Development and Psychopathology **25** (2013), 817–842

doi:10.1017/S0954579413000199

Deconstructing the externalizing spectrum: Growth patterns of overt aggression, covert aggression, oppositional behavior, impulsivity/inattention, and emotion dysregulation between school entry and early adolescence

SHERYL L. OLSON,[a] ARNOLD J. SAMEROFF,[a] JENNIFER E. LANSFORD,[b] HOLLY SEXTON,[c] PAMELA DAVIS-KEAN,[d] JOHN E. BATES,[d] GREGORY S. PETTIT,[e] AND KENNETH A. DODGE[b]
[a]*University of Michigan;* [b]*Duke University;* [c]*University of Texas–Austin;* [d]*Indiana University; and* [e]*Auburn University*

Abstract

The purpose of this study was to determine whether five subcomponents of children's externalizing behavior showed distinctive patterns of long-term growth and predictive correlates. We examined growth in teachers' ratings of overt aggression, covert aggression, oppositional defiance, impulsivity/inattention, and emotion dysregulation across three developmental periods spanning kindergarten through Grade 8 (ages 5–13 years). We also determined whether three salient background characteristics, family socioeconomic status, child ethnicity, and child gender, differentially predicted growth in discrete categories of child externalizing symptoms across development. Participants were 543 kindergarten-age children (52% male, 81% European American, 17% African American) whose problem behaviors were rated by teachers each successive year of development through Grade 8. Latent growth curve analyses were performed for each component scale, contrasting with overall externalizing, in a piecewise fashion encompassing three developmental periods: kindergarten–Grade 2, Grades 3–5, and Grades 6–8. We found that most subconstructs of externalizing behavior increased significantly across the early school age period relative to middle childhood and early adolescence. However, overt aggression did not show early positive growth, and emotion dysregulation significantly increased across middle childhood. Advantages of using subscales were most clear in relation to illustrating different growth functions between the discrete developmental periods. Moreover, growth in some discrete subcomponents was differentially associated with variations in family socioeconomic status and ethnicity. Our findings strongly affirmed the necessity of adopting a developmental approach to the analysis of growth in children's externalizing behavior and provided unique data concerning similarities and differences in growth between subconstructs of child and adolescent externalizing behavior.

A large body of research has focused on correlates and predictors of global levels of externalizing problem behavior among children and adolescents. The term "externalizing problems" has been a useful summary variable for a heterogeneous cluster of behaviors encompassing individual differences in children's physical aggression, oppositional behavior, covert aggression, emotion dysregulation, impulsive/overactive behavior, and rule-breaking behavior (Dodge, Coie, & Lynam, 2006). Cross-sectional factor analytic studies across a wide range of age periods and life circumstances have shown that individual differences in externalizing behavior comprise a cohesive and stable dimension of problem behavior (Achenbach & Rescorla, 2001). In what follows, we argue that the success of traditional broadband measures of child externalizing behavior provides a foundation for a different approach, one that highlights finer distinctions within this heterogeneous construct (e.g., Frick & White, 2008; Hinshaw, 2002; Rowe et al., 2008).

The field of developmental psychopathology has been devoted to examining changing constellations of age-appropriate and atypical behavior as children grow, as well as placing current behavior in a pathway from prior adaptations or maladaptations to future ones (e.g., Cicchetti, 2006; Rutter & Sroufe, 2000). In the current study, we use this approach to examine the course of five distinct constructs that contribute to externalizing behavior.

Distinct Forms of Problem Behavior Within the Externalizing Spectrum

We briefly describe five theoretically meaningful subdimensions of externalizing behavior that can be extracted from children's scores on the most widely used measure of chil-

This project was possible due to funding provided by the National Science Foundation for the Development of Learning Sciences Integrative Research Activities for Developmental Science grant (CAPCA Center) to the University of Michigan (BCS-0818478). The Child Development Project has been funded by Grants MH42498, MH56961, MH57024, and MH57095 from the National Institute of Mental Health; Grant HD30572 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development; and Grant DA016903 from the National Institute on Drug Abuse. Kenneth A. Dodge is supported by Senior Scientist award 2K05 DA015226 from the National Institute on Drug Abuse. We are grateful to the individuals who participated in this research.

Address correspondence and reprint requests to: Sheryl Olson, Department of Psychology, University of Michigan, 530 Church, Ann Arbor, MI 48109; E-mail: slolson@umich.edu.

dren's externalizing problems, the Child Behavior Checklist (Achenbach & Rescorla, 2001): oppositional defiant behavior, overt aggression, covert aggression, impulsivity/inattention, and emotion dysregulation. As shown below, although these subdimensions are intercorrelated, evidence suggests the desirability of distinguishing among them.

Overt aggression

Overt aggression appears early in life (Alink et al., 2006). Behaviors such as hitting, pushing, biting, shoving, kicking, or hair pulling are clearly evident in early toddlerhood and peak between ages 2 and 3 years (Hay, 2005). Subsequently, overt aggressive behaviors decline across development, with steep drops occurring between the toddler and school-age years (Nagin & Tremblay, 2005). For example, in a large longitudinal study of normally developing children in day care (NICHD Early Child Care Research Network, 2004), mothers rated the frequency of children's physical aggression at ages 24, 36, and 56 months and through the early school-age years. The most frequent form of early aggression, hitting others, occurred in 70% of the sample at ages 2 and 3, but declined to 20% at ages 4 and 5 and to 12% in the third grade. Overt destructive behavior (e.g., "destroys others' things") also showed marked declines across the preschool and early school-age years (NICHD Early Child Care Research Network, 2004).

These normative trends summarize average behavioral tendencies across large groups of children. A sizable body of evidence has shown that *individual differences* in early aggressive and destructive behaviors remain moderately stable across the preschool to school transition (Campbell, Shaw, & Gilliom, 2000). That is, although normally expected levels of aggression decline with development, a child's position in relation to his/her peers is fairly stable, even across major developmental transitions. Thus, some preschool-age children continue to show high levels of problem behavior across the school-age years (Broidy et al., 2003; NICHD Early Child Care Research Network, 2004; Shaw, Gilliom, Ingoldsby, & Nagin, 2003).

Covert aggression

Covert aggression is marked by surreptitious rule breaking and antisocial behaviors such as stealing, cheating, lying, and vandalism. The development of covert aggression has received much less research attention than that of overt forms of externalizing problem behavior (Hinshaw, 2002). Symptom clusters of covert and overt aggression can be reliably differentiated (e.g., Frick et al., 1993; Tackett, Krueger, Iacono, & McGue, 2005). Moreover, children's covert aggression appears to follow a different pattern of development than that of overt aggression (Barker et al., 2007; Cote et al., 2006; Patterson, Shaw, Snyder, & Yoerger, 2005). For example, using longitudinal data from the Oregon Youth Study, Patterson and Yoerger (2006) found significant intraindividual growth in maternal ratings of boys' covert antisocial behavior. Boys in Grades 4–12 resided in high-crime areas. Boys who showed significant levels of growth in covert antisocial behavior had relatively high levels of later juvenile offenses and adult recidivism. Barker et al. (2007) affirmed and broadened these findings by examining boys' trajectories of physical violence and theft between adolescence and early adulthood. Individual growth in the development of physical aggression and stealing behavior was asymmetrical: relatively few boys increased in the frequency of physically aggressive behavior, whereas the majority increased in the frequency of stealing. Thus, subcomponents of overt and covert aggression have shown contrasting patterns of individual growth across development.

Oppositional defiant behavior

Oppositional behavior appears in the toddler period and is common across the preschool and early school-age years (Dix, Stewart, Gershoff, & Day, 2007; Olson, Sameroff, Lunkenheimer, & Kerr, 2009). Typical problem behaviors include arguing back, refusing to comply with parents' requests, and testing the "limits" of parental control (American Psychiatric Association, 2000). Clinically significant manifestations of oppositional behavior are marked by the frequency, severity, and persistence of the child's oppositional behavior in relation to normally developing age peers (Eyberg, 2006; Keenan & Wakschlag, 2004). Early oppositional behaviors often serve as the first bellwether of continuing and worsening patterns of disruptive behavior (Keenan & Shaw, 2003; Lahey, McBurnett, & Loeber, 2000). In population-based studies of school-age children and adolescents, symptoms of oppositional defiant disorder have shown very high correlations with symptoms of overt and covert aggression (e.g., Lahey et al., 2008). However, oppositional and aggressive behaviors have also been associated with different risk factors and age profiles (Dick, Viken, Kaprio, Pulkkinen, & Rose, 2005; Rowe, Costello, Angold, Copeland, & Maughn, 2010). For example, in the Great Smoky Mountains Study, Rowe et al. (2010) found that symptoms of aggressive behavior in school-age children and youth predicted behavioral outcomes in early adulthood, whereas irritable and headstrong behaviors had stronger links with later emotional disorders. Moreover, according to rules specified in the DSM-IV, oppositional defiant disorder cannot be diagnosed in the presence of conduct disorder. Thus, longitudinal studies of individual growth in oppositional defiant behavior independent of co-occurring aggression have been scarce. Existing data have suggested that oppositional defiant behavior declines across the primary grades, then increases during the transition to puberty (Kroneman, Hipwell, Loeber, Koot, & Pardino, 2011; Nagin & Tremblay, 2005). However, a small subgroup of children show continuously high levels of oppositional defiant symptoms across development (Nagin & Tremblay, 2005).

We have discussed the differentiation of overt, covert and oppositional defiant forms of problem behavior within the externalizing problems spectrum. Other promising research efforts have focused on differentiating aggressive, destructive behavior from problem behavior that maps onto two salient temperament constructs: impulsivity/inattention and emotion dysregulation. These two behavioral subdimensions reflect constructs of temperament that have been identified across the lifespan (Rothbart & Bates, 2006). As shown below, both subdimensions have been found to co-occur with aggressive and oppositional problem behaviors; in addition, symptoms of emotion dysregulation have been used to define narrowband measures of aggressive behavior (Achenbach & Rescorla, 2001).

Impulsivity/inattention

Substantial attention has been given to differentiating individual differences in impulsivity/inattention/hyperactivity, core symptoms of attention-deficit/hyperactivity disorder, from oppositional and aggressive behavior (e.g., Nigg & Nikolas, 2008; Rutter, 2003). Children and youth who have shown high levels of impulsivity and inattention also tend to show high levels of oppositional defiant and aggressive behavior (Lahey, 2008). Within the externalizing problem spectrum, the strongest levels of overlap have been found for symptoms of impulsivity/inattention and oppositional defiant behavior (e.g., Lubke, Muthen, Moilerin, McGough, & Loo, 2007; Rommense et al., 2009). Despite these high levels of co-occurrence, exploratory and confirmatory factor analyses have supported the distinction of inattentive/impulsive, oppositional, and aggressive problem behaviors (D'Onofrio et al., 2008; Loeber, Burke, & Pardini, 2009). Moreover, Jester et al. (2005) found that symptoms of inattention/hyperactivity and aggression showed different patterns of individual growth between early childhood and adolescence. Symptoms of impulsivity/hyperactivity tended to remain relatively constant, whereas overt aggression significantly declined across development. Another large body of work has shown that symptoms of impulsivity/inattention and aggression, albeit highly intercorrelated, have strikingly different associations with genetic, neurobiological, and environmental risk factors (Beauchaine & Neuhaus, 2008; Lahey, 2008).

Emotion dysregulation

Emotion dysregulation is another important dimension of temperament that has been mixed with symptoms of other externalizing problems. In addition to symptoms of overt and covert aggression, many items on the Child Behavior Checklist Aggressive Behavior Scale assess the child's propensity for inadequate regulation of negative emotions, (e.g., frequent temper tantrums, moodiness, and irritability; Achenbach & Rescorla, 2001). Problems of emotion dysregulation, particularly frequent, intense outbursts of anger that are easily elicited, are central to definitions of disruptive behavior problems (Belden, Thompson, & Luby, 2008; Cole, Hall, & Radzioch, 2009). Symptoms of emotion dysregulation and aggressive, disruptive behavior have been found to be moderately intercorrelated (Singh & Waldman, 2010), but several lines of research suggest the usefulness of distinguishing among them. For example, scholars have differentiated distinct subtypes of aggressive behavior that reflect different patterns of emotion regulation (Dodge & Pettit, 2003). Children who manifest a reactive style of aggression have shown high levels of poorly regulated anger mixed with aggressive behavior, particularly in response to perceived provocations from peers and adults. In contrast, children whose symptoms fit a proactive style of aggression have shown far more "cool" and calculating forms of aggressive behavior, often used to achieve instrumental social or material advantages (Dodge et al., 2006). Similarly, in comparison with symptoms of overt aggression and disruptive behavior, symptoms of emotion dysregulation have been independently linked to genetic risk factors (Deater-Deckard, Petrill, & Thompson, 2007). However, relatively little is known about individual growth in emotion dysregulation across development. Mean levels of negative affect have been found to decline across a period of 23 years (Charles, Reynolds, & Gatz, 2001). Within a smaller window of time, maternal ratings of children's emotion dysregulation declined across the transition from preschool to early school age, albeit with strong individual variability in symptom levels (Blandon, Calkins, Keane, & O'Brien, 2008).

Summary and Implications

In summary, the statistical co-occurrence of narrowband dimensions of problem behavior does not indicate "developmental isomorphism" (Stormshak, Bierman, & the Conduct Problem Prevention Research Group, 1998). The success of traditional composite measures of externalizing behavior has provided an empirical and conceptual foundation for a different approach, one that highlights finer distinctions within these heterogeneous constructs. Examining individual differences in different subdimensions of externalizing behavior may enhance our understanding of the etiology, development, and prevention of disorder (Barker et al., 2007; Hinshaw, 2002; Stormshak et al., 1998). Hinshaw (2002) has argued cogently for a configural approach to understanding development of psychopathology. We believe that a fundamental building block of a configural approach is providing sound descriptive data on the development of major subcomponents of externalizing behavior. If, as we have argued, identifiable components of externalizing behavior have different antecedents and consequences, then it is important to study their developmental growth patterns. To this end, we examined individual differences in the growth of children's oppositional behavior, overt aggression, covert aggression, impulsivity/inattention, and emotion dysregulation using eight waves of data spanning school entry through middle adolescence. Data were drawn from the Child Development Project (CDP), a well-known prospective longitudinal study of the development of behavioral adjustment (Dodge, Bates, & Pettit, 1990; Pettit, Laird, Dodge, Bates, & Criss, 2001).

Most previous studies of child externalizing behavior have used maternal ratings of child behavior problems that are subject to single informant biases and may provide an underestimation of the extent of externalizing problems expressed in classroom and peer situations. To provide a conservative test of the coherence and growth of subcomponents of child externalizing behavior and to assess children's externalizing problems in situations where impulsivity, inattention, and aggression may be more salient than at home, we used teacher reports of each child's behavioral adjustment that were contributed by different individuals each year.

