

Predictive Validity and Early Predictors of Peer-Victimization Trajectories in Preschool

Edward D. Barker, PhD; Michel Boivin, PhD; Mara Brendgen, PhD; Nathalie Fontaine, PhD; Louise Arseneault, PhD; Frank Vitaro, PhD; Catherine Bissonnette, MSc; Richard E. Tremblay, PhD

Context: From the time of school entry, chronic levels of victimization by one's peers predict a multitude of psychiatric and physical health problems. However, developmental trajectories of peer victimization, from the time children first begin to socially interact, are not currently known nor are early familial or child predictors.

Objectives: To describe preschool trajectories of peer victimization, assess continuity of preschool victimization after school entry, and examine early child- and family-level predictors of preschool trajectories of victimization.

Design: A longitudinal, large-scale, multiple-informant, population-based study.

Setting: Québec Longitudinal Study of Child Development.

Participants: One thousand nine hundred seventy children (51% boys).

Main Outcome Measures: Developmental trajectories were described using mothers' reports of peer victimization at 4 times from 3 $\frac{1}{3}$ to 6 $\frac{1}{6}$ years of age. In first grade (mean age, 7.2 years), teacher and child reports of peer victimization were collected. Family-level predictors, mostly at age 17 months, included measurements

of family adversity (insufficient income [when the infant was aged 5 months], single-parent family, low education, or teenaged mother) and harsh, reactive parenting. Child-level predictors at age 17 months were the mother's ratings of physical aggression, hyperactivity, and emotional problems.

Results: Three preschool trajectories of peer victimization were identified (low/increasing, moderate/increasing, and high/chronic). In first grade, children following high/chronic and moderate/increasing preschool trajectories were highest in teacher- and child-rated peer victimization. High levels of harsh, reactive parenting predicted high/chronic peer victimization over and above other child- and family-level variables. Insufficient parent income and child physical aggression predicted the high/chronic and moderate/increasing peer-victimization trajectories.

Conclusions: Early childhood preventive interventions should target parenting skills and child behaviors, particularly within families with insufficient income. Together, these risks confer a heightened likelihood for continued peer victimization as rated by mothers, teachers, and the children themselves.

Arch Gen Psychiatry. 2008;65(10):1185-1192

PEEER VICTIMIZATION IS INCREASINGLY recognized as a major social problem. Cross-national statistics show that up to 1 in 10 youths are the target of physical attacks, hostile words, and indirect/social aggression from peers during one's school years.¹⁻⁵ Studies also show that peer victimization becomes increasingly stable over time, with the same children enduring such negative experiences throughout childhood and adolescence.⁶⁻⁸ The consequences associated with high and chronic victimization are manifold and include depression, loneliness, low self-esteem, physical health problems, social withdrawal, alcohol and/or drug use, school absence and avoidance, decrease in school performance, self-harm, and suicidal ideation.^{4,9-21}

In an effort to identify early risk factors of peer victimization, most research has focused on the individual characteristics of victimized children and, to a lesser extent, of their families. At school entry, the most robust predictor of proximal and subsequent victimization is physical aggression.^{22,23} Internalizing symptoms (eg, depressive symptoms and social withdrawal) and behavioral regulation problems (eg, hyperactivity) have also been examined but are more likely to emerge as proximal determinants of chronic peer victimization in late childhood.^{9,24-29} The few studies that have examined family factors report that harsh parenting is prospectively linked to victimization,^{30,31} possibly through the development of the child's aggressive behaviors. Certain studies also suggest that victimized children are more likely to come from low-income households.^{32,33}

Author Affiliations are listed at the end of this article.

However, research is mixed with regard to the stability of peer victimization in early childhood. Some research suggests that victimization solidifies later in elementary school^{34,35} or adolescence,^{8,36} whereas other research has reported a pattern of moderate short-term stability as early as preschool (3½-4 years of age).³⁷⁻³⁹

Although the existing studies yield important information about the stability of peer victimization before elementary school, they also present 4 limitations. First, peer victimization in preschool has mainly been assessed at 2 times only, which limits the conclusions regarding stability and change. Second, the existing studies relied on small samples and are therefore limited in epidemiological value. Third, studies that examined child predictors of victimization did so beginning around ages 4 to 5 years. However, the behavioral and internalizing problems that are commonly associated with peer victimization are already present^{40,41} and children start spending a significant amount of time with peers as early as 2 years of age.^{42,43} Fourth, to our knowledge, no studies have examined child- and family-level predictors of preschool victimization simultaneously. This is an important limitation, as child-level risk factors of peer victimization (ie, aggression and internalizing problems) often co-occur with family-level risk factors (ie, harsh parenting, single-parent family, and insufficient income).⁴⁴⁻⁴⁶ Examining these issues is crucial to the planning of evidence-based, targeted interventions aimed at reducing peer victimization and preventing subsequent mental health problems.

The goals of the present study were to (1) identify groups of children that followed distinct trajectories of peer victimization during preschool, (2) examine the predictive association between the preschool trajectories and peer victimization after school entry, and (3) examine child- and family-level predictors of these preschool peer-victimization trajectories. Whereas most children were expected to follow a low/stable trajectory of peer victimization in preschool, we assumed that a small group of children would follow a high/chronic trajectory of preschool peer victimization. As children become increasingly engaged in peer interactions, we also posited that a third group would emerge as being increasingly victimized. We further expected that these groups would differ with respect to early school victimization and that high family adversity and high physical aggression would predict high/chronic peer victimization during preschool.

In examining these issues, we also investigated sex differences. Because highly aggressive girls were found to be more victimized than highly aggressive boys in kindergarten,²² aggressive behaviors were expected to be more predictive of preschool peer victimization among girls than among boys.

