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Mapping the Growth of Heterogeneous Forms of Externalizing Problem Behavior between Early Childhood and Adolescence: A Comparison of Parent and Teacher Ratings

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Abstract

Our main goal was to compare long-term growth patterns in teachers' and mothers' ratings of Overt Aggression, Covert Aggression, Oppositional Defiance, Impulsivity/inattention, and Emotion Dysregulation across developmental periods spanning kindergarten through grade 8 (ages 5 to 13 years). We also determined whether three salient background characteristics, family SES, child ethnicity, and child gender, differentially predicted growth in discrete categories of child externalizing symptoms across development. Participants were 549 kindergarten-age children (51% male; 83% European American; 17% African American) whose problem behaviors were rated by teachers and parents each successive year of development through 8th grade. Latent growth curve analyses were performed for each component scale, contrasting with an overall index of externalizing, in a piecewise fashion encompassing two periods of development: K-1 and grades 1–8. Our findings showed that there were salient differences and similarities between informants in their levels of concern about specific forms of externalizing problems, patterns of change in problem behavior reports across development, and in the extent to which their ratings of specific problems were associated with children's gender, ethnicity, and family SES backgrounds. Thus, these data provided novel information about issues that have received scant empirical attention and have important implications for understanding the development and prevention of children's long-term externalizing problems.

A large body of research has focused on assessment of global levels of child and adolescent externalizing problem behavior. The term "externalizing problems" is a useful summary index of diverse behaviors encompassing children's physical aggression, oppositional

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behavior, covert aggression, emotion dysregulation, and rule-breaking behavior (Dodge, Coie, & Lynam, 2006). Cross-sectional factor analytic studies have shown that individual differences in child externalizing behaviors comprise a cohesive and stable dimension of psychopathology (Achenbach & Rescorla, 2001). However, an omnibus index of problem behavior may obscure important sources of variability. Examining individual differences in the growth of different types of child externalizing behavior may enhance our understanding of the etiology, development, and prevention of disorder (Barker et al., 2007; Hinshaw, 2002). We join with other scholars in arguing 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., Hinshaw, 2002). An important first step is demonstrating that heterogeneous components of externalizing behavior can be differentiated within a measurement model. Thus, our main goal was to use latent growth curve modeling to illuminate the differentiation, long-term growth, and predictive correlates of heterogeneous forms of child externalizing behavior in a multi-informant design.

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 children's externalizing problems, the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001): oppositional defiant behavior, overt aggression, covert antisocial behavior, impulsivity/inattention, and emotion dysregulation. These subdimensions are intercorrelated, but evidence suggests the desirability of distinguishing among them, as shown below.

Overt aggression

Overt aggression appears early in life. 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, 2017). Possibly reflecting the rapid growth of children's self-regulation skills, overt aggressive behaviors decline sharply between the toddler and early school-age years. For example, although a small subgroup of preschoolers will continue to show high levels of aggressive behavior, most children inhibit overt aggressive behaviors by the time they enter school (Olson, Choe & Sameroff, 2017).

Covert antisocial behavior

Covert antisocial behavior is defined by surreptitious rule infractions such as stealing, cheating, lying, and vandalism. The development of covert antisocial behavior has received much less research attention than that of overt forms of externalizing problem behavior (Hinshaw, 2002). Symptom clusters of covert rule breaking and overt aggression can be reliably differentiated (e.g., Tackett, Krueger, Iacono, & McGue, 2005). Moreover, children's covert antisocial behaviors appear to follow a different pattern of development than that of overt aggression. For example, Barker et al. (2007) examined 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.

Oppositional behavior

Oppositional behavior appears in the toddler period and is common across the preschool and early school-age years (Wakschlag et al., 2012). Typical problem behaviors include passive noncompliance, arguing back, refusing to comply with parents' requests, and testing the "limits" of parental control (APA, 2013). In population-based studies of children and adolescents, symptoms of oppositional defiant disorder have shown high correlations with symptoms of overt and covert aggression (e.g., Lahey et al., 2008). However, oppositional and aggressive behaviors have been associated with different risk factors, developmental outcomes, and age profiles (Dick, Viken, Kaprio, Pulkkinen, & Rose, 2005). Moreover, there have been few longitudinal studies of growth in oppositional behavior independent of co-occurring aggression.

Impulsivity/inattention

Symptoms of impulsivity/inattention overlap considerably with those of oppositional defiant behavior and aggression (e.g., Rommelse et al., 2009), but exploratory and confirmatory factor analyses have supported distinctions among inattentive/impulsive, oppositional, and aggressive problem behaviors (Bezdjian et al., 2011). Moreover, Jester et al. (2005) found that symptoms of inattention/hyperactivity and aggression showed different patterns of individual growth between early childhood and adolescence. In addition, impulsivity/inattention and aggression have been found to show strikingly different associations with genetic, neurobiological, and environmental risk factors (Martel, Nikolas, Jernigan, Friderici, & Nigg, 2012).

Emotion dysregulation

Finally, problems of emotion dysregulation, particularly frequent, intense outbursts of irritability or anger, are central to definitions of disruptive behavior problems (Cole, Hall, & Radzioch, 2009). Symptoms of emotion dysregulation and aggressive, disruptive behavior have shown moderate levels of co-occurrence (Singh & Waldman, 2010), but several lines of research suggest the usefulness of distinguishing among them. For example, there has been strong theoretical and empirical support for the distinction between aggressive children who show frequent displays of poorly regulated anger versus "cool" and calculating forms of antisocial behavior (Dodge et al., 2006; Frick, Ray, Thornton, & Kahn, 2014). 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).

In a large, multi-site prospective longitudinal study of the development of child externalizing problems, Olson et al. (2013) measured individual differences in overt aggression, covert rule infractions, oppositional defiant behavior, emotion dysregulation, and inattentive/impulsive behavior from children's scores on the Achenbach Teacher Report Form (TRF; Achenbach & Rescorla, 2001). All five subdimensions of externalizing behavior were reliably differentiated each consecutive year between kindergarten and eighth grade, and

showed both similarities and differences in long-term growth patterns. Moreover, growth in some discrete subcomponents was differentially associated with variations in family SES and ethnicity. Using an omnibus problem behavior index would have masked these differential growth trends and predictive patterns. However, only teachers' ratings of child externalizing behavior were analyzed. As argued below, comparing long-term growth patterns in mothers' and teachers' ratings of discrete subdimensions of child externalizing behavior addresses significant gaps in research and has important theoretical and practical implications.

Patterns of cross-informant generalizability

In previous studies, externalizing problem behavior ratings have been collected from both parents and teachers and combined into composite scores for statistical analysis. This common practice has the advantage of providing a robust cross-situational index of child problem behavior. However, separate analyses of parent and teacher ratings may provide important information that would be masked by a composite index of problem behavior. For example, correlations between mother and teacher ratings of child externalizing problems have been modest at best, averaging between .20 – .30 (e.g., Rescorla et al., 2014). Parents typically report higher levels of child externalizing problems than teachers (Miner & Clarke-Stewart, 2008). Moreover, mother and teacher ratings of child behavior problems have shown different long-term predictions to adjustment outcomes (Ferdinand, van der Ende, & Verhulst, 2007). In a rare longitudinal study of cross-informant differences, Keiley, Bates, Dodge, and Pettit (2000) found that growth patterns in overall externalizing problem behavior differed according to the source of the data. For example, the trajectory of mother reported externalizing problems decreased across time for the average child, controlling for race, SES, and gender, whereas teacher reported externalizing problems began at a lower level and increased slightly across time. Keiley et al. (2000) also found that mother and teacher ratings of externalizing problems were differentially related to key background variables such as race, SES and gender. Therefore, important information may be gained if mothers' and teachers' ratings of child problem behavior are considered separately.

