academic failure [Olweus, 2003; Schwartz, 2000]. However, compared with victims and some non-victims, aggressors are also reported to be less lonely, more popular, and to have larger social networks [albeit with other aggressive children; Boulton, 1995; Cairns et al., 1988; Olweus, 1978; Rodkin et al., 2000].

Olweus [1978] and other researchers [Kochenderfer-Ladd, 2003; Kumpulainen et al., 1998; Pellegrini et al., 1999; Schwartz et al., 2001] have identified a subgroup of aggressive victims with high reputations as both victims and aggressors. This comorbidity is often associated with a cluster of externalizing problems, including hyperactivity, impulsivity, emotional over-reactivity, and academic failure. Unlike aggressors, the behavior of aggressive victims is seldom goal orientated or successful in dominating over peers. Instead, their behaviors are often viewed as irritable and inattentive by their peers, and aggressive victims are often victimized (e.g., socially ostracized) because of their "dysregulated aggression" [Schwartz et al., 2001; p 157]. Similar to victims, membership in this subgroup is often associated with internalizing difficulties, such as anxiety, depression, and low self-esteem [Kumpulainen et al., 1998]. In short, aggressive victims have often been found to be the most maladjusted subgroup [Graham et al., 2006; Unnever, 2005].

TWO APPROACHES TO CLASSIFICATION

Traditional Categorization Methods

In their review, Schwartz et al. [2001] showed that most studies used midpoint cutoffs with standard deviation adjustments to categorize students into traditional subgroups of aggressors, victims, aggressive victims, and socially adjusted students. As such, students were placed into a low or high group for subsequent analyses. Although this is a parsimonious, traditional approach to create meaningful groups for comparisons, there are several limitations [for a detailed discussion, see Cohen et al., 2003; Maxwell and Delaney, 1993].

A first limitation is that the cutoff criteria and percentages of traditional subgroups vary substantially across studies. When peer nominations were used, Schwartz et al.'s [2001] review reported the prevalence rates of students categorized as victims, aggressors, and aggressive victims as varying between 2 and 17%. These variabilities were higher when self- or teacher-reported measures were included—e.g., the percentage of aggressive victims ranged from 2 to 29%. Although such differences may be related to sample or contextual factors, they may also be due to the variability in standard deviation adjustments across studies—ranging from .25 to 1.00 [Schwartz et al., 2001].

Second, moving toward analytical limitations, dichotomization ignores sample heterogeneity by assuming that individuals within each group are relatively similar to each other and uniquely different from another group. Although the standard deviation adjustment can alleviate this to some degree, it does not eliminate the problem. Third, when studies dichotomized and adjusted mean scores to create subgroups, they seldom reported the new subgroup mean scores or the disaggregated item scores (which comprise the mean) for each group. Fourth, dichotomization of continuous variables often biases or reduces the correlation between two variables [Cohen et al., 2003].

A fifth limitation of traditional approaches to creating groups is the elimination of participants from analyses. Dichotomization removes participants whose scores lie outside of the cutoff criteria (e.g., median or mean), and standard deviation adjustments further reduce that number [Cohen et al., 2003]. This consequently impacts statistical power and interpretability of the results. As an alternative, Juvonen et al. [2003] included a borderline or at risk subgroup that fell between their standard deviation adjustments. This borderline subgroup consisted of 22% of their sample of middle school students. In addition, results showed that these borderline students shared similar levels of social, psychological, and academic adjustment with at least two other traditional subgroups on seven out of nine measures and at least one other subgroup on all measures. These similarities suggest that borderline students may be better categorized into other traditional subgroups rather than being removed from analyses.

The final limitation involves the total number of traditional subgroups, given the multiple forms of peer harassment that may be studied (e.g., physical, verbal, relational). Students vary greatly in their experience as victims or aggressors, and high or low scores on any one item could greatly influence composite or mean scores when multiple items are used. Therefore, aggregated scores and subgroup cutoffs ignore the possibility of unique types of victims and aggressors. Given a set of peer

harassment indicators, the potential combination of traditional subgroups may not be limited to two (e.g., victim versus non-victim) or the traditional four (victims, aggressors, aggressive victims, and socially adjusted) subgroups.