The five subcomponents of problem behavior highlighted in this study differed from those derived by Achenbach in the development of the Teacher Report Form (TRF; Achenbach & Rescorla, 2001). In the TRF, two subscales comprise the Externalizing Problems Scale: rule breaking and aggressive behavior. Ours differed significantly for several reasons. We wished to construct identical item composites across all nine waves of data. Thus, rule breaking was not included, because the number and type of problem behavior items changed substantially between early childhood and early adolescence. Other differences reflected theoretical issues. In prior research, items describing overt aggression, covert aggression, emotion dysregulation, and oppositional defiant behavior have been confounded by lumping them into composite measures of externalizing behavior. As described above, there are sound theoretical reasons for differentially examining the growth properties and risk correlates of these problem behavior subconstructs. Finally, individual differences in impulsivity/inattention were included because they index fundamental self-regulation deficits that strongly cooccur with children's aggressive and destructive behavior (e.g., Nigg & Nikolas, 2008). Given the exploratory nature of our study, we considered impulsivity and inattention together as proxies for self-regulation difficulties that underlie attention-deficit/hyperactivity spectrum disorders.

We emphasize that we are not challenging the construct validity of broadband externalizing problem scales. The validity of these measures has been amply demonstrated. Rather, we are questioning whether theoretically meaningful subdimensions of externalizing behavior may show different patterns of growth and different associations with common risk factors across development. This knowledge has important implications for determining how we can improve longitudinal models of the development of children's externalizing problems. With regard to risk factors, as an initial step we examined three fundamental background characteristics that have been related to children's behavioral adjustment in many previous studies: family socioeconomic status (SES), child ethnicity, and child gender. Across hundreds of studies, low levels of family SES have been found to be consistent predictors of elevated child externalizing problems (e.g., Dearing, McCartney, & Taylor, 2006; Duncan, Kalil, & Ziol-Guest, 2008). However, it is unknown whether variations in SES contribute differentially to growth in specific components of child externalizing problems. We hypothesized that low SES would be related to higher initial levels of each subdimension and to accelerated growth in each subdimension over time. Similarly, ethnicity has been identified as a possible moderator of the development of child externalizing problems, with some studies showing different patterns of risk factors for African American and European American subsamples (e.g., Bradley, Corwyn, Burchinal, McAdoo, & Garcia Coll, 2001; Lansford, Deater-Deckard, Dodge, Bates, & Pettit, 2004; Supplee, Skuban, Shaw, & Prout, 2009). Especially when examined independently of variations in family SES, it is unknown whether ethnicity contributes differentially to growth in selective subcomponents of externalizing problems. Given that there are ethnic differences in the prevalence of diagnoses of, for example, attention-deficit/hyperactivity disorder and oppositional defiant disorder (Pastor & Reuben, 2005; Teplin et al., 2006), we hypothesized that there would be ethnic differences in growth of different subcomponents of externalizing (steeper slopes among children from minority backgrounds). Finally, given that many previous studies have featured male-only samples, it is important to determine whether boys and girls show different patterns of growth in externalizing behavior (Crick & Zahn-Waxler, 2003). If externalizing behaviors are considered as a broadband construct, boys and girls may appear to demonstrate similar patterns of growth, but this growth may be accounted for by growth in impulsivity and inattention for boys, for example, and by emotion dysregulation for girls. To the best of our knowledge, determining whether child gender moderates differences in the growth of selective subcomponents of externalizing behavior is a unique contribution. We hypothesized that boys would show higher initial levels and accelerated growth in overt aggression, covert aggression, oppositional defiance, and impulsivity/inattention compared to girls, whereas girls would show higher initial levels and accelerated growth in emotion dysregulation compared to boys.

Research Objectives

Our major research goals were as follows:

1. to determine whether teacher ratings of five different subcomponents of child externalizing behavior (i.e., oppositional defiant behavior, overt aggression, covert aggression, impulsivity/inattention, and emotion dysregulation) can be reliably differentiated across nine longitudinal assessments spanning kindergarten through middle school;
2. to examine individual differences in the growth of externalizing problem subcomponents between kindergarten and eighth grade, comparing these slopes with one another and with a total problems index; and
3. to determine whether key background variables such as family SES, ethnicity, and child gender predict individual differences in the growth of different subcomponents of externalizing problems between kindergarten and eighth grade.

Method

We used the kindergarten to eighth-grade (child ages 5–13 years) longitudinal data set from the CDP (Dodge et al., 1990), a multisite, multicohort longitudinal study. The CDP recruited a normative community sample from three sites (Nashville and Knoxville, Tennessee, and Bloomington, Indiana) during the summer prior to kindergarten entry (when children were 5 years old). Two cohorts (one beginning in 1987 and one beginning in 1988) were initially assessed with extensive in-person interviews. Since then, participants have been assessed annually through mailed questionnaires, and telephone and face-to-face interviews.

The goals of the CDP are to examine the social development and adjustment of children longitudinally from school entry, across schooling age (early and middle childhood and adolescence), and into adulthood. To that extent, information about the child has been collected from a wide variety of sources, including parents, teachers, and peers (see Dodge et al., 1990; Pettit et al., 2001; Weiss, Dodge, Bates, & Pettit, 1992). For the purposes of this paper, we focused on information about the child's socioemotional behaviors as provided by the child's teacher.

Local institutional review boards for all sites reviewed and approved study materials and consent forms. Signed informed consent was obtained from all participants prior to administration of study materials.

Sample

The CDP has an available sample of 585 participants, nearly equally split across the two age cohorts (53% in Cohort 1, started kindergarten in 1987; 47% in Cohort 2, started kindergarten in 1988). Males comprise just over half of the sample ($n = 304$, 52%), and the racial/ethnic composition of the sample includes 81% European American, 17% African American, and 2% other. For the purposes of these analyses, the sample was limited to those who were uniquely identified into one race/ethnic category (as either European or African American, $N = 574$). We also limited the sample with respect to the socioemotional information that was available for a participant. Our analysis focuses on examining information longitudinally across nine time points (from kindergarten to eighth grade); recent papers on growth modeling suggest a minimum of three observations because three points are the minimum number required to identify a linear growth pattern (Curran, Obeidat, & Losardo, 2010). Therefore, we limited our sample to those individuals for whom there were data available for three or more of the nine time points. This further reduced our sample to 543 participants.

SES in the CDP was measured with the Hollingshead (1979) Four Factor Index, a composite index score based on parental education and occupation information. For our sample, the mean score on the Hollingshead was 39.43 (*SD* = 13.97), which corresponds to skilled craftspeople, clerical workers, and sales workers in the Hollingshead system; the sample ranged from 8 (unskilled laborers) to 66 (doctors, lawyers, and other highly educated professionals). The median level of education for both mothers and fathers was graduation from high school. See Table 1 for further demographic information for the sample.

Measures

For the purposes of this study, the measures of interest were those examining the socioemotional behaviors of the participants. Teachers completed the 112-item TRF (Achenbach, 1991) at each of the nine waves (kindergarten through eighth grade). Items on the TRF are rated on a 3-point scale (0 = *not true of the student*, 1 = *somewhat or sometimes true of the student*, and 2 = *often or very true of the student*). Based on our research goals, we created five subscales: overt aggression, covert aggression, oppositional defiant, impulsivity/inattention, and emotion dysregulation. Items that corresponded to each problem behavior category were selected for inclusion if identical composites could be created within all nine waves. Thus, inclusion was based not only on rational considerations but also on whether there was sufficient variability in those items across each wave of data, permitting the creation of identical composites. Each subscale was created within a wave by averaging across relevant items. Overt aggression was defined by the relative frequency of cruelty/bullying, destruction of others' property, fighting, physically attacking, and threatening others (5 items); covert aggression was defined by the relative frequency of lying/cheating and stealing (2 items); oppositional defiant was defined by the relative frequency of arguing, disobedience, disturbing classmates, disrupting class, and behaving irresponsibly (5 items); inattention/impulsivity was defined by the relative frequency of inability to sustain attention, restlessness, impulsivity, clowning behavior, distractibility, excessive talkativeness, failing to complete tasks, and loudness (8 items); and emotion dysregulation was defined as the relative frequency of jealous behavior, screaming, irritability, sudden mood changes, and temper displays (5 items). Participants had to have all of the items that comprised a scale in order to have a value calculated. The internal reliability of each subscale was calculated within each of the nine waves. Alpha coefficients were acceptable, ranging from 0.47 (covert aggression) through 0.92 (both oppositional defiant and inattention/impulsivity). In addition, an overall externalizing spectrum score was created using the 25 items that comprised the subscales. The composite index was included to demonstrate the models and conclusions that would be drawn from contrasting the subscales to an omnibus externalizing problems construct.

Analysis plan

In order to evaluate the statistical coherence of the subscales, we initially performed a confirmatory factor analysis (CFA) specifying a single-factor solution using Mplus 5.2 with full-information maximum likelihood estimation to account for missing data (Muthén & Muthén, 2008). Each subscale

Table 1. *Observed means and standard deviations for covariates, total externalizing, and the five externalizing subfactors, estimated together and separately by gender*

	All ($N = 543$)		Male ($n = 282$)		Female ($n = 261$)		
	Mean	*SD*	Male	*SD*	Female	*SD*	*t* Test/χ^2
Covariates							
SES (Hollingshead)	39.59	14.03	40.21	14.07	38.92	13.98	1.07, *ns*
African American	0.17		0.16		0.18		0.28, *ns*
Total Externalizing							
Kindergarten	0.20	0.29	0.25	0.33	0.15	0.25	4.09***
First grade	0.25	0.33	0.32	0.37	0.17	0.25	5.37***
Second grade	0.26	0.35	0.32	0.36	0.20	0.34	3.77***
Third grade	0.25	0.34	0.33	0.38	0.17	0.28	5.41***
Fourth grade	0.25	0.35	0.33	0.39	0.16	0.28	5.20***
Fifth grade	0.26	0.33	0.35	0.37	0.18	0.26	5.51***
Sixth grade	0.26	0.35	0.33	0.36	0.18	0.33	4.40***
Seventh grade	0.24	0.33	0.30	0.35	0.18	0.30	3.97***
Eighth grade	0.26	0.36	0.34	0.39	0.18	0.32	4.23***
Externalizing Subfactors							
Overt aggression							
Kindergarten	0.11	0.28	0.14	0.31	0.08	0.23	2.61**
First grade	0.12	0.28	0.16	0.32	0.07	0.22	3.48***
Second grade	0.13	0.32	0.15	0.31	0.12	0.32	0.95, *ns*
Third grade	0.13	0.32	0.17	0.37	0.08	0.24	3.38***
Fourth grade	0.14	0.32	0.19	0.38	0.08	0.24	3.71***
Fifth grade	0.13	0.30	0.19	0.37	0.07	0.20	4.05***
Sixth grade	0.13	0.30	0.15	0.31	0.10	0.29	1.60, *ns*
Seventh grade	0.09	0.24	0.11	0.25	0.07	0.23	1.52, *ns*
Eighth grade	0.12	0.32	0.14	0.34	0.10	0.29	1.51, *ns*
Covert aggression							
Kindergarten	0.09	0.29	0.09	0.28	0.08	0.29	0.31, *ns*
First grade	0.11	0.32	0.11	0.30	0.11	0.34	−0.25, *ns*
Second grade	0.13	0.35	0.13	0.31	0.14	0.39	−0.40, *ns*
Third grade	0.12	0.34	0.13	0.35	0.10	0.32	0.80, *ns*
Fourth grade	0.14	0.35	0.16	0.37	0.12	0.32	1.20, *ns*
Fifth grade	0.12	0.30	0.14	0.32	0.11	0.28	1.20, *ns*
Sixth grade	0.11	0.30	0.11	0.30	0.11	0.30	0.17, *ns*
Seventh grade	0.09	0.26	0.13	0.30	0.06	0.20	2.70**
Eighth grade	0.11	0.29	0.16	0.33	0.08	0.22	2.87**
Oppositional defiant							
Kindergarten	0.28	0.45	0.34	0.50	0.20	0.38	3.71***
First grade	0.33	0.49	0.44	0.56	0.21	0.38	5.49***
Second grade	0.35	0.51	0.45	0.55	0.23	0.45	4.77***
Third grade	0.32	0.49	0.43	0.55	0.20	0.38	5.37***
Fourth grade	0.32	0.49	0.44	0.55	0.20	0.40	5.27***
Fifth grade	0.35	0.48	0.47	0.53	0.22	0.38	5.83***
Sixth grade	0.35	0.50	0.47	0.55	0.22	0.41	5.23***
Seventh grade	0.34	0.48	0.44	0.52	0.24	0.42	4.27***
Eighth grade	0.37	0.54	0.49	0.59	0.25	0.47	4.36***
Temperament Subfactors							
Inattention/impulsivity							
Kindergarten	0.31	0.42	0.39	0.46	0.21	0.33	5.21***
First grade	0.41	0.48	0.52	0.53	0.28	0.37	6.00***
Second grade	0.41	0.47	0.52	0.50	0.29	0.42	5.58***
Third grade	0.39	0.46	0.51	0.50	0.25	0.36	6.60***
Fourth grade	0.38	0.47	0.51	0.52	0.24	0.37	6.54***
Fifth grade	0.40	0.46	0.53	0.50	0.26	0.36	6.50***

Table 1 (*cont.*)

	All ($N = 543$)		Male ($n = 282$)		Female ($n = 261$)		
	Mean	*SD*	Male	*SD*	Female	*SD*	*t* Test/χ^2
Sixth grade	0.38	0.47	0.51	0.51	0.24	0.39	6.17***
Seventh grade	0.38	0.48	0.49	0.51	0.27	0.43	4.76***
Eighth grade	0.41	0.51	0.54	0.54	0.27	0.44	5.36***
Emotion dysregulation							
Kindergarten	0.11	0.24	0.13	0.27	0.10	0.20	1.44, *ns*
First grade	0.15	0.33	0.17	0.35	0.13	0.30	1.41, *ns*
Second grade	0.14	0.32	0.15	0.32	0.14	0.31	0.36, *ns*
Third grade	0.15	0.31	0.18	0.35	0.12	0.25	2.23*
Fourth grade	0.15	0.30	0.19	0.35	0.11	0.24	2.75**
Fifth grade	0.17	0.32	0.20	0.36	0.14	0.26	2.04*
Sixth grade	0.18	0.35	0.20	0.35	0.17	0.36	0.95, *ns*
Seventh grade	0.14	0.31	0.15	0.32	0.14	0.30	0.26, *ns*
Eighth grade	0.17	0.33	0.17	0.32	0.17	0.35	−0.11, *ns*

Note: SES, socioeconomic status.
*$p < .05$. **$p < .01$. ***$p < .001$.

was examined separately within each wave in order to confirm that items loaded on discrete structural components. Initial CFAs were performed for the full sample and then separately by gender. Model fit for each CFA was assessed using χ^2 and standard fit indices such as the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR; Hu & Bentler, 1999; McDonald & Ho, 2002).