Discrepancies between informants may reflect true variation in child behavior across settings, as well as a host of intuitive expectations and biases (De Los Reyes et al., 2015). Understanding the unique contributions of different informants offers potential value-added effects to study design. Knowledge of the redundancy of cross-informant contributions may guide decisions about optimal use in research and clinical settings, for example, is one informant more critical than another for providing useful information about a particular form of problem behavior (Kerr, Lunkenheimer, & Olson, 2007)? In addition, knowledge of parent and teacher agreement on specific subdimensions of child externalizing behaviors may yield important information about situational variability in the constructs themselves. For example, are certain types of externalizing problems more likely to show cross-informant discrepancies than others? Is this true, as well, for patterns of developmental change in specific types of externalizing problem behavior or for the strength of their associations with predictive correlates?

Research Objectives

In summary, our study was a novel attempt to illuminate the long-term growth of heterogeneous forms of child externalizing behavior in a multi-informant design. Large summary variables are useful for aggregating a variety of related constructs. However, the statistical co-occurrence of narrowband dimensions of problem behavior does not indicate “developmental isomorphism” (Stormshak et al., 1998): aggregation may mask a variety of separate time courses related to the biological and social development of the child. Drawing upon theories of heterotypic continuity and the salience of contextual influences across development (e.g., Cicchetti, 2006; Sameroff, 2009), we argue that descriptive research on the development of heterogeneous components of externalizing behavior is essential for building a complete understanding of the externalizing spectrum. Knowledge of these issues has important implications for determining how we can improve models of the etiology and prevention of children’s externalizing problems, and converges with emerging approaches to the study of psychopathology (e.g., R DoC; Sanislow et al., 2010).

The five subdimensions of problem behavior considered in this study differed from those derived by Achenbach in the development of the Child Behavior Checklist and Teacher Report Form (CBCL and TRF; Achenbach & Rescorla, 2001). In the CBCL and TRF, the Externalizing Problems scale is defined by two subscales: Rule Breaking and Aggressive Behavior. For several reasons, ours differed significantly. First, 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. In prior research, items describing constructs of overt aggression, covert antisocial behavior, emotion dysregulation, and oppositional defiant behavior have been fruitfully combined into a composite measure of externalizing behavior. In the current study, we examined the constructs separately, in terms of their differential growth properties and risk correlates. Finally, we also included individual differences in impulsivity/inattention because they index fundamental self-regulation deficits that strongly co-occur with children’s aggressive and oppositional behavior (e.g., King et al., 2016). Based on previous research, we expected mothers’ ratings to show decreasing levels of externalizing problems across development in relation to teachers’ ratings. Few investigators have determined whether this trend holds true for growth trajectories of specific forms of externalizing behavior. We hypothesized that initial levels and patterns of developmental change in impulsivity/inattention, emotion dysregulation, and oppositional defiant behavior would show stronger cross-informant differences than other subdimensions of externalizing. High levels of impulsivity/inattention may be seen as more disruptive in school settings due to the task-oriented nature of classroom environments, whereas oppositional defiance and emotion dysregulation may be especially salient in home settings given the higher saturation of parent-child and sibling conflicts that trigger such behaviors. Recent findings have supported higher concerns about impulsivity and inattention symptoms in school contexts and of oppositional defiant behavior in home settings (King et al., 2016). However, to our knowledge no investigators have determined whether and how contextual differences play out in long-term growth trajectories of heterogeneous externalizing problems.

Our secondary goal was to examine whether established risk factors differentially predicted initial levels and changes in mothers' and teachers' ratings of each subcomponent of externalizing problems between kindergarten and eighth grade. To expand upon previous work in meaningful ways, we included measures of family SES, child ethnicity, child gender, child temperament and parenting risk that have been related to the development of child externalizing problems in many previous reports.

Family SES

A large body of research has shown that low levels of family SES are associated with heightened child externalizing problems (e.g., McLoyd, Mistry, & Hardaway, 2014). Far less is known about specific forms of externalizing problems that may be most strongly related to family SES, and how they vary across development and different life contexts. Olson et al. (2013) found that children from low SES households entered school with higher levels of all forms of externalizing problems than others. However, by early adolescence, students in higher SES households manifested declining levels of oppositional defiant behaviors and impulsivity/inattention relative to those in lower SES families. We questioned whether these findings generalized to maternal ratings of child externalizing behaviors, an exploratory goal given the dearth of prior research on this issue.

Child ethnicity

Some studies have shown that African-American children are at elevated risk for externalizing problems relative to children of European-American descent (e.g., Supplee, Skuban, Shaw, & Prout, 2009). Is child ethnicity also linked with differential growth in selective subcomponents of externalizing problems, especially when examined independently of variations in family SES? Olson et al. (2013) found that African American versus European American children did not differ in levels of externalizing problems at school entry. However, according to their teachers, between kindergarten and second grade African American children manifested higher levels of externalizing problems than children from European American backgrounds. For oppositional defiance, this trend continued into middle childhood. Others have found that teachers' ratings of African-American children's global externalizing problems increased across time in relation to those of European-American children and mothers' reports (Keiley et al., 2000; Miner & Clarke-Stewart, 2009). Therefore, we expected that teachers' ratings of oppositional defiant behavior in African-American vs. European American children would show sharper increases across time than those of mothers' ratings.

Child gender

To our knowledge there have been no previous studies of gender differentiated patterns of growth in mothers vs. teachers' ratings of heterogeneous externalizing problem behaviors. Controlling for family SES and ethnicity, Olson et al. (2013) found that teachers rated boys more highly than girls in kindergarten levels of overt externalizing problems. However, teachers' ratings of child externalizing behaviors did not show gender-differentiated patterns of change between kindergarten and eighth grade. We built upon these findings by comparing mothers' and teachers' ratings of heterogeneous externalizing behavior between early childhood and adolescence. Based on Keiley et al. (2000), we expected that teachers

would report higher levels of overt externalizing problems in boys than mothers. Theorists have emphasized the strong role that emotion regulation difficulties play in the development and expression of externalizing problems in girls (Crick and Grotpeter, 1995). Thus, we also expected that emotion dysregulation may be more salient for girls than boys, especially following the adolescent transition and in family settings due to potentially frequent parent-child and sibling conflicts.

Child temperament

We examined two child temperament constructs that have been related to the onset and growth of child externalizing problems: resistance to control and difficultness (Bates, Pettit, Dodge, & Ridge, 1998). Resistance to control refers to the child's noncompliance with parents' attempts to stop and redirect his/her behavior whereas difficultness primarily captures children's irritable emotionality (Bates, Schemerhorn, & Petersen, 2014). Child resistance to control has been differentially related to overt self-regulation problems such as poor inhibitory control, whereas difficultness has been linked to broader patterns of maladjustment (Bates et al., 2014). Thus, we expected that resistance to control would be uniquely predictive of growth in children's oppositional defiant and impulsive/inattentive behavior, whereas difficultness would be associated with overt aggression and emotion dysregulation. Given the lack of previous research on this topic, our examination of cross-informant differences in these growth patterns was an exploratory research objective.

Parenting behavior

Finally, we also examined two parenting behavior constructs that have been related to the development of child externalizing problems in many previous reports: corporal punishment and low warmth. Frequent corporal punishment has been related to high levels of child aggression, impaired self-regulation, and growth in children's externalizing problems across the school-age years (Gershoff & Grogan-Kaylor, 2016). Lastly, low levels of parental warmth have been correlated with relatively high levels of child externalizing problems (Pettit, Bates, and Dodge, 1997). However, to our knowledge this is the first attempt to relate both sources of parenting risk to mothers' and teachers' ratings of heterogeneous child externalizing problems across development. Therefore, our exploratory goals were to determine whether parenting risk was differentially associated with specific forms of externalizing problems and to examine cross-informant differences in these predictive patterns.