Latent Class Analysis

LCA examines the pattern of relations among a set of observed categorical or continuous variables, and identifies and classifies similar individuals into latent classes [unmeasured groups; McCutcheon, 1987; for more details, see Muthén and Muthén 2000].[1] Rather than using theoretically based categorization via dichotomization and standard deviation adjustments, the iterative process of LCA identifies the maximum number of latent classes (similar individuals) based on a set of indicator variables. This model-based process compares models with a particular number of latent classes with models with one less class. For instance, LCA first determines whether a model with a minimum of two latent classes (e.g., aggressors and non-aggressors) would provide a better fit than a one class model (e.g., non-aggressors). If so, LCA continues to test models with additional classes until model fit indices are satisfactory.

The advantages of LCA are its abilities to estimate unique profiles of means and variances (among other parameters) for each mutually exclusive latent class. These estimates are often calculated under the criterion of conditional independence, wherein all variables are assumed to be statistically independent of each other. This option allows for a conservative estimate of parameters and optimizes the distinction among latent classes. For example, students within each aggressor and victim latent class are highly similar to each other and uniquely different from the other classes across the set of aggressor and victim variable means.

Given a number of latent classes, membership (posterior) probabilities for each class can be estimated for all individuals. These are estimated probabilities of being classified into each latent class, or the extent that individuals fit a particular profile. Classification of participants can then be based on the highest probability. Thus, comparisons can be made across latent classes with regard to correlates and other adjustment variables. Unlike traditional dichotomization, LCA classification does not eliminate participants because all are given membership probabilities and all will likely have a highest probability class that can be used for classification.

Nylund et al. [in press] applied LCA to the study of victimization in middle school. In their study, self-perceived victimization measures were used as indicators to identify the number of victim latent classes. Unlike traditional low and high subgroups, Nylund et al. [in press] identified three victim latent classes by their degree of victimization (i.e., non-victimized, sometimes victimized, and victimized). Furthermore, the emergent number of latent classes was consistent across six longitudinal waves (time points) of data, and the victimized class consistently felt less safe at school and was more depressed than the other latent classes. Although this study used the same participants from Nylund et al. [in press], our focus was on peer perceived victim and aggressor status rather than self-reports or victim status alone, and we investigated an array of adjustment outcomes for the emergent latent classes.

PRESENT STUDY

As an application of LCA, this study used multiple continuous variable indicators of victim and aggressor reputations. The study had three aims. First, as recent studies suggest that traditional subgroups are more heterogeneous than theorized previously [Kochenderfer-Ladd, 2003; Nylund et al., in press; Schwartz et al., 2001], we examined the type of latent classes that would emerge with parallel sets of physical, verbal, and relational victim and aggressor peer nomination indicators. We were particularly interested in whether LCA would uncover more or less heterogeneous groups than those identified using traditional cutoff scores. The second aim compared LCA classification in relation to traditional subgroup (mean plus .50 standard deviation adjustment) categorization of students. This comparison explored the potential overlaps and discrepancies between latent classes and traditional subgroup classification of students. The final aim of the study examined the differences among latent classes on three sets of social, psychological, and academic adjustment outcomes that have been studied previously with traditional subgroups [Juvonen and Graham, 2001; Juvonen et al., 2003; Kochenderfer-Ladd, 2003; Kochenderfer-Ladd and Ladd, 2001]. To add greater predictability and to compare results with previous peer harassment research, we examined the impact of Fall of sixth grade latent class membership on adjustment outcomes at the Spring of sixth grade.

[1]Although some researchers equate LCA with the use of dichotomous indicator variables and latent profile analysis with continuous indicators, LCA is often referred to as an umbrella term for both analyses and will be used in this study as a general term.

METHOD

Participants

Participants were 2,307 sixth grade students (46% males, 54% females, *M* age = 11.5 years) from 99 classrooms in 11 ethnically diverse public middle schools in the Los Angeles county area. The self-reported ethnic composition of the sample was 44% Latino, 25% African American, 10% Asian, 9% White, 10% other/biracial, and 1% no answer. All the 11 schools that participants attended were located in comparable low socioeconomic status /working-class urban communities, and all qualified for Title 1 compensatory education funds. Students were participants in an ongoing longitudinal study of peer victimization during middle school. Data were gathered twice (Fall and Spring semesters) during each of the three years of middle school, and yielded six waves of data. For this study, wave 1 and wave 2 data were used and participants were the subsample of students who had complete peer nomination data at wave 1 ($n = 2144$).

