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## Continuity and Change in Social and Physical Aggression from Middle Childhood through Early Adolescence

Marion K. Underwood<sup>1</sup>, Kurt J. Beron<sup>2</sup>, and Lisa H. Rosen<sup>1</sup>

<sup>1</sup>School of Behavioural and Brain Sciences, The University of Texas at Dallas, Richardson, Texas

<sup>2</sup>School of Economic, Political, and Policy Sciences, The University of Texas at Dallas, Richardson, Texas

### Abstract

For a sample followed from age 9–13 ( $N=281$ ), this investigation examined developmental trajectories for social and physical aggression as measured by teacher ratings. Trajectories for both forms of aggression were estimated first separately, then jointly. Mean levels of both social and physical aggression decreased over time for the overall sample, but with high variability of individual trajectories. Subgroups followed high trajectories for both social and physical aggression. Joint estimation yielded six trajectories: low stable, low increasers, medium increasers, medium desisters, high desisters, and high increasers. Membership in the high increaser group was predicted by male gender, unmarried parents, African American ethnicity, and maternal authoritarian and permissive parenting. Permissive parenting also predicted membership in the medium increaser group. This is one of the first studies to examine social aggression longitudinally across this developmental period. Though the results challenge the claim that social aggression is at its peak in early adolescence, the findings emphasize the importance of considering different developmental trajectories in trying to understand origins and outcomes of aggression.

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Children's aggressive behavior changes with development and individuals may follow different trajectories in their social and physical aggression as they mature. Physical aggression emerges in the second year of life and becomes frequent for many children during the toddler years [Tremblay et al., 1996]. Although most children decrease in their physical aggression as they move into middle childhood [NICHD ECRN, 2004], a subgroup continues to fight physically across this developmental period [Broidy et al., 2003]. Social aggression emerges in the preschool years, and continuing through middle childhood and adolescence, children engage in social exclusion and friendship manipulation as a way of harming peers and pursuing social goals [Crick et al., 1997; Underwood, 2003; Vaillancourt et al., 2007]. The primary goals of this longitudinal study were to examine the development of social and physical aggression from age 9–13, and to examine family predictors of aggression trajectories.

Different terms have been proposed to describe children harming peers by social exclusion, friendship manipulation, and malicious gossip: indirect aggression [Feshbach, 1969; Lagerspetz et al., 1988], social aggression [Cairns et al., 1989; Galen and Underwood, 1997], and relational aggression [Crick and Grotpeter, 1995]. This study will examine social aggression because this construct includes nonverbal as well as verbal forms of social exclusion, and acknowledges that exclusion, gossip, and friendship manipulation can take both

direct and indirect forms [Archer and Coyne, 2005]. In reviewing previous studies, we will note the specific construct used by each investigator.

Just as childhood physical aggression is related to many negative outcomes [see Dodge et al., 2006, for a review], engaging in relational/social aggression is related to poor adjustment [Crick et al., 1999, 2005, 2006; Prinstein et al., 2001; Underwood, 2003; Werner and Crick, 1999]. Successful prevention and intervention to reduce aggression requires understanding how social and physical aggression change with development and whether individuals follow different developmental trajectories.

## Developmental Course of Physical Aggression

During middle childhood and adolescence, physical aggression decreases for most youth and many refrain entirely [Dodge et al., 2006]. However, some continue to fight and follow high aggression trajectories [see Broidy et al., 2003, for cross-national studies]. Boys engage in physical aggression more than girls do [Card et al., 2008; Dodge et al., 2006], and are more likely to follow high aggression trajectories [Broidy et al., 2003]. Ethnic differences in physical aggression emerge in adolescence, such that African American youth are much more likely than other groups to be arrested for violent offenses, but ethnic differences are smaller for self-reports of violence and when effects of socioeconomic class are controlled [see Dodge et al., 2006, for a discussion of this issue]. A large longitudinal study found that children who follow high physical aggression trajectories into middle childhood tend to come from low income families, have less well-educated mothers, and parents who are observed to be less sensitive and responsive [NICHD ECRN, 2004]. Adolescent physical aggression and violence can be predicted by a dynamic cascade model involving risk factors that contribute to each other and directly influence physical aggression across development: early adverse environments, poor preparedness for school, conduct problems, low school achievement, low parental monitoring, and affiliation with a deviant peer group [Dodge et al., 2008].

## Developmental Course of Social Aggression

Indirect, relational, and social aggression have been characterized as most frequent in late middle childhood and early adolescence [Bjorkqvist et al., 1992; Cairns et al., 1989]. As children mature they may engage in less direct aggression and more indirect aggression, a form of heterotypic continuity, because the risk of punishment for indirect aggression is far less [Bjorkqvist, 1994]. Social aggression may also increase in early adolescence because peer relationships are ascending in importance [Buhrmester, 1996] and so disrupting social status and friendships may be an even more potent means of harm.

Only a few cross-sectional studies have examined age differences in social aggression. One peer rating study claims that indirect aggression peaks at age 11, but 11-year-olds from one sample were compared with 8- and 15-year-olds from a different sample, and no statistical analyses examined age differences [Bjorkqvist et al., 1992]. For an African American sample, 7th graders reported more social aggression than 1st and 4th graders when asked to describe their worst peer conflict in the preceding year [Xie et al., 2003]. This method elicits accounts of salient episodes of victimization, but does not assess how frequently individual children engage in these behaviors. Early studies of relational aggression focused on the age range of 9–12 [3rd–6th grade, Crick and Grotpeter, 1995], and developmental differences could not be examined because relational aggression was assessed by peer nominations standardized within grade.

Longitudinal studies of physical aggression have begun to include measures of social aggression, but few examine development in middle childhood and beyond. A pioneering investigation reported a developmental increase in worst peer conflicts involving social

aggression between grades 4 and 7 for girls only [Cairns et al., 1989], but narratives of worst peer conflicts do not measure individuals' frequencies of engaging in social aggression. In the last decade, longitudinal evidence for growth and change in indirect aggression from ages 2–11 has emerged from the National Longitudinal Survey of Children and Youth in Canada [Statistic Canada, 2008]. Details of these important studies will be presented below, but one limitation is that indirect aggression is assessed by parent report, and parents may have limited information on the extent to which older children engage in subtle forms of indirect aggression with peers outside the home. Although a few longitudinal studies of relational aggression are available, most examine relational aggression across a single school year [Crick, 1996; Murray-Close et al., 2007]. Although the time interval examined was brief, it is interesting to note that relational aggression increased in a linear fashion for girls from the fall of 4th grade to the fall of 5th grade [Murray-Close et al., 2007].

Experts disagree as to whether girls are clearly higher on indirect/relational/social aggression than boys are. Some assert that girls are as aggressive as boys are, but the form of aggression differs [Crick et al., 1999], that “girls manipulate and boys fight” [Bjorkqvist et al., 1992, p 117]. These claims fit well with strong gender stereotypes of girls as catty and manipulative; even preschoolers assume that girls are more likely to be relationally aggressive than boys [Giles and Heyman, 2005]. However, many studies find no gender differences or even that boys are more relationally/socially aggressive than girls are [for example, Brendgen et al., 2008 (trend); David and Kistner, 2000; Henington et al., 1998; Keenan et al., 2007; Leadbeater et al., 2006; Salmivalli and Kaukiainen, 2004; Tomada and Schneider, 1997]. A recent comprehensive meta-analysis found that the gender difference favoring girls for indirect aggression is so small as to be trivial [Card et al., 2008]. Still, gender may be related to individual growth trajectories for social aggression. Gender may also influence the process by which social aggression unfolds and relates to psychopathology [Underwood, 2003].

## Developmental Course of Social and Physical Aggression

Relational/social aggression and physical aggression are highly correlated [Crick et al., 1999; Underwood, 2003]. Thus, it is vitally important to examine how social and physical aggression relate to each other across developmental time, and also whether subgroups of children follow different trajectories. The National Longitudinal Survey of Youth in Canada [Tremblay et al., 1996] examined the stability and relations between indirect and physical aggression using confirmatory factor analysis [Vaillancourt et al., 2003]. Mothers reported on children's physical and indirect aggression at age 4–7 (Time 1), age 6–9 (Time 2), and age 8–11 (Time 3). Confirmatory factor analyses supported a two-factor model of children's aggression across gender, age, and cohorts. Path analyses showed that children tended to be consistent across time in their use of forms of aggression, and did not support the theory of heterotypic continuity. Another study with this sample examined trajectories of indirect aggression from ages 4–10 [Vaillancourt et al., 2007]. The results indicated two trajectory groups for indirect aggression: increasing users (35%) and stable low users (65%). For the increasing indirect aggression group, levels of indirect aggression increased from ages 4–6, but not from ages 6–10.