Method

Procedures

We used the kindergarten to eighth grade dataset from the Child Development Project (CDP, Dodge, Bates, & Pettit, 1990), a multi-site, longitudinal study. The CDP recruited a normative community sample ($N = 585$) from three sites (Nashville and Knoxville, Tennessee and Bloomington, Indiana) during the summer prior to kindergarten entry; two cohorts (one beginning in 1987 and one beginning in 1988) were initially assessed with extensive in-person interviews, and then annually through mailed questionnaires, and

telephone and face-to-face interviews. Local Institutional Review Boards (IRB) for all sites reviewed and approved study materials and consent forms.

Participants

Children ranged in age from 5 to 13 years. Males ($n = 304$) comprised 52% of the sample and child ethnicity was 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. We also limited our sample to those individuals who had data for at least one of the nine time points for mothers' reports and one of the nine time points for teachers' reports to meet data requirement for growth model estimation. These restrictions resulted in an analytic sample of 549 participants. Socioeconomic status was measured using the Hollingshead Four Factor Index (1979), a composite index score based on parental education, occupation, and marital status. The index ranged from 8 (unskilled laborers) to 66 (major business or professional). For our sample, the Hollingshead index ranged from 11 to 66, and the mean score was 39.71, ($SD = 14.06$), which corresponds to skilled craftspeople, clerical, and sales workers.

Measures

Child externalizing problems—Mothers completed the 122-item Child Behavior Checklist (CBCL, Achenbach & Rescorla, 2001) and teachers completed the 122-item Teacher Report Form (TRF, Achenbach, 1991) at each of the nine waves (kindergarten through eighth grade). Items on the CBCL and TRF are rated on 3-point scales (0 = *not true of the student*, 1 = *somewhat or sometimes true of the student*, and 2 = *often or very true of the student*). We created five subscales: Overt Aggression, Covert Antisocial Behavior, Oppositional Defiant Behavior, Impulsivity/inattention and Emotion Dysregulation. In some cases there were slight differences between the parent and teacher versions of each scale in item content. 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. Subscales were created within wave by averaging across relevant items so that every subscale had the same range (0 to 2), despite different numbers of items. Next, each scale was multiplied by 10 to facilitate possible quadratic terms for growth modeling.

Overt aggression was defined by cruelty/bullying, destruction of others' property, fighting, physically attacking, and threatening others (6 items for parents; 5 items for teachers); covert aggression by lying/cheating and stealing (3 items for parents; 2 items for teachers); oppositional/defiant by arguing, disobedience, disturbing classmates, disrupting class, and behaving irresponsibly (3 items for parents; 5 items for teachers); inattention/impulsivity by inability to sustain attention, restlessness, impulsivity, clowning behavior, distractibility, excessive talkativeness, failing to complete tasks, and loudness (6 items for parents; 8 items for teachers); and emotion dysregulation by jealous behavior, screaming, irritability, sudden mood changes, and temper displays (5 items for both informants). Participants had to rate all items that comprised a scale in order to have a value calculated. Alpha internal consistency coefficients were adequate to strong across all waves and both teacher and parent reports

(ranging between .60 and .92) except for mothers' reports of covert anti-social behavior in some waves (K, 2, 5, 8) and oppositional defiant behavior in the initial (kindergarten) wave, as shown in Table 1. In addition, an overall externalizing score was created using all items comprising the subscales. The composite index was included to demonstrate the models and conclusions that would be drawn from contrasting the subscales with an omnibus externalizing problems construct. Within informants, inter-correlations between different subscales showed that the majority were related yet distinct constructs: they ranged from .09 to .65 and .09 to .89 for mother and teacher ratings, respectively ($M=.37$ for both). The full correlation table is available as an electronic resource (Supplemental Table 1).

Child temperament—During home interviews before children started kindergarten or in the first weeks of school, mothers completed the Retrospective Infant Characteristics Questionnaire (Bates & Bayles, 1984), an account of the child's temperament during infancy. Mothers' concurrent reports of their child's temperament in infancy have been found to correlate significantly with their retrospective reports using this measure (Bates, Pettit, Dodge, & Ridge, 1998). Two scales were derived: Resistance to control (unmanageability; 3 items, $\alpha = .83$) and difficultness (negative emotionality; 9 items, $\alpha = .86$).

Parenting risk—During the home visit, two interviewers observed parent-child interactions upon greeting, during transitions, and at the end. The home visitors assessed the warmth of the mother's and father's behavior toward the child by noting the occurrence of each of four behavioral events (see Caldwell & Bradley, 1984): "mother/father speaks to child with a positive tone," "expresses a positive attitude when speaking of the child," "initiates positive physical contact with the child," and "accepts positive physical contact from the child." The two visitors' agreement on the sum of the ratings was substantial ($r = .58$), so the eight items (four from each of the two visitors) were averaged to create a score for observed maternal warmth ($\alpha = .61$) and observed paternal warmth ($\alpha = .68$) to the child. Mothers' and fathers' warmth scores ($r = .57$, $p < .001$) and were averaged to create a parental warmth composite score.

Parents' use of corporal punishment was measured using three different methods: in-depth interviews with mothers regarding how the child was disciplined (by both parents); the structured Concerns and Constraints interview, in which mothers described what they would do if her child misbehaved in certain ways; and through a modified version of the Conflict Tactics Scale (Straus, 1979). First, interviewers privately rated the discipline received by the child on a 5-point scale ranging from 1 (nonrestrictive, mostly positive guidance) to 3 (moderately restrictive, sometimes physical) to 5 (strict, often physical; the parent reports numerous restrictive and physical means of discipline and uses corporal punishment for much misbehavior). Interrater reliability was good ($r = .80$, $n = 56$). Second, in the Concerns and Constraints interview, mothers were presented with five hypothetical vignettes involving child misbehavior and asked what they would do if their child misbehaved in that way. Mothers' free responses were coded with respect to the use of corporal punishment (1 = *present*, 0 = *absent*). A total physical punishment score was computed by averaging across the five vignettes ($\alpha = .42$; higher scores corresponded with greater use of corporal

punishment). For the third measure, the Conflict Tactics Scale, we used a modified version of the Aggression scale (Strassberg, Dodge, Bates, & Pettit, 1992, $\alpha = .60$ to $.90$). The Aggression scale measures several acts of corporal punishment and violence, including threatening or throwing something at the child, hitting or spanking the child with the hand, or hitting or spanking the child with an object. A composite variable, Harsh Discipline, was created by standardizing and averaging the three corporal punishment measures (Deater-Deckard, Dodge, Bates, & Pettit, 1996).

Results

Analytic models

Table 1 shows means and standard deviations for each subscale and the overall externalizing score at each wave by informant, which were estimated by full information maximum likelihood with all variables in the same model. To fit models that were suitable for both data sources, our first task was to examine empirical trends for each informant's ratings by construct. As shown in Figure 1, sample mean plots indicated that mother and teacher reports showed sharp changes between kindergarten and first grade, and that trajectories between grades 1 and 8 could be modeled as linear or quadratic functions, depending upon the construct and informant. Thus, we modeled the growth of child externalizing problems in two pieces: change between kindergarten to first grade and a growth function between grades 1 through 8. The latter were flexible in that they allowed either linear or quadratic functions between grades 1–8 depending on the patterns of the data. Growth curve models for mothers' and teachers' ratings on the same subscales were estimated simultaneously. To identify the part of the model for change between grades kindergarten (K)-1, the variance of latent change (slope) was constrained to be equal to the variance of the specific observed subscale at k for each corresponding informant.