Procedure

Participants were given parental consent forms at the beginning of the study. Only students with parental permission indicated in the signed return forms were allowed to participate. To encourage a high return rate, students with signed consent forms (with or without parental permission to participate) were entered into a raffle. Across schools, 75% of the distributed consent forms were returned, and 89% of these returned forms granted parental permission. Questionnaires were distributed approximately 2 months after the beginning of the school semester. Students completed questionnaires during a single session in a classroom setting. All instructions and questionnaire items were read aloud by graduate student researchers, whereas undergraduate research assistants circulated around the classroom to clarify and answer students' questions. In these middle schools, students spent several class periods a day with the same classmates. This ensured familiarity among classmates when students completed peer nomination measures. The surveys took approximately 30–40 min to complete.

Measures

Victim and aggressor indicators. Peer nomination procedures instructed participants to list up to four students who fit particular aggressor and victim descriptions. Participants used a class roster which consisted of students from their homeroom. The names on the class roster were arranged alphabetically and by gender. The three victim descriptions depicted physical (''gets pushed round''), verbal (''gets put down or made fun of by others''), and relational victimization (''others kids spread nasty rumors about them''). Parallel aggressive descriptions portrayed physical (''starts fights or pushes other kids around''), verbal (''puts other kids down or makes fun of others''), and relational aggression (''spreads nasty rumors about other kids''). Nominations for each individual item were summed and standardized within classroom. For the composite scores, the three victim items were summed and standardized within classrooms ($\alpha = .80$). The same was done for the three aggressor items ($\alpha = .87$).

Psychological adjustment. Four measures of psychological adjustment were used at wave 2 (sixth grade Spring semester). Depression was assessed using the 10-item Children's Depression Inventory [short form; Kovacs, 1992]. For each item, students were asked to choose one of three statements that best described how they had been feeling for the past 2 weeks (e.g., ''I am sad once in a while,'' ''I am sad many times,'' or ''I am sad all the time''). Item scores ranged from 0 to 2 and were averaged wherein higher scores indicated greater depression ($\alpha = .82$). For self-esteem, the self-worth subscale from Harter [1985] Self-Perception Profile for Children was used. For the self-worth subscale, students circled one of two statements that best described them, and then responded whether the selected statement was ''really true for me'' or ''sort of true for me.'' This created a 4-point scale for each item. An example item was ''Some kids like the kind of person they are but other kids often wish they were someone else.'' Scores were averaged, such that higher scores indicated greater self-worth ($\alpha = .81$). For feelings of loneliness, the Asher and Wheeler [1985] 16-item Loneliness Scale was used. For each item (e.g., ''I have nobody to talk to''), students indicated how true that statement was for them on a 5-point scale (1 = ''not true at all'' to 5 = ''always true''; $\alpha = .88$). Social anxiety was assessed using nine items from the fear of negative evaluation (e.g., ''I worry about what others think of me'') and social avoidance (e.g., ''I'm afraid to invite others to do things with me because they might say no'') subscales of the Social Anxiety Scale for Adolescence [La Greca and Lopez, 1998]. Students responded on a 5-point scale (1 = ''not at all'' to 5 = ''all the time'') for all items, and an average social anxiety score was computed ($\alpha = 84$).

Social adjustment. Peer nomination measures at wave 2 were also used to assess peer rejection (''who do you not like to hang out with'') and coolness or notoriety (''who are the coolest kids''). Again, nominations for each individual item were summed and standardized within classroom.

Academic adjustment. Two sources of academic adjustment at wave 2 were used: grade point average (GPA) and teacher ratings of school engagement. Students' GPA was averaged across all semester classes, and scored on a 5-point scale ranging from 0 (F) to 4 (A), with higher scores indicating better academic performance. Six items from the Teacher Report of Engagement Questionnaire [Wellborn and Connell, 1991] were also used as a separate assessment of students' school engagement (e.g., ''In my class this student concentrates on doing his/her work''). Teachers' responses were on a 4-point scale (1 = ''not at all characteristic of this student'' to 4 = ''very characteristic of this student''). These scores were averaged, such that higher scores indicated greater school engagement, and standardized within classrooms ($\alpha = .92$).