According to traditional fit statistic interpretation, models with generally "good" fit have nonsignificant χ^2s (CFI > 0.95, RMSEA < 0.05, SRMR < 0.05). Models with "moderate" fit typically have nonsignificant or significant χ^2s ($\chi^2/df < 3$, CFI > 0.90, RMSEA < 0.08, and SRMR < 0.08). All models included robust maximum likelihood estimation (MLR) in order to account for potential nonnormativeness in the factor indicators.

Next, growth modeling was performed using Mplus 5.2 (Muthén & Muthén, 2008); missing data were accounted for through full-information maximum likelihood estimation in Mplus (Schafer & Graham, 2002). In addition, in all models, MLR estimation was used to account for possible bias in estimates due to deviations in multivariate normality across the measured indicators or created subfactors. It is not possible to directly compare nested models using traditional χ^2 difference tests with statistics resulting from models with MLR estimation; therefore, the Satorra–Bentler scaled χ^2 difference test was used for model comparisons (Satorra, 2000) as described on the Mplus website (www.statmodel.com).

The first step in these analyses was to use latent growth curve models for each subscale across the nine time points in order to identify the functional form of growth for that particular construct. Because of the timing of data collection, the model estimated kindergarten as Time 0 (initial status) through eighth grade (as Time 8). In all models, SES and race were included as covariates, with the intercepts and slopes for each construct regressed onto the SES variable and a dummy variable identifying African American children (see Figure 1 for a depiction of the analytic model). Our a priori hypothesis regarding the functional form of growth was that there would be three developmentally appropriate growth periods: early school age (kindergarten to second grade), late school age (third to fifth grade), and early adolescence (sixth to eighth grade). Therefore, all scores were analyzed using piecewise regression with a single intercept (identifying initial status at kindergarten) and three slopes, one for each developmental period.[1] In order to determine whether the piecewise model was justified, the slopes for the three pieces were constrained to be equal and the model fit for this nested model was compared to one in which the slope parameters were free to vary across the three pieces.

Initially we examined an unconditional model with only the fixed and random effects and no demographic covariates. Based on the significant random effects estimates, which justified adding covariates, we then added SES (as measured with the Hollingshead) and ethnicity (a dummy variable scored 1 for African Americans and 0 for European Americans) and regressed each of the four growth parameters (the intercept and three slopes) on these two demographic covariates (see Table 2).

Finally, in order to examine moderation by gender, each model was tested on the sample together and split by gender. In the models split by gender, further multiple group analyses were performed through the use of constraining the parameters (intercepts and then slopes), to be equal across the gender groups in order to identify gender differences in initial status and growth for each of the five subdimensions of behavior.

1. Linear and quadratic models were also estimated with the five subscales and the total externalizing measure. However, because of the large number of time points (nine) and variation in the scale means across time, the a priori hypothesis of three growth periods was considered the most parsimonious. This is consistent with recent papers using growth curve modeling with a large number of time points (e.g., Curran et al., 2008).

https://doi.org/10.1017/S0954579413000199 Published online by Cambridge University Press

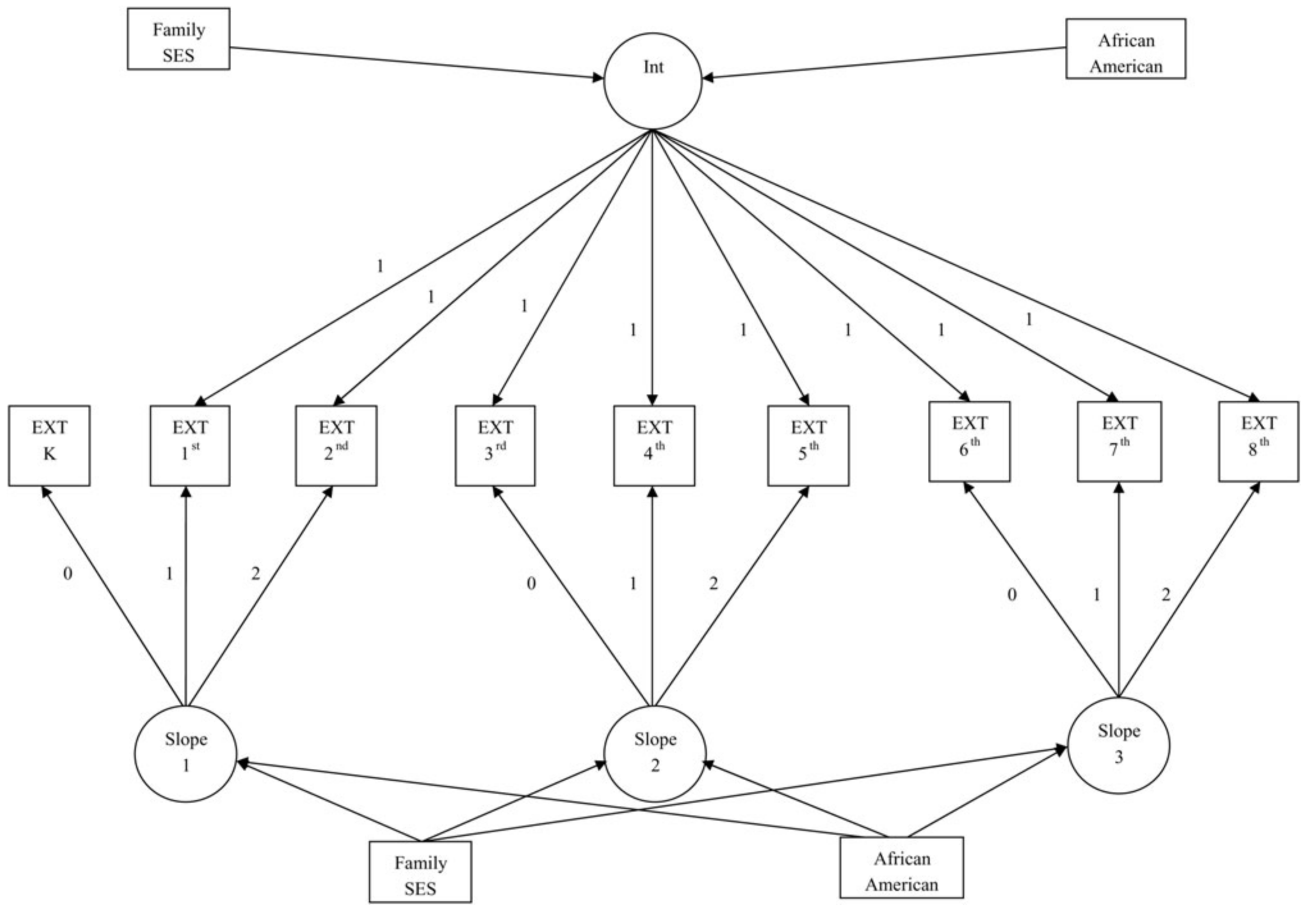

Figure 1. The conceptual figure of the piecewise growth model, conditioned on socioeconomic status and race.

Results

Descriptive analyses

Preliminary analyses were performed to examine potential differences between those with complete and incomplete data across the nine waves of data. We examined potential bias in missingness by gender (male vs. female), ethnicity (European vs. African American) and SES (as measured by the Hollingshead) using χ^2 and *t* tests for the missing versus nonmissing samples. The nonmissing sample was defined as those individuals who had three or more valid waves of data for each of the five subscales. Missing data analyses of SES, race, and gender characteristics between the included and excluded sample were not significant. In addition, for the problem behavior items that had sufficient data for the excluded sample, independent samples *t* tests were performed for the included versus excluded sample. None of these comparisons were significant, suggesting that patterns of missing data were not systemically related to study variables.

Mean differences across gender were assessed using *t* tests of each subscale within each time point (see Table 1). In the majority of problem behavior subscale comparisons, boys had significantly higher scores than girls. Given these mean-level differences, the next question concerned whether the pattern of interrelationships among the subscales also would differ by gender, providing justification for examining the moderation of growth by gender in the analyses. Confirmatory factor analyses of the subscales also were performed in order to confirm the reliability of the measures. The CFA models revealed that the subscales had moderate to good fit indices and thus were adequately measuring these latent constructs. (See Appendix A, Table A.1, for the reliabilities, range of subscale loadings, subscale intercorrelations, and fit indices for the CFA models.) Intercorrelations between subscales suggested that the majority were related yet distinct constructs. However, this was not true for inattention/impulsivity and oppositional defiant behavior, which had extremely high levels of co-occurrence across all waves.

Growth models

A major goal was to determine whether growth in the externalizing subscales differed from growth in the externalizing total score. Figure 2 provides a graphic illustration of these patterns, using mean scores. Table 2 and Table 3 present the unstandardized, standardized, and standard error estimates for both the

https://doi.org/10.1017/S0954579413000199 Published online by Cambridge University Press

Table 2. *Fit statistics, unstandardized, and standardized growth curve parameters for subconstructs for the full model (males and females estimated together), controlling for SES and ethnicity*

	Covert Aggression*		Overt Aggression		Oppositional Defiant		Emotion Dysregulation*		Inattention/ Impulsivity		Total Externalizing	
	US	S	US	S	US	S	US	S	US	S	US	S
Fixed Effects												
Intercept	**0.21*****	**1.15**	**0.25*****	**1.24**	**0.58*****	**1.63**	**0.25*****	**1.56**	**0.64*****	**1.90**	**0.43*****	**1.81**
	(0.05)		(0.05)		(0.07)		(0.04)		(0.07)		(0.05)	
SES	−0.00**	−0.24	−0.00**	−0.23	−0.01***	−0.28	−0.00***	−0.27	−0.01***	−0.33	−0.01**	−0.32
	(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)	
Black	−0.01	−0.01	−0.04	−0.08	−0.07	−0.08	−0.04	−0.10	−0.07	−0.08	−0.05	−0.08
	(0.04)		(0.04)		(0.06)		(0.03)		(0.05)		(0.04)	
Slope 1	**0.08****	1.13	0.03	0.31	0.03	0.27	0.03	0.40	0.03	0.34	0.04	0.49
	(0.03)		(0.03)		(0.03)		(0.03)		(0.03)		(0.02)	
SES	−0.00**	−0.31	−0.00	−0.12	0.00	−0.05	−0.00	−0.12	0.00	0.01	−0.00	−0.10
	(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)	
Black	0.01	0.07	0.06*	0.21	0.07*	0.26	0.06**	0.32	0.04	0.15	0.05*	0.24
	(0.02)		(0.03)		(0.03)		(0.02)		(0.03)		(0.02)	
Slope 2	**−0.07****	**−1.65**	−0.03	−0.55	−0.03	−0.22	0.00	0.06	−0.03	−0.35	−0.02	−0.32
	(0.03)		(0.02)		(0.03)		(0.03)		(0.03)		(0.02)	
SES	0.00**	0.51	0.00	0.16	0.00	0.08	0.00	0.04	0.00	0.07	0.00	0.09
	(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)	
Black	0.03	0.24	0.03	0.16	0.06	0.21	0.01	0.08	**0.07****	**0.29**	0.05	0.23
	(0.02)		(0.02)		(0.03)		(0.02)		(0.03)		(0.02)	
Slope 3	0.01	0.15	0.03	0.34	**0.09***	**0.71**	0.03	0.87	**0.11****	0.92	**0.06***	0.81
	(0.03)		(0.03)		(0.04)		(0.03)		(0.04)		(0.03)	
SES	0.00	−0.06	−0.00	−0.13	−0.00*	−0.21	−0.00	−0.35	−0.00*	−0.25	−0.00*	−0.25
	(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)	
Black	−0.01	−0.06	−0.03	−0.12	−0.01	−0.02	0.00	0.02	−0.04	−0.11	−0.02	−0.10
	(0.02)		(0.03)		(0.04)		(0.03)		(0.04)		(0.03)	
Random Effects												
Var, intercept	0.03*		0.04**		0.12***		0.02*		0.10***		0.05***	
	(0.02)		(0.01)		(0.02)		(0.01)		(0.02)		(0.01)	
Var, Slope 1	0.00		0.01**		0.01		0.01		0.01*		0.01*	
	(0.00)		(0.00)		(0.01)		(0.00)		(0.00)		(0.00)	
Var, Slope 2	0.00		0.00		0.01***		0.00*		0.01**		0.001**	
	(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)	
Var, Slope 3	0.00		0.01		0.02*		0.00		0.01*		0.01	
	(0.00)		(0.00)		(0.01)		(0.00)		(0.01)		(0.00)	
Fit Statistics												
	χ^2 (41) = 62.68*		χ^2 (41) = 61.51*		χ^2 (41) = 50.86		χ^2 (41) = 57.85*		χ^2 (41) = 70.09**		χ^2 (41) = 53.95	
	χ^2/df = 1.53		χ^2/df = 1.50		χ^2/df = 1.24		χ^2/df = 1.41		χ^2/df = 1.71		χ^2/df = 1.32	
	CFI = 0.94		CFI = 0.97		CFI = 0.99		CFI = 0.97		CFI = 0.98		CFI = 0.99	

Table 2 (*cont.*)

	Covert Aggression*		Overt Aggression		Oppositional Defiant		Emotion Dysregulation*		Inattention/ Impulsivity		Total Externalizing	
	US	S	US	S	US	S	US	S	US	S	US	S
	RMSEA = 0.03 SRMR = 0.05 MLR = 2.14		RMSEA = 0.03 SRMR = 0.05 MLR = 2.09		RMSEA = 0.02 SRMR = 0.03 MLR = 1.45		RMSEA = 0.03 SRMR = 0.04 MLR = 1.64		RMSEA = 0.04 SRMR = 0.03 MLR = 1.33		RMSEA = 0.02 SRMR = 0.03 MLR = 1.55	
Model Comparisons												
All slopes, constrained	χ^2 (43) = 71.12** MLR = 2.09		χ^2 (43) = 64.12* MLR = 2.06		χ^2 (43) = 54.13 MLR = 1.43		χ^2 (43) = 58.65 MLR = 1.63		χ^2 (43) = 75.88** MLR = 1.32		χ^2 (43) = 57.57 MLR = 1.53	
Adjusted χ^2 diff	**χ^2 (2) = 13.23***		χ^2 (2) = 2.44, *ns*		χ^2 (2) = 3.46, *ns*		χ^2 (2) = 0.38, *ns*		**χ^2 (2) = 6.33***		χ^2 (2) = 3.92, *ns*	
Slopes 1 and 2, constrained	χ^2 (42) = 70.16** MLR = 2.12		χ^2 (42) = 63.42* MLR = 2.08		χ^2 (42) = 51.88 MLR = 1.44		χ^2 (42) = 58.48* MLR = 1.63		χ^2 (42) = 71.94** MLR = 1.32		χ^2 (42) = 56.23 MLR = 1.54	
Adjusted χ^2 diff	**χ^2 (1) = 12.67*****		χ^2 (1) = 2.08, *ns*		χ^2 (1) = 0.96, *ns*		χ^2 (1) = 0.38, *ns*		χ^2 (1) = 1.89, *ns*		χ^2 (1) = 2.59, *ns*	
Slopes 1 and 3, constrained	χ^2 (42) = 65.22* MLR = 2.11		χ^2 (42) = 62.02 MLR = 2.07		χ^2 (42) = 52.41 MLR = 1.44		χ^2 (42) = 58.02 MLR = 1.64		χ^2 (42) = 72.48** MLR = 1.32		χ^2 (42) = 54.59 MLR = 1.54	
Adjusted χ^2 diff	**χ^2 (1) = 4.07***		χ^2 (1) = 0.01, *ns*		χ^2 (1) = 1.62, *ns*		χ^2 (1) = 0.00, *ns*		χ^2 (1) = 2.54, *ns*		χ^2 (1) = .39, *ns*	
Slope 2 and 3, constrained	χ^2 (42) = 64.70* MLR = 2.13		χ^2 (42) = 63.14* MLR = 2.08		χ^2 (42) = 53.78 MLR = 1.44		χ^2 (42) = 58.30* MLR = 1.68		χ^2 (42) = 75.49** MLR = 1.32		χ^2 (42) = 57.03 MLR = 1.54	
Adjusted χ^2 diff	χ^2 (1) = 2.23, *ns*		χ^2 (1) = 1.68, *ns*		χ^2 (1) = 3.19, *ns*		χ^2 (1) = 0.26, *ns*		**χ^2 (1) = 6.24***		χ^2 (1) = 3.56, *ns*	

Note: All model comparisons are relative to the fit statistics for the unconstrained conditional model with males and females estimated together and used the Satorra–Bentler adjusted chi − square comparison test. Standard errors are in parentheses. SES, socioeconomic status; US, unstandardized estimates; S, standardized estimates; CFI, comparative fit index, RMSEA, root mean square error of approximation, SRMR, standardized root mean square residual; MLR, maximum likelihood robust.
*$p <. 05$. **$p < .01$. ***$p < .001$.