Our conceptual model is illustrated in Figure 2. As shown, model constraints were indicated by having the same label for the variance of an observed subscale at K for an informant's rating, for example, maternal rating (mk), and the variance of its latent change between K to 1st grade (sOm). The label was indicated as vk_m for this instance. Similar notations applied to the teacher ratings (i.e., tk , sOt , and vkt). Due to computational limitations we were not able to estimate the growth models with all five components of externalizing analyzed simultaneously. However, we used all subscales and all covariates as auxiliary variables when they were not in a specific model.

Growth curve analyses

The model in Figure 2 was estimated for each subscale and the total score. Then, the quadratic terms of the growth curve models between grades 1 and 8 were used to determine whether there were quadratic or linear trajectories for each specific subscale (see Supplemental Table 2). The results for the quadratic terms indicated that linear growth functions were appropriate for overt aggression and covert aggression for both mothers' and teachers' ratings. For the subscales of oppositional defiant behavior and emotion dysregulation and for the total score, the quadratic terms for mothers' ratings were significant, but teachers' ratings were best represented by linear growth functions. Finally,

for impulsivity/inattention, quadratic functions were needed for both informants' ratings. Based on the appropriate model for each subcomponent of externalizing problems, the trajectories of maternal and teacher ratings were compared and tested. All models were estimated using Mplus 7.4 (Muthen & Muthen, 1998–2015). Missing data were accounted for using the full-information maximum likelihood estimation (FIML) approach with auxiliary variables to assist in the estimation (Schafer & Graham, 2002). Additionally, standard errors for all models were obtained using the robust variance estimator (MLR) which relaxes the conditional constant residual variance assumption and produces consistent estimates of standard errors regardless whether the residual variances meet general linear regression distribution assumptions (Muthen & Muthen, 1998–2015).

Table 2 shows means and comparative differences in the unconditional growth factors of mothers' and teachers' ratings on each externalizing problem subscale and the total score. For interested readers, the variance and correlations among latent growth factors from the selected model in Table 2 are presented in Supplemental Table 3. Model fit indexes in Table 2 were good across the six dependent variables (for all models $RMSEA = .03$; CFI 's ranged from .95 – 1.0). There were significant differences between informants in the initial levels of each subdimension and in the total scale. We also found significant differences between informants in change in problem behaviors between kindergarten and first grade. Mothers reported steep declines in children's problem behaviors except for covert antisocial behavior and oppositional defiant behaviors across the transition from kindergarten to first grade, whereas teachers reported increased levels of all problem behaviors except overt aggression.

There were differences between mothers' and teachers' ratings in patterns of change between grades 1 and 8 on oppositional defiant behavior, emotion dysregulation, and total problems. Both mothers' and teachers' ratings of overt and covert aggression displayed similar linear functions and of impulsivity/inattention, similar quadratic functions. However, only overt aggression showed significant differences between informants. Mothers' ratings of overt aggression showed a significant decline across time, whereas teachers' ratings showed an insignificant small decline with overall low levels of concern reported by both informants.

Next, covariates of child gender, child ethnicity, family SES, child temperament, and parenting behavior were entered simultaneously into the model to predict initial levels, change between grades K – 1st, and growth rates between 1st – 8th in problem behaviors. The continuous covariates such as family SES, child temperament and parenting behavior were centered at the grand mean for model estimation. As shown in Table 3, these covariates (both distal and proximal factors) primarily predicted initial levels of mothers' and teachers' ratings of child externalizing behaviors. Controlling for other risk factors in the model, teachers but not mothers rated boys more highly than girls on overt aggression, oppositional defiant behavior, impulsivity/inattention, and total externalizing problems. However, mothers but not teachers rated girls as having higher initial levels of emotion dysregulation than boys. European American mothers reported higher initial levels of their children's oppositional defiant, emotional dysregulation, and total externalizing problems behaviors than African American mothers, but teachers' ratings did not show these differences. For SES, both mothers and teachers rated initial levels of covert antisocial behavior, impulsivity/

inattention, and emotion dysregulation significantly lower for children from relatively high SES backgrounds. In addition, teachers' but not mothers' ratings showed this significant associations between SES and overt aggression, oppositional defiant behavior, and total externalizing problems.

With respect to measures of child temperament, children who were high in resistance to control were perceived by mothers but not teachers as having higher kindergarten levels of behavior problems than others on all measures except covert antisocial behavior. Similarly, children who were high in difficult temperament were perceived by mothers but not teachers as having higher initial levels of oppositional defiant behavior, impulsivity/inattention, emotion dysregulation, and total problems than others. With respect to measures of parenting, high levels of corporal punishment predicted relatively high initial levels of both mothers' and teachers' ratings of overt aggression, impulsivity/inattention, and total externalizing. Moreover, corporal punishment predicted mothers' but not teachers' ratings of covert antisocial behavior, oppositional defiant behavior, and emotion dysregulation. Finally, low levels of parental warmth were associated with higher levels of teachers' but not mothers' ratings of child emotion dysregulation in kindergarten.

Kindergarten - grade 1—As for covariates predicting changes in child problem behavior between grades K – 1, background factors had no significant association except for family SES significantly predicting change in mothers' ratings of impulsivity/inattention and total problems, with steeper declines for higher than lower SES families. For child temperament and parenting, high levels of child resistance to control temperament were associated with steeper declines in mothers' ratings of overt aggression and steeper increases in teachers' ratings of impulsivity/inattention. Frequent corporal punishment predicted steeper declines in mothers' but not teachers' ratings of emotion dysregulation (although children who experienced frequent corporal punishment continued to show higher levels of ED than others). Finally, parental warmth was associated with change in both informants' ratings of children's impulsivity/inattention: high levels of parental warmth predicted smaller declines for mothers' ratings and steeper increases for teachers' ratings.

Grades 1 – 8—Teachers' ratings of covert antisocial behavior decreased across grades 1 – 8 for girls but not boys. Mothers' ratings of impulsivity/inattention and total problems showed declining rates across development that were steeper and had a sooner up-turn for girls than boys. With respect to child ethnicity, teachers' ratings of oppositional defiant behavior and total problem behavior increased over time for African American children, and the increases for each year were more than half of a standard deviation of the corresponding latent growth factor (.57 and .30, respectively), while growth levels were flat for European American children. Child ethnicity also predicted increasing levels of teachers' ratings of impulsivity/inattention for African American children. Children's SES backgrounds also had significant associations with trajectories of impulsivity/inattention rated by teachers: the high SES group did not change much across grades 1 to 8, whereas the low SES group decreased from grades 1 to 4 then increased thereafter. We note that the low SES group had much higher levels of impulsivity/inattention rated by teachers than others at every grade.

Child temperament did not predict growth rates in children's externalizing behaviors between grades 1–8. However, corporal punishment predicted trajectories of mothers' but not teachers' ratings of impulsivity/inattention and total externalizing between grades 1 and 8. In contrast, parental warmth had a significant negative association with growth rates in emotion dysregulation and total problems for teachers' but not mothers' ratings. Lower levels of parental warmth predicted increases in teachers' ratings of emotion dysregulation and total problems.