Another investigation with this sample estimated a joint trajectory model for indirect and physical aggression [Cote et al., 2007]. The joint trajectory model yielded four trajectories for stability and change in physical aggression from ages 4–8: low (5%), low-desister (36%), moderate desister (44%), and high (15%). Similar to the results of Vaillancourt et al. [2007], the joint estimation yielded two trajectories for indirect aggression: low (68%) and high-rising (32%). On the basis of the two indirect aggression by four physical aggression groups, eight joint trajectory groups were formed: low physical and indirect aggression (5%), low physical aggression and rising indirect aggression (4%), low desisting physical aggression and low

indirect aggression (32%), low desisting physical aggression and rising indirect aggression (.4%), moderate desisting physical aggression and low indirect aggression (30%), moderate desisting physical aggression and high indirect aggression (14%), high physical aggression and low indirect aggression (1%), and high physical and indirect aggression (14%). Less than two percent of children were low on one form of aggression and high on the other; children who were on a higher trajectory for one form of aggression were likely to be on a higher trajectory for the other form. The group characterized by declining physical aggression and rising indirect aggression included more girls.

## Family Predictors of Joint Trajectories for Physical and Social Aggression

This study will examine family predictors of membership in different trajectory groups estimated jointly for social and physical aggression. Several family factors are likely related to following a trajectory characterized by high social and physical aggression: African American ethnicity, parents being unmarried, low family income, and authoritarian and permissive parenting. African American ethnicity has been related to higher levels of physical aggression [Coie et al., 1982] and also to higher levels of relational aggression [David and Kistner, 2000; Osterman et al., 1994; Phillipsen et al., 1999; Putallaz et al., 2007]. Children with divorced parents who are triangulated in marital conflicts are higher on teacher-rated social aggression at school [Kerig et al., 2001], and a previous study with early waves of data from this same study found that exposure to negative interparental conflict strategies predicted girls' social aggression as rated by teachers [Underwood et al., 2008]. Low family income is associated with higher levels of physical aggression [Coie and Dodge, 1998; Dodge et al., 1994; Mistry et al., 2002; Patterson et al., 1990]. Emerging evidence suggests that low family income predicts membership in a trajectory group high on indirect and physical aggression from ages 4–10 [Vaillancourt et al., 2007], membership in trajectory groups higher on physical aggression during middle childhood [Harachi et al., 2006] and is related to higher teacher ratings of social aggression at age 10 for this same sample [grade 5, Underwood et al., 2009].

Authoritarian and permissive parenting may also relate to developmental trajectories for both forms of aggression. Aversive parenting has been found to be positively correlated with relational aggression in preschool samples [Casas et al., 2006; Hart et al., 1998; Nelson et al., 2006], to membership in a trajectory group high on indirect and physical aggression from ages 2–8 [Cote et al., 2007], and to membership in a high and increasing trajectory for indirect aggression from ages 4–10 [Vaillancourt et al., 2007]. Authoritarian parenting is a broad parenting style that involves low warmth and responsiveness and high control and punitiveness, and has been found to relate to disruptive behaviors [Bierman and Smoot, 1991] and to relational aggression [Casas et al., 2006; Hart et al., 1998]. Maternal permissive parenting has been found to relate to relational aggression [Sandstrom, 2007] and social aggression [Underwood et al., 2009], perhaps because "...parents who regularly engage in permissive tactics (e.g., failing to draw boundaries or set limits) could raise children who feel entitled to get their own way or to be specially accommodated by their peers" [Sandstrom, 2007; p 400]. These broad parenting styles were examined in this study because previous work has found support for their relation to physical and social aggression, and also because these parenting dimensions seem relevant for children in middle childhood and early adolescence, as opposed to other parenting constructs such as monitoring that may ascend in importance as youth mature.

## The Current Research

As rich as previous studies of the development of aggression are, they do not provide information on the development of indirect/relational/social aggression through the age range of early adolescence when these behaviors are hypothesized to be at their peak. Also, the

assessment of indirect aggression in many of these studies is limited to parents' (primarily mothers') reports. This study extends existing research by examining joint trajectories for social and physical aggression in an older age range (9–13, which includes the transition to middle school). Social and physical aggression were assessed with teacher reports when the children were in grades 3, 4, 5, 6, and 7. Trajectory groups were first estimated separately for social and physical aggression, and then jointly estimated, with each trajectory group having a distinct pattern of developmental change in social and physical aggression.

We expected physical aggression trajectories to be similar to those found in earlier research, with either three or four groups: one stable low group, one stable high group, and perhaps one medium-desisting and one-medium increasing group [Broidy et al., 2003; Martino et al., 2008]. We expected to find two trajectory groups for social aggression, a stable low group and a high group [see Cote et al., 2007; Vaillancourt et al., 2007]. Whether the high social aggression group would be increasing, stable, or decreasing is unclear. Previous theory and research would suggest that the high subgroup would be increasing in social aggression near the end of elementary school and the beginning of junior high school [Cairns et al., 1989; Murray-Close et al., 2007; Xie et al., 2003]. However, stability in social aggression also seems possible across this period, given that recent longitudinal studies of indirect aggression show little change in the age range of 6–10 [Vaillancourt et al., 2007]. Also, decreasing social aggression across this age range could occur, because advances in cognitive and moral development might enable older children to better appreciate the harmful impact of social aggression, and to understand that engaging in these behaviors toward others creates a group climate in which friends cannot be trusted. Also, the major ecological transition of going to middle school means most children are exposed to greater academic demands, changing classes throughout the day, and thus exposure to larger groups of peers that could bring more numerous social opportunities and make social exclusion and friendship manipulation more difficult to achieve.

For the jointly estimated trajectory groups, we predicted that each trajectory group will show similar developmental patterns for social and physical aggression, given that these behaviors are highly correlated [Crick et al., 1999; Underwood, 2003]. We did not expect to find a group high only on social aggression, or groups that show increases in one form of aggression and decreases in the other form [Cote et al., 2007]. We expected to find a group that is stable and low on both social and physical aggression (here after referred to as the low, stable group). On the basis of prior research [Broidy et al., 2003], we expected to find a smaller group that is high on both social and physical aggression initially and increases with development (the high, increasing group). We predicted that another subset of youth would be initially high in social and physical aggression, but decrease with development (the desister group). Last, we also predicted there would be a group of youth who will be initially low on both social and physical aggression but will increase near the beginning of junior high school ["increasers," similar to late starter antisocial youth who do not show early risk factors but engage in antisocial behavior in adolescence, Moffitt, 1993].

Gender will be examined as a predictor of group membership. We predicted that gender would not be related to membership in trajectory groups estimated only on the basis of social aggression, given that gender differences in indirect aggression are so small as not to be meaningful [Card et al., 2008]. We expected that male gender would predict membership in higher physical aggression trajectory groups, because boys are higher on direct, physical aggression [Card et al., 2008; Dodge et al., 2006]. We anticipated that more boys than girls would follow the high and rising trajectory when the estimation is based on both social and physical aggression, and that more girls than boys would be members of the lower trajectory groups.

Although jointly estimated trajectories for social and physical aggression during middle childhood and early adolescence have not been examined in earlier research, we tentatively offer the following hypotheses for family predictors. On the basis of previous research detailed above, we hypothesized that African American ethnicity, low income, and authoritarian and permissive parenting would all predict membership in the group high and increasing on both social and physical aggression. Membership in the initially high but desisting trajectory group will be predicted by low family income and African American ethnicity, but lower levels of authoritarian and permissive parenting than the high, increasing trajectory group. We expected that these children may be higher in third grade on both forms of aggression because of SES and ethnicity, but that more optimal parenting might enable these children to better regulate emotions and develop skills in social problem solving and thus become less socially and physically aggressive as they mature.