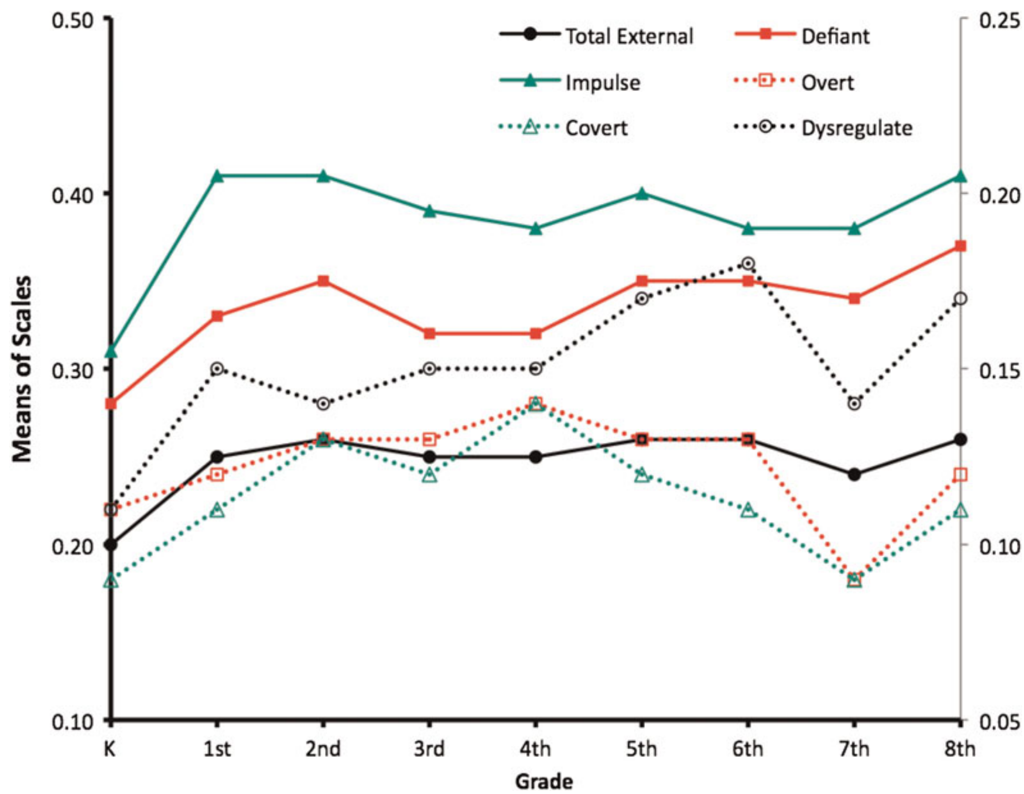

Figure 2. Externalizing aggression and subscales from kindergarten to eighth grade (overall). Solid lines use the scale on the left *y* axis, and dotted lines use the scale on the right *y* axis. [A color version of this figure can be viewed online at http://journals.cambridge.org/dpp]

fixed effects (the means/intercepts for the four growth parameters) and the random effects (the variance for each of the four growth terms). Table 2 presents the results from the model with SES and ethnicity, and Table 3 reports the same model, analyzed separately by gender. The fit statistics for each model are included below the variance estimates. The bottom halves of Tables 2 and 3 also present the results from comparison models in which the estimates for the three slope growth parameters were held equal in order to evaluate whether the slopes for the three developmental periods were the same or suggested significantly different growth patterns. The fit statistics for these nested models are presented with the results from the χ^2 difference test (with the Satorra–Bentler adjustment) appearing directly below the fit statistics. Each of these constrained nested models was compared to the original model in which the three slope terms were unconstrained.

Unconditional models. The fit statistics suggested that the unconditional models fit the data relatively well (all CFIs $>$ 0.94, all RMSEAs $<$ 0.06; see Appendix A, Table A.2). The total problem score and all of the subscales had significant intercept estimates, interpreted as the initial status of each construct at kindergarten being significantly greater than zero. In addition, all of the subscales had significant and positive growth terms for the first early school-age slope (kindergarten to second grade), with the exception of overt aggression. All of the subscales, except for overt aggression, significantly increased from kindergarten to second grade. In the second school-age slope (third to fifth grade), only emotion dysregulation had a significant slope estimate, increasing from third to fifth grade. None of the subscales demonstrated significant growth (positive or negative) in the third developmental period (sixth to eighth grade). Follow-up model comparisons that constrained the first slope piece to be equal to the other growth periods resulted in significantly worse fitting models for all constructs except oppositional defiant behavior. These comparisons suggested that most constructs of externalizing behavior increased significantly across the early childhood period relative to middle childhood and early adolescence. Almost all of the parameter estimates for the random effects (the variances of the growth parameters) were significantly different from zero, suggesting that there was unexplained variability in the growth terms.

Conditional models. Given this unexplained variability in the growth parameters, in subsequent models we added SES and ethnicity as predictors of each of the fixed effects growth terms. As seen in Table 2, for all of the models SES was significantly associated with the initial behavior status at kindergarten; individuals from higher SES backgrounds had significantly lower levels of all scores. The effect of SES was similar in magnitude across the measures (standardized βs = –0.23 to –0.35). When we examined the slopes, there was only one significant relation between SES and growth during both early school age and late

Table 3. *Fit statistics and standardized for growth curve parameters for subconstructs for males and females estimated separately, controlling for SES and ethnicity*

	Covert Aggression*				Overt Aggression*				Oppositional Defiant			
	Male*		Female		Male*		Female		Male		Female	
	US	S	US	S	US	S	US	S	US	S	US	S
Fixed Effects												
Intercept	**0.21*** **	**1.38**	**0.21** **	**0.95**	**0.33*** **	**1.48**	**0.17***	**1.04**	**0.74*** **	**1.89**	**0.43*** **	**1.45**
	(0.06)		(0.08)		(0.30)		(0.07)		(0.11)		(0.09)	
SES	−0.00**	−0.27	−0.00*	−0.21	−0.00**	−0.28	−0.00	−0.19	−0.01***	−0.33	−0.01**	−0.26
	(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)	
Black	−0.04	−0.09	0.03	0.05	−0.08	−0.13	−0.01	−0.02	−0.09	−0.09	−0.05	−0.06
	(0.05)		(0.06)		(0.06)		(0.05)		(0.10)		(0.07)	
Slope 1	**0.08***	**1.80**	0.07	0.76	0.01	0.11	0.04	0.48	0.03	0.30	0.03	0.25
	(0.09)		(0.04)		(0.04)		(0.04)		(0.05)		(0.04)	
SES	−0.00*	−0.50	−0.00†	−0.20	0.00	−0.06	−0.00	−0.17	0.00	0.02	−0.00	−0.12
	(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)	
Black	0.03	0.26	−0.00	−0.02	0.09*	0.29	0.02	0.10	0.08	0.33	0.05	0.17
	(0.09)		(0.04)		(0.04)		(0.03)		(0.04)		(0.04)	
Slope 2	−0.04	−1.13	**−0.09***	**−1.65**	−0.01	−0.25	−0.06	−0.76	0.02	0.16	−0.06	−0.59
	(0.04)		(0.04)		(0.04)		(0.03)		(0.05)		(0.04)	
SES	0.00	0.37	0.00*	0.49	0.00	0.08	0.00	0.22	0.00	−0.04	0.00†	0.19
			(0.00)		(0.00)		(0.00)		(0.00)		(0.00)	
Black	0.03	0.28	0.03	0.18	0.02	0.12	0.04	0.18	0.06	0.17	0.08†	0.29
	(0.03)		(0.03)		(0.04)		(0.03)		(0.05)		(0.04)	
Slope 3	0.05	10.56	−0.03	−0.36	0.05	10.32	0.03	0.24	**0.15***	**1.13**	0.04	0.34
	(0.05)		(0.03)		(0.05)		(0.04)		(0.07)		(0.05)	
SES	−0.00	−0.39	0.00	0.05	−0.00	−0.56	−0.00	−0.05	−0.00*	−0.35	−0.00	−0.08
	(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)	
Black	−0.01	−0.11	−0.00	−0.02	−0.04	−0.36	−0.02	−0.05	−0.04	−0.10	0.02	0.05
	(0.04)		(0.03)		(0.04)		(0.04)		(0.06)		(0.05)	
Random Effects												
Var, intercept	0.02*		0.05†		0.05**		0.02		0.14***		0.08**	
	(0.01)		(0.03)		(0.02)		(0.02)		(0.03)		(0.03)	
	US		US		US		US		US		US	
Var, Slope 1	0.00[a]		0.01		0.01*		0.01		0.01		0.01†	
	(0.00)		(0.01)		(0.01)		(0.01)		(0.01)		(0.01)	
Var, Slope 2	0.00[a]		0.00		0.00		0.01*		0.02*		0.01**	
	(0.00)		(0.00)		(0.00)		(0.00)		(0.01)		(0.00)	
Var, Slope 3	0.00[a]		0.01		0.00[a]		0.02*		0.02		0.02†	
	(0.00)		(0.01)		(0.00)		(0.01)		(0.01)		(0.01)	

Fit Statistics												
	χ^2 (85) = 123.10**; MLR = 1.94 CFI = 0.91, RMSEA = 0.04, SRMR = 0.07				χ^2 (83) = 112.40*; MLR = 1.97 CFI = 0.95, RMSEA = 0.04, SRMR = 0.07				χ^2 (82) = 92.75; MLR = 1.43 CFI = 0.99, RMSEA = 0.02, SRMR = 0.04			
Model Comparisons												
Intercepts, constrained	χ^2 (86) = 123.45* MLR = 1.94				χ^2 (84) = 114.96* MLR = 1.97				χ^2 (83) = 97.07 MLR = 1.43			
Adjusted χ^2 diff	χ^2 (1) = 0.05, *ns*				χ^2 (1) = 2.68, *ns*				**χ^2 (1) = 4.98***			
Slope 1, constrained	χ^2 (86) = 123.68** MLR = 1.93				χ^2 (84) = 112.96* MLR = 1.96				χ^2 (83) = 93.00 MLR = 1.43			
Adjusted χ^2 diff	χ^2 (1) = 0.02, *ns*				χ^2 (1) = 0.30, *ns*				χ^2 (1) = 0.02, *ns*			
Slope 2, constrained	χ^2 (86) = 124.42** MLR = 1.93				χ^2 (84) = 113.51* MLR = 1.96				χ^2 (83) = 94.35 MLR = 1.43			
Adjusted χ^2 diff	χ^2 (1) = 1.23, *ns*				χ^2 (1) = 0.97, *ns*				χ^2 (1) = 1.84, *ns*			
Slope 3, constrained	χ^2 (86) = 124.75** MLR = 1.93				χ^2 (84) = 112.98* MLR = 1.96				χ^2 (83) = 94.21 MLR = 1.43			
Adjusted χ^2 diff	χ^2 (1) = 1.76, *ns*				χ^2 (1) = 0.10, *ns*				χ^2 (1) = 1.56, *ns*			
	Emotion Dysregulation*				Inattention/Impulsivity				Total Aggression			
	Male		Female*		Male		Female		Male*		Female	
	US	S	US	S	US	S	US	S	US	S	US	S
Fixed Effects												
Intercept	**0.30*** ** (0.07)	**1.56**	**0.20*** ** (0.05)	**1.73**	**0.82*** ** (0.10)	**2.33**	**0.47*** ** (0.07)	**1.65**	**0.53*** ** (0.07)	**2.11**	**0.33*** ** (0.06)	**1.67**
SES	−0.00** (0.00)	−0.29	−0.00* (0.00)	−0.29	−0.01*** (0.00)	−0.39	−0.01*** (0.00)	−0.31	−0.01** (0.00)	−0.36	−0.00*** (0.00)	−0.31
Black	−0.07 (0.05)	−0.13	−0.02 (0.04)	−0.05	−0.11 (0.09)	−0.11	−0.02 (0.06)	−0.03	−0.08 (0.06)	−0.11	−0.02 (0.05)	−0.04
Slope 1	0.02 (0.04)	0.19	0.03 (0.03)	0.86	0.03 (0.05)	0.42	0.03 (0.04)	0.31	0.04 (0.04)	0.48	0.04 (0.03)	0.48
SES	0.00 (0.00)	−0.05	−0.00 (0.00)	−0.30	0.00 (0.00)	0.05	0.00 (0.00)	−0.03	0.00 (0.00)	−0.05	−0.00 (0.00)	−0.13
Black	0.08* (0.03)	0.31	0.04 (0.02)	0.40	0.06 (0.04)	0.27	0.01 (0.03)	0.05	0.07** (0.03)	0.33	0.02 (0.03)	0.12
Slope 2	0.03 (0.04)	0.44	−0.03 (0.03)	−0.34	0.00 (0.05)	0.02	**−0.06*** (0.03)	−0.82	0.01 (0.04)	0.16	**−0.06*** (0.03)	−0.87
SES	0.00 (0.00)	−0.07	0.00 (0.00)	0.16	0.00 (0.00)	−0.02	0.00 (0.00)	0.18	0.00 (0.00)	−0.05	0.00* (0.00)	0.26
Black	0.02 (0.04)	0.12	0.01 (0.03)	0.06	0.06 (0.05)	0.20	0.09* (0.03)	0.45	0.04 (0.04)	0.18	0.06 (0.03)	0.34