Discussion

Our findings affirmed the importance of examining developmental changes in heterogeneous forms of child externalizing behavior, and revealed striking differences and similarities between informants. One primary research aim was to determine whether mothers' and teachers' ratings of five theoretically meaningful sub-dimensions of child externalizing behavior showed similar patterns of individual growth between school entry and early adolescence, comparing each slope with one another and with a total problems index. Replicating earlier findings with teachers' ratings of these constructs (Olson et al., 2013), scales based on mothers' ratings of the externalizing behavior subdimensions were reliably coherent each consecutive year between kindergarten and eighth grade. Although mothers tended to rate kindergartners' problem behaviors at significantly higher levels than teachers, both informants rated overt and covert aggression as the least frequent problem behaviors shown by children and adolescents. Thus, differences between aggressive behavior and other forms of disruptive behavior were consistent across informants and settings.

This was not true, however, for other behaviors where level differences between parent and teacher ratings were quite high. Mothers reported relatively high levels of emotion dysregulation and teachers low. Similarly, oppositional defiant behavior was far more commonly reported in the home environment than in the school context. These behaviors are often displayed in response to environmental triggers such as parent-child and sibling conflicts that are common in home environments. In addition, it makes sense that children would regulate strong negative emotions and oppositional behaviors in the school environment, where the consequences of defiance to a teacher can lead to serious disciplinary actions. Teachers noted oppositional defiant behaviors but at significantly lower levels than the high levels reported by parents. When teachers do observe problem behaviors that are not normative in school contexts, this may give extra weight to the clinical significance of the child's adjustment problems.

For teachers, the most concerning issue was inattention/impulsivity. Across all nine years of development, impulsivity/inattention was the most frequent problem behavior that teachers reported (see, also, King et al., 2016). Mothers also reported relatively high levels of impulsivity/inattention but it was not the most common problem behavior in the home environment. As shown by Duncan et al. (2007) children's attention regulation skills at school entry are one of the primary factors predicting achievement later in schooling. Thus, attention regulation and impulse control are fundamental issues for behavioral adjustment and achievement in school contexts, and interventions related to these issues may be more critical than those for other forms of behavior problems. Relying upon a broad index of

externalizing problems may obscure identification of high impact target behaviors that are crucial for intervention in school environments.

Further analyses revealed that teachers' and mothers' reports of children's externalizing behaviors showed different patterns of change from kindergarten to grade 1. With the exception of oppositional defiant behaviors and covert antisocial behavior, mothers reported steep declines in children's problem behaviors across the transition from kindergarten to grade 1, whereas teachers reported increasing levels for all problem behaviors except overt aggression. These data extended previous analyses of global constructs of child externalizing (e.g., Keiley et al., 2000) by showing that most but not all forms of problem behavior fit this pattern. The fact that mothers' and teachers' ratings showed *opposite* patterns of change across this critical developmental transition has implications for understanding contextual moderators of the development, assessment and treatment of children's early disruptive behavior problems.

Considering comparative patterns of change between grades 1 and 8, only overt aggression showed significant differences between informants. As noted above, both informants reported relatively low levels of overt aggression. However, mothers' ratings of overt aggression showed a steady pattern of decline whereas teachers' ratings showed greater instability across time.

Finally, we explored whether mothers' and teachers' ratings of heterogeneous externalizing behaviors showed different patterns of association with the gender, ethnicity, socioeconomic status (SES), early temperament, and parenting experiences of the child. First, teachers rated boys more highly than girls on overt aggression, oppositional defiant behavior, and inattention/impulsivity and mothers did not, whereas mothers rated girls as having higher levels of emotion dysregulation than boys and teachers did not. Between grades 1–8 teachers were more likely than mothers to rate boys as showing higher levels of growth in covert antisocial behavior than girls. Mothers' ratings of children's impulsivity/inattention declined across development, with steeper declines for girls than boys. Based on a large body of previous research (e.g., Rescorla et al., 2014), it was not surprising that boys were at elevated risk for both initial and increased levels of overt forms of externalizing problems. The finding that gender differences in *covert* antisocial behavior were more likely to be reported by teachers than mothers was unique. Covert aggression is a low frequency behavior that (by definition) is difficult to assess. Thus it was intriguing that teachers were more likely than mothers to detect boys' elevated risk for increased covert aggression across development, and this finding merits further study. Finally, mothers detected elevated levels of emotion dysregulation in girls but not boys, suggesting that to understand gender differences in externalizing behavior we must take into account both the specific type and setting of children's problem behaviors. Theorists such as Crick & Grotpeter (1995) have emphasized the strong role that emotion regulation difficulties play in the development and expression of externalizing problems in girls. Our findings support this conceptualization, and suggest that mothers may be key informants, perhaps reflecting girls' willingness to confide in them and/or the saturation of parent-child and sibling conflicts in family settings.

Controlling for family SES and other covariates, teachers' ratings showed greater change in impulsivity/inattention for African American than European American children and mothers' ratings. Our data showed that the greatest areas of concern involved overt problems of self-regulation: oppositional behavior, impulsivity, and inattention. These differential risks were not evident in kindergarten, so we must question what factors in the school environments promoted relatively high levels of growth in teachers' perceptions of disruptive and inattentive behaviors among African American children. Key risk factors may include implicit negative expectations for behavior and achievement (Okonofua & Eberhardt, 2015), contextual features of the child's classroom, such as racial density and race of teacher (Jackson et al., 2006), differences in educational opportunity structures for children from racial minority backgrounds, and/or differences in family support of educational involvement (McLoyd, Mistry, & Hardaway, 2014).

Generally, children from low SES backgrounds were more likely than others to show elevated levels of covert antisocial behavior, impulsivity/inattention, and emotion dysregulation at the beginning of kindergarten as reported by both mothers and teachers. Furthermore, in contrast to our findings for child ethnicity, *both* informants' ratings revealed higher levels of change in impulsivity/inattention for children from relatively low family SES backgrounds. A large body of previous research has shown that children from lower SES backgrounds are at elevated risk for behavioral adjustment problems at school entry and beyond (e.g., McLoyd, et al., 2014). Our findings are unique in showing that associated problems of impulsivity/inattention are more likely to increase across development than other forms of externalizing behavior, suggesting specific targets for prevention.

We related two temperament risk constructs to differential growth in mothers' and teachers' ratings of externalizing subdimensions. Resistance to control refers to the child's noncompliance with parents' attempts to stop and redirect his/her behavior, whereas the difficultness construct primarily captures children's negative emotionality, especially high levels of irritability (Bates et al., 1998). Kindergartners who were rated highly on both scales received elevated maternal but not teacher ratings of overt aggression, oppositional defiant behavior, impulsivity/inattention, and emotion dysregulation, possibly reflecting the fact that mothers contributed assessments of both child temperament and externalizing behavior. However, from kindergarten to first grade, children high in resistance to control showed steeper increases in teachers' ratings of impulsivity/inattention, extending prior research linking this temperament construct to weak inhibitory competencies (Bates et al., 2014).

Finally, we also contributed novel analyses of two parenting behavior constructs, corporal punishment and warmth, to initial levels and change in externalizing subdimensions across the two different settings. Higher levels of corporal punishment were associated with both informants' ratings of overt aggression, impulsivity/inattention, and total problems as well as to mothers' but not teachers' ratings of covert antisocial behavior, oppositional defiant behavior, and emotion dysregulation. Moreover, across development high levels of corporal punishment predicted increases in mothers' but not teachers' ratings of impulsivity/inattention. Thus, consistent with a large body of previous work, high levels of corporal punishment were a robust risk factor for generalized patterns of externalizing problems across different life settings. However, predictions to *changes* in children's externalizing

behavior were highly differentiated, suggesting that self-regulation problems in home settings worsen across development.