METHODS

PARTICIPANTS

The participants were part of the Québec Longitudinal Study of Child Development,⁴⁷ a sample of children born in Québec, Montreal, Canada, between October 1997 and July 1998 (excluding children born in Cree or Inuit territories, Native Canadian reserves, or northern Québec). Participants were initially selected from the Québec Birth Registry through a stratified

sampling procedure based on living area and birth rate. Families that could be located (N=2675) were contacted by mail and telephone. Of those, 83.1% agreed to participate in the first assessment, resulting in an initial sample of 2120 children selected for follow-up. Signed informed consent was obtained from mothers during the home visit. The ethics board of Santé Québec, the agency responsible for the data collection, approved the study.⁴⁷

The participants were seen at 4.5 months of age (standard deviation [SD], 0.55 months; time 1 [n=2120]), 16.6 months (SD, 0.56 months; time 2 [n=2045]), 2.4 years (SD, 0.54 months; time 3 [n=1997]), 3.4 years (SD, 0.58 months; time 4 [n=1950]), 4.1 years (SD, 3.12 months; time 5 [n=1944]), 5.1 years (SD, 3.12 months; time 6 [n=1759]), 6.2 years (SD, 3.05 months; time 7 [n=1492]), and at 7.2 years (SD, 3.06 months; time 8 [n=1528]). At time 1, 51.2% of the children were boys and living predominantly in French-speaking families (81%). On average, mothers and fathers were aged 28.8 and 31.8 years, respectively; 16.9% of mothers and 19.9% of fathers did not hold a high school degree, whereas 27.7% of mothers and 25.2% of fathers held a university degree; 27.7% reported an income lower than CaD \$30 000 (US \$29 451) and 30.6% reported incomes higher than CaD \$60 000 (US \$58 902); and 7.1% families were headed by a single parent. Most children (93.4%) attended some form of child care (either by a relative or nonrelative, or in a center-based setting) before school entry, mainly after 9 months of age (79.6%).⁴⁸

To maximize the use of available data, boys and girls with at least 1 data point on mother-rated preschool peer victimization between time 4 and time 7 were included in the trajectory analysis (n=1970; 51% boys). Children with missing data on both teacher and child ratings in first grade (n=740; 59% boys) did not significantly differ from children without missing data with respect to mother-rated victimization at time 4 ($t_{1938}=-0.79, P=.43$), time 5 ($t_{1931}=-0.74, P=.46$), time 6 ($t_{1751}=-0.38, P=.70$), and time 7 ($t_{1469}=1.15, P=.25$). A total of 1259 children had complete data on teacher and children reports in first grade (47% boys). Children with missing data on the age 17-month predictors did not significantly differ on mother-rated (times 4-7) or teacher- or child-rated (time 8) victimization.

OUTCOME MEASURES

Repeated Measures of Peer Victimization

Peer victimization during preschool was assessed through mother ratings at times 4 (41 months), 5, 6, and 7 (kindergarten). The mothers were asked: In the past 6 months, how often would you say that your child was (1) made fun of by other children, (2) hit or pushed by other children, and (3) called names by other children? They rated these items on a 3-point scale (0=never, 2=often). Within each year, individual item scores were averaged to obtain a global score of peer victimization. Cronbach α ranged from 0.60 to 0.84.

Peer Victimization in First Grade

Peer victimization in school (time 8, first grade) was assessed through teacher ratings and the children's self-ratings, the latter via structured interviews. The teachers rated the same 3 items as the mothers (mean score: boys, 1.45 [SD, 1.80]; girls, 0.95 [SD, 1.58]; Cronbach $\alpha=0.66$). The children were asked to rate the following 5 items (0=never, 2=often): Does it ever happen that (1) some children at school call you names or say bad things to you? (2) some children at school say bad things behind your back to other children? (3) a child at school will not

let you play with his/her group? (4) a child at school pushes, hits, or kicks you? or (5) a child at school teases you in a mean way? (mean score: boys, 3.51 [SD, 2.40]; girls, mean, 3.18 [SD, 2.46]; Cronbach $\alpha=0.72$). Boys were victimized significantly more than girls ($P < .05$) according to the teacher and child reports. Teacher- and child-rated victimization reports were significantly associated ($n=1257$, $r=0.20$, $P < .001$).

Early Childhood Predictors

Family-Level Risks. The following family adversity variables were created from information obtained from the mothers and Statistics Canada at time 1 (5 months): (1) family structure (0=2 parents, 1=1 parent), (2) parents' levels of education (0=at least high school education, 1=no high school education), (3) parents' age at the birth of the first child (0=20 years or older, 1=19 years or younger), and (4) insufficient household income (calculated as a categorical variable to reflect Statistics Canada's definition of low income while taking into account the number of people in the household and the family zone of residence). Income was coded as sufficient (0) or not (1). Boys and girls did not significantly differ on the family adversity variables.

Harsh, reactive parenting was assessed using the mothers' self-ratings at time 2 (17 months). Mothers rated the following 3 items on a 10-point scale (0=not at all what I did; 10=exactly what I did): In the past 6 months, I have (1) been angry with my child when he/she was particularly fussy, (2) raised my voice or shouted at my child when he/she was particularly fussy, and (3) spanked my child when he/she was particularly fussy. The items were taken from the harsh/reactive subscale of the Parental Cognitions and Conduct Toward the Infant Scale⁴⁹ (mean score: boys, 3.44 [SD, 2.48]; girls, 3.25 [SD, 2.31]; Cronbach $\alpha=0.77$). Boys did not significantly differ from girls in harsh, reactive parenting.

Child-Level Risks at 17 Months of Age. Physical Aggression. Mothers rated the following 3 items on a 3-point scale (0=never; 2=often): How often would you say that your child (1) hits, bites, or kicks, (2) fights, or (3) bullies others (mean score: boys, 1.09 [SD, 1.11]; girls, 0.90 [SD, 1.02]; Cronbach $\alpha=0.83$). Boys scored significantly higher than girls ($P < .05$) on the physical aggression measure.

Hyperactivity. Mothers rated the following 7 items on a 3-point scale (0=never or not true; 2=often or very true): How often would you say your child (1) cannot sit still, is restless or hyperactive, (2) is easily distracted or has trouble sticking to any activity, (3) is fidgety, (4) cannot concentrate or pay attention for long, (5) is impulsive or acts without thinking, (6) has difficulty waiting for his/her turn in games, or (7) cannot settle down to do anything for more than a few moments (mean score: boys, 3.72 [SD, 2.20]; girls, 3.23 [SD, 2.14]; Cronbach $\alpha=0.74$). Boys scored significantly higher on the hyperactivity measure than girls ($P < .05$).

Internalizing Symptoms. Mothers rated the following 7 items on a 3-point scale (0=never or not true; 2=often or very true): How often would you say that your child (1) seems to be unhappy or sad, (2) is not as happy as other children, (3) is too fearful or anxious, (4) is worried, (5) cries, (6) is nervous, high-strung, or tense, or (7) has trouble enjoying himself/herself (mean score: boys, 0.90 [SD, 1.06]; girls, 0.83 [SD, 0.98]; Cronbach $\alpha=0.54$). Boys and girls did not differ significantly in mean scores of internalizing symptoms.