Table 3 (*cont.*)

	Emotion Dysregulation*				Inattention/Impulsivity				Total Aggression			
	Male		Female*		Male		Female		Male*		Female	
	US	S	US	S	US	S	US	S	US	S	US	S
Slope 3	0.03	0.42	0.04	1.20	**0.17***	1.24	0.05	0.47	0.09	1.24	0.04	0.52
	(0.05)		(0.04)		(0.07)		(0.05)		(0.05)		(0.03)	
SES	−0.00	−0.21	−0.00	−0.36	−0.00*	−0.36	−0.00	−0.11	−0.00*	−0.40	−0.00	−0.14
	(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)	
Black	−0.03	−0.13	0.02	0.23	−0.08	−0.21	0.00	0.00	−0.04	−0.19	−0.00	−0.02
	(0.05)		(0.04)		(0.06)		(0.05)		(0.04)		(0.04)	
Random Effects												
Var, intercept	0.03		0.01†		0.11***		0.07***		0.06***		0.04**	
	(0.02)		(0.01)		(0.02)		(0.02)		(0.01)		(0.01)	
Var, Slope 1	0.01		0.00		0.01		0.01*		0.01		0.01*	
	(0.01)		(0.00)		(0.01)		(0.00)		(0.00)		(0.00)	
Var, Slope 2	0.00		0.01*		0.01**		0.00		0.01*		0.00*	
	(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)	
Var, Slope 3	0.01		0.00[a]		0.02		0.01*		0.01		0.01	
	(0.01)		(0.00)		(0.01)		(0.01)		(0.01)		(0.00)	

	Emotion Dysregulation*	Inattention/Impulsivity	Total Aggression
Fit Statistics	χ^2 (83) = 127.59**; MLR = 1.53 CFI = 0.93, RMSEA = 0.04, SRMR = 0.06	χ^2 (82) = 116.70**; MLR = 1.33 CFI = 0.97, RMSEA = 0.04, SRMR = 0.05	χ^2 (82) = 114.65*; MLR = 1.46 CFI = 00.98, RMSEA = 00.04, SRMR = 00.05
Model Comparisons			
Intercepts, constrained	χ^2 (84) = 129.16** MLR = 1.53	χ^2 (83) = 123.47** MLR = 1.33	χ^2 (83) = 119.01** MLR = 1.46
Adjusted χ^2 diff	χ^2 (1) = 1.57, *ns*	**χ^2 (1) = 6.77****	**χ^2 (1) = 4.53***
Slope 1, constrained	χ^2 (84) = 127.72** MLR = 1.53	χ^2 (83) = 116.95** MLR = 1.33	χ^2 (83) = 114.88* MLR = 1.46
Adjusted χ^2 diff	χ^2 (1) = 0.13, *ns*	χ^2 (1) = 0.02, *ns*	χ^2 (1) = 0.01, *ns*
Slope 2, constrained	χ^2 (84) = 128.70** MLR = 1.53	χ^2 (83) = 117.98** MLR = 1.32	χ^2 (83) = 117.03** MLR = 1.46
Adjusted χ^2 diff	χ^2 (1) = 1.09, *ns*	χ^2 (1) = 1.24, *ns*	χ^2 (1) = 2.88, *ns*
Slope 3, constrained	χ^2 (84) = 127.84** MLR = 1.53	χ^2 (83) = 118.77** MLR = 1.32	χ^2 (83) = 115.41* MLR = 1.46
Adjusted χ^2 diff	χ^2 (1) = 0.09, *ns*	χ^2 (1) = 2.36, *ns*	χ^2 (1) = 0.58, *ns*

Note: All model comparisons are relative to the fit statistics for the unconstrained conditional model with gender estimated separately and used the Satorra–Bentler adjusted chi-square comparison test. For the constrained models, the estimate for males was constrained to be the same as for females. Standard errors are in parentheses. SES, socioeconomic status; US, unstandardized estimates; S, standardized estimates; CFI, comparative fit index, RMSEA, root mean square error of approximation, SRMR, standardized root mean square residual; MLR, maximum likelihood robust.
†$p < .01$. *$p < .05$. **$p < .01$. ***$p < .001$.

school age, an increase in covert aggression. However, during early adolescence, there was a significant negative relation (standardized βs = –0.21 to –0.25, all *p*s < .05), such that students from higher SES households manifested a decreased rate of growth (less problem behavior) in total score, oppositional defiant, and impulsivity/inattention behaviors relative to students from lower SES households. This was not evident in the covert and overt aggression or emotional dysregulation scores during this period.

Ethnicity was not significantly related to the initial behavior status. However, being African American was significantly associated with higher slopes across early school age in four of the six models. African American students experienced a significantly steeper, positive slope for total problem score, overt aggression, oppositional defiant behavior, and emotional dysregulation but not covert aggression or impulsivity/inattention. The magnitude of the significant relations was similar across the constructs (standardized βs = 0.21 to 0.32, all *p*s < .05). After early school age only oppositional defiant continued to show positive growth into late school age (β = 0.21, *p* = .05) but now joined by positive growth in impulsivity/inattention (β = 0.29, *p* < .01). By early adolescence (sixth to eighth grade), there were no significant relations between growth and ethnicity on any scale.

With respect to the growth patterns for the constructs, once controls for SES and ethnicity were included, some of the significant growth terms seen in the unconditional models were not present. However, there were a few parameters that were not present in the unconditional model that emerged in the controlled models. Covert aggression had a significant positive slope estimate for early school age. Conversely, during late school age there was a significant negative slope for covert aggression. Finally, the slopes for impulsivity/inattention remained fairly stable until early adolescence, when a significant, positive slope emerged. Oppositional defiant behaviors also followed a similar form with nonsignificant slope terms until early adolescence, during which defiant behaviors significantly increased. Our follow-up model comparisons, which evaluated changes in slope across the three periods versus constraining this growth to be the same, resulted in significantly worse fitting models for covert aggression and impulsivity/inattention. These results show that assuming a similar growth pattern across the entire developmental period between kindergarten and eighth grade did not accurately capture the functional changes in development occurring during this time. In addition, it is useful to note that if we were simply examining the functional form of the total externalizing problem scale, we would not have detected these developmental variations; none of the growth terms in this model were significant. Disaggregating externalizing behaviors into these more specified components allowed the unique patterns to emerge. The fit statistics for these models also suggested moderate to good fit (all CFIs > 0.94, all RMSEAs < 0.036).

Moderation by gender. Given the gender differences that emerged in our initial *t* tests of each of the measures (boys > girls), our next step was to examine the models controlling for SES/ethnicity with males and females estimated separately.[2] Table 3 provides the estimates for both the fixed and the random effects. There were some gender differences in initial status; specifically, oppositional defiant behavior, impulsivity/inattention, and the total externalizing problem constructs had significantly worse fitting models when the intercepts were constrained to be equal across gender. With respect to growth, however, we did not see strong gender differences in our slope terms (the adjusted χ^2 difference tests for the models with the slopes constrained versus unconstrained were nonsignificant, suggesting models with equally good fit). Thus, no further analyses were conducted.

Discussion

Our primary goal was to determine how the developmental course of salient subcomponents of the broad externalizing problems spectrum differed across the school years spanning kindergarten through eighth grade. In preliminary analyses, we established the internal reliability of five subdimensions of problem behavior that had identical item content across the developmental period spanning school entry through early adolescence. Items corresponding to overt aggression, covert aggression, oppositional defiant behavior, impulsivity/inattention, and emotion dysregulation were composited into identical subscales within each successive year of development. CFA performed within each wave indicated that all five subdimensions of child problem behavior showed acceptable levels of internal reliability across the nine successive years of teacher ratings. Moreover, intercorrelations between different subscales across the nine waves of teacher ratings indicated that the majority of measures were related but distinct constructs. A notable exception was found for intercorrelations between symptoms of oppositional defiant and inattentive/impulsive behavior, which were extremely high. These findings converged with those of prior studies showing extremely high levels of co-occurrence between symptoms of oppositional and inattentive/impulsive behaviors (e.g., Lubke et al., 2007; Rommelse et al., 2009). In the current study, that intercorrelations above .90 were found across all waves, beginning in kindergarten, suggested that individual differences in these two types of problem behaviors become intertwined at an early age and remain so across significant expanses of development. It would be fascinating to study the developmental sequencing and etiology of these co-occurrences. One genetically informed study indicated that symptoms of oppositional defiant disorder and attention-deficit/hyperactivity disorder were strongly intercorrelated at the level of behavioral phenotypes, but they did not map onto a shared endophenotype (Rommelse et al., 2009). Further research is needed.

2. See Table A.3 in Appendix A for the results from the model with all growth parameters regressed on SES, ethnicity, and gender, which further justified the examination of gender as a moderator.

We hypothesized that individual differences in the growth of each problem behavior subdimension would map onto three distinct growth periods reflecting key developmental transitions: early school age (kindergarten–second grade), late school age (third through fifth grades), and early adolescence (sixth through eighth grades). Therefore, growth was analyzed using piecewise regression with a single intercept (initial status at kindergarten) and three slopes that corresponded to each different period. In addition to reflecting a priori hypotheses about significant transition periods in development, this practice also was consistent with recent approaches to growth modeling across a large number of time points (Curran et al., 2008). Subsequent analyses confirmed that alternative models (e.g., linear and quadratic functions) did not adequately fit growth patterns in these data and that retaining three separate slopes provided a better estimate of individual growth than retaining fewer slope functions. However, patterns of growth between the subconstructs were more similar than different, with notable exceptions. All of the scales (including the total score) had significant and positive growth across the first slope (kindergarten through second grade) except for overt aggression. Within the second slope piece, Grades 3 through 5, only emotion dysregulation continued to have a significantly positive slope. Finally, no subconstructs of problem behavior had significant slopes between sixth and eighth grades. In further analyses, we examined change in slopes across all three periods by constraining the slopes of the first piece to be equal to the others. This resulted in significantly worse fitting models for covert aggression and impulsivity/inattention.

Thus, taking a developmental approach to the description of growth trends in children's externalizing problem behaviors was strongly supported. Assuming similar patterns across the entire developmental period did not capture changes in the growth of symptoms that occurred between these three different developmental periods. Moreover, had we used a total score index, these differential growth trends between different time periods would not have emerged.

Our findings have implications for preventive efforts with at-risk children. For example, knowing that growth in most aspects of externalizing behavior occurred between kindergarten and second grade supports arguments for intervening during or prior to school entry. It also was fascinating that individual differences in overt aggression did not follow the early growth trend that other components showed, suggesting the importance of addressing high levels of overt aggression well before school entry.

Another research goal was to provide a basis for examining whether growth in subcomponents of externalizing behavior had different predictors. As an example, we tested whether two important family background measures, SES and ethnicity, differentially impacted individual differences in the growth of subdimensions of child and adolescent externalizing problems. Preliminary analyses suggested the desirability of adding major demographic covariates to each model. For example, examination of the variances of the growth parameters revealed significant levels of unexplained variability across development. Thus, family SES and ethnicity were added as predictors of fixed growth effects. For all constructs, family SES was associated with initial behavior status (i.e., kindergarten level ratings of maladjustment), but only one subscale (covert aggression) had initial growth that was predicted by family SES, in a positive direction. However, by early adolescence, family SES was associated with negative growth in oppositional defiant behaviors and impulsivity/inattention: students in higher SES households manifested declining levels of oppositional defiant behaviors and impulsivity/inattention relative to those in lower SES families. It is noteworthy that youths from higher SES families did not show declining levels of growth in covert aggression, overt aggression, or emotion dysregulation.

In prior analyses of the CDP, low family SES has been linked with teachers' ratings of child externalizing behavior in kindergarten though second grade (e.g., Dodge, Pettit, & Bates, 1994). The current analyses affirmed that children from low-SES households began kindergarten with heightened risk for all varieties of externalizing problem behavior; in other words, the adverse influence of socioeconomic disadvantage extended to the full spectrum of externalizing problem behaviors. However, our findings also showed that variations in family SES were most strongly linked with growth in some subdimensions of externalizing problems but not others. A surprising finding was that children from higher SES households showed more positive growth in covert aggression (lying and stealing) than those from lower SES households. This interesting and unexpected finding suggested that norms for covert aggressive behavior may differ from those for more overt forms, recalling the burgeoning literature on relational aggression (e.g., Murray-Close, Ostrov, & Crick, 2007) and research by Luthar and Goldstein (2008) showing that adolescents from high-SES families are at heightened risk for certain forms of covert antisocial behavior, especially abuse of illicit substances. A more predictable finding was that children from low-SES families were at elevated risk for growth in oppositional defiant behaviors and inattention/impulsivity during the tumultuous period between Grades 6 and 8. As a whole, these data were unique in showing that a major demographic risk factor was differentially related to growth in some subcomponents of the externalizing spectrum but not others; in the case of covert aggression, the direction of association differed from expectations based on global constructs of externalizing behavior.

Our findings regarding effects of family ethnicity on the growth of children's externalizing problems were fascinating and cautionary. In contrast with family SES, which was associated with a broad range of externalizing problems in kindergarten, African American and European American kindergartners did not differ significantly from one another on any externalizing problem index. However, according to their teachers, African American children manifested steeper positive slopes in behavior problems than children from European American backgrounds during the period spanning kin-

https://doi.org/10.1017/S0954579413000199 Published online by Cambridge University Press

dergarten through second grade. For oppositional defiance, this trend continued into middle childhood. By early adolescence, however, there were no significant associations between growth in problem behavior and the child's ethnicity. Because these risks were not evident in kindergarten, we must question what factors in the elementary school promoted relatively high levels of growth in externalizing problems among African American children (e.g., Spencer, 2006). Key risk factors may include racial discrimination (Brody et al., 2006); contextual features of children's classrooms, such as racial density and race of teacher (Jackson, Barth, Powell, & Lochmamm, 2006); differences in educational opportunity structures for children from racial minority backgrounds; and/or differences in patterns of family support of educational involvement (e.g., McLoyd, 2004). Early externalizing problems may set some children on a pathway to "cascading" patterns of adjustment problems in later childhood and adolescence (e.g., Dodge, Greenberg, Malone, & the Conduct Problems Prevention Research Group, 2008). This sobering finding indicates the need for further research into risk and protective factors associated with declining levels of early school adjustment among young African American children.

Finally, given the high importance of child gender as a moderator of the development of externalizing symptoms (e.g., Crick & Zahn-Waxler, 2003; Keenan & Shaw, 2003), gender was examined as a potential moderator of initial levels and growth in each problem behavior subscale. Controlling for family SES and ethnicity, we examined growth in the five subdimensions of problem behavior, with boys and girls estimated separately. There were predictable differences between boys and girls in initial behavior problem status: boys exceeded girls in kindergarten levels of oppositional defiance, impulsivity/inattention, and overall externalizing problems. However, examination of individual growth in overall levels and subdimensions of externalizing problem behavior did not reveal strong evidence for sex-differentiated patterns of change.