RESULTS

LCA Classifications

LCA was used to examine the pattern of relations among three victim and three bully continuous peer nomination items. As there are no definitive indicators for the correct number of latent classes, and the final model is often dependent on both statistical and substantive criteria, Table I shows commonly used indicators of model fit [Hagenaars and McCutcheon, 2002; Muthén, 2002; Nylund et al., in press]. Using the Lo-Mendell-Rubin likelihood ratio test (which compares an estimated model with a model with one less class), the *P*-values in the last column of Table I showed that the addition of further classes improved model fit up to the five class model. The nonsignificant *P*-value for the sixth class model indicated that a sixth class would not improve model fit over a fifth class model. In addition, information criteria (i.e., AIC, BIC, ABIC) were used to compare models, wherein models with additional model parameters are penalized in the search for the most parsimonious model. Model selection was based on the lowest model indices, or a scree-like test, in which selection was based on where the indices begin to level off. Results showed that the AIC, BIC, and ABIC values decreased in large amounts with the addition of each class and began to level off after the fifth class. The differences in model indices between the fifth and sixth class models, and thereafter, were smaller than previous differences. In addition, models with six or more latent classes were neither theoretically nor statistically distinctive relative to the five class model.[2]

For each participant, LCA also generates posterior probabilities for membership into each class, and generally, one class has the highest probability of membership. Posterior probability results for the five class model showed that students classified into their highest probability latent class had a 92–98% probability for being in that class, and a 2–6% probability of being in any other class. Taken together, these results indicated that a five class model provided the best overall fit.

The top portion of Table II contains the profiles of estimated means, standard errors, and prevalence rates for each latent class. Results showed that the majority (75.2%) of students had a profile (estimated means) for each aggressor and victim nomination item that was below zero; these students were classified as the socially adjusted class. For the 7.6% of students classified under the victim class, the profile showed that all three victim reputation items were relatively high (ranging from .42 to 1.56), whereas all aggressor reputation items were below zero. For the aggressor class, which consisted of 9.6% of students, the three aggressor items were relatively high (ranging from .84 to 1.29). In addition, LCA also showed that aggressors experienced some form of victimization (i.e., relational victimization).

Unlike traditional subgroups, LCA results found two separate latent classes for aggressive victims—termed highly-victimized aggressive-victims and highly-aggressive aggressive-victims. The highly-victimized aggressive-victims class consisted of 3% of the students. These students had the highest estimated means for victim reputation items (all above 2.72) among all classes and relatively high values for the three aggressor items (ranging from .27 to .48). In contrast, highly-aggressive aggressive-victims had the highest values for aggressor items (above 2.54) and relatively high values for the three victim indicators (ranging from .49 to 1.08). This latent class consisted of 4.6% of students. For all subsequent analyses, participants with the highest probability for a particular latent class membership were classified into that class.

[2]Parametric bootstrapped likelihood ratio tests were also used to estimate model fit, but results with our data were inconclusive.

TABLE I. Fit Indices for LCA Models With 1-8 Classes ($N = 2,144$)

Number of Classes	Log-likelihood	Number of free parameters	BIC	Adjusted BIC	AIC	LMR LRT *P*-value for *k*-1
1	−17836.71	12	35765.46	35727.33	35697.41	N/A
2	−15568.94	19	31283.63	31223.26	31175.89	0.000
3	−14369.89	26	28939.22	28856.62	28791.79	0.000
4	−13861.89	33	27976.91	27872.06	27789.79	0.000
5	−13533.06	40	27372.94	27245.86	27146.13	0.039
6	−13274.79	47	26910.08	26760.76	26643.57	0.353
7	−12997.82	54	26409.85	26238.29	26103.65	0.671
8	−12817.38	61	26102.65	25908.84	25756.75	0.239

LMR LRT is the Lo-Mendell-Rubin likelihood ratio test (which compares an estimated model (k) with a model with one less class)
LCA = latent class analysis; LMR LRT = Lo-Mendell-Rubin likelihood ratio test; BIC = Bayesian information criterion; AIC = Akaike information criterion.