We tentatively predicted that membership in the medium, increasing trajectory group would be predicted by higher levels of authoritarian and permissive parenting (as compared to the low stable trajectory group). These children may have initially lower levels of aggression than the high and increasing group perhaps because they are not necessarily from lower income families, but may increase in social and physical aggression across grades 3–7 due to less than optimal parenting.

## METHOD

### Participants

Participants were 141 girls and 140 boys, their teachers, and their parents. Target children were recruited from a large, diverse public school district in the Southern United States when they were approximately 9 years old at the end of 3rd grade and assessed yearly through age 13 at the end of 7th grade. The sample was 21% African American, 5.3% Asian, 51.6% Caucasian, and 21% Hispanic, and 1.1 % other, which was representative of the county in which the research was conducted [U.S. Census Bureau, 2000]. Parents reported family income on a five-point scale: 20% reported less than \$25,000, 22% reported \$26,000–\$50,000, 17% reported \$51,000–\$75,000, 31% \$76,000–\$100,000, 2% reported greater than \$100,000 per year, and 8% did not disclose annual incomes. Most children (65.8%) had married parents, 3.6% had remarried parents, 12.1% had divorced parents, 6.4% had separated parents, 1% had parents who were widowed, and 9.3% of parents were never married.

Participants' 3rd, 4th, 5th, 6th, and 7th grade teachers were invited to provide ratings of children's social behaviors at school. In grades 3–6, teacher ratings were provided by elementary school teachers who taught the children all day in their classrooms. In grade 7, the first year of junior high school in this school system, language arts teachers provided ratings because these teachers have students for two class periods per day.

One parent also participated in the longitudinal study, the parent most knowledgeable about the child's social life. For 83% of the sample, the parent was the mother and for 17% of the sample, the parent was the father. Other ongoing longitudinal studies of childhood aggression have used reports of the "person most knowledgeable about the child" (the PMK, Cote et al., 2007, p 4, 89.9% of their PMK's were mothers). The choice to include only one parent was deliberate, because another important component of this large-scale project was observing parents and children yearly as they talk together about the child's social experiences. We believed we would see more intimacy and self-disclosure if we observed the child only with the parent most involved in his or her peer relationships.

## Procedures

Target children were recruited by distributing parental permission letters in public school classrooms late in the children's 3rd grade year. The initial consent rate for the five-year longitudinal study involving yearly laboratory assessments was 55%. This consent rate is commensurate with and even higher than many similar studies [Sifers et al., 2002].

Each year in the spring, each child's teacher was contacted by email or in person and asked to complete questionnaires assessing the target child's social behavior with peers and psychosocial adjustment. Teachers were offered \$25 compensation per student. Teacher ratings were available for 198 children in grade 3 (70%), 215 children in grade 4 (77%), 227 children in grade 5 (81%), 222 children in grade 6 (79%), and 194 children in grade 7 (69%). To examine whether selective attrition occurred, children with and without teacher data in grades 4–7 were compared on aggression in grade 3. The only significant difference that emerged was that in grade 6 only, those without teacher data ( $M=1.68$ ,  $SD=.96$ ) were higher on grade 3 physical aggression than those with teacher data ( $M=1.40$ ,  $SD=.69$ ),  $t=2.09$ ,  $P<.05$ .

In the summer between grades 3 and 4, parents and children participated in an initial family interview, either at their homes or the laboratory according to their preferences, at which they completed measures assessing parenting and family relations and the child's psychological adjustment. This study includes two parent report measures: the Family Life Inventory (a brief measure assessing demographic variables) and the Parenting Styles and Dimensions questionnaire [Robinson et al., 1995].

## Measures

**Children's social behavior scale—teacher form (CSBS-T)**—Teachers rated children's social behavior on a modified form of the CSBS-T [Crick, 1996], which assesses relational aggression, physical aggression, and prosocial behavior. The CSBS-T was modified by adding social aggression items for gossip and nonverbal social exclusion to the relational aggression subscale. Social aggression was assessed with four items: "ignores people or stops talking to them when he/she is mad at them," "gossips or spreads rumors about people to make other students not like them," "gives others dirty looks, rolls his/her eyes, or uses other gestures to hurt others' feelings, embarrass them, or make them feel left out," and "tries to turn others against someone for revenge or exclusion." Physical aggression was measured with four items: "hits or pushes others," "gets into physical fights with peers," "threatens others," and "tries to dominate or bully other students." Factor analyses of the aggression items were conducted with the two additional items, following Crick [1996] with the original CSBS-T, principal components with VARIMAX rotation. Analyses resulted in the two predicted factors. For example, for 4th grade teachers' ratings, the first factor included all social aggression items, had an eigenvalue of 8.22, and accounted for 63% of the variance, with item loadings ranging from .62 to .81. The second factor included the physical aggression items, had an eigenvalue of 1.92, and accounted for 15% of the variance, with item loadings ranging from .60 to .84. Both subscales were reliable for this sample: Cronbach's  $\alpha$ s ranged from .75 to .95. Teachers' reports of children's relational aggression on the CSBS-T were positively correlated with peer nominations for relational aggression [for girls,  $r=.63$ ,  $P<.001$  and for boys,  $r=.57$ ,  $P<.001$ ; Crick, 1996].

**Parenting styles and dimensions (PSD)**—The participating parent completed a 50-item questionnaire designed to assess authoritative, authoritarian, and permissive parenting [Baumrind, 1971] of children in the preschool and elementary age ranges [Robinson et al., 1995]. Parents rated both themselves and their spouses on how often they engage in particular parenting behaviors, on a scale from never (1) to always (5). Factor analysis demonstrated that the items loaded onto three factors that correspond to Baumrind's parenting styles. Sample

items are “I guide our child more through punishment than by reasoning” (authoritarian) and “I let our child do anything he/she wants to do” (permissive). Each subscale had high internal consistency ( $\alpha$ s ranged from .75 to .91). The validity of the PSD’s authoritarian and authoritative scales was established in a version modified for low-income African American parents of preschool children [Coolehan et al., 2002]. Construct validity of the two scales was demonstrated by factor analysis, and concurrent validity by convergent and divergent associations with observations of parent—child relationships. Dimensions of these scales have been shown to relate to relational aggression for preschool children [Hart et al., 1998] and for school-aged children [Sandstrom, 2007].

Given that most of the parents providing ratings in our study were mothers, for most of our sample, mothers’ ratings of parenting styles were self-reports. For the few families in which fathers were the participating parent, we included father’s ratings of mother’s authoritarian and permissive parenting, so as to include as much information about mothers’ parenting as possible. Spouses show high agreement in their ratings of parenting styles for authoritarian ( $r=.84$  between mothers’ and fathers’ reports of mothers’ authoritarian parenting and  $r=.75$  between mothers’ and fathers’ reports of fathers’ authoritarian parenting) and permissive parenting ( $r=.64$  between mothers’ and fathers’ reports of mothers’ permissiveness and  $r=.53$  between mothers’ and fathers’ reports of father’s permissiveness, Winslow et al., 2005).

## RESULTS

We first describe basic descriptive and correlational findings for social and physical aggression. Second, we present unconditional baseline growth models separately for social and physical aggression. These models provide an average social aggression trajectory and an average physical aggression trajectory around which individuals vary. Third, we present findings of mixture (group-based) models that allow for the identification of different trajectories that individuals may cluster around rather than creating a single, average trajectory as was done in the unconditional baseline growth models [Nagin, 1999]. Based on these mixture models, we classified students into different aggression trajectory classes. We began by creating trajectory classes separately for social and physical aggression. The determination of the polynomial degree and number of classes for each aggression variable was made using the Bayesian Information Criterion [BIC; Nagin, 2005]. We then estimated a single dual trajectory model. This enabled us to identify groups of students who followed different joint trajectories of social and physical aggression (e.g., a cluster of students who demonstrated low rates of both social and physical aggression across elementary school). Fourth, we examined which family factors predicted group membership in the joint trajectory categories.