Strengths and limitations

This exploratory study had several noteworthy strengths and limitations. A major strength was the availability of a large sample of children who were tracked across the entire school-age period and assessed at yearly intervals by different raters. Moreover, the sample contained significant levels of diversity in child gender, family ethnicity, and SES. These features provided an ideal basis for examining growth in children's problem behavior across three significant transition points in development and for relating growth patterns of specific problem behavior subcomponents to key distal risk factors.

As noted earlier, our omnibus index of externalizing problem behavior was idiosyncratic to this study, used as a heuristic for examining the relative advantages of broad versus narrow measures of child externalizing spectrum behavior. We caution that our summary measure should not be confused with the broadband Externalizing Problems Scale of the TRF. Similarly, the five subcomponents of problem behavior highlighted in our study were based on theoretical issues and differed from narrowband scales derived in the development of the TRF.

Another limitation of the study was our exclusive reliance on teacher ratings of child externalizing behavior. Without further study, we do not know whether our findings would generalize to parent ratings of similar problem behavior constructs. Moreover, some scholars have argued that when different teachers rate the same child at different ages, this may introduce "noise" in the form of unmeasured variability in teacher characteristics (Greven, Asherson, Rijsdijk, & Plomin, 2011). It would be fascinating to conduct the same analyses with parent ratings of child externalizing behavior, and we plan to take this step with the current database.

Our assessment of covert aggression was limited. By definition, covert aggression is difficult to assess. Because we constructed item composites that were identical across all nine waves of data, our index contained only two items. That is, we had to use items that were as meaningful for kindergarteners as they were for eighth graders, excluding many of the usual adolescent-relevant forms of covert rule breaking. Given the paucity of research on the long-term growth of covert aggression, this effort provides a promising beginning, albeit one that should be followed with research using other samples and measures.

Similarly, although the emotion dysregulation subscale had sufficient items, the scale content bears further scrutiny in light of advances in knowledge of this important construct. For example, some may question the inclusion of an item such as "jealous behavior" as a valid index of dysregulated affect.

Finally, we combined inattentive and impulsive symptoms as a means of examining self-regulation problems that co-occurred with growth in different forms of aggressive and oppositional behavior. However, given that inattention and impulsivity have been treated as independent symptoms clusters in the DSM and have shown somewhat different growth patterns (e.g., Greven et al., 2011), a cogent argument could be made for breaking this subscale into two parts.[3] Likewise, our decision to segment children's development into three periods that corresponded to salient developmental transitions was fruitful. However, other ways of segmenting the developmental spectrum may be plausible as well.

3. We performed sensitivity analyses in order to test whether breaking the inattention/impulsivity scale into separate components would result in a better fitting model by constructing two CFA models with all the constructs within each wave, one in which inattention/impulsivity was a single scale with the items reflecting inattention correlated and one in which inattention and impulsivity were separated into distinct scales. With the exception of the seventh-grade wave, all of the χ^2 difference tests between these nested models suggested that the combined inattention/impulsivity model was a significantly better fitting models, all χ^2 (1) $\geq$ 5.93, $p <$ .05. In the seventh-grade wave, the model with separate inattention and impulsivity scales was significantly better fitting, χ^2 (1) = 11.03, $p <$ .001.

Conclusions and Implications

Large summary variables such as externalizing behavior are useful for aggregating a variety of related constructs that may be more predictive than the constructs considered separately. A potential drawback of this approach is that aggregation may mask a variety of separate time courses related to the biological and social development of the child. We found that whereas the overall externalizing problem score increased during the first few years of elementary school and remained flat after that, several subcomponents showed different patterns of increase and decrease across all three age periods, especially when SES and ethnicity were considered. There have been separate genetic polymorphisms, hormonal factors, and brain areas related to these subcomponents over time. In addition, the importance of social influences in the family, school, and peer group have been shown to wax and wane over time. An externalizing score may be a good summary of the child's behavior, but it may be far less useful for intervention and treatment where the causal chains become the targets.

Moreover, summary variables are subject to the endogeneity question in that there may be other factors that are producing the intercorrelations of items in the externalizing score. Sameroff (2000) discussed the complex issue of the nonrandomness of co-occurrences among mental health disorders. The more severely children were affected in any domain of psychopathology, the more likely they were to be affected in a variety of others. Thus, the more serious the disturbance, the more likely is co-occurrence not only between disorders but also among multiple deviant pathways within a disorder (Loeber et al., 1993).

To be clear, we are not arguing that "splitting" heterogeneous constructs of child externalizing behavior is always better than "lumping" them into an omnibus measure. Rather, we look to longitudinal data to tell us under what conditions does focusing on subconstructs of psychopathology give us more useful information than focusing on broader constructs. This is an empirical question.

Finally, our findings clearly indicated the necessity of applying a developmental perspective to the examination of growth in children's externalizing problems. With the exception of overt aggression, all subcomponents of externalizing problems showed the highest levels of positive growth between kindergarten and second grade. These data provide guideposts for future analyses of growth in problem behavior across the developmental period and affirm the early school-age period as an opportune time for preventive intervention. In the case of overt aggression, however, intervening well before school entry is strongly indicated.

References

Achenbach, T. M. (1991). *Manual for the Teacher's Report Form and l991 profile*. Burlington, VT: University of Vermont, Department of Psychiatry.

Achenbach, T. M., & Rescorla, L. A. (2001). *Manual for ASEBA school-age forms & profiles*. Burlington, VT: University of Vermont, Research Center for Children, Youth, & Families.

Alink, L., Mesman, J., vanZeijl, J., Stolk, M., Juffer, F., Koot, H., et al. (2006). The early childhood aggression curve: Development of physical aggression in 10- to 50-month-old children. *Child Development*, *77*, 954–966.

American Psychiatric Association. (2000). *Diagnostic and statistical manual for mental disorders* (4th ed., text rev.). Washington DC: Author.

Barker, E. D., Seguin, J. R., White, H. R., Bates, M. E., Lacurse, E., Carbonneau, R., et al. (2007). Developmental trajectories of male physical violence and theft. *Archives of General Psychiatry*, *64*, 592–599.

Beauchaine, T. P., & Neuhaus, E. (2008). Impulsivity and vulnerability to psychopathology. In T. P. Beauchaine & S. P. Hinshaw (Eds.), *Child and adolescent psychopathology*. Hoboken, NJ: Wiley.

Belden, A., Thompson, N., & Luby, J. (2008). Temper tantrums in healthy versus depressed and disruptive preschoolers: Defining tantrum behaviors associated with clinical problems. *Journal of Pediatrics*, *152*, 117–122.

Blandon, A., Calkins, S., Keane, S. P., & O'Brien, M. (2008). Individual differences in trajectories of emotion regulation processes: The effects of maternal symptomatology and children's physiological regulation. *Developmental Psychology*, *44*, 1110–1123.

Bradley, R. H., Corwyn, R. F., Burchinal, M., McAdoo, H., & Garcia Coll, C. (2001). The home environments of children in the United States: Part II. Relations with behavioral development through age thirteen. *Child Development*, *72*, 1868–1886.

Brody, G. H., Chen, Y.-F., Murry, V. M., Ge, X., Simons, R. L., Gibbon, F. X., et al. (2006). Perceived discrimination and the adjustment of African American youths: A five-year longitudinal analysis with contextual moderation effects. *Child Development*, *77*, 1170–1189.

Broidy, L. M., Nagin, D. S., Tremblay, R. E., Bates, J. E., Brame, B., Dodge, K., et al. (2003). Developmental trajectories of childhood disruptive behaviors and adolescent delinquency: A six-site, cross-national study. *Developmental Psychology*, *39*, 222–245.

Campbell, S. B., Shaw, D. S., & Gilliom, M. (2000). Early externalizing behavior problems: Toddlers and preschoolers at risk for later maladjustment. *Development and Psychopathology*, *12*, 467–488.

Charles, S. T., Reynolds, C. A., & Gatz, M. (2001). Age related changes in positive and negative affect over 23 years. *Journal of Personality and Social Psychology*, 80, 36–51.

Cicchetti, D. (2006). Developmental psychopathology. In D. Cicchetti & D. J. Cohen (Eds.), *Developmental psychopathology: Vol. 1. Theory and method* (2nd ed., pp. 1–23). Hoboken, NJ: Wiley.

Cole, P. M., Hall, S. E., & Radzioch, A. M. (2009). Emotion dysregulation and the development of serious misconduct. In S. L. Olson & A. J. Sameroff (Eds.), *Biopsychosocial regulatory processes in the development of childhood behavior problems* (pp. 186–211). New York: Cambridge University Press.

Cote, S., Vaillancourt, T., Leblanc, J. C., Nagin, D. S., Brendgen, M., & Tremblay, R. E. (2006). The development of physical aggression form toddlerhood to pre-adolescence: A nation-wide longitudinal study. *Journal of Abnormal Child Psychology*, *34*, 71–85.

Crick, N. R., & Zahn-Waxler, C. (2003). The development of psychopathology in females and males: Current progress and future challenges. *Development and Psychopathology*, *15*, 719–742.

Curran, P. J., Hussong, A. M., Cai, L., Huang, W., Chassin, L., Sher, K. J., et al. (2008). Pooling data from multiple longitudinal studies: The role of item response theory in integrative data analysis. *Developmental Psychology*, *44*, 365–380.

Curran, P. J., Obeidat, K., & Losardo, D. (2010). Twelve frequently asked questions about growth curve modeling. *Journal of Cognition and Development*, *11*, 121–136.

Dearing, E., McCartney, K., & Taylor, B. (2006). Within child associations between family income and externalizing and internalizing problems. *Developmental Psychology*, *42*, 237–252.

Deater-Deckard, K., Petrill, S., & Thompson, L. (2007). Anger/frustration, task persistence, and conduct problems in childhood: A behavioral genetic analysis. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *48*, 80–87.

Dick, D. M., Viken, R. J., Kaprio, J., Pulkkinen, L., & Rose, R. J. (2005). Understanding the covariation among childhood externalizing symptoms: Genetic and environmental influences on conduct disorder, attention deficit hyperactivity disorder, and oppositional defiant disorder symptoms. *Journal of Abnormal Child Psychology*, *33*, 219–229.

Dix, T., Stewart, A., Gershoff, E., & Day, W. (2007). Autonomy and children's reactions to being controlled: Evidence that both compliance and defiance may be positive markers in early development. *Child Development*, *78*, 1204–1221.

Dodge, K. A., Bates, J. E., & Pettit, G. S. (1990). Mechanisms in the cycle of violence. *Science*, *260*, 1678–1683.

Dodge, K. A., Coie, J. D., & Lynam, D. (2006). Aggression and antisocial behavior in youth. In W. Damon (Series Ed.) & N. Eisenberg (Vol. Ed.), *Handbook of child psychology: Vol. 3. Social, emotional, and personality development* (6th ed., pp. 719–988). Hoboken, NJ: Wiley.

Dodge, K. A., Greenberg, M. T., Malone, P. S., & The Conduct Problems Prevention Research Group. (2008). Testing an idealized dynamic cascade model of the development of serious violence in adolescence. *Child Development*, *79*, 1907–1927.

Dodge, K. A., & Pettit, G. S. (2003). A biopsychosocial model of the development of chronic conduct problems in adolescence. *Developmental Psychology*, *39*, 349–371.

Dodge, K. A., Pettit, G. S., & Bates, J. E. (1994). Socialization mediators of the elation between socioeconomic status and child conduct problems. *Child Development*, *65*, 649–665.

D'Onofrio, B. M., VanHulle, C. A., Waldman, I. D., Rodgers, J. L., Harden, K. P., Rathouz, P. J. et al. (2008). Smoking during pregnancy and offspring externalizing problems: An exploration of genetic and environmental confounds. *Development and Psychopathology*, *20*, 139–164.

Duncan, G. J., Kalil, A., & Ziol-Guest, K. (2008). *The economic costs of early childhood poverty* (Working Paper No. 4). Washington DC: Partnership for America's Economic Success.

Eyberg, S. (2006). Oppositional defiant disorder. In J. E. Fisher & W. T. O'Donohue (Eds.), *Practitioners guide to evidence based psychotherapy* (pp. 461–468). New York: Springer.

Frick, P., Van Horn, Y., Lahey, B., Crist, M., Loeber, R., Hat, E., et al. (1993). Oppositional defiant disorder and conduct disorder: A meta-analytic review of factor analyses and cross-validation in a clinic sample. *Clinical Psychology Review*, *3*, 319–340.

Frick, P., & White, S. (2008). Research review: The importance of callous–unemotional traits for developmental models of aggressive and disruptive behavior. *Journal of Child Psychology, Psychiatry, and Allied Disciplines*, *49*, 359–375.

Greven, C. U., Asherson, P., Rijsdijk, F. V., & Plomin, R. (2011). A longitudinal twin study on the association between inattentive and hyperactive–impulsive ADHD symptoms. *Journal of Abnormal Child Psychology*, *39*, 623–632.

Hay, D. (2005). The beginnings of aggression during infancy. In R. Tremblay, W. Hartup, & J. Archer (Eds.), *Developmental origins of aggression* (pp. 107–132). New York: Guilford Press.

Hinshaw, S. P. (2002). Intervention research, theoretical mechanisms, and causal processes related to externalizing behavior problems. *Development and Psychopathology*, *14*, 789–818.

Hollingshead, A. A. (1979). *Four Factor Index of Social Status*. Unpublished manuscript, Yale University.

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indices in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*, 1–55.

Jackson, M. F., Barth, J. M., Powell, N., & Lochman, J. E. (2006). Classroom contextual effects of race on children's peer nominations. *Child Development*, *77*, 1325–1337.

Jester, J. M., Nigg, J. T., Adams, K., Fitzgerald, H. E., Puttler, L. I., Wong, M., et al. (2005). Inattention/hyperactivity and aggression from early childhood to adolescence: Heterogeneity of trajectories and differential influence of family environment characteristics. *Development and Psychopathology*, *17*, 99–125.

Keenan, K., & Shaw, D. S. (2003). Starting at the beginning: Identifying etiological factors for antisocial behavior in the first years of life. In B. B. Lahey, T. E. Moffitt, & A. Caspi, (Eds.), *The causes of conduct disorder and serious delinquency* (pp. 153–181). New York: Guilford Press.

Keenan, K., & Wakschlag, L. (2004). Are oppositional defiant and conduct disorder symptoms normative behaviors in preschoolers? A comparison of referred and nonreferred children. *American Journal of Psychiatry*, *161*, 356–358.

Kroneman, A., Hipwell, A., Loeber, R., Koot, H., & Pardini, D. (2011). Contextual risk factors as predictors of disruptive behavior disorder trajectories in girls: The moderating effect of callous–unemotional features. *Journal of Child Psychology and Psychiatry*, *52*, 167–175.

Lahey, B. (2008). Oppositional defiant disorder, conduct disorder, and juvenile delinquency. In T. P. Beauchaine & S. P. Hinshaw (Eds), *Child and adolescent psychopathology*. Hoboken, NJ: Wiley.