TABLE II. Profile of Means, Standard Error, and Prevalence Rates for Each Latent Class and Traditional Subgroup ($N = 2144$)

	Latent classes									
	Socially adjusted		Victims		Aggressors		Highly-aggressive aggressive-victims		Highly-victimized aggressive-victims	
	M	SE	*M*	SE	*M*	SE	*M*	SE	*M*	SE
Verbal victim	−0.34	0.01	1.56	0.12	0.04	0.10	0.49	0.12	3.33	0.16
Physical victim	−0.29	0.02	1.30	0.18	−0.04	0.08	0.32	0.14	3.31	0.16
Relational victim	−0.30	0.02	0.42	0.12	0.57	0.09	1.08	0.13	2.73	0.21
Physical aggressor	−0.31	0.01	−0.13	0.07	0.85	0.15	3.13	0.13	0.48	0.20
Verbal aggressor	−0.35	0.01	−0.18	0.05	1.30	0.11	3.09	0.13	0.27	0.13
Relational aggressor	−0.31	0.02	−0.16	0.08	1.24	0.11	2.55	0.17	0.35	0.15
Prevalence rates	0.75		0.08		0.10		0.05		0.03	
	Traditional subgroups									
	Socially adjusted		Victims		Aggressors		Aggressive victims		Borderline	
	M	SE	*M*	SE	*M*	SE	*M*	SE	*M*	SE
Verbal victim	−0.43	0.01	1.54	0.09	−0.41	0.03	1.46	0.11	0.21	0.04
Physical victim	−0.38	0.01	1.48	0.10	−0.39	0.03	1.25	0.12	0.16	0.04
Relational victim	−0.43	0.01	0.97	0.09	−0.11	0.05	1.77	0.11	0.28	0.05
Physical aggressor	−0.38	0.01	−0.32	0.03	1.18	0.10	1.92	0.12	0.20	0.05
Verbal aggressor	−0.43	0.01	−0.37	0.02	1.49	0.10	1.84	0.10	0.26	0.05
Relational aggressor	−0.42	0.01	−0.38	0.03	1.35	0.10	1.77	0.10	0.31	0.05
Prevalence rates	0.57		0.09		0.07		0.06		0.21	

All indicator items scores were standardized with a mean of 0 (that represents approximately the 50th percentile of the sample) and a standard deviation of 1. Positive values indicate groups means greater than the 50th percentile, whereas negative values indicate group means less than the 50th percentile of the sample.

Comparisons Between Traditional and LCA Approaches

To identify and classify students into traditional subgroups for comparison, we followed the categorization approach based on Juvonen et al.'s [2003] study using the same data (see bottom portion of Table II). Following standardization of peer nomination frequencies, students who fell .50 standard deviation above the sample mean for the aggressor score and below the sample mean on the victim score were categorized into the aggressor subgroup. Students above .50 standard deviation of the mean for the victim score and below the mean for aggressor score were categorized into the victim subgroup. Students with both aggressor and victim scores that were .50 standard deviation above their respective mean were categorized as the aggressive

victim subgroup. The socially adjusted subgroup consisted of students who fell below the mean for both victim and aggressor scores. The remaining students were categorized into the borderline subgroup. In all, the percentage of students categorized into each subgroup were: 57% socially adjusted, 21% borderline, 9% victims, 7% aggressors, and 6% aggressive victims. Table II also shows the disaggregated descriptive statistics for each of these groups.

Comparing the profiles for latent classes in the top portion of Table II with those for the traditional subgroups in the bottom portion of the table, it is evident that there were some similarities and differences between the approaches. To begin, the victim and socially adjusted latent classes were relatively similar to their traditional subgroup counterparts. First, the profile means for the victim subgroup and latent classes showed that these students experienced three forms of victimization but had no reputations as aggressors. Second, the socially adjusted subgroup and latent class also shared similar profiles with all victim and aggressor indicator means below average (or in the negative).

The differences between traditional subgroups and latent classes were exemplified in the remaining comparisons. First, although the traditional aggressor subgroup was theoretically ideal (with high means for all aggressor items and low means for the victim indicators), the profile for the aggressor latent class showed high aggressive reputations as well as a moderate relational victim reputation. Second, rather than a single aggressive victim subgroup with high reputations for all items, the two comorbid latent classes displayed differing levels of aggressive and victim reputations. That is, highly-aggressive aggressive-victims had higher reputations as aggressors and moderate reputations as victims compared with traditional aggressive victims. In contrast, highly-victimized aggressive-victims had greater victim reputations and moderate aggressor reputations.