In contrast, variations in parental warmth showed specific associations across externalizing problem subdimensions and raters. Low levels of parental warmth were associated with teachers' but not mothers' ratings of heightened emotion dysregulation in kindergarten. Moreover, between grades 1 and 8 children who received lower levels of parental warmth were rated by teachers but not mothers as showing increasing levels of emotion dysregulation and total problems. These findings are consistent with earlier research linking low warmth with global externalizing problems (e.g., Pettit, Bates, & Dodge, 1998) and unique in showing that low parental warmth predicted increased emotion regulation difficulties in school settings, a specific association that merits further research attention.

Our findings have implications for the assessment and prevention of children's externalizing problems. Problems of emotion dysregulation and oppositional defiant behavior were more salient in the family than in the classroom settings. Thus, the family setting may be a particularly important context for treatment and prevention of these common child and adolescent behaviors. The opposite pattern held for problems of inattention/impulsivity, which were more salient in classroom than home settings and showed sobering, informant-specific increases across development for African American children. Classroom settings may be an optimal context to focus prevention efforts, ideally provided at school entry and focused on diverse characteristics of classroom ecologies that exacerbate or mitigate teachers' perceptions of children's impulsivity and inattention difficulties.

Strengths and Limitations

One major strength of our study was the availability of a large sample of children who were tracked across the entire school-age period and assessed at yearly intervals by parents and teachers. Moreover, the sample contained significant levels of diversity in child gender, family ethnicity and socioeconomic status. These features provided an ideal basis for examining growth in children's problem behavior across important transition points in development, and for relating growth patterns of specific problem behavior subcomponents to salient distal and proximal risk factors.

In relation to limitations, as noted earlier our omnibus index of externalizing problem behavior was particular 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 broad Externalizing Problems scale of the CBCL/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 CBCL/TRF.

Moreover, our assessment of covert aggression was limited. By definition, covert antisocial behavior is difficult to observe. Because we constructed item composites that were identical across all nine waves of data, our index contained relatively few 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 that should be followed with research using other samples and measures, and other approaches to scaling to account for heterotypic continuity.

Finally, corporal punishment was assessed using maternal report, whereas warmth was assessed using a combination of observational methods and reports from both parents. Thus, the fact that punishment predicted growth in mothers' but not teachers' ratings of child externalizing problems could have reflected single informant bias. As noted above, the same limitations apply to our assessments of child temperament, which were contributed by mothers and primarily predicted maternal reports of child externalizing. Our inclusion of parenting and temperament risk variables was meant as an illustration, not as an exhaustive study of these constructs.

Conclusion

Our study showed that there were important differences between teachers and mothers in their levels of concern about specific forms of externalizing problems, patterns of change in problem behavior reports across development, and in the extent to which their ratings of specific problems were associated with children's gender, ethnicity, family SES backgrounds, temperament, and parenting experiences. These findings would have been obscured had we focused on an aggregate measure of psychopathology contributed by a single informant. 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, nor are we arguing that teachers' and parents' reports should always be examined separately. Rather, we look to longitudinal data to show the conditions under which focusing on subconstructs of psychopathology assessed by different informants gives us more useful information than focusing on aggregate constructs. This approach facilitates identification of contexts where various research measures or interventions may be optimally effective.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Figure 1.

Sample means of mother and teacher ratings on child externalizing problems K to 8th grades from full-information maximum likelihood (FIML) estimation (N=549)

Conceptual 2-pieces growth model of mother and teacher ratings on child externalizing problems K to 1st grade change & quadratic function of growth for 1st to 8th grade mk to mg8 refer to mother rating at kindergarten to 8th grade; tk to tg8 refer to teacher rating at kindergarten to 8th grade.

Table 1

Sample means, standard deviations, and Cronbach's alpha values for total externalizing and five externalizing subscores for mother and teacher ratings and predictors from full information maximum likelihood (FIML) estimation

(N=549)	Mother Rating				Teacher Rating			
	Mean	SD	alpha ¹	N	Mean	SD	alpha ¹	N
<i>Total Externalizing Problems</i>								
			23 items				25 items	
Kindergarten	4.36	2.79	0.87	489	2.06	2.98	0.94	530
First grade	3.87	2.75	0.88	465	2.60	3.39	0.94	501
Second grade	3.77	2.72	0.88	438	2.70	3.56	0.95	486
Third grade	3.51	2.93	0.91	452	2.49	3.46	0.95	476
Fourth grade	3.50	2.88	0.91	403	2.53	3.51	0.95	441
Fifth grade	3.39	2.86	0.90	380	2.69	3.41	0.95	417
Sixth grade	3.34	2.76	0.90	432	2.68	3.56	0.95	416
Seventh grade	3.52	2.78	0.89	433	2.69	3.43	0.95	403
Eighth grade	3.40	2.77	0.90	404	2.82	3.71	0.96	376
<i>Externalizing Sub-Factors:</i>								
Overt Aggression			6 items				5 items	
Kindergarten	2.04	2.79	0.72	538	1.14	2.78	0.84	543
First grade	1.53	2.32	0.66	476	1.21	2.87	0.84	511
Second grade	1.44	2.44	0.73	445	1.39	3.20	0.87	494
Third grade	1.31	2.46	0.76	456	1.26	3.19	0.90	477
Fourth grade	1.26	2.46	0.78	407	1.41	3.30	0.88	449
Fifth grade	1.16	2.36	0.77	385	1.30	3.04	0.86	427
Sixth grade	1.11	2.16	0.73	434	1.33	3.07	0.86	425
Seventh grade	1.00	1.95	0.67	441	1.01	2.54	0.85	410
Eighth grade	1.01	2.09	0.77	407	1.24	3.18	0.89	386
Covert Anti-Social Behavior			3 items				2 items	
Kindergarten	1.47	2.17	0.47	541	0.91	2.90	0.72	540
First grade	1.32	2.37	0.64	481	1.17	3.39	0.73	513
Second grade	1.43	2.35	0.53	449	1.38	3.54	0.73	493
Third grade	1.26	2.65	0.75	458	1.14	3.35	0.79	477

(N=549)	Mother Rating				Teacher Rating			
	Mean	SD	r	N	Mean	SD	r	N
Fourth grade	1.26	2.41	0.66	407	1.37	3.53	0.72	450
Fifth grade	1.24	2.28	0.52	384	1.26	2.96	0.63	427
Sixth grade	1.32	2.42	0.60	434	1.12	3.04	0.68	424
Seventh grade	1.17	2.32	0.62	443	1.01	2.73	0.58	410
Eighth grade	1.13	2.14	0.55	411	1.21	2.98	0.58	388
Oppositional Defiant	3 items				5 items			
Kindergarten	6.57	3.78	0.49	513	2.85	4.55	0.88	540
First grade	6.42	4.14	0.60	481	3.36	4.98	0.89	511
Second grade	6.45	4.23	0.62	450	3.59	5.21	0.91	493
Third grade	6.15	4.52	0.66	459	3.18	4.89	0.90	476
Fourth grade	6.15	4.30	0.64	410	3.27	5.02	0.90	448
Fifth grade	5.65	4.31	0.65	393	3.57	4.83	0.88	424
Sixth grade	5.93	4.45	0.69	438	3.54	5.02	0.89	423
Seventh grade	5.90	4.37	0.61	445	3.74	5.02	0.89	408
Eighth grade	6.28	4.46	0.71	413	3.87	5.55	0.92	386
<i>Temperament Sub-Factors</i>								
Impulsivity/Inattention	6 items				8 items			
Kindergarten	6.31	4.38	0.76	541	3.07	4.14	0.87	541
First grade	5.78	4.39	0.79	478	4.12	4.79	0.88	509
Second grade	5.52	4.39	0.80	449	4.14	4.77	0.89	492
Third grade	5.15	4.54	0.82	457	3.73	4.50	0.88	477
Fourth grade	5.01	4.43	0.81	405	3.79	4.68	0.89	447
Fifth grade	4.76	4.48	0.82	382	3.98	4.62	0.88	424
Sixth grade	4.71	4.28	0.79	435	3.79	4.64	0.90	424
Seventh grade	4.99	4.35	0.79	445	4.25	4.99	0.91	410
Eighth grade	4.72	4.35	0.81	409	4.29	5.20	0.92	386
Emotion Dysregulation	5 items				5 items			
Kindergarten	5.13	4.23	0.74	534	1.17	2.49	0.74	541
First grade	4.33	4.04	0.75	478	1.57	3.30	0.82	511
Second grade	4.04	3.89	0.74	450	1.50	3.21	0.83	494