Lahey, B., McBurnett, K., & Loeber, R. (2000). Are attention-deficit/hyperactivity disorder and oppositional defiant disorder developmental precursors to conduct disorder? In A. J. Sameroff, M. Lewis, & S. Miller (Eds.), *Handbook of developmental psychopathology* (2nd ed., pp. 431–446). New York: Plenum Press.

Lahey, B., Rathouz, P., Van Hulle, C., Urbano, R., Krueger, R., Applegate, B., et al. (2008). Testing structural models of DSM-IV symptoms of common forms of child and adolescent psychopathology. *Journal of Abnormal Child Psychology*, *36*, 187–206.

Laird, R. D., Jordan, K. Y., Dodge, K. A., Pettit, G. S., & Bates, J. E. (2001). Peer rejection in childhood, involvement with antisocial peers in early adolescence, and the development of externalizing behavior problems. *Development and Psychopathology*, *13*, 337–354.

Lansford, J. E., Deater-Deckard, K., Dodge, K. A., Bates, J. E., & Pettit, G. S. (2004). Ethnic differences in the link between physical discipline and later adolescent externalizing behaviors. *Journal of Child Psychology and Psychiatry*, *45*, 801–812.

Loeber, R., Burke, J. D., & Pardini, D. A. (2009). Development and etiology of disruptive and delinquent behavior. *Annual Review of Clinical Psychology*, *5*, 291–310.

Loeber, R., Wung, P., Keenan, K., Giroux, B., Stouthamer-Loeber, M., Van-Kammen, W. B., et al. (1993). Developmental pathways in disruptive child behavior. *Development and Psychopathology*, *5*, 103–133.

Lubke, G. H., Muthen, B., Moilerin, I. K., McGough, J. J., & Loo, S. (2007). Subtypes vs. severity differences in attention deficit/hyperactivity disorder in the Northern Finnish Birth Cohort. *Journal of the American Academy of Child & Adolescent Psychiatry*, *46*, 1584–1593.

Luthar, S. S., & Goldstein, A. S. (2008). Substance use and related behavior among suburban late adolescents: The importance of perceived parental containment. *Development and Psychopathology*, *20*, 591–614.

McDonald, R. P., & Ho, M.-H. R. (2002). Principles and practice in reporting structural equation analyses. *Psychological Methods*, *7*, 64–82.

McLoyd, V. C. (2004). Linking race and ethnicity to culture: Steps along the road from inference to hypothesis testing. *Human Development*, *47*, 185–191.

Murray-Close, D., Ostrov, J. M., & Crick, N. R. (2007). A short-term study of growth of relational aggression during middle childhood: Associations with gender, friendship intimacy, and internalizing problems. *Development and Psychopathology*, *19*, 187–203.

Muthén, B., & Muthén, L. (2008). *Mplus user's guide* (5th ed.). Los Angeles: Author.

Nagin, D., & Tremblay, R. (2005). What has been learned from group-based trajectory modeling? Examples form physical aggression and other problem behaviors. *Annals of the American Academy of Political and Social Science*, *602*, 131–144.

NICHD Early Child Care Research Network. (2004). Trajectories of physical aggression from toddlerhood to middle childhood. *Monographs of the Society for Research in Child Development*, *69*, 1–143.

Nigg, J., & Nikolas, M. (2008). Attention-deficit/hyperactivity disorder. In T. P. Beauchaine & S. P. Hinshaw (Eds.), *Child and adolescent psychopathology*. Hoboken, NJ: Wiley.

Olson, S. L., Sameroff, A. J., Lunkenheimer, E. L., & Kerr, D. C. R. (2009). Self-regulatory processes in the development of disruptive behavior problems: The preschool-to-school transition. In S. L. Olson & A. J. Sameroff (Eds.), *Biopsychosocial regulatory process in the development of childhood behavior problems* (pp. 144–185). New York: Cambridge University Press.

Pastor, P. N., & Reuben, C. A. (2005). Racial and ethnic differences in ADHD and LD in young school-age children: Parental reports in the National Health Interview Survey. *Public Health Reports*, 120, 383–392.

Patterson, G. R., Shaw, D. S., Snyder, J. J., & Yoerger, K. (2005). Changes in maternal ratings of children's overt and covert antisocial behavior. *Aggressive Behavior*, *31*, 473–484.

Patterson, G. R., & Yoerger, K. (2006). Intraindividual growth in covert antisocial behavior: A necessary precursor to chronic juvenile and adult arrests? *Criminal Behavior and Mental Health*, *9*, 24–38.

Pettit, G. S., Laird, R. D., Dodge, K. A., Bates, J. E., & Criss, M. M. (2001). Antecedents and behavior problem outcomes of parental monitoring and psychological control in adolescence. *Child Development*, *72*, 583–598.

Rommelse, N. N. J., Altink, M. E., Fliers, E. A., Martin, N. C., Buschgens, C. J. M., Hartman, C. A., et al. (2009). Comorbid problems in ADHD: Degree of association, shared endophenotypes, and formation of distinct subtypes. *Journal of Abnormal Child Psychology*, *37*, 793–804.

Rothbart, M. K., & Bates, J. E. (2006). Temperament. In W. Damon & N. Eisenberg (Eds.), *Handbook of child psychology: Vol. 3. Social, emotional, and personality development* (6th ed.). Hoboken, NJ: Wiley.

Rowe, R., Costello, J., Angold, A., Copeland, W., & Maughan, B. (2010). Developmental pathways in oppositional defiant disorder and conduct disorder. *Journal of Abnormal Psychology*, *119*, 726–738.

Rowe, R., Rijsdijk, F., Maughan, B., Eley, T., Hosang, G., & Eley, T. (2008). Heterogeneity in antisocial behaviours and comorbidity with depressed mood: A behavioural genetic approach. *Journal of Child Psychology and Psychiatry*, *49*, 526–534.

Rutter, M. (2003). Commentary: Causal processes leading to antisocial behavior. *Developmental Psychology*, *39*, 372–378.

Rutter, M., & Sroufe, L. A. (2000). Developmental psychopathology: Concepts and challenges. *Development and Psychopathology*, *12*, 265–296.

Sameroff, A. J. (2000). Dialectical processes in developmental psychopathology. In A. J. Sameroff, M. Lewis, & S. M. Miller (Eds.), *Handbook of developmental psychopathology* (pp. 22–40). New York: Kluwer Academic/Plenum Press.

Satorra, A. (2000). Scaled and adjusted restricted tests in multi-sample analysis of moment structures. In D. D. H. Heijmans, D. S. G. Pollock, & A. Satorra (Eds.), *Innovations in multivariate statistical analysis: A festschrift for Heinz Neudecker* (pp. 233–247). Dordrecht: Kluwer Academic.

Schafer, J. L., & Graham, J. W. (2002). Missing data: Our view of the state of the art. *Psychological Methods*, *7*, 147–177.

Shaw, D. S, Gilliom, M., Ingoldsby, E. M., & Nagin, D. S. (2003). Trajectories leading to school-age conduct problems. *Developmental Psychology*, *39*, 189–200.

Singh, A. L., & Waldman, I. D. (2010). The etiology of associations between negative emotionality and externalizing disorders. *Journal of Abnormal Psychology*, *2*, 376–388.

Spencer, M. B. (2006). Revisiting the 1990 Special Issue on minority children: An editorial perspective 15 years later. *Child Development*, *77*, 1149–1154.

Stormshak, E. A., Bierman, K. L., & The Problem Prevention Research Group. (1998). The implications of different developmental patterns of disruptive behavior problems for school adjustment. *Development and Psychopathology*, *10*, 451–467.

Supplee, L. H., Skuban, E. M., Shaw, D. S., & Prout, J. (2009). Emotion regulation strategies and later externalizing behavior among European American and African American children. *Development and Psychopathology*, *21*, 393–415.

Tackett, J., Krueger, R., Iocono, W. M., & McGue. (2005). Symptom based subfactors of DSM-defined conduct disorder: Evidence for etiologic distinctions. *Journal of Abnormal Psychology*, *114*, 483–487.

Teplin, L. A., Abram, K. M., McClelland, G. M., Mericle, A. A., Dulcan, M. K., & Washburn, J. J. (2006). *Psychiatric disorders of youth in detention*. Washington, DC: Office of Juvenile Justice and Delinquency Prevention.

Weiss, B., Dodge, K. A., Bates, J. E., & Pettit, G. S. (1992). Some consequences of early harsh discipline: Child aggression and a maladaptive social information processing style. *Child Development*, *63*, 1321–1335.

Appendix A

Table A.1. *Reliabilities, fit statistics, and correlations among factors from confirmatory factor analyses by wave*

Variable	Reliability (α)	Loadings Range	Covert Aggression	Overt Aggression	Oppositional Defiant	Inattention/ Impulsivity	Emotion Dysreg	Fit Statistics
Kindergarden (*N* = 537)								
Covert aggression	0.70	0.64–0.92	1.00					χ^2 (259) = 584.84***
Overt aggression	0.83	0.58–0.80	0.69	1.00				
Oppositional defiant	0.88	0.66–0.86	0.62	0.82	1.00			CFI = 0.90
Inattention/Impulsive	0.87	0.44–0.77	0.47	0.73	0.96	1.00		RMSEA = 0.05
Emotion dysregulation	0.73	0.49–0.71	0.60	0.88	0.74	0.75	1.00	SRMR = 0.06
Grade 1 (*N* = 515)								
Covert aggression	0.67	0.65–0.84	1.00					χ^2 (259) = 562.97***
Overt aggression	0.83	0.59–0.86	0.72	1.00				
Oppositional defiant	0.89	0.72–0.85	0.59	0.76	1.00			CFI = 0.92
Inattention/impulsive	0.88	0.45–0.80	0.53	0.73	0.99	1.00		RMSEA = 0.05
Emotion dysregulation	0.82	0.41–0.80	0.56	0.75	0.67	0.71	1.00	SRMR = 0.06
Grade 2 (*N* = 509)								
Covert aggression	0.70	0.60–0.95	1.00					χ^2 (259) = 520.99***
Overt aggression	0.86	0.61–0.83	0.74	1.00				
Oppositional defiant	0.91	0.68–0.86	0.71	0.80	1.00			CFI = 0.94
Inattention/impulsive	0.88	0.47–0.83	0.65	0.73	0.95	1.00		RMSEA = 0.05
Emotion dysregulation	0.83	0.63–0.80	0.74	0.88	0.77	0.73	1.00	SRMR = 0.05
Grade 3 (*N* = 491)								
Covert aggression	0.73	0.74–0.87	1.00					χ^2 (259) = 513.85***
Overt aggression	0.89	0.72–0.86	0.73	1.00				
Oppositional defiant	0.90	0.71–0.87	0.71	0.83	1.00			CFI = 0.93
Inattention/impulsive	0.88	0.48–0.82	0.59	0.69	0.95	1.00		RMSEA = 0.05
Emotion dysregulation	0.79	0.52–0.83	0.67	0.85	0.80	0.72	1.00	SRMR = 0.06
Grade 4 (*N* = 460)								
Covert aggression	0.66	0.61–0.92	1.00					χ^2 (259) = 555.36***
Overt aggression	0.88	0.63–0.86	0.72	1.00				
Oppositional defiant	0.90	0.73–0.87	0.75	0.81	1.00			CFI = 0.92
Inattention/impulsive	0.89	0.52–0.79	0.64	0.63	0.96	1.00		RMSEA = 0.05
Emotion dysregulation	0.80	0.53–0.82	0.68	0.88	0.79	0.65	1.00	SRMR = 0.05
Grade 5 (*N* = 444)								
Covert aggression	0.57	0.54–0.87	1.00					χ^2 (259) = 513.88***
Overt aggression	0.86	0.56–0.85	0.68	1.00				
Oppositional defiant	0.88	0.61–0.84	0.62	0.81	1.00			CFI = 0.93
Inattention/impulsive	0.88	0.49–0.80	0.51	0.70	0.99	1.00		RMSEA = 0.05

https://doi.org/10.1017/S0954579413000199 Published online by Cambridge University Press

Table A.1 (*cont.*)

Variable	Reliability (α)	Loadings Range	Covert Aggression	Overt Aggression	Oppositional Defiant	Inattention/ Impulsivity	Emotion Dysreg	Fit Statistics
Emotion dysregulation	0.79	0.48–0.80	0.65	0.79	0.81	0.64	1.00	SRMR = 0.05
Grade 6 (N = 438)								
Covert aggression	0.60	0.64–0.80	1.00					χ^2 (259) = 596.44***
Overt aggression	0.86	0.63–0.80	0.91	1.00				
Oppositional defiant	0.89	0.64–0.88	0.68	0.74	1.00			CFI = 0.91
Inattention/impulsive	0.90	0.53–0.78	0.63	0.69	0.99	1.00		RMSEA = 0.06
Emotion dysregulation	0.83	0.59–0.83	0.71	0.82	0.78	0.75	1.00	SRMR = 0.06
Grade 7 (N = 421)								
Covert aggression	0.49	0.56–0.72	1.00					χ^2 (259) = 596.18***
Overt aggression	0.83	0.50–0.83	0.83	1.00				
Oppositional defiant	0.89	0.65–0.87	0.61	0.71	1.00			CFI = 0.90
Inattention/impulsive	0.91	0.57–0.82	0.49	0.56	0.97	1.00		RMSEA = 0.06
Emotion dysregulation	0.83	0.60–0.82	0.68	0.86	0.78	0.70	1.00	SRMR = 0.06
Grade 8 (N = 397)								
Covert aggression	0.47	0.46–0.88	1.00					χ^2 (259) = 590.89***
Overt aggression	0.89	0.70–0.85	0.74	1.00				
Oppositional defiant	0.93	0.74–0.93	0.75	0.74	1.00			CFI = 0.91
Inattention/impulsive	0.92	0.49–0.87	0.72	0.68	0.98	1.00		RMSEA = 0.06
Emotion dysregulation	0.82	0.66–0.81	0.72	0.91	0.79	0.78	1.00	SRMR = 0.06

Note: The range of factor loadings represents standardized factor loadings. Missing data were accounted for with full-information maximum likelihood (although, if there were no items present for a scale at a particular time, those individuals were excluded from the analysis, as reflected in the sample size in parentheses). Possible nonnormality of data was accounted for with the robust maximum likelihood estimator. CFI, comparative fit index, RMSEA, root mean square error of approximation, SRMR, standardized root mean square residual.
***$p < .001$.