STATISTICAL ANALYSIS

First, models for the mother-rated victimization trajectories were estimated. Growth mixture models^{50,51} were applied to estimate the trajectories using Mplus, version 4.1 (Muthén & Muthén, Los

Angeles, California). A series of models was fitted, beginning with a 1-group trajectory model and moving to a 6-group trajectory model, all with random starting values. The best-fitting model was established using the Bayesian information criteria,⁵² the Lo-Mendell-Rubin likelihood ratio test,⁵³ and entropy.⁵⁴ The Bayesian information criteria is a commonly used fit index, in which lower values indicate a more parsimonious model. The Lo-Mendell-Rubin likelihood ratio test provides a $k-1$ likelihood ratio-based method (in which k =number of trajectories) for determining the ideal number of trajectories (a low P value [$< .05$] indicates a better fit to the data). Entropy is a measure of classification accuracy, with values closer to 1 indexing greater precision (range, 0-1). Next, variance parameters (random effects) were added to the models to test whether trajectory-specific variance estimates improved model fit and classification.

Second, we examined the predictive validity of the preschool peer-victimization trajectories with respect to first grade peer victimization. Mean differences in teacher and child ratings of peer victimization were examined as a function of the different preschool victimization trajectories. We standardized the first grade variables for comparison purposes. We also examined sex by trajectory interactions. Because of unequal populations in the trajectory groups, mean differences were tested with a general linear model multivariate analysis of variance using weighted data (SAS, version 8.2; SAS Institute Inc, Cary, North Carolina). This corrected for potential uncertainty in trajectory assignment.

Third, we examined whether early child- and family-level risk factors predicted the preschool peer-victimization trajectories, and we tested for all possible sex interactions in this context. These predictive relationships were examined in an integrated growth mixture model (**Figure 1**) (model extensions such as these are described in detail elsewhere⁵⁰).

RESULTS

DESCRIPTIVE STATISTICS

Mother-rated victimization steadily increased for boys and girls, from ages 3.4 years through 6 years. Boys had significantly more mother-rated victimization (**Table 1**).

VICTIMIZATION TRAJECTORIES

Figure 2 presents the 3-group trajectory model and the fit indices for the 1- to 6-group trajectory models. The Bayesian information criteria steadily decreased in the 1- to 4-group trajectory models, but increased in the 5-group trajectory model. Entropy favored the 4-group trajectory model. Nevertheless, a careful comparison of the 4- and 3-group trajectory models indicated that the additional group split a low/increasing trajectory into 2 low/increasing trajectories. However, these 2 low/increasing trajectories were of limited heuristic value and did not differ with respect to first grade or infancy variables. The 3-group trajectory (compared with the 2-trajectory model) indicated that the additional group differentiated a high/chronic trajectory group from low/ and moderate/increasing groups, each of which clearly differed in mean levels of preschool peer victimization. We therefore examined the 3-group trajectory model.

There were 3 distinct trajectories of mother-rated peer victimization. Most of the children (71%) followed a low/increasing trajectory, 25% followed a moderate/

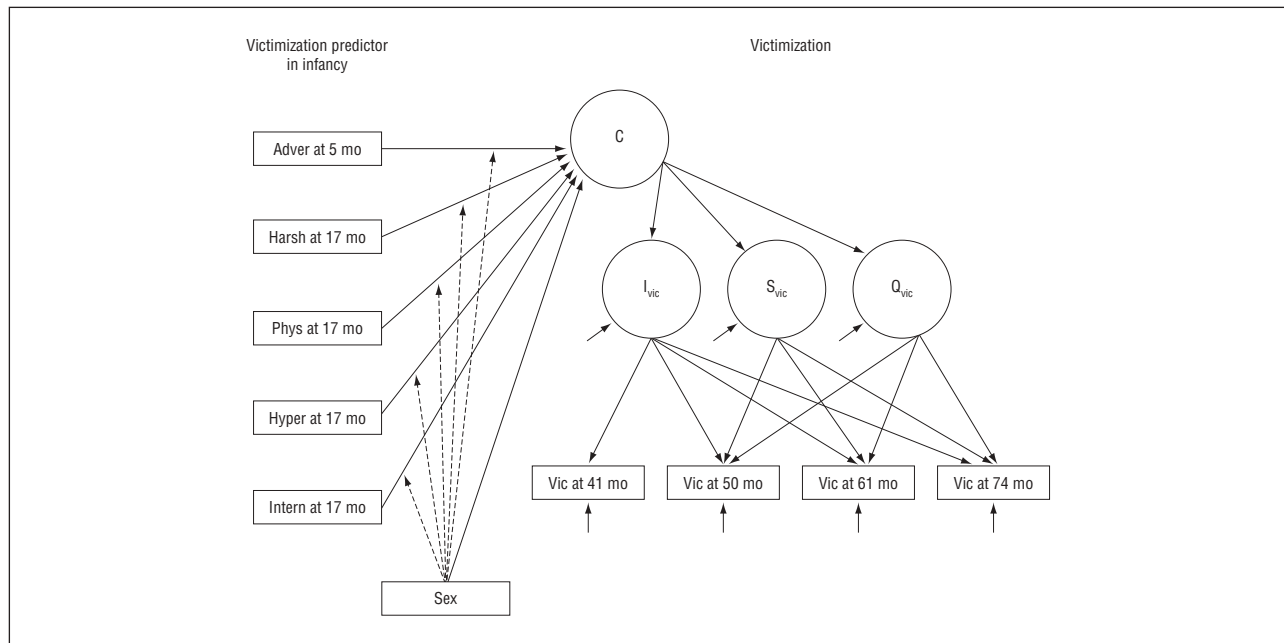


Figure 1. Integrated growth mixture model of family- and child-level risk factors predicting peer-victimization trajectories. Adver indicates family adversity variables; C, latent trajectory classes; circles, latent variables; dotted lines, interactions; Harsh, harsh, reactive parenting; Hyper, hyperactivity; I, intercept; Intern, internalizing problems; Phys, physical aggression; Q, quadratic trend; rectangles, observed variables; S, linear trend; solid lines, direct effects; and Vic, victimization.

Table 1. Mother-Rated Victimization Summary Statistics by Age and Sex of Child

Age at Victimization, mo	Mother-Rated Victimization Score, Mean (SD) ^a		P Value
	Boys	Girls	
41	1.39 (1.43)	1.21 (1.37)	< .05
50	1.46 (1.67)	1.34 (1.55)	.1
61	1.84 (1.84)	1.65 (1.81)	< .05
74	2.34 (2.03)	1.88 (1.91)	< .05

^aThe mothers were asked: In the past 6 months, how often would you say that your child was (1) made fun of by other children, (2) hit or pushed by other children, and (3) called names by other children? They rated these items on a 3-point scale (0=never, 2=often).

increasing trajectory, and 4% followed a high/chronic trajectory. Slightly more girls than boys followed the low/increasing group (52% girls), whereas more boys than girls were in the moderate/increasing (57% boys) and high/chronic (61% boys) groups.