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(N=549)	Mother Rating			Teacher Rating		
	Mean	SD	alpha ¹	Mean	SD	alpha ¹
Third grade	3.98	4.00	0.76	1.49	3.09	0.81
Fourth grade	4.02	4.10	0.76	1.50	3.06	0.80
Fifth grade	4.06	4.31	0.81	1.77	3.19	0.80
Sixth grade	4.10	4.11	0.78	1.90	3.58	0.85
Seventh grade	4.51	4.19	0.76	1.65	3.19	0.83
Eighth grade	4.20	3.95	0.77	1.77	3.34	0.82
Predictors						
Gender (1=female)	0.49	0.50				
African-American	0.17	0.38				
SES (Hollingshead)	39.69	14.07				
Resistance to control	3.584	1.13				
Difficult temperament	3.298	0.95				
Harsh discipline	0.005	1.97				
Parental warmth	0.807	0.21				

¹ Means and standard deviation are from FIML with N=549 estimated by Mplus while alpha values are based on casewise deletion from standardized items estimated by Stata.

Table 2

Estimates of trajectories of externalizing problems K-G8 for the selected functions and χ^2 tests of an equal growth factor of mother and teacher ratings (N=549)

	Overt aggression	Covert anti social behavior	Oppositional defiant	Impulsivity inattention	Emotion dysregulation	Total externalizing
A.) Estimates of trajectories parameters	b (s.e.)	b (s.e.)	b (s.e.)	b (s.e.)	b (s.e.)	b (s.e.)
Maternal rating						
initial level (im)	2.04 (.12) ***	1.47 (.09) ***	6.57 (.16) ***	6.32 (.19) ***	5.13 (.18) ***	4.36 (.12) ***
K to 1st grade change (s0m)	-.54 (.11) ***	-.10 (.10)	.00 (.17)	-.52 (.15) ***	-.89 (.16) ***	-.48 (.10) ***
linear term of slope 1st–8th grade (s1m)	-.08 (.02) ***	-.03 (.02)	-.30 (.08) ***	-.36 (.07) ***	-.13 (.07)	-.19 (.05) ***
quadratic term of slope 1st–8th grades (q1m)	--	--	.04 (.01) **	.03 (.01) ***	.02 (.01) *	.02 (.01) **
Teacher rating						
initial level (it)	1.14 (.12) ***	.91 (.12) ***	2.85 (.19) ***	3.07 (.18) ***	1.17 (.11) ***	2.06 (.13) ***
K to 1st grade change (s0t)	.19 (.13)	.38 (.14) **	.43 (.17) *	1.10 (.18) ***	.30 (.12) *	.50 (.12) ***
linear term of slope 1st–8th grade (s1t)	-.03 (.02)	-.03 (.02)	.06 (.04)	-.22 (.09) *	.04 (.02)	.03 (.02)
quadratic term of slope 1st–8th grades (q1t)	--	--	--	.04 (.01) **	--	--
Model fit indexes	RMSEA: .03; CFI: .97; SRMR: .12	RMSEA: .03; CFI: .94; SRMR: .11	RMSEA: .03; CFI: .99; SRMR: .10	RMSEA: .03; CFI: 1.0; SRMR: .07	RMSEA: .03; CFI: .99; SRMR: .08	RMSEA: .03; CFI: .98; SRMR: .04
B.) test equal means of a growth factor of externalizing problems between mother and teacher ratings	χ^2 (df=1)	χ^2 (df=1)	χ^2 (df=1)	χ^2 (df=1)	χ^2 (df=1)	χ^2 (df=1)
initial level (im=it)	35.25 ***	16.62 ***	289.53 ***	239.75 ***	413.85 ***	241.75 ***
K to 1st grade change (s0m=s0t)	19.42 ***	8.77 **	3.22	47.61 ***	34.43 ***	38.88 ***
linear term of slope 1st–8th grade (s1m=s1t)	4.29 *	.07	--	1.47	--	--
quadratic term of slope 1st–8th grades (q1m=q1t)	--	--	--	.12	--	--

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Notes:

* p < .05;
** p < .01;
*** p < .001;

K: Kindergarten, G8: 8th grade, b: unstandardized regression coefficients, im: initial level of growth factor for mother ratings, s0m: change between kindergarten and 1st grade of growth factor for mother ratings, s1m: linear term of slope for 1st to 8th grades of growth factor for mother ratings, q1m: quadratic term of slope for 1st to 8th grades of growth factor for mother ratings, it: initial level of growth factor for teacher ratings, s0t: change between kindergarten and 1st grade of growth factor for teacher ratings, s1t: linear term of slope for 1st to 8th grades of growth factor for teacher ratings, q1t: quadratic term of slope for 1st to 8th grades of growth factor for teacher ratings.

Unstandardized coefficients of predictors¹ on growth factors of K-G8 externalizing problems rated by mother and teacher for the selected models (N=549)