Estimation of the unconditional baseline growth models and the mixture models was done using a combination of the SAS add-on Proc Traj [Jones and Nagin, 2007], Mplus [Muthén and Muthén, 2006], and Stata [StataCorp, 2007]. In these analyses, we considered the metric of the aggression variables; both physical and social aggression were assessed by teacher ratings that peaked at the lowest value (one) and were then skewed out to the maximum value (five). Following the recommendation of Nagin [2005], we analyzed the natural logarithm of the variables to account for the skewed nature of the data and used a censored normal (tobit) likelihood model to account for the concentration at the minimum value. To account for the missing data, we used a maximum likelihood approach that allowed all observations to contribute to the estimated results [Muthén and Muthén, 2006]. The only constraint was that children were required to have had a minimum of two out of the five possible teacher reports of aggression.



## Descriptive Statistics

Teachers reported on student social and physical aggression in third, fourth, fifth, sixth, and seventh grades (see Table I for mean and standard deviations, by gender). Average levels of social and physical aggression declined slightly from third to seventh grade. Teachers reported girls to be more socially aggressive than boys only in third grade; there were no gender differences in social aggression in grades 4, 5, 6, and 7. Teachers rated boys as higher on physical aggression than girls in grades 4, 5, 6, and 7.

We computed correlation coefficients by gender to assess the relationships between social and physical aggression across the five-year period (see Table I), and conducted Fisher's  $r$  to  $z$  tests to test for significant gender differences in the magnitude of correlations. At each grade level there were moderately strong correlations between teacher-rated social and physical aggression for both girls and boys. In 5th grade, social and physical aggression were more strongly correlated for boys than for girls. Social and physical aggression were moderately stable across the five-year period for both gender groups. Stability of social aggression was stronger for girls than for boys from grades 3 to 6. Stability of physical aggression was stronger for boys than girls from grades 3 to 5, grades 4 to 6, grades 5 to 6, grades 3 to 7, and grades 4 to 7. The only significant gender differences in correlations between parenting and aggression were that authoritarian parenting was more strongly related to physical aggression for boys than girls in grades 3, 6, and 7.

## Growth and Change in Social and Physical Aggression

We constructed unconditional baseline growth models (i.e., conventional growth curves) for social and physical aggression. We evaluated models that were both linear and quadratic; the slope parameters in all cases were allowed to be random and were estimated by numerical integration. Let  $y_{it}^*$  be either the social or physical latent aggression variable for the  $i$ th child in the  $t$ th grade and  $G$  be the grade level (3–7). Then the initial growth model, shown as a mixed linear model, was

$$y_{it}^* = \beta_{00} + \beta_{10}G_{it} + \beta_{20}G_{it}^2 + r_{0i} + r_{1i}G_{it} + r_{2i}G_{it}^2 + \epsilon_{it} \quad (1)$$

where the  $\beta$ 's are the parameters for the intercept and growth variables, the  $r$ 's are the random errors on these parameters, and  $\epsilon$  is the (residual) error term for the equation. Recall that the aggression variable was censored so that the full specification included

$$\begin{aligned} y_{it} &= 0 & \text{if } y_{it}^* < 0 \\ y_{it} &= y_{it}^* & \text{otherwise} \end{aligned} \quad (2)$$

Our objective in these analyses was to determine whether there was evidence of heterogeneity across the parameters and, if so, whether the variation might best be modeled by a conventional growth curve model or by a mixture model. The conventional growth curve model essentially assumes one average trajectory around which individuals vary whereas the mixture model allows for multiple trajectories that individuals may follow.

We also attempted a group analysis to account for the effects of gender on the trajectories. The combination of the size of our sample and the computational burden of the procedures led to convergence problems. We modified the specification to determine the effect of gender on the intercept and slope of the trajectories, and again ran into computational problems. We finally constrained the variance of the slope of the trajectory and modeled gender affecting the

intercepts of the two processes and we report these results below. We also report the influence of the gender of the child in the analyses of family predictors of joint trajectory membership.

**Growth and change in social aggression**—The results for the social aggression conventional growth curve models, both linear and quadratic, showed a nonsignificant intercept with significant variation around this starting point. One difference between the linear and quadratic social aggression models was that the linear model had a significant and negative, linear component whereas the quadratic had no significant trajectory elements. This suggests that although the average social aggression trajectory is decreasing, there is still large variation in the starting points implying the possibility of distinct trajectories for different groups. The wide variability in the data for the standard, linear social aggression model is depicted in Figure 1a. The individual growth trajectories for each member of the sample are presented in this figure and the average growth trajectory is represented by the thicker line. The average trajectory is slightly decreasing but focus on this single growth curve masks enormous variability.

**Growth and change in physical aggression**—The results for the initial growth curve model for physical aggression, both linear and quadratic, showed evidence of a flat trajectory with random variation around the intercept but no evidence of any linear or nonlinear elements, quadratic term, or random component. The single growth curve for physical aggression masks high variability (see Fig. 1b), as does the single social aggression growth curve.

### Growth Trajectories for Social and Physical Aggression

The finding of substantial heterogeneity around a relatively flat average trajectory for both social and physical aggression in the standard growth curve analyses suggested that mixture models would better capture this variation. Mixture models separate students into different classes based on a finite-mixture latent trajectory model [Duncan et al., 2006]. These models can be conceptualized as standard structural equation growth models extended to have latent categorical class variables that are estimated simultaneously with the growth curve part of the model. The discrete latent classes define the trajectories of different clusters of students. The estimation approach we follow is often referred to as semiparametric or latent class growth analysis [Muthén, 2004; Nagin, 2005]. In this formulation we modify Equation (1) by removing the terms involving the random errors, the  $r$ 's, and add in a model predicting the latent probability of being in class  $j$ ,  $\pi_j$ , based on a set of parameters,  $\theta_j$ .

$$\pi_j = \frac{e^{\theta_j}}{\sum_{j=1}^J e^{\theta_j}} \quad (3)$$

We followed the method proposed by Nagin [2005] to determine the number of classes and the polynomial specifications. For each aggression type we first estimated a one-class linear model, then a two-class linear model, and so forth. We then estimated a one-class quadratic model, then a two-class quadratic model, and so forth. We identified the lowest calculated BIC for each polynomial to determine the final polynomial degree and number of classes (see Table II). The end result was a two-class linear model for social aggression and a three-class linear model for physical aggression. As described previously, we ultimately included a gender variable to determine the effect of gender on the intercept for each process.

The tools used to evaluate the fit of traditional structural equation models, for example the CFI or the RMSEA, do not apply to mixture models of the type used in this analysis. Instead we relied on methods designed for these types of models. For example, these models are known

to sometimes have local maxima resulting in the possibility of different solutions depending on the starting values used. To reduce the likelihood of this issue we ran each model with one hundred random start values to avoid local maxima.

We then used fit methods developed for mixture models. We assessed the reliability of the results of the models by computing the average posterior probability of assignment (AvePP) and the odds of correct classification [OCC; Nagin, 2005]. All students were assigned a probability of being in every class within the aggression type being estimated. Final assignment of the student to a class was made to the class for that student with the highest probability. However, in most cases, the probability of being in a different class is nonzero. A measure of the reliability of the model can be determined by averaging the actual (posterior) probability of being assigned to the class to which the student is eventually assigned. For example, one student within the social aggression model may have a .45 probability of being in class one and .55 probability of being assigned to class two, whereas another student might have .2 probability of being assigned to class one and .8 probability of being assigned to class two. Both students would be assigned to class two, but the second student is more reliably placed. In this illustration, the average posterior probability for class 2 would be  $\text{AvePP}_2 = .675$ . The guidelines developed by Nagin [1999, 2005] state that an average posterior probability of assignment of .70 or greater for each class is acceptable. The second reliability measure, the odds of correct classification for class  $j$ , is computed [Nagin, 2005] by:

$$\text{OCC}_j = \frac{\text{AvePP}_j / (1 - \text{AvePP}_j)}{\hat{\pi}_j / (1 - \hat{\pi}_j)}$$

In this formula, the numerator is the odds of correct assignment based on the average posterior probability and the denominator uses the estimated population proportion of class  $j$ ,  $\hat{\pi}_j$ , and provides an estimate of what the odds are of a student being classified in class  $j$  if they were randomly assigned. Thus, a higher  $\text{OCC}_j$  suggests better classification by the model compared to just randomly assigning students to a class. The rule constructed by Nagin [2005] suggests having an  $\text{OCC}_j$  greater than five for each group.