CONTINUITY OF VICTIMIZATION IN FIRST GRADE

First grade teacher- and child-rated peer victimization scores were evaluated using a general linear model multivariate analysis of variance with a 2 (sex) × 3 (victimization trajectories) factorial design. There was no multivariate sex by trajectory interaction ($F_{4, 2486} = 1.56, P = .38$), but significant main effects were identified for sex ($F_{2, 1243} = 11.89, P < .001$) and the victimization trajectories ($F_{4, 2486} = 4.85, P < .001$).

Teacher-rated peer victimization in first grade was predicted by the mother-rated peer victimization trajectory

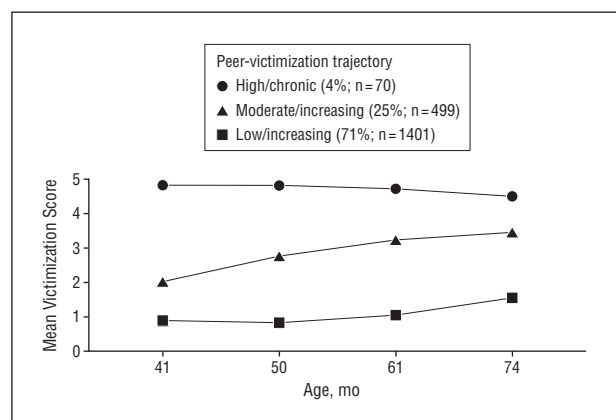


Figure 2. Developmental trajectories of mother-rated victimization. The mothers were asked: In the past 6 months, how often would you say that your child was (1) made fun of by other children? (2) was hit or pushed by other children? or (3) was called names by other children? They rated these items on a 3-point scale (0=never, 2=often). Fit indices for 1-trajectory model (Bayesian information criteria [BIC]=27454.09; entropy, not applicable; Lo-Mendell-Rubin likelihood ratio test [LMR-LRT], not applicable), 2-trajectory (BIC=26393.87; entropy=0.80; LMR-LRT, $P < .001$), 3-trajectory (BIC=26206.36; entropy=0.78; LMR-LRT, $P < .001$), 4-trajectory model (BIC=26047.45; entropy=0.81; LMR-LRT, $P < .001$), and 5-trajectory model (BIC=26140.207; entropy=0.70; LMR-LRT, $P = .03$). The 6-trajectory model failed to converge. Adding variance parameters to the 3-trajectory model (entropy=0.68) and the 4-trajectory model (entropy=0.64) did not improve classification accuracy. The 5- and 6-group trajectory models with random effects failed to converge.

ries ($F_{2, 1244} = 7.65, P < .001$) and by sex ($F_{1, 1244} = 32.69, P < .001$). Teacher-rated peer victimization rose from the low/increasing (mean, -0.05 [SD, 0.69]) to the moderate/increasing (mean, 0.10 [SD, 0.69]) to the high/chronic (mean, 0.24 [SD, 0.68]) victimization trajectories. Compared with children in the low/increasing trajectory, those in the moderate/increasing ($t_{1198} = 3.33; P < .001; d = 0.21$) and high/chronic ($t_{926} = 2.70; P = .007; d = 0.39$) trajectory

Table 2. Family- and Child-Level Risk Factors by Trajectories of Mother-Rated Preschool Victimization

Characteristic	Children by Victimization Trajectory			P Value
	Low/Increasing	Moderate/Increasing	High/Chronic	
Family-level risk factor				
Early childbearing, %	8.81	10.47	5.40	.58
No high school diploma, %	16.37	19.38	17.19	.58
Separated family, %	5.75	7.40	7.43	.56
Insufficient income, %	19.35	26.96	38.60	.002
Harsh, reactive parenting score, mean (SD) ^a	3.25 (2.03)	3.50 (1.17)	4.51 (0.39)	<.001
Child-level risk factor score, mean (SD)				
Physical aggression ^b	0.83 (0.83)	1.20 (0.58)	1.47 (0.24)	<.001
Hyperactivity ^c	3.74 (1.94)	4.15 (1.20)	4.95 (0.50)	<.001
Internalizing symptoms ^d	0.70 (0.81)	1.00 (0.57)	1.31 (0.22)	<.001

^aMothers rated the following 3 items on a 10-point scale (0=not at all what I did; 10=exactly what I did): In the past 6 months, I have (1) been angry with my child when he/she was particularly fussy, (2) raised my voice or shouted at my child when he/she was particularly fussy, and (3) spanked my child when he/she was particularly fussy.

^bMothers rated the following 3 items on a 3-point scale (0=never; 2=often): How often would you say that your child (1) hits, bites, or kicks, (2) fights, and/or (3) bullies others?

^cMothers rated the following 7 items on a 3-point scale (0=never or not true; 2=often or very true): How often would you say your child (1) cannot sit still, is restless or hyperactive, (2) is easily distracted or has trouble sticking to any activity, (3) is fidgety, (4) cannot concentrate or pay attention for long, (5) is impulsive or acts without thinking, (6) has difficulty waiting for his/her turn in games, or (7) cannot settle down to do anything for more than a few moments.

^dMothers rated the following 7 items on a 3-point scale (0=never or not true; 2=often or very true): How often would you say that your child (1) seems to be unhappy or sad, (2) is not as happy as other children, (3) is too fearful or anxious, (4) is worried, (5) cries, (6) is nervous, high-strung, or tense, or (7) has trouble enjoying himself/herself?

ries were rated by teachers as being more victimized by their peers in first grade. However, children in the moderate/increasing trajectory did not differ from those in the high/chronic trajectory with regard to teacher-rated peer victimization in first grade ($t_{366}=1.31, P=.19; d=0.13$). Compared with girls (mean, -0.09 [SD, 1.37]), boys (mean, 0.27 [SD, 1.19]) were rated by teachers as more victimized by their peers in first grade ($t_{1246}=4.96; P<.001; d=0.28$).

Child-rated peer victimization in first grade was also significantly predicted by the mother-rated preschool victimization trajectories ($F_{2, 1244}=4.70, P=.009$) but not by sex ($F_{1, 1244}=0.41, P=.52$). Child-rated peer victimization increased from the low/increasing (mean, -0.02 [SD, 0.69]) and moderate/increasing (mean, 0.03 [SD, 0.69]) trajectories to the high/chronic trajectory (mean, 0.23 [SD, 0.68]). Children following the high/chronic trajectory reported being more victimized than those in the low/increasing trajectory ($t_{926}=2.45; P=.01; d=0.36$). However, the children in the low/increasing and moderate/increasing groups did not significantly differ from each other ($t_{1198}=1.08; P=.28; d=0.07$), nor did the children in the moderate/increasing and high/chronic groups ($t_{366}=-1.23; P=.22; d=0.11$).