Table 3

	Overt aggression			Covert anti-social behavior			Oppositional defiant			Impulsivity inattention			Emotion dysregulation			Total externalizing problems		
	Mother bm (s.e.)	Teacher bt (s.e.)		Mother bm (s.e.)	Teacher bt (s.e.)		Mother bm (s.e.)	Teacher bt (s.e.)		Mother bm (s.e.)	Teacher bt (s.e.)		Mother bm (s.e.)	Teacher bt (s.e.)		Mother bm (s.e.)	Teacher bt (s.e.)	
Initial level (lnf6)																		
gender (1=female)	-.41 (.22)	-.54 (.23)	*	-.25 (.18)	-.08 (.25)		.22 (.30)	-1.25 (.37)	***	-.31 (.34)	-1.60 (.34)	***	.76 (.33)	*	-.20 (.21)	-.07 (.21)	-.89 (.24)	***
race (1=black)	-.17 (.36)	-.23 (.42)		-.20 (.31)	-.08 (.46)		-1.47 (.48)	-.32 (.64)	**	-.63 (.51)	-.39 (.55)		-1.66 (.48)	***	-.33 (.37)	-.67 (.34)	-.26 (.42)	*
SES	-.01 (.01)	-.03 (.01)	**	-.02 (.01)	*	-.03 (.01)	.02 (.01)	-.07 (.02)	***	-.03 (.01)	*	-.06 (.01)	***	-.04 (.01)	**	-.02 (.01)	-.05 (.01)	***
Resistance to control	.65 (.11)	***		.19 (.10)	.03 (.13)		.74 (.16)	***		.91 (.17)	***		.71 (.16)	***	.15 (.13)	.65 (.10)	***	.21 (.14)
Difficult temperament	.17 (.13)	.02 (.12)		.06 (.12)	.10 (.13)		.42 (.18)	*	-.06 (.23)	.41 (.20)	*	.17 (.22)	.64 (.22)	**	-.07 (.13)	.34 (.13)	**	.04 (.15)
Harsh discipline	.31 (.07)	***	*	.19 (.05)	***		.49 (.08)	***	.27 (.10)	.58 (.08)	***	.26 (.10)	*	.54 (.09)	***	.45 (.06)	***	.19 (.07)
Parental warmth	-.94 (.62)	-.95 (.79)		.19 (.51)	-1.08 (.77)		-.75 (.74)	-.15 (1.04)		-1.31 (.86)	-1.09 (.85)		-.89 (.83)		-1.63 (.73)	-.91 (.54)		-.97 (.74)
Intercept	2.26 (.17)	***	1.44 (.20)	***	1.62 (.14)	***	6.71 (.21)	***	3.51 (.31)	***	6.57 (.26)	***	3.91 (.28)	***	1.33 (.18)	4.52 (.17)	***	2.54 (.21)
K-G1 Change (slm/slt)																		
gender (1=female)	.05 (.21)	-.18 (.25)		.30 (.20)	.32 (.28)		-.34 (.35)	-.64 (.34)		.00 (.30)	-.43 (.36)		.26 (.32)		-.23 (.25)	.14 (.20)		-.37 (.24)
race (1=black)	-.01 (.34)	.46 (.50)		.21 (.36)	.34 (.51)		-.08 (.53)	.24 (.56)		-.50 (.49)	-.83 (.57)		-.06 (.52)		.84 (.44)	-.17 (.33)		.24 (.40)
SES	-.01 (.01)	-.01 (.01)		.01 (.01)	-.02 (.01)		-.03 (.02)	.00 (.01)		-.04 (.01)	**	-.02 (.01)	-.01 (.02)		-.01 (.01)	-.02 (.01)	*	-.01 (.01)
Resistance to control	-.27 (.11)	*	.03 (.14)	.08 (.10)	.15 (.14)		-.10 (.21)	.12 (.20)		-.08 (.16)	.48 (.19)	**	-.03 (.17)		.09 (.13)	-.07 (.11)		.23 (.13)
Difficult temperament	-.07 (.12)	-.02 (.15)		-.08 (.12)	-.17 (.16)		-.22 (.23)	-.22 (.22)		-.06 (.20)	-.31 (.21)		-.20 (.20)		.12 (.15)	-.08 (.13)		-.21 (.15)
Harsh discipline	-.11 (.07)	-.04 (.07)		-.04 (.06)	-.01 (.07)		-.10 (.10)	-.06 (.10)		-.10 (.08)	-.06 (.10)		-.23 (.09)	*	-.06 (.07)	-.11 (.06)		-.01 (.07)
Parental warmth	-.07 (.60)	-.27 (.79)		-.97 (.59)	.76 (.80)		.10 (.94)	-.23 (1.02)		1.37 (.67)	2.02 (.94)	*	.68 (.77)		1.15 (.82)	.40 (.48)		.67 (.74)
Intercept	-.56 (.17)	***	.20 (.21)	***	.16 (.22)	*	.17 (.25)	.70 (.28)	*	-.44 (.24)	1.43 (.30)	***	-1.01 (.25)	***	.27 (.19)	-.52 (.16)	***	.64 (.20)
G1-G8 Linear term of slope (slm/slt)																		
gender (1=female)	.03 (.03)	.03 (.04)		-.01 (.03)	-.13 (.04)	**	-.31 (.16)	-.08 (.07)		-.46 (.14)	***	-.17 (.18)	-.27 (.15)		.01 (.04)	-.23 (.09)	**	-.06 (.04)
race (1=black)	.01 (.05)	.12 (.08)		-.01 (.06)	.05 (.08)		.37 (.26)	.35 (.13)	**	.26 (.22)	1.10 (.29)	***	.26 (.24)		.11 (.08)	.15 (.15)		.22 (.09)
SES	.00 (.00)	.00 (.00)		.00 (.00)	.00 (.00)		-.01 (.01)	.00 (.00)		.01 (.01)	.02 (.01)	**	.00 (.01)		.00 (.00)	.00 (.00)		.00 (.00)

	Overt aggression				Covert anti-social behavior				Oppositional defiant				Impulsivity inattention				Emotion dysregulation				Total externalizing problems			
	Mother bm		Teacher bt		Mother bm		Teacher bt		Mother bm		Teacher bt		Mother bm		Teacher bt		Mother bm		Teacher bt		Mother bm		Teacher bt	
	(s.e.)		(s.e.)		(s.e.)		(s.e.)		(s.e.)		(s.e.)		(s.e.)		(s.e.)		(s.e.)		(s.e.)		(s.e.)		(s.e.)	
Resistance to control	-.02 (.02)		-.01 (.02)		-.03 (.02)		.07 (.09)		-.06 (.04)		.01 (.07)		-.07 (.09)		-.05 (.08)		-.04 (.02)		.00 (.05)		-.04 (.02)			
Difficult temperament	-.01 (.02)		.00 (.03)		-.01 (.03)		-.05 (.11)		.06 (.04)		-.15 (.09)		-.14 (.10)		-.07 (.10)		-.01 (.03)		-.08 (.06)		.03 (.03)			
Harsh discipline	-.01 (.01)		.00 (.01)		.00 (.01)		-.06 (.04)		.00 (.02)		-.09 (.04)	*	.07 (.06)		-.01 (.04)		.01 (.01)		-.05 (.02)	*	-.01 (.01)			
Parental warmth	.12 (.10)		-.03 (.12)		-.15 (.11)		.21 (.43)		-.29 (.18)		-.37 (.35)		-.78 (.47)		.26 (.41)		-.22 (.11)	*	.09 (.23)		-.25 (.11)	*		
Intercept	-.09 (.03)	***	-.06 (.03)		.03 (.03)		-.22 (.13)		.04 (.06)		-.17 (.11)		-.30 (.14)	*	-.04 (.11)		.02 (.03)		-.11 (.07)		.01 (.04)			
G1-G8 Quadratic term of slope (qlm/qlt)																								
gender (1=female)	-		-		-		.04 (.02)		-		.06 (.02)	**	.01 (.03)		.03 (.02)		-		.03 (.01)	*	-			
race (1=black)	-		-		-		-.03 (.04)		-		-.04 (.03)		-.12 (.04)	**	-.02 (.03)		-		-.02 (.02)		-			
SES	-		-		-		.00 (.00)		-		.00 (.00)		-.004 (.00)	***	.00 (.00)		-		.00 (.00)		-			
Resistance to control	-		-		-		-.01 (.01)		-		.00 (.01)		.00 (.01)		.01 (.01)		-		.00 (.01)		-			
Difficult temperament	-		-		-		.01 (.01)		-		.01 (.01)		.03 (.01)	*	.00 (.01)		-		.01 (.01)		-			
Harsh discipline	-		-		-		.01 (.01)		-		.01 (.01)	*	-.01 (.01)		.00 (.01)		-		.01 (.00)	*	-			
Parental warmth	-		-		-		-.01 (.06)		-		.07 (.05)		.06 (.07)		-.02 (.06)		-		.00 (.03)		-			
Intercept	-		-		-		.02 (.02)		-		.01 (.01)		.05 (.02)	*	.01 (.01)		-		.01 (.01)		-			
Model fitness indexes				RMSEA: .03; CFI: .96; SRMR: .09				RMSEA: .03; CFI: .98; SRMR: .07				RMSEA: .03; CFI: .99; SRMR: .05				RMSEA: .03; CFI: .98; SRMR: .07				RMSEA: .03; CFI: .98; SRMR: .03				

Notes:

*
p < .05;
**
p < .01;

p < .001.

-- indicates the corresponding cell not applied due to no quadratic term of growth for both mother and teacher ratings or different growth function between 1st and 8th grades for mother 1 Continuous predictors of SES to Parental Warmth are centered at grand mean for model estimation.