**Social aggression trajectories**—Two different trajectories of social aggression were identified (see Fig. 2a). Approximately 55% of students (in our sample, 67 females and 73 males) followed a trajectory that could be categorized as stable, low social aggression. A second group, approximately 45% of the students (65 females and 50 males), was initially rated high on social aggression but these ratings declined across grades 3–7. The results of this two-class model were reliable. The lowest AvePP for the social aggression model was .86, and the lowest OCC for social aggression was 6.75. The effect of being female on the initial third grade social aggression starting point was nonsignificant ( $\beta = .063$ ,  $P > .10$ ).

**Physical aggression trajectories**—Three different trajectories of physical aggression were identified (see Fig. 2b). Approximately 28% of students (58 females and 32 males) followed a stable, low trajectory of physical aggression. A second group, approximately 53% of the students (59 females and 59 males), followed a higher but slightly decreasing trajectory of physical aggression. The third class, approximately 19% of the students (15 females and 32 males), followed a higher, stable physical aggression trajectory. The results of this three-class model were reliable. The lowest AvePP for the physical aggression model was .74, and the lowest OCC for physical aggression was 7.21. The effect of being female on the initial third grade physical aggression starting point was significant ( $\beta = .428$ ,  $P < .01$ ). Boys were initially higher than girls on physical aggression.

**Joint trajectories for social and physical aggression**—The same students were assessed on both social and physical aggression by the same teachers at the same time points. Thus, we were able to construct an elaboration of the model that accounted for both aggression variables jointly. This dual trajectory (parallel process) model simultaneously estimated the trajectories and allowed the probabilities of group membership to be predicted as part of the model identifying six joint trajectory groups [Cote et al., 2007; Jones and Nagin, 2007]. A joint likelihood model was constructed that weighted the individual social and physical aggression trajectories by the joint probability of membership for a youth in each of the six groups. Thus, a probability was defined for the combination of being in the first class of social aggression and the first class of physical aggression, a second probability was formed from the first class of social aggression and the second class of physical aggression, and so on, which resulted in six joint probabilities.

To interpret these results we used the model-implied estimated mean social aggression and the mean physical aggression values for each grade for each of the six combinations implied by the model. Figure 3a depicts change in estimated mean social aggression across time for the six joint trajectory groups. Some groups follow declining trajectories of social aggression and others follow rising trajectories. Figure 3b depicts estimated mean change in physical aggression across time for the joint trajectory groups. As for social aggression, some groups follow declining trajectories of physical aggression and other groups follow rising trajectories of physical aggression. For each of the six groups, social and physical aggression develop similarly; increases in social aggression are accompanied by increases in physical aggression and decreases in social aggression are accompanied by decreases in physical aggression within joint trajectory groups.

We constructed interpretive labels based on social and physical aggression trajectories for each of the six groups. The number of individuals assigned to each group and the odds ratios are presented in Table III. An odds ratio is the ratio of two odds, where the odds is the ratio of the probability of an event occurring divided by the probability of it not occurring [Long, 1997]. An odds ratio of 1.0 means the independent variable has no effect on the dependent variable. An odds ratio above 1 indicates that the independent variable increases the likelihood of the event while an odds ratio below 1 indicates that the independent variable decreases the likelihood of the event. So, for example, in Table III the female coefficient in the first column is estimated to be .17. This means that the odds of being in the high increaser class relative to the stable low are decreased by a factor of .17 for females (compared with males), or, equivalently, the odds are decreased by 83% for females. There was a relatively equal spread of students across the six joint trajectory groups: approximately 24% were in the stable low group, 13% were in the low increasers groups, 14% were in the medium increasers, 24% were in the medium desisters, 12% were in the high desisters, and 12% were in the high increasers. We again assessed the effect of being female on the initial third grade starting points, now estimated for both social and physical aggression jointly. The results followed the pattern of the individual trajectories with the social aggression intercept nonsignificant ( $\beta=.075, P>.05$ ) whereas physical aggression was significant ( $\beta=.408, P<.01$ ), though the borderline significance now of the social aggression intercept merits future investigation.

### Family Predictors of Joint Trajectory Membership

We estimated a multinomial logit model to predict joint trajectory group assignment based on a set of family factor variables. This hierarchical analysis included four variable blocks of interest: the first block consisted of gender; the second block added marital status, race, and income; the third block added maternal authoritarian and permissive parenting, and the fourth block added interactions between gender and all family predictors. The interactions between

family predictors and gender were all nonsignificant, so the results below are reported without the interactions with gender.

Table IV presents the estimated odds ratios for four contrasts of particular interest to this research: (1) high increasers on both aggression variables vs. those low on both, (2) high increasers on both vs. high desisters on both, (3) medium increasers on both vs. those low on both, and (4) low increasers vs. low on both physical and social aggression. The first contrast examined the high increaser group relative to the low both group. In the final model (block 3), having married parents decreased the odds of being in the high increaser group. Male gender and being African American increased the odds of being in the high increaser group as did maternal authoritarian and permissive parenting. The second contrast examined the high increaser group relative to the high desister group. In the final model, maternal authoritarian parenting increased the odds of being in the high increaser group. The third contrast examined the medium increaser group relative to the stable low group. Maternal permissive parenting was the only significant predictor of group membership and was associated with increased odds of being in the medium increaser group. The fourth contrast examined the low increasers relative to the stable low group. Neither gender nor any of the family variables were significant predictors of group membership.

## DISCUSSION

Overall, these results supported the hypotheses that social and physical aggression would change together across time, with joint trajectories for a stable low group, a low but increasing group, a high but desisting group, and a group high but increasing (slightly). As predicted, male gender, having unmarried parents, African American ethnicity, and authoritarian and permissive parenting predicted membership in the high increaser group as compared with the stable low group. In a developmental period in which both forms are decreasing overall for the sample, these factors predicted not only being higher but increasing (albeit slightly) rather than decreasing across time. Authoritarian parenting also predicted membership in the high increaser as compared with the high desister group. Permissive parenting predicted membership in the high increaser and medium increaser groups.

When growth and change were examined separately for both physical and social aggression, results showed that the overall sample decreased slightly over time for both behaviors, but with high variability, particularly for social aggression. Estimation of physical aggression trajectories yielded three groups: stable low, moderate but decreasing, and stable high, consistent with other studies of physical aggression in this age range [Broidy et al., 2003]. As expected and consistent with previous work [Card et al., 2008; Dodge et al., 2006], male gender predicted higher physical aggression.

Separate estimation of social aggression trajectories yielded two groups, a low, stable and a high, but decreasing group. Gender had no significant effect on third grade levels of social aggression, which is consistent with a large meta-analysis showing that gender differences in indirect aggression were not substantial [Card et al., 2008]. The stable, low group has emerged in other trajectory studies of indirect aggression as rated by parents [Cote et al., 2007; Vaillancourt et al., 2007], but the high group in this study decreased over time. This different pattern of change may be due to the different age groups examined. The high groups in previous studies increased from ages 4–8 [Cote et al., 2007] and from age 4–10 [Vaillancourt et al., 2007], although this study found no change in indirect aggression from the high group from ages 6–10. Our study began when children were 9, and these results indicate that the high group seemed to decrease in social aggression gradually across time through age 13. None of these results are consistent with earlier claims that social aggression peaks in the preadolescent [Bjorkqvist et al., 1992] or early adolescent years [Cairns et al., 1989; Xie et al., 2003].

Although caution should be exercised in comparing across samples, these findings taken together with the results of Cote et al. [2007] and Vaillancourt et al. [2007] suggest that social aggression may peak in frequency around age 8 or 9, when children are in a developmental period when many feel desperate to fit into the same gender peer group [Gottman and Mettetal, 1986]. However, it is also possible that parents do not perceive changes in indirect aggression from ages 6–10 and teachers view social aggression as decreasing from ages 9–13 because children are becoming increasingly subtle and sophisticated in their use of social aggression and more adept at hiding it from adults.

As predicted, the joint estimation of trajectories for both social and physical aggression yielded a high but slightly increasing group, a high desister group, a medium increaser group, and low stable group. In addition, medium desister and lowest increaser groups also emerged. Again for the joint trajectories, male gender significantly predicted higher initial levels of physical aggression in third grade, but there was only a trend for girls to be slightly higher on social aggression in third grade. Joint trajectories estimated separately for girls and boys were strikingly similar (except that boys' rates of physical aggression were higher), thus trajectories were examined for girls and boys together.