CHILD- AND FAMILY-LEVEL PREDICTORS OF PEER-VICTIMIZATION TRAJECTORIES DURING PRESCHOOL

We first examined the bivariate relationships between the predictors and peer-victimization trajectories. To be included in the analysis, a predictor had to demonstrate significant variation across the trajectories. Of the family-level risk variables (**Table 2**), insufficient income and harsh, reactive parenting were significantly associated with victimization, as were all child-level risk variables (physical aggression, hyperactivity, and internalizing symp-

oms). All these variables were therefore included as predictors in the subsequent multinomial regression.

Three peer-victimization trajectory contrasts were examined (**Table 3**): low/increasing vs high/chronic, moderate/increasing vs high/chronic, and low/increasing vs moderate/increasing. Interactions with sex were not significant and were therefore not included. Three risk variables differentiated those in the high/chronic group from those in the low/increasing group: insufficient family income; harsh, reactive parenting; and greater physical aggression in the child. Two risk variables differentiated the moderate/increasing group from the low/increasing group: insufficient family income and greater physical aggression in the child. The high/chronic group differed from the moderate/increasing group in only 1 risk variable: harsh, reactive parents.

COMMENT

This study aimed to document, at the population level, the developmental trajectories of peer victimization during preschool, their predictive validity with respect to early school-based peer victimization, and their early childhood family- and child-level predictors. Three trajectory groups were identified with respect to victimization by peers between 3.4 and 6.2 years of age. As expected, most of the children (71%) fell on a low/increasing trajectory, whereas 25% and 4% of the children followed moderate/increasing and high/chronic trajectories, respectively. The overall age-related increase in preschool peer victimization is consistent with the view that, as preschool children progressively spend more time interacting with peers, they are more likely to experience negative peer experiences.⁴¹

Children with a moderate/increasing or high/chronic trajectory were likely to show elevated levels of peer vic-

Table 3. Integrated Growth Mixture Model of Preschool Peer-Victimization Trajectories Predicted by Family- and Child-Level Risk Factors

Variable	Peer-Victimization Trajectory Comparison					
	Low/Increasing vs High/Chronic		Moderate/Increasing vs High/Chronic		Low/Increasing vs Moderate/Increasing	
	OR (95% CI)	P Value	OR (95% CI)	P Value	OR (95% CI)	P Value
Family-level risk factor						
Insufficient income	0.46 (0.24-0.88)	.02	0.63 (0.31-1.29)	.21	0.73 (0.52-1.02)	.07
Harsh, reactive parenting	0.85 (0.75-0.96)	.007	0.86 (0.75-0.99)	.04	0.98 (0.92-1.05)	.56
Child-level risk factor						
Sex	1.49 (0.71-3.10)	.29	1.13 (0.49-2.61)	.78	1.32 (0.96-1.81)	.09
Physical aggression	0.73 (0.56-0.97)	.03	0.97 (0.71-1.32)	.85	0.76 (0.66-0.87)	< .001
Hyperactivity	0.93 (0.77-1.14)	.49	0.96 (0.76-1.16)	.56	0.99 (0.93-1.06)	.85
Internalizing symptoms	0.78 (0.59-1.05)	.1	0.88 (0.62-1.26)	.49	0.89 (0.76-1.04)	.15

Abbreviations: CI, confidence interval; OR, odds ratio.

timization in first grade based on teacher and child reports. Thus, not only were high/chronic and moderate/increasing patterns of peer victimization revealed through the mothers' ratings during preschool, but these patterns of negative peer experiences also tended to persist for some children in early primary school. This is the first study to reveal such early continuity in peer victimization. Future longitudinal studies should examine whether these developmental patterns persist in later grades and should document the degree of continuity from preschool to primary school peer victimization with more longitudinal data points.

Four important findings regarding the early predictors of peer-victimization trajectories in preschool deserve comment. First, the best predictor of both high/chronic and moderate/increasing trajectories of preschool peer victimization was high levels of early physical aggression. Children who displayed aggressive behaviors very early in development (age 17 months) were more likely to experience peer victimization in preschool than nonaggressive children. The association between physical aggression and peer victimization has been documented before,^{22,23} but never at such an early age. Previous research has emphasized the distinction between aggressive victims,^{30,31} usually smaller in number, from nonaggressive or passive victims. Aggressive victims could be more prevalent in the preschool years than in late childhood, as aggressive children will increasingly affiliate with other aggressive children and be protected from adverse peer experiences.^{55,56} These early negative peer experiences should be more closely examined, as they may reinforce physically aggressive behaviors through an escalating cycle of peer abuse and negative social cognitive processes, such as hostile biases in attribution.⁵⁷

Second, in contrast to physically aggressive behaviors, neither early internalizing symptoms nor early signs of hyperactivity were associated with peer victimization during preschool. Internalizing symptoms have been shown to both predict and result from peer victimization in late childhood and adolescence.^{58,59} As internalizing difficulties become more salient and increasingly non-normative in older children, their association with peer victimization may oc-

cur at a later age.²⁹ Similarly, although hyperactivity has been associated with relational difficulties with peers²⁸ and found to increase in victimized children in second grade,⁶⁰ it does not appear to be a specific predictor of peer victimization in very young children when physically aggressive behaviors are taken into account. It will be important to further document the predictive association of internalizing symptoms and hyperactivity with later peer victimization in school.

Third, both harsh, reactive parenting and insufficient parental income predicted preschool peer victimization above and beyond a child's aggressive behavior. Harsh, reactive parenting distinguished the high/chronic group from the 2 other groups, whereas insufficient income distinguished the 3 trajectories from each other. What could account for these additive contributions? Early harsh, reactive parenting has been identified as a determinant and as a consequence of early physical aggressive behaviors.^{49,61} In some families, harsh, reactive parenting is embedded in a bidirectional coercive parent-child process leading to the reinforcement of the child's aggressive behavior.^{62,63} These coercive processes may provide the training ground for the further development of aggressive patterns with peers, ultimately resulting in rejection and victimization. Insufficient income is a more general index of family strain that may subsume mediating factors not directly measured here, such as parental stress and depression⁶⁴⁻⁶⁶ and children's exposure to environmental stressors, including neighborhood poverty, family disruptions, and other adverse social conditions.⁶⁷ These conditions are not only favorable to the establishment of a coercive family process but may also result in fewer opportunities to develop interpersonal skills and protective friendships.^{29,43,67,68}

Fourth, although a higher proportion of boys were likely to follow the high/chronic (61%) or moderate/increasing (57%) trajectories, we did not find sex-specific effects in the patterns of prediction between physical aggression and victimization. This finding stands in contrast to prior research.²² The lack of sex-specific effects in the present study may be due to our examination of predictive relationships at an earlier developmental period.