To examine the consistencies and discrepancies between both traditional and LCA approaches, Table III shows a cross-tab comparison of students classified into traditional subgroups and latent classes, and the percentages of traditional subgroup members who were also classified within each latent class. This table showed that a large percentage of those categorized into a traditional subgroup also fit a profile of a similarly labeled latent class (e.g., victims, aggressors, socially adjusted). For the borderline subgroup, the majority of its members were also classified into one latent class (i.e., socially adjusted). However, the aggressive victim subgroup consisted of members who were classified into the aggressor (37%), highly-aggressive aggressive-victims (38%), highly-victimized aggressive-victims (17%), and victim (8%) latent classes. In addition, with the exception of the socially adjusted subgroup, each traditional subgroup consisted of members who were from at least three other latent classes. Thus, comparing LCA to a traditional cutoff approach showed considerable heterogeneity within traditional subgroups.

Adjustment Outcomes

Having identified five latent classes in the LCA approach, we next examined how these classes differed on self-reported psychological outcomes, social outcomes based on peer report, and academic outcomes derived from teacher ratings and actual grades that were assessed in the Spring of sixth grade. Hence, the adjustment data examined in this

TABLE III. Cross-Tab Comparison Counts Among Traditional Subgroups and Latent Classes, and the Percentages of Traditional Subgroup Members Within Each Latent Class

	Traditional subgroups					
Latent classes	Aggressors	Aggressive victims	Victims	Borderline	Socially adjusted	Total
Victims	—	10	110	43	—	163
% Latent class members	—	(8%)	(57%)	(10%)	—	(8%)
Aggressors	100	49	—	56	—	205
% Latent class members	(65%)	(37%)	—	(12%)	—	(10%)
Socially adjusted	29	—	53	317	2,114	1,613
% Latent class members	(19%)	—	(27%)	(70%)	(100%)	(75%)
Highly-aggressive aggressive-victim	24	50	—	24	—	98
% Latent class members	(16%)	(38%)	—	(5%)	—	(5%)
Highly-victimized aggressive-victim	—	23	30	12	—	65
% Latent class members	—	(17%)	(16%)	(3%)	—	(3%)
Total	153	132	193	452	1,214	2,144

short-term longitudinal analysis came from multiple informants. A one-way multivariate analysis of variance was performed on the Spring adjustment outcomes as a function of Fall latent class membership. Due to listwise analyses, the total *N* for this analysis was reduced to 1,602, or 75% of the wave 1 participants. Results of the multivariate analysis of variance showed that the linear combination of adjustment outcomes was significantly different among the latent classes, Pillai's Trace = 0.40, $F(24, 6372) = 29.26$, $P < .001$, partial $\eta^2 = .10$. All subsequent one-way univariate analyses for each adjustment outcome showed significant differences among latent classes. That is, results showed significant differences among latent classes for loneliness [$F(4, 1597) = 31.80$, $P < .001$, partial $\eta^2 = .07$], social anxiety [$F(4, 1597) = 11.13$, $P < .001$, partial $\eta^2 = .03$], self-esteem [$F(4, 1597) = 8.87$, $P < .001$, partial $\eta^2 = .02$], depression [$F(4, 1597) = 8.17$, $P < .001$, partial $\eta^2 = .02$], peer rejection [$F(4, 1597) = 150.34$, $P < .001$, partial $\eta^2 = .27$], coolness [$F(4, 1597) = 20.42$, $P < .001$, partial $\eta^2 = .05$], GPA [$F(4, 1597) = 25.80$, $P < .001$, partial $\eta^2 = .06$], and school engagement [$F(4, 1597) = 35.66$, $P < .001$, partial $\eta^2 = .08$]. Subsequent Scheffé pairwise comparisons on adjustment outcomes were performed. Table IV displays the means, standard errors, and Scheffé post hoc results.

In terms of victims, aggressors, and socially adjusted latent classes in the first three columns of Table IV, comparisons showed differences that were consistent with previous findings. Victims experienced the greatest psychological and social maladjustment, socially adjusted students performed academically better, and aggressors were perceived as the most cool but experienced the same level of rejection as victims [Juvonen et al., 2003]. Having identified two comorbid latent classes, we focused on adjustment differences between highly-aggressive aggressive-victims and highly-victimized aggressive-victims latent classes in Table IV, and between comorbid and non-comorbid latent classes.