Overall, the joint trajectories found here are similar to those found by Cote et al. [2007] for a younger age group based on parent reports. Taken together, these results highlight the importance of conducting person-centered as well as variable-centered analyses. Although the sample overall may be decreasing in social aggression across middle childhood and early adolescence, a subgroup is increasing in both social and physical aggression, when trajectories are jointly estimated for both forms of aggression. Three of the joint trajectory groups were increasing across time for social aggression, and the medium increaser groups may be somewhat akin to the adolescent onset group for antisocial behavior ["late starters," Moffitt, 1993].

To begin to understand why some children might follow a high, rising trajectory for social and physical aggression, this study examined gender and family characteristics as possible predictors. As hypothesized, male gender predicted membership in the high increaser relative to the stable low group. Given the lack of gender differences in social aggression found here as well as in a recent large meta-analysis [Card et al., 2008], the fact that more boys than girls are members of the high and increasing trajectory group may be due to boys being higher on physical aggression [Dodge et al., 2006].

Also as predicted, having divorced or never married parents predicted membership in the high increaser group as compared with the stable low group, even when family income and aversive parenting were controlled in the analyses. Children with unmarried parents may have been exposed to more marital conflict, which has been shown to relate to externalizing problems [Jenkins et al., 2005]. Perhaps children from families in which parents are not married are triangulated more in interparental conflicts, which may relate to relational aggression [Kerig et al., 2001] or are exposed more to negative interparental conflict strategies, which have been shown to relate to girls' social aggression in earlier waves of this same study [Underwood et al., 2008]. Or, perhaps single parents are more stressed and overworked, which might result in them modeling more aggression or responding less than optimally when children misbehave.

Also as hypothesized, mothers' authoritarian parenting predicted membership in the high increaser group, as compared with the stable low and high desister groups. These results are consistent with evidence that authoritarian parenting relates to children's physical aggression [Hart et al., 1992], that various forms of aversive parenting are associated with relational aggression in the preschool years [Casas et al., 2006; Hart et al., 1998; Nelson et al., 2006], and that hostile parenting predicts membership in a high joint trajectory group from ages 4–8

[Cote et al., 2007] and a high indirect aggression group from ages 4–10 [Vaillancourt et al., 2007]. Although it is difficult to know precisely which elements of the authoritarian style may be related to children's aggression, perhaps children who are treated harshly by parents have a higher baseline level of anger, so are more likely to be both social and physically aggressive, and children with punitive parents may lack opportunities to practice more direct, assertive strategies for conflict resolution so may be prone to maligning others or lashing out when they are angry at them.

Permissive parenting also emerged as a predictor of membership in the high increaser group relative to the low stable group. This finding is consistent with an earlier study showing that mothers' reports of permissive parenting were associated with peer nominations for relational aggression for a 4th grade, US sample [Sandstrom, 2007]. As hypothesized by Sandstrom [2007], perhaps permissive parents provide children with many opportunities to manipulate and coerce others. Interestingly, permissive parenting was also the only significant predictor of membership in the medium increaser compared with the stable low group. This finding implies that even when social and physical aggression are initially low, perhaps due to the absence of other family risk factors, permissive mothering relates to growth in social and physical aggression.

The one family factor that did not predict trajectory group membership as expected was family income. Low income did not predict membership in the high increaser group relative to either the stable, low or the high desister groups. Perhaps family income did not emerge as a significant predictor because this variable relates differently to social and physical aggression. Although lower family income has been consistently found to be associated with higher levels of physical aggression [Coie and Dodge, 1998; Dodge et al., 1994; Mistry et al., 2002; Patterson et al., 1990], the evidence for the relation between family income and social aggression is less clear. Some studies find that higher income is associated with higher levels of relational aggression in preschoolers [Bonica et al., 2003; McNeilly-Choque et al., 1996], whereas other research shows that low income predicts membership in a higher trajectory group for indirect aggression [Vaillancourt et al., 2007]. Also, our five-point scale for assessing family income may not have been sufficiently sensitive to detect income effects.

None of the family factors examined were significant predictors of membership in the low increaser relative to the stable low group. Perhaps other factors not examined here, such as the peer context, might account for this group's rise in aggression as they enter preadolescence. Belonging to a peer group high on relational aggression in this age range predicts increases in relational aggression, especially if the particular peer group is high on status and centrality [Ellis and Zarbatany, 2007; Espelage et al., 2003].

All these results must be interpreted in light of methodological limitations. This study relied on teacher reports of both social and physical aggression. Although teachers have ample opportunities to observe aggression at school and teacher ratings and peer nominations for both physical and relational aggression are strongly correlated [Crick, 1996], as children mature teachers may have a more limited perspective because children may become more sophisticated in engaging in aggressive behaviors away from the watchful eyes of adults. Also, teachers in this study rated frequency of aggressive behaviors, thus these ratings may not have captured whether specific episodes of aggression were becoming more severe or having a greater impact with age. Another limitation was that a few teachers opted not to provide ratings each year; however, imputation measures to estimate missing information were used in these analyses. Because of the limitations in our sample size and computational procedures, it was not possible to conduct a group analysis to examine gender as a predictor of trajectory group membership, though in future work with additional waves and new estimation routines being developed we expect to be able to bring a group analysis of gender into the trajectories themselves. Another

shortcoming is that we only examined mothers' authoritarian and permissive parenting as predictors of trajectory group membership, primarily because our sample included single-parent families and requiring father information would have reduced the available sample size further. However, our inability to include fathers is unfortunate because previous research has found that fathers' aversive parenting relates to children's relational aggression [Hart et al., 1998; Nelson et al., 2006].

Still, this study had important strengths. Whereas previous trajectory studies relied on parents as reporters, our reporters were teachers, different teachers each year. Although teachers may not see all aggression, they likely have more information about aggression toward peers than parents do. Another strength is that this study of joint trajectories followed children into preadolescence, into the developmental period described by others as the developmental peak of indirect [Bjorkqvist et al., 1992] and social aggression [Cairns et al., 1989; Xie et al., 2003]. This is also one of the first studies to examine family predictors of social and physical aggression in children beyond preschool.

In future research, it will be important to examine continuity and change in social and physical aggression into the high school and young adult years, to see whether there continues to be a high and rising group as well as groups that are desisting. Understanding more about why children and adolescents follow particular trajectories will be critically important. Family factors seem predictive, but other variables may also be relevant including individual characteristics such as physical attractiveness and social competence and academic engagement, the extent to which students are victimized by peers, and peer socialization. It would be intriguing to know whether youth in the high, increasing group are affiliating mostly with each other, whether groups high on social and physical aggression actively encourage these behaviors among members, and the types of social consequences that youth face for perpetrating social and physical aggression at different developmental periods. Investigating whether membership in different trajectory groups predicts adjustment will also be vitally important. Variable-based analyses strongly suggest that both physical [Dodge et al., 2006] and social/relational aggression [Crick et al., 1999; Underwood, 2003] confer risk for maladjustment. High trajectory groups might be especially vulnerable to internalizing and externalizing problems as they move through adolescence, as well as bulimia symptoms and features of borderline personality disorder, which were associated with relational aggression in college women [Werner and Crick, 1999]. Understanding the origins and outcomes of following different developmental trajectories could guide the development of effective prevention programs to help all youth feel a sense of belongingness among peers, reduce physical violence in school communities, and to increase the odds of youth escaping psychopathology.