Table A.2. *Fit statistics and standardized growth curve estimates for subconstructs for the unconditional model for males and females estimated together*

	Covert Aggression*		Overt Aggression		Oppositional Defiant		Emotion Dysregulation		Inattention/Impulsivity		Total Aggression	
	US	S	US	S	US	S	US	S	US	S	US	S
Fixed Effects												
Intercept	**0.09***** (0.01)	**0.48**	**0.11***** (0.01)	**0.55**	**0.28***** (0.02)	**0.78**	**0.12***** (0.01)	**0.73**	**0.32***** (0.02)	**0.93**	**0.21***** (0.01)	**0.87**
Slope 1	**0.02**** (0.01)	**0.29**	0.01 (0.01)	0.09	**0.02**** (0.01)	**0.23***	**0.02*** (0.01)	**0.19***	**0.04***** (0.01)	**0.41***	**0.03***** (0.01)	**0.32***
Slope 2	−0.00 (0.01)	−0.10	−0.00 (0.01)	−0.03	0.01 (0.01)	0.09	**0.01*** (0.01)	**0.21**	−0.00 (0.01)	−0.03	0.00 (0.01)	0.05
Slope 3	−0.00 (0.01)	−0.04	−0.01 (0.01)	−0.08	0.02 (0.01)	0.11	−0.00 (0.01)	−0.08	0.02 (0.01)	0.16	0.01 (0.01)	0.06
Random Effects												
Var, intercept	0.03* (0.02)		0.04** (0.01)		0.13*** (0.02)		0.03* (0.01)		0.12*** (0.02)		0.06*** (0.01)	
Var, Slope 1	0.00 (0.00)		0.01** (0.00)		0.01* (0.00)		0.01† (0.00)		0.01* (0.00)		0.01** (0.00)	
Var, Slope 2	0.00 (0.00)		0.00† (0.00)		0.01*** (0.00)		0.00* (0.00)		0.01*** (0.00)		0.01** (0.00)	
Var, Slope 3	0.01 (0.00)		0.01† (0.00)		0.02* (0.01)		0.00 (0.00)		0.01* (0.01)		0.00† (0.00)	
Fit Statistics												
	χ^2 (31) = 46.43* χ^2/df = 1.50 CFI = 0.94 RMSEA = 0.03 SRMR = 0.06 MLR = 2.45		χ^2 (31) = 42.35 χ^2/df = 1.37 CFI = 0.97 RMSEA = 0.03 SRMR = 0.06 MLR = 2.37		χ^2 (31) = 30.52 χ^2/df = 0.98 CFI = 1.00 RMSEA = 0.00 SRMR = 0.03 MLR = 1.56		χ^2 (31) = 38.32 χ^2/df = 1.24 CFI = 0.98 RMSEA = 0.02 SRMR = 0.04 MLR = 1.79		χ^2 (31) = 45.52* χ^2/df = 1.47 CFI = 0.99 RMSEA = 0.03 SRMR = 0.03 MLR = 1.42		χ^2 (31) = 27.26 χ^2/df = .88 CFI = 1.00 RMSEA = 0.00 SRMR = 0.03 MLR = 1.71	
Model Comparisons												
All slopes, constrained	χ^2 (33) = 51.16* MLR = 2.35		χ^2 (33) = 45.26 MLR = 2.28		χ^2 (33) = 31.92 MLR = 1.52		χ^2 (33) = 41.59 MLR = 1.74		χ^2 (33) = 54.35* MLR = 1.40		χ^2 (33) = 32.61 MLR = 1.66	
Adjusted χ^2 diff	**χ^2 (2) = 7.72***		χ^2 (2) = 3.18, *ns*		χ^2 (2) = 1.09, *ns*		χ^2 (2) = 3.97, *ns*		**χ^2 (2) = 10.72****		**χ^2 (2) = 8.04***	
Slopes 1 and 2, constrained	χ^2 (32) = 49.24* MLR = 2.40		χ^2 (32) = 43.63 MLR = 2.33		χ^2 (32) = 31.48 MLR = 1.54		χ^2 (32) = 38.86 MLR = 1.77		χ^2 (32) = 53.64 MLR = 1.41		χ^2 (32) = 30.54 MLR = 1.68	
Adjusted χ^2 diff	**χ^2 (1) = 5.08***		χ^2 (1) = 1.13, *ns*		χ^2 (1) = 0.94, *ns*		χ^2 (1) = 0.05, *ns*		**χ^2 (1) = 10.77****		**χ^2 (1) = 5.04***	
Slopes 1 and 3, constrained	χ^2 (32) = 49.37* MLR = 2.39		χ^2 (32) = 44.35 MLR = 2.33		χ^2 (32) = 31.14 MLR = 1.54		χ^2 (32) = 41.00 MLR = 1.76		χ^2 (32) = 48.07* MLR = 1.41		χ^2 (32) = 30.65 MLR = 1.68	
Adjusted χ^2 diff	**χ^2 (1) = 5.90***		χ^2 (1) = 3.00, *ns*		χ^2 (1) = 0.44, *ns*		**χ^2 (1) = 4.19***		χ^2 (1) = 2.89, *ns*		**χ^2 (1) = 5.37***	

Table A.2 (*cont.*)

	Covert Aggression*		Overt Aggression		Oppositional Defiant		Emotion Dysregulation		Inattention/Impulsivity		Total Aggression	
	US	S	US	S	US	S	US	S	US	S	US	S
Slope 2 and 3, constrained	χ^2 (32) = 47.28 MLR = 2.40		χ^2 (32) = 43.29 MLR = 2.33		χ^2 (32) = 30.90 MLR = 1.54		χ^2 (32) = 39.84 MLR = 1.76		χ^2 (32) = 47.18* MLR = 1.41		χ^2 (32) = 27.56 MLR = 1.69	
Adjusted χ^2 diff	χ^2 (1) = 0.00, *ns*		χ^2 (1) = 0.32, *ns*		χ^2 (1) = 0.09, *ns*		χ^2 (1) = 1.77, *ns*		χ^2 (1) = 1.70, *ns*		χ^2 (1) = 0.02, *ns*	

Note: All model comparisons are relative to the fit statistics for the unconstrained unconditional model and used the Satorra–Bentler adjusted chi-square comparison test. Standard errors are in parentheses. US, unstandardized estimates; S, standardized estimates; CFI, comparative fit index, RMSEA, root mean square error of approximation, SRMR, standardized root mean square residual; MLR, maximum likelihood robust.
†$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

Table A.3. *Fit statistics and standardized growth curve parameters for subconstructs for males and females estimated together, controlling for gender, SES, and ethnicity*

	Covert Aggression*		Overt Aggression		Oppositional Defiant		Emotion Dysregulation*		Inattention/Impulsivity		Total Aggression	
	US	S	US	S	US	S	US	S	US	S	US	S
Fixed Effects												
Intercept	0.21***	1.17	0.28***	1.42	0.66***	1.86	0.27***	1.66	0.74***	2.22	0.49***	2.07
	(0.05)		(0.05)		(0.08)		(0.05)		(0.07)		(0.05)	
Female	−0.01	−0.02	−0.07**	−0.17	−0.15***	−0.21	−0.03	−0.10	−0.19***	−0.29	−0.11***	−0.24
	(0.02)		(0.02)		(0.04)		(0.02)		(0.03)		(0.02)	
SES	−0.00**	−0.24	−0.00**	−0.24	−0.01***	−0.29	−0.00***	−0.28	−0.01***	−0.34	−0.01***	−0.33
	(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)	
Black	−0.01	−0.01	−0.04	−0.08	−0.07	−0.08	−0.04	−0.10	−0.07	−0.07	−0.05	−0.08
	(0.04)		(0.04)		(0.06)		(0.03)		(0.05)		(0.03)	
Slope 1	0.08*	1.16	0.04	0.35	0.05	0.50	0.04	0.47	0.05†	0.52	0.05*	0.66
	(0.03)		(0.03)		(0.03)		(0.03)		(0.03)		(0.02)	
Female	−0.00	−0.03	−0.01	−0.03	−0.04**	−0.22	−0.01	−0.07	−0.03*	−0.17	−0.02*	−0.15
	(0.01)		(0.01)		(0.02)		(0.01)		(0.02)		(0.01)	
SES	−0.00**	−0.31	−0.00	−0.12	0.00	−0.06	−0.00	−0.13	0.00	0.00	−0.00	−0.10
	(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)	

Black	0.01	0.07	0.06*	0.21	0.07*	0.26	0.06**	0.32	0.04	0.15	0.05*	0.24
	(0.02)		(0.03)		(0.03)		(0.02)		(0.03)		(0.02)	
Slope 2	**−0.06***	**−1.57**	−0.03	−0.48	−0.02	−0.14	0.01	0.15	−0.02	−0.25	−0.02	−0.23
	(0.03)		(0.03)		(0.03)		(0.03)		(0.03)		(0.02)	
Female	−0.01	−0.12	−0.01	−0.05	−0.01	−0.05	−0.01	−0.07	−0.01	−0.07	−0.01	−0.06
	(0.01)		(0.01)		(0.02)		(0.01)		(0.02)		(0.01)	
SES	0.00**	0.52	0.00	0.16	0.00	0.07	0.00	0.04	0.00	0.06	0.00	0.09
	(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)	
Black	0.03	0.24	0.03	0.16	0.06†	0.20	0.01	0.08	0.07*	0.29	0.04†	0.23
	(0.02)		(0.02)		(0.03)		(0.02)		(0.03)		(0.02)	
Slope 3	0.03	0.46	0.02	0.21	0.09†	0.70	0.02	0.43	**0.11****	**0.91**	0.06†	0.77
	(0.03)		(0.03)		(0.05)		(0.04)		(0.04)		(0.03)	
Female	−0.03*	−0.26	0.02	0.12	0.00	0.01	0.03†	0.38	0.00	0.00	0.01	0.03
	(0.02)		(0.01)		(0.02)		(0.02)		(0.02)		(0.01)	
SES	0.00	−0.08	−0.00	−0.13	−0.00*	−0.21	−0.00	−0.32	−0.00*	−0.25	−0.00*	−0.25
	(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)	
Black	−0.01	−0.05	−0.03	−0.12	−0.01	−0.02	0.00	0.02	−0.04	−0.11	−0.02	−0.10
	(0.02)		(0.03)		(0.04)		(0.03)		(0.04)		(0.03)	
Random Effects												
Var, intercept	0.03*		0.04**		0.11***		0.02*		0.09***		0.05***	
	(0.02)		(0.01)		(0.02)		(0.01)		(0.02)		(0.01)	
Var, Slope 1	0.00		0.01**		0.01†		0.01		0.01*		0.01*	
	(0.00)		(0.00)		(0.01)		(0.00)		(0.00)		(0.00)	
Var, Slope 2	0.00		0.00†		0.01***		0.00†		0.01**		0.01**	
	(0.00)		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)	
Var, Slope 3	0.00		0.01†		0.02*		0.00		0.01*		0.01	
	(0.00)		(0.00)		(0.01)		(0.00)		(0.01)		(0.00)	
Fit Statistics												
	χ^2 (46) = 68.42*		χ^2 (46) = 70.91*		χ^2 (46) = 54.87		χ^2 (46) = 64.13*		χ^2 (46) = 74.47**		χ^2 (46) = 59.50	
	χ^2/df = 1.50		χ^2/df = 1.50		χ^2/df = 1.50		χ^2/df = 1.50		χ^2/df = 1.50		χ^2/df = 1.50	
	CFI = 0.95		CFI = 0.96		CFI = 0.99		CFI = 0.97		CFI = 0.98		CFI = 0.99	
	RMSEA = 0.03		RMSEA = 0.03		RMSEA = 0.02		RMSEA = 0.03		RMSEA = 0.03		RMSEA = 0.02	
	SRMR = 0.05		SRMR = 0.05		SRMR = 0.03		SRMR = 0.04		SRMR = 0.03		SRMR = 0.03	
	MLR = 2.01		MLR = 1.96		MLR = 1.40		MLR = 1.57		MLR = 1.29		MLR = 1.48	
Model Comparisons												
All slopes, constrained	χ^2 (48) = 75.98**		χ^2 (48) = 73.06*		χ^2 (48) = 57.44		χ^2 (48) = 64.74		χ^2 (48) = 79.16**		χ^2 (48) = 61.69	
	MLR = 1.98		MLR = 1.94		MLR = 1.39		MLR = 1.56		MLR = 1.28		MLR = 1.47	
Adjusted χ^2 diff	**χ^2 (2) = 10.29****		χ^2 (2) = 1.87, *ns*		χ^2 (2) = 2.60, *ns*		χ^2 (2) = 0.47, *ns*		χ^2 (2) = 4.97, *ns*		χ^2 (2) = 2.11, *ns*	
Slopes 1 and 2, constrained	χ^2 (47) = 75.42**		χ^2 (47) = 72.67**		χ^2 (47) = 56.29		χ^2 (47) = 64.63*		χ^2 (47) = 76.53**		χ^2 (47) = 61.09	
	MLR = 1.99		MLR = 1.95		MLR = 1.39		MLR = 1.56		MLR = 1.29		MLR = 1.48	
Adjusted χ^2 diff	**χ^2 (1) = 10.94*****		χ^2 (1) = 1.83, *ns*		χ^2 (1) = 1.48, *ns*		χ^2 (1) = 0.38, *ns*		χ^2 (1) = 2.16, *ns*		χ^2 (1) = 1.64, *ns*	
Slopes 1 and 3, constrained	χ^2 (47) = 70.07*		χ^2 (47) = 71.43		χ^2 (47) = 55.51		χ^2 (47) = 64.32*		χ^2 (47) = 75.85**		χ^2 (47) = 58.76	
	MLR = 1.99		MLR = 1.95		MLR = 1.39		MLR = 1.57		MLR = 1.29		MLR = 1.48	

Table A.3 (*cont.*)

	Covert Aggression*		Overt Aggression		Oppositional Defiant		Emotion Dysregulation*		Inattention/Impulsivity		Total Aggression	
	US	S	US	S	US	S	US	S	US	S	US	S
Adjusted χ^2 diff	χ^2 (1) = 1.70, *ns*		χ^2 (1) = 0.17, *ns*		χ^2 (1) = 0.53, *ns*		χ^2 (1) = 0.19, *ns*		χ^2 (1) = 1.34, *ns*		χ^2 (1) = 1.21, *ns*	
Slope 2 and 3, constrained	χ^2 (47) = 70.79* MLR = 2.00		χ^2 (47) = 71.90* MLR = 1.95		χ^2 (47) = 57.12 MLR = 1.39		χ^2 (47) = 64.22* MLR = 1.56		χ^2 (47) = 78.89* MLR = 1.29		χ^2 (47) = 60.77 MLR = 1.48	
Adjusted χ^2 diff	χ^2 (1) = 2.52, *ns*		χ^2 (1) = 0.84, *ns*		χ^2 (1) = 2.38, *ns*		χ^2 (1) = 0.01, *ns*		**χ^2 (1) = 5.03***		χ^2 (1) = 1.27, *ns*	

Note: All model comparisons are relative to the fit statistics for the unconstrained conditional model including gender as a covariate and used the Satorra–Bentler adjusted chi-square comparison test. Standard errors are in parentheses. US, unstandardized estimates; S, standardized estimates; CFI, comparative fit index, RMSEA, root mean square error of approximation, SRMR, standardized root mean square residual; MLR, maximum likelihood robust.

†$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.