Comparisons between comorbid latent classes showed that highly-victimized aggressive-victims generally experienced greater adjustment difficulties than highly-aggressive aggressive-victims and the differences were significant on three specific outcomes. Highly-victimized aggressive-victims reported significantly greater feelings of loneliness than highly-aggressive aggressive-victims and they were significantly more rejected and perceived as less cool by their peers. Thus, the main differences between the two comorbid groups were traced to the social adjustment outcomes. Comparisons between the comorbid classes and all other latent classes showed the unique disadvantages of having a reputation as both victimized and aggressive. First, highly-victimized aggressive-victims and victims were generally similar to each other except on feelings of loneliness and rejection, for which highly-victimized aggressive-victims were significantly worse off than all latent classes. In addition, highly-victimized aggressive-victims experienced significantly greater adjustment difficulties than aggressors on all of the psychological and social adjustment outcomes except self-esteem. Highly-victimized aggressive-victims also fared more poorly than the socially adjusted latent class on these same psychological and social variables as well as the academic adjustment outcomes.

There were few differences between highly-aggressive aggressive-victims and aggressors except that the comorbid group was rejected more significantly by peers and performed worse in school as measured by overall GPA. In addition, like their aggressive counterparts, highly-aggressive aggressive-victims

TABLE IV. Scheffé Post Hoc Analyses of Mean (Standard Error) Differences in Adjustment Measures at Spring sixth Grade among Latent Classes ($N = 1602$)

	Victims	Aggressors	Socially adjusted	Highly-aggressive Aggressive-victims	Highly-victimized Aggressive-victims
Loneliness	$2.04\ (.05)_{a}$	$1.59\ (.05)_{b}$	$1.65\ (.02)_{b}$	$1.83\ (.08)_{ab}$	$2.40\ (.08)_{c}$
Social anxiety	$2.40\ (.07)_{ad}$	$1.91\ (.06)_{b}$	$2.15\ (.02)_{c}$	$2.22\ (.11)_{bcd}$	$2.63\ (.11)_{d}$
Self-esteem	$2.94\ (.07)_{a}$	$3.22\ (.06)_{b}$	$3.25\ (.02)_{b}$	$2.95\ (.10)_{ab}$	$2.94\ (.10)_{ab}$
Depression	$0.36\ (.03)_{ac}$	$0.24\ (.03)_{ab}$	$0.24\ (.01)_{b}$	$0.34\ (.04)_{abc}$	$0.42\ (.04)_{c}$
Rejection	$0.54\ (.08)_{a}$	$0.48\ (.07)_{a}$	$-0.25\ (.02)_{b}$	$1.09\ (.11)_{c}$	$2.04\ (.12)_{d}$
Coolness	$-0.41\ (.09)_{a}$	$0.42\ (.08)_{b}$	$0.04\ (.03)_{cd}$	$0.30\ (.13)_{bd}$	$-0.71\ (.14)_{a}$
School Engagement	$-0.32\ (.09)_{a}$	$-0.41\ (.08)_{ac}$	$0.17\ (.03)_{b}$	$-0.84\ (.13)_{c}$	$-0.57\ (.13)_{ac}$
GPA	$2.08\ (.09)_{a}$	$2.07\ (.08)_{a}$	$2.56\ (.03)_{b}$	$1.55\ (.14)_{c}$	$1.96\ (.14)_{ac}$

Row means (latent classes) sharing a letter subscript are not significantly different from each other, whereas those that do not share a subscript are significantly different at $P < .05$. For peer rejection, popularity, and school engagement, group means were standardized.
GPA = grade point average.

were significantly worse off than the socially adjusted latent class on peer rejection and on academic achievement. Last, compared with victims, highly-aggressive aggressive-victims were significantly less rejected, and perceived as more cool, but were doing significantly more poorly in school. Lower academic achievement, in fact, is probably what most distinguished the two comorbid groups from all other latent classes.

DISCUSSION

The application of LCA to the identification of aggressor/victim groups proved insightful in terms of (1) the emergence of five latent classes, (2) identifying overlaps and disparities between traditional subgroups and latent classes, and (3) comparisons among latent classes in terms of psychological, social, and academic adjustment outcomes.

LCA of the six aggressor and victim indicators resulted in five unique latent classes: victims, aggressors, highly-victimized aggressive-victims, highly-aggressive aggressive-victims, and socially adjusted. This was in contrast to the traditional four subgroups that have been studied theoretically and empirically in the past. Although comparisons showed some substantive overlap between traditional and latent class approaches, the results also showed differences in mean profiles for each approach and the classification of students into groups.