Our study should be interpreted in the context of its limitations. First, mothers' ratings were used to assess the preschool peer-victimization trajectories and most of the family- and child-level predictors. However, the present study also used multiple informants (mother, teacher, and child) to establish predictive validity. Second, the construct of peer victimization should be qualified and put in the context of preschool-aged children. As is often the case in peer-victimization research,^{5,69-71} we did not explicitly specify the power imbalance implicit to the definition of bully-victim relationships.^{1,3,72} The present results will need to be replicated in contexts in which the power imbalance is defined to study participants. Third, given the predictive relationship between trajectories and aggressive behaviors, it could be that peer victimization partly reflects the give-and-take of aggressive exchanges and the peer group's reaction to the child's aggression. However, because aggressive behaviors were assessed at least 2 years before the initial measure of peer victimization, the possibility of a contextual artifact is minimized. A more fundamental question, and one that cannot be answered by the present study, concerns the nature of peer-victimization experiences in preschool as they relate to such experiences in middle and late childhood. Observational studies are needed to document the social dynamics of peer victimization in preschool. Fourth, we did not examine the role of siblings. In future early developmental studies, it will be important to consider that older siblings often victimize younger ones.^{3,61} Fifth, we did not examine the possibility that harsh parenting can be, in part, a result of child aggression and vice versa.^{49,73} Future research should examine whether or not bidirectional aggressive parent-child relationships indirectly or directly affect peer-relation difficulties. Sixth, although the trajectory analyses were performed on 93% of the initial sample, attrition was an important factor in first grade and may have affected the results. We, however, did not identify significant associations between missing responses on mother reports of preschool victimization and child and teacher reports of peer victimization in first grade.

These limitations notwithstanding, this is the first large-scale, multiple-informant, population-based longitudinal study to provide robust evidence that chronic and increasing patterns of peer victimization emerge as soon as children start to interact socially, peer victimization in preschool is predictive of peer victimization in first grade, and chronically victimized children tend to be highly physically aggressive in infancy, to have parents with a harsh, reactive parenting style, and to come from households with insufficient income. The present results also suggest that multiple forms of victimization may be the norm for victimized children,⁷⁴ ie, children with a high/chronic trajectory had harsh, reactive parents and were victimized by peers in preschool and after school entry. Other forms of victimization are likely to occur for these children, both within the school (eg, verbal bullying by teachers⁷⁵) and within the community,⁷⁶ particularly within low socioeconomic contexts.^{64,65,74} These results suggest that early preventive interventions should target both child- and parent-level risks and focus on alternatives to harsh and aggressive interactions.

Submitted for Publication: December 10, 2007; final revision received March 6, 2008; accepted April 16, 2008.

Author Affiliations: Department of Psychology, Center for the Prevention of Youth Behavior Problems, University of Alabama, Tuscaloosa (Dr Barker); Social, Genetic and Developmental Psychiatry Centre, Institute of Psychiatry, King's College London, London, England (Drs Barker and Arseneault); School of Psychology, Université Laval, Québec City, Québec, Canada (Drs Boivin and Fontaine and Ms Bissonnette); Department of Psychology, Université du Québec à Montréal, Montréal, Québec (Dr Brendgen); Department of Psychology, University College London, London, England (Dr Fontaine); School of Psycho-education (Dr Vitaro) and Departments of Pediatrics, Psychiatry, and Psychology (Dr Tremblay), Université de Montréal, Montréal; and International Laboratory for Child and Adolescent Mental Health Development, INSERM U669, Paris, France (Dr Tremblay).

Correspondence: Michel Boivin, PhD, School of Psychology, Université Laval, Québec City, QC G1K 7P4, Canada (michel.boivin@psy.ulaval.ca).

Financial Disclosure: None reported.

Funding/Support: This research was based on the Québec Longitudinal Study of Child Development and was supported by the Institut de la Statistique du Québec, the Québec Ministry of Health and Social Services, the Québec Ministry of Families and Seniors, the Canadian Institutes for Health Research, the Social Science and Humanities Research Council of Canada, the Québec Fund for Research on Society and Culture, the Québec Health Research Fund, and the Canada Research Chair Program. Analyses were supported by grant MRC G0500953 from the Medical Research Council, London, England.

REFERENCES

- Nansel TR, Craig W, Overpeck MD, Saluja G, Ruan J. Cross-national consistency in the relationship between bullying behaviors and psychosocial adjustment. *Arch Pediatr Adolesc Med.* 2004;158(8):730-736.
- Solberg ME, Olweus D. Prevalence estimation of school bullying with the Olweus Bully/Victim Questionnaire. *Aggress Behav.* 2003;29(3):239-268.
- Rigby K. *New Perspectives on Bullying.* London, England: Jessica Kingsley Publishers; 2002.
- Kochenderfer BJ, Ladd GW. Peer victimization: cause or consequence of school maladjustment. *Child Dev.* 1996;67(4):1305-1317.
- Juvonen J, Graham S, Schuster MA. Bullying among young adolescents: the strong, the weak, and the troubled. *Pediatrics.* 2003;112(6, pt 1):1231-1237.
- Olweus D. *Aggression in the Schools: Bullies and Whipping Boys.* Washington, DC: Hemisphere; 1978.
- Hodges EVE, Perry DG. Personal and interpersonal antecedents and consequences of victimisation by peers. *J Pers Soc Psychol.* 1999;76(4):677-685.
- Scholte RHJ, Engels RC, Overbeek G, de Kemp RAT, Haselager GJ. Stability in bullying and victimization and its association with social adjustment in childhood and adolescence. *J Abnorm Child Psychol.* 2007;35(2):217-228.
- Boivin M, Hymel S, Bukowski WM. The role of social withdrawal, peer rejection, and victimization by peers in predicting loneliness and depressed mood in childhood. *Dev Psychopathol.* 1995;7(4):765-785.
- Fergusson DM, Beautrais AL, Horwood LJ. Vulnerability and resiliency to suicidal behaviours in young people. *Psychol Med.* 2003;33(1):61-73.
- Fekkes M, Pijpers FIM, Fredriks AM, Vogels T, Verloove-Vanhorick SP. Do bullied children get ill, or do ill children get bullied? a prospective cohort study on the relationship between bullying and health-related symptoms. *Pediatrics.* 2006;117(5):1568-1574.
- Brunstein Klomek A, Marracco F, Kleinman A, Schonfeld IS, Gould MS. Bullying, depression, and suicidality in adolescents. *J Am Acad Child Adolesc Psychiatry.* 2007;46(1):40-49.
- Kim YS, Koh Y-J, Leventhal B. School bullying and suicidal risk in Korean middle school students. *Pediatrics.* 2005;115(2):357-363.
- Sourander A, Aromaa M, Pihlakoski L, Haavisto A, Rautava P, Helenius H, Sillan-