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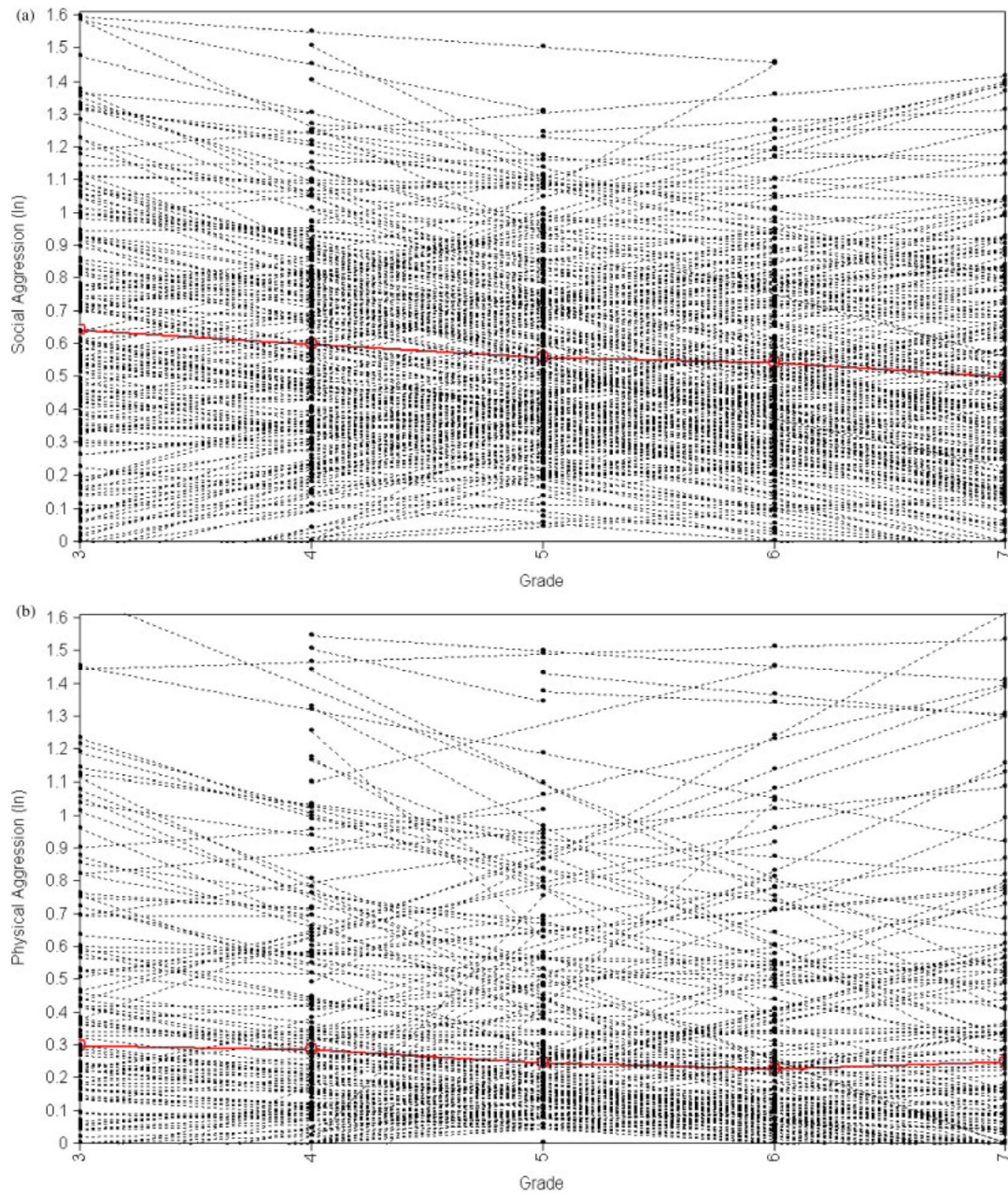


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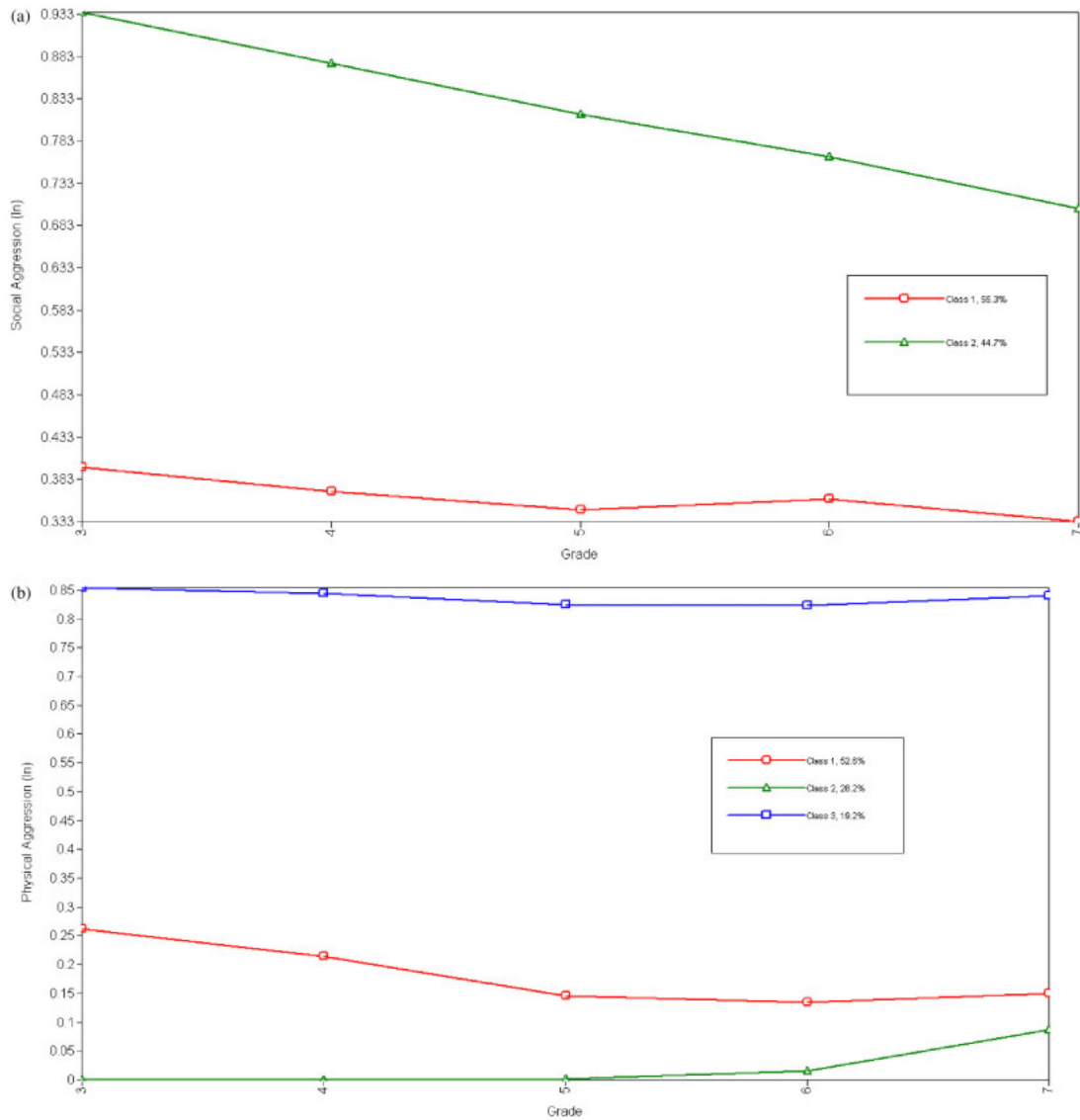
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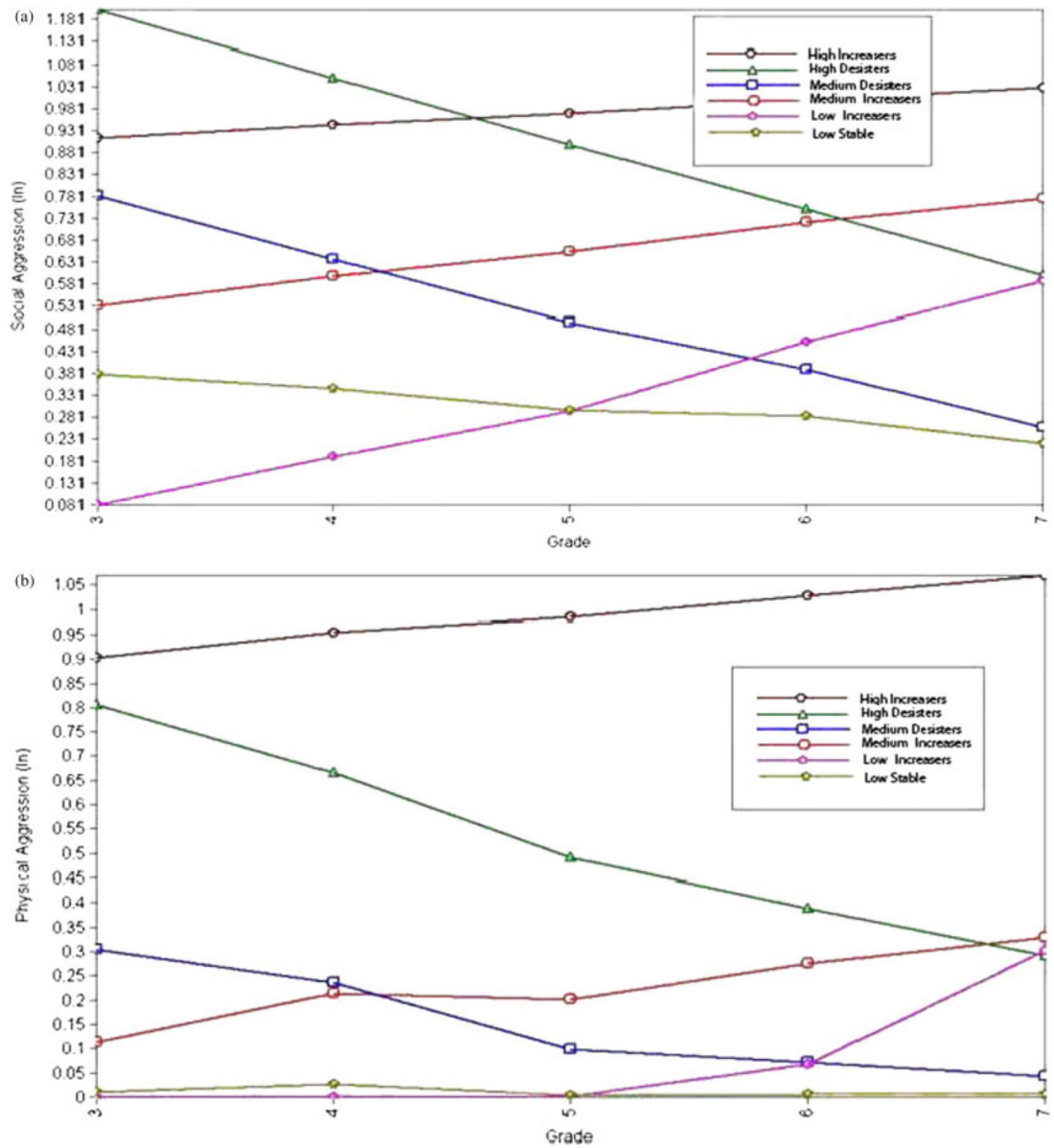
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**Fig. 1.** (a) Individually estimated social aggression trajectories, and the average trajectory, from the linear conventional growth model. (b). Individually estimated physical aggression trajectories, and the average trajectory, from the linear conventional growth model.