In general, results from the comparisons suggest that the traditional dichotomization approach does not completely capture the variability within and across subgroups. Although the traditional approach relies on a priori theories regarding the qualifiers of being categorized into a subgroup, the model-based approach of LCA identifies differing number and profiles of latent classes in a post hoc fashion. The results from this study showed that the latent classes consisted of members from at least two other traditional subgroups. The LCA also showed that borderline students, a subgroup that was often eliminated in previous studies, exhibited profiles that allowed them to be classified into a latent class. In addition, despite the fact that the majority of the traditional aggressor subgroup were also members of the aggressor latent class, LCA showed that aggressors were not immune to victimization as studied previously . That is, aggressors may be vulnerable to having nasty rumors being spread about them, possibly due to their reputation as bullies. It may be safer to retaliate against aggressive youth with more indirect relational tactics rather than physical or verbal methods which typically involve face-to-face confrontation.

Unlike previous research on aggressive victims, LCA identified two comorbid classes with differing degrees of both aggressive and victim reputations. Highly-aggressive aggressive-victims had the highest aggressive reputations and moderate victim reputations, whereas highly-victimized aggressive-victims showed a reverse pattern. This is in contrast to previous research that categorized comorbid groups with the highest aggressive and victim reputations among traditional subgroups [Juvonen et al., 2003; Schwartz et al., 2001; Unnever, 2005]. Our results suggest that aggressive victims should not be viewed as a single group because there is considerable variance in the degree to which they have reputations as both aggressors and victims.

The differentiation of comorbid latent classes also provides new insights into the heterogeneity within aggressive victims and their adjustment outcomes. Highly-victimized aggressive-victims, but not highly-aggressive aggressive-victims, were generally shown to be the most psychologically maladjusted. They had greater feelings of loneliness, and to a lesser extent, greater social anxiety than most of the other latent classes, including highly-aggressive aggressive-victims who did not differ from the other latent classes. These results suggest that the negative impact of a strong victim and moderate aggressor reputation is greater with regard to feelings of connectedness with others (loneliness and social anxiety) rather than intrapsychic processes [self esteem and depression; Kochenderfer-Ladd and Ladd, 2001].

Examining social adjustment, this study found unique differences between the comorbid latent classes. Although both comorbid latent classes experienced the greatest peer rejection, highly-victimized aggressive-victims were more rejected than highly-aggressive aggressive-victims. Similarly, highly-aggressive aggressive-victims and aggressors were perceived as most cool, whereas highly-victimized aggressive-victims and victims were the least cool. Although Schwartz et al. [2001] suggested that comorbidity impacts social status in a negative manner, the present results showed that it is the extent of aggressive and victim reputations that plays a role. That is, an aggressive reputation elevates and a victim reputation diminishes students' peer social status when differentiating within comorbid latent classes and among all other latent classes. However, the psychological and social advantages of highly-aggressive aggressive-victims over highly-victimized aggressive-victims did not

generalize to the academic domain, where the two comorbid latent classes were doing the most poorly in school. Students who have social adjustment problems, whether primarily as victims, aggressors, or a combination of both, are at risk for academic adjustment problems, even though the psychological and social processes that are related to these outcomes may be different for particular subgroups [Graham et al., 2006].

There is a great deal of interest in the peer harassment literature on youth who have characteristics of both victims and aggressors [e.g., Ma, 2001; Schwartz et al., 2001; Unnever, 2005]. Are they more similar to victims, to aggressors, or are they a distinct subgroup with their own behavioral characteristics? Extant research suggests that the comorbid group is distinct from victims and aggressors, and may indeed be at greater risk for multiple adjustment difficulties. As intervention approaches are developed to meet the needs of comorbid youth, our findings underscore the importance of recognizing the heterogeneity within this group. Targeted interventions for comorbid youth will first need to identify whether they are predominantly aggressive or victimized aggressive-victims. For example, the highly-aggressive aggressive victim may benefit more from strategies that help them gain greater social acceptance, whereas highly-victimized aggressive-victims may need an intervention approach that is balanced more toward behavioral management and anger control. An important first step in the development of targeted interventions is an accurate identification of youth who are in need of those interventions. LCA provides an appropriate alternative analytic approach to identify more accurately the characteristics of youth who may be in need of intervention because they have reputations as both aggressors and victims.

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