- pää M. Early predictors of deliberate self-harm among adolescents: a prospective follow-up study from age 3 to age 15. *J Affect Disord.* 2006;93(1-3):87-96.
15. Schwartz D, Proctor LJ, Chien DH. The aggressive victim of bullying: emotional and behavioral dysregulation as a pathway to victimization by peers. In: Juvonen J, Graham S, eds. *Peer Harassment in School: The Plight of the Vulnerable and Victimized*. New York, NY: Guilford Press; 2001:xix, 147-174.
 16. Olweus D. *Bullying at School: What We Know and What We Can Do*. Oxford, England: Blackwell Publishers; 1993.
 17. Hawker DSJ, Boulton MJ. Twenty years' research on peer victimization and psychosocial maladjustment: a meta-analytic review of cross-sectional studies. *J Child Psychol Psychiatry.* 2000;41(4):441-455.
 18. Perry DG, Kusel SJ, Perry LC. Victims of peer aggression. *Dev Psychol.* 1988;24(6):807-814.
 19. Kumpulainen K, Raesaenen E. Children involved in bullying at elementary school age, their psychiatric symptoms and deviance in adolescence: an epidemiological sample. *Child Abuse Negl.* 2000;24(12):1567-1577.
 20. Boivin M, Hymel S. Peer experiences and social self-perceptions: a sequential model. *Dev Psychol.* 1997;33(1):135-145.
 21. Boivin M, Poulin F, Vitaro F. Depressed mood and peer rejection in childhood. *Dev Psychopathol.* 1994;6(3):483-498.
 22. Snyder J, Booker E, Patrick MR, Snyder AZ, Schrepferman L, Stoolmiller M. Observed peer victimization during elementary school: continuity, growth, and relation to risk for child antisocial and depressive behavior. *Child Dev.* 2003;74(6):1881-1898.
 23. Ladd GW, Troop-Gordon W. The role of chronic peer difficulties in the development of children's psychological adjustment problems. *Child Dev.* 2003;74(5):1344-1367.
 24. Sourander A, Helstelae L, Helenius H, Piha J. Persistence of bullying from childhood to adolescence: a longitudinal 8-year follow-up study. *Child Abuse Negl.* 2000;24(7):873-881.
 25. Hodges EVE, Malone MJ, Perry DG. Individual risk and social risk as interacting determinants of victimization in the peer group. *Dev Psychol.* 1997;33(6):1032-1039.
 26. Egan SK, Perry DG. Does low self-regard invite victimization? *Dev Psychol.* 1998;34(2):299-309.
 27. Schwartz D, Dodge KA, Coie JD. The emergence of chronic peer victimization in boys' play groups. *Child Dev.* 1993;64(6):1755-1772.
 28. Waschbusch DA. A meta-analytic examination of comorbid hyperactive-impulsive-attention problems and conduct problems. *Psychol Bull.* 2002;128(1):118-150.
 29. Boivin M, Hymel S, Hodges EVE. Toward a process view of peer rejection and peer harassment. In: Juvonen J, Graham S, eds. *Peer Harassment in School: The Plight of the Vulnerable and Victimized*. New York, NY: Guilford Press; 2001:265-289.
 30. Schwartz D, Dodge KA, Pettit GS, Bates JE. The early socialization of aggressive victims of bullying. *Child Dev.* 1997;68(4):665-675.
 31. Schwartz D, Dodge KA, Pettit E, Bates JE. Friendship as a moderating factor in the pathway between early harsh home environment and later victimization in the peer group. *Dev Psychol.* 2000;36(5):646-662.
 32. Hoglund WL, Leadbeater BJ. The effects of family, school, and classroom ecologies on changes in children's social competence and emotional and behavioral problems in first grade. *Dev Psychol.* 2004;40(4):533-544.
 33. Leadbeater B, Hoglund W, Woods T. Changing contents? the effects of a primary prevention program on classroom levels of peer relational and physical victimization. *J Community Psychol.* 2003;31(4):397-418.
 34. Kochenderfer-Ladd B. Identification of aggressive and asocial victims and the stability of their peer victimization. *Merrill Palmer Quarterly.* 2003;49(4):401-425.
 35. Boulton MJ, Smith PK. Bully/victim problems in middle-school children: stability, self-perceived competence, peer perceptions and peer acceptance. *Br J Dev Psychol.* 1994;12(3):315-329.
 36. Nylund K, Bellmore A, Nishina A, Graham A. Subtypes, severity, and structural stability of peer victimization: what does latent class analysis say? *Child Dev.* 2007;78(6):1706-1722.
 37. Monks CP, Smith PK, Swettenham J. Aggressors, victims, and defenders in preschool: peer, self-, and teacher reports. *Merrill Palmer Quarterly.* 2003;49(4):453-469.
 38. Crick NR, Casas JF, Ku H-C. Relational and physical forms of peer victimization in preschool. *Dev Psychol.* 1999;35(2):376-385.
 39. Olson SL. Development of conduct problems and peer rejection in preschool children: a social systems analysis. *J Abnorm Child Psychol.* 1992;20(3):327-350.
 40. Sterba S, Egger HL, Angold A. Diagnostic specificity and nonspecificity in the dimensions of preschool psychopathology. *J Child Psychol Psychiatry.* 2007;48(10):1005-1013.
 41. Boivin M, Vitaro F, Poulin F. Peer relationships and the development of aggressive behavior in early childhood. In: Tremblay RE, Hartup WW, Archer J, eds. *Developmental Origins of Aggression*. New York, NY: Guilford; 2005.
 42. Ellis S, Rogoff B, Cromer CC. Age segregation in children's social interactions. *Dev Psychol.* 1981;17(4):399-407.
 43. Rubin KH, Bukowski WM, Parker JG. Peer interactions, relationships, and groups. In: Eisenberg N, Damon W, Lerner RM, eds. *Handbook of Child Psychology: Social, Emotional, and Personality Development*. Vol 3. 6th ed. Hoboken, NJ: John Wiley & Sons Inc; 2006.
 44. Dodge KA, Coie JD, Lynam D. Aggression and antisocial behavior in youth. In: Eisenberg N, Damon W, Lerner RM, eds. *Handbook of Child Psychology: Social, Emotional, and Personality Development*. Vol 3. 6th ed. Hoboken, NJ: John Wiley & Sons Inc; 2006:719-788.
 45. Moffitt TE. Life-course persistent versus adolescence-limited antisocial behavior. In: Cicchetti D, Cohen DJ, eds. *Developmental Psychopathology: Risk, Disorder, and Adaptation*. Vol 3. 2nd ed. New York, NY: John Wiley & Sons Inc; 2006:570-598.