**Fig. 2.**  
 (a) Growth trajectories estimated for social aggression. (b) Growth trajectories estimated for physical aggression.



**Fig. 3.** (a) Change in social aggression for joint trajectory groups. (b) Change in physical aggression for joint trajectory groups.

**TABLE I**  
Correlations Between Measures of Social and Physical Aggression and Parenting, by Gender (Girls/Boys)

	1	2	3	4	5	6	7	8	9	10	11
1. Social Aggression Grade 3	—										
2. Physical Aggression Grade 3	.79 <sup>*/.79*</sup>	—									
3. Social Aggression Grade 4	.51 <sup>*/.32*</sup>	.57 <sup>*/.27*</sup>	—								
4. Physical Aggression Grade 4	.36 <sup>*/.46*</sup>	.48 <sup>*/.57*</sup>	.70 <sup>*/.62*</sup>	—							
5. Social Aggression Grade 5	.50 <sup>*/.31*</sup>	.27 <sup>*/.25*</sup>	.35 <sup>*/.39*</sup>	.27 <sup>*/.34*</sup>	—						
6. Physical Aggression Grade 5	.40 <sup>*/.58*</sup>	.25 <sup>*/.66*</sup>	.35 <sup>*/.33*</sup>	.56 <sup>*/.47*</sup>	.54 <sup>*/.72*</sup>	—					
7. Social Aggression Grade 6	.45 <sup>*/.12</sup>	.32 <sup>*/.14</sup>	.44 <sup>*/.29*</sup>	.30 <sup>*/.40*</sup>	.53 <sup>*/.55*</sup>	.45 <sup>*/.61*</sup>	—				
8. Physical Aggression Grade 6	.31 <sup>*/.39*</sup>	.30 <sup>*/.49*</sup>	.32 <sup>*/.34*</sup>	.33 <sup>*/.64*</sup>	.34 <sup>*/.52*</sup>	.59 <sup>*/.77*</sup>	.65 <sup>*/.76*</sup>	—			
9. Social Aggression Grade 7	.23 <sup>†/.05</sup>	.08 <sup>†/.33*</sup>	.23 <sup>†/.25*</sup>	.11 <sup>†/.38*</sup>	.40 <sup>†/.23*</sup>	.34 <sup>†/.42*</sup>	.42 <sup>†/.27*</sup>	.45 <sup>†/.38*</sup>	—		
10. Physical Aggression Grade 7	.07 <sup>†/.30*</sup>	.05 <sup>†/.41*</sup>	-.01 <sup>†/.35*</sup>	-.03 <sup>†/.49*</sup>	.21 <sup>†/.24*</sup>	.30 <sup>†/.51*</sup>	.23 <sup>†/.26*</sup>	.53 <sup>†/.50*</sup>	.63 <sup>†/.67*</sup>	—	
11. Authoritarian Parenting	.07 <sup>†/.08</sup>	-.10 <sup>†/.27*</sup>	.05 <sup>†/.19</sup>	.22 <sup>†/.29*</sup>	.19 <sup>†/.13</sup>	.11 <sup>†/.31*</sup>	.00 <sup>†/.22*</sup>	.00 <sup>†/.33*</sup>	.19 <sup>†/.34*</sup>	-.02 <sup>†/.47*</sup>	—
12. Permissive Parenting	-.12 <sup>†/-.03</sup>	-.05 <sup>†/.16</sup>	.12 <sup>†/.17</sup>	.12 <sup>†/.15</sup>	.03 <sup>†/.31*</sup>	.06 <sup>†/.32*</sup>	.04 <sup>†/.24*</sup>	-.01 <sup>†/.23*</sup>	.18 <sup>†/.17</sup>	.10 <sup>†/.20†</sup>	.26 <sup>†/.35*</sup>

Values in bold indicate gender differences are significant

\*  $P < .05$

†  $P < .10$ .



**TABLE II**  
Bayesian Information Criteria by Number of Classes and Polynomial Degree

Number of Classes	Polynomial degree	BIC
Social aggression		
1	Linear	1,560
	Quadratic	1,565
	Cubic	1,569
2	Linear	1,476
	Quadratic	1,486
	Cubic	1,491
3	Linear	1,480
	Quadratic	1,494
	Cubic	1,504
Physical aggression		
1	Linear	1,706
	Quadratic	1,711
	Cubic	1,716
2	Linear	1,540
	Quadratic	1,545
	Cubic	1,552
3	Linear	1,531
	Quadratic	1,541
	Cubic	1,551
4	Linear	1,544
	Quadratic	1,558
	Cubic	1,566

TABLE III

## Joint Trajectory Groups by Gender

Group	Boys		Girls		Odds ratio
	N	%	N	%	
Medium increasers	17	13.71	19	14.5	1.048
High Desisters	15	12.1	16	12.21	0.993
Medium Desisters	26	20.97	35	26.72	1.346
Low increasers	20	16.13	14	10.69	0.611
High Increasers	22	17.89	9	6.82	0.336**
Low on Both	23	18.55	39	29.77	1.825**
Total	124	100	131	100	

\*\* $P < .05$ .

**TABLE IV**  
Odds Ratios for Family Variables Predicting Membership in Trajectory Groups

	High increasers relative to low both	High increasers relative to high desisters	Medium increasers relative to low both	Low increasers relative to low both
Female	0.17**	0.21*	0.31	0.34
Married	0.21*	0.21*	0.28	0.29
African American	5.64*	7.23*	2.70	1.98
Low income	2.14	2.54	1.16	0.71
Mother authoritarian		5.90*	1.21	0.75
Mother permissive		12.09**	5.43*	0.51

N= 199

\*  $P < .05$

\*\*  $P < .01$ .