 46. Robins LN. *Deviant Children Grown Up*. Baltimore, MD: Williams & Wilkins; 1966.
 47. Jetté M, Des Grosseilliers L. *Survey Description and Methodology of the Longitudinal Study of Child Development in Québec (ÉLDEQ 1998-2002)*. Québec, QC, Canada: Institut de la Statistique du Québec; 2000.
 48. Côté SM, Boivin M, Nagin DS, Japel C, Xu Q, Zoccolillo M, Junger M, Tremblay RE. The role of maternal education and nonmaternal care services in the prevention of children's physical aggression problems. *Arch Gen Psychiatry.* 2007;64(11):1305-1312.
 49. Boivin M, Perusse D, Dionne G, Sayasset V, Zoccolillo M, Tarabulsy GM, Tremblay N, Tremblay RE. The genetic-environmental etiology of parents' perceptions and self-assessed behaviours toward their 5-month-old infants in a large twin and singleton sample. *J Child Psychol Psychiatry.* 2005;46(6):612-630.
 50. Muthén B. Latent variable analysis: growth mixture modeling and related techniques for longitudinal data. In: Kaplan D, ed. *Handbook of Quantitative Methodology for the Social Sciences*. Newbury Park, CA: Sage Publications; 2004:345-368.
 51. Muthén B, Shedden K. Finite mixture modeling with mixture outcomes using the EM algorithm. *Biometrics.* 1999;55(2):463-469.
 52. Raftery AE. Bayesian model selection in social research. *Sociol Methodol.* 1995;25:111-163.
 53. Lo Y, Mendell NR, Rubin DB. Testing the number of components in a normal mixture. *Biometrika.* 2001;88(3):767-778.
 54. McLachlan G, Peel D. *Finite Mixture Models*. New York, NY: Wiley-Interscience; 2000.
 55. Boivin M, Vitaro F. The impact of peer relationships on aggression in childhood: inhibition through coercion or promotion through peer support. In: McCord J, ed. *Coercion and Punishment in Long-Term Perspectives*. New York, NY: Cambridge University Press; 1996:183-197.
 56. Cairns RB, Cairns BD, Neckerman HJ, Gest SD, Gariépy J-L. Peer networks and aggressive behavior: social support or social rejection? *Dev Psychol.* 1988;24:815-823.
 57. Dodge KA, Lansford JE, Burks VS, Bates JE, Pettit GS, Fontaine R, Price JM. Peer rejection and social information-processing factors in the development of aggressive behavior problems in children. *Child Dev.* 2003;74(2):374-393.
 58. Arseneault L, Walsh E, Trzesniewski K, Newcombe R, Caspi A, Moffitt TE. Bullying victimization uniquely contributes to adjustment problems in young children: a nationally representative study. *Pediatrics.* 2006;118(1):130-138.
 59. Nansel TR, Overpeck M, Pilla RS, Ruan WJ, Simons-Morton B, Scheidt P. Bullying behaviors among US youth: prevalence and association with psychosocial adjustment. *JAMA.* 2001;285(16):2094-2100.
 60. Kumpulainen K, Raesaenen E, Puura K. Psychiatric disorders and the use of mental health services among children involved in bullying. *Aggress Behav.* 2001;27(2):102-110.
 61. Tremblay RE, Nagin DS, Séguin JR, Zoccolillo M, Zelazo PD, Boivin M, Pérusse D, Japel C. Physical aggression during early childhood: trajectories and predictors. *Pediatrics.* 2004;114(1):e43-e50.
 62. Patterson GR, Reid JB, Dishion TJ. *Antisocial Boys*. Vol 4. Eugene, OR: Castina Publishing Co; 1992.
 63. Bates JE, Pettit GS, Dodge KA. Family and child factors in stability and change in children's aggressiveness in elementary school. In: McCord J, ed. *Coercion and Punishment in Long-Term Perspectives*. New York, NY: Cambridge University Press; 1996.
 64. Kohen DE, Leventhal T, Dahinten SV, McIntosh CN. Neighborhood disadvantage: pathways of effects for young children. *Child Dev.* 2008;79(1):156-169.
 65. Ingoldsby EM, Shaw DS. Neighborhood contextual factors and early-starting antisocial pathways. *Clin Child Fam Psychol Rev.* 2002;5(1):21-55.
 66. Leventhal T, Brooks-Gunn J. The neighborhoods they live in: the effects of neighborhood residence on child and adolescent outcomes. *Psychol Bull.* 2000;126(2):309-337.
 67. Dodge KA, Pettit GS, Bates JE. Socialization mediators of the relation between socioeconomic status and child conduct problems. *Child Dev.* 1994;65(2, spec No):649-665.
 68. Kupersmidt JB, Griesler PC, DeRosier ME, Patterson CJ, Davis PW. Childhood aggression and peer relations in the context of family and neighborhood factors. *Child Dev.* 1995;66(2):360-375.
 69. Nishina A, Juvonen J, Witkow MR. Sticks and stones may break my bones, but names will make me feel sick: the psychosocial, somatic, and scholastic consequences of peer harassment. *J Clin Child Adolesc Psychol.* 2005;34(1):37-48.
 70. Schwartz D, McFadyen-Ketchum S, Dodge KA, Pettit E, Bates JE. Early behavior problems as a predictor of later peer group victimization: moderators and mediators in the pathways of social risk. *J Abnorm Child Psychol.* 1999;27(3):191-201.
 71. Troop-Gordon W, Ladd GW. Trajectories of peer victimization and perceptions of the self and schoolmates: precursors to internalizing and externalizing problems. *Child Dev.* 2005;76(5):1072-1091.
 72. Arseneault L, Milne B, Taylor A, Adams F, Delgado K, Caspi A, Moffitt TE. Being bullied as an environmentally mediated contributing factor to children's internalizing problems. *Arch Pediatr Adolesc Med.* 2008;162(2):145-150.
 73. Patterson GR. *Coercive Family Process*. Eugene, OR: Castalia; 1982.
 74. Finkelhor D, Omrod RK, Turner HA. Polyvictimization and trauma in a national longitudinal cohort. *Dev Psychopathol.* 2007;19(1):149-166.
 75. Brendgen M, Wanner B, Vitaro F. Verbal abuse by the teacher and child adjustment from kindergarten through grade 6. *Pediatrics.* 2006;117(5):1585-1598.
 76. Kelly BM, Schwartz D, Gorman AH, Nakamoto J. Violent victimization in the community and children's subsequent peer rejection: the mediating role of emotion dysregulation. *J Abnorm Child Psychol.* 2008;36(2):175-185.