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Growth Trajectories of Early Aggression, Overactivity, and Inattention: Relations to Second Grade Reading

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Abstract

The link between behavior problems and low academic achievement is well established, but few studies have examined longitudinal relations between early externalizing behaviors before school entry and low academic achievement following transition to formal schooling. Early inattention has been particularly overlooked, despite strong associations between inattention and reading difficulties later in development. Trajectories of infant/toddler aggression, overactivity, and inattention, developed from parent reports about 1- to 3-year-old children, were examined as predictors of direct assessments of second grade reading in an at-risk epidemiological study subsample (N = 359). Reports of inattentive and overactive behaviors at age 1-to-3 years and changes in inattention through toddlerhood predicted reading achievement in second grade. A parallel process model suggested that the effects of early inattention on reading appear to be most robust. Findings underscore the contribution of social-emotional development to school readiness and the importance of early identification of children with externalizing problems, as early interventions designed to reduce externalizing problems may improve later reading skills.

Keywords

reading achievement; early externalizing behavior; inattention; growth trajectories; school readiness

The link between behavior problems and reading achievement is well-documented (Hinshaw 1992; Masten, Roisman et al. 2005). However, few studies have examined this association in the years leading up to school entry, before formal academic achievement is a developmentally salient task (NICHD, 2004). Mechanisms responsible for the association between behavior problems and reading problems likely operate earlier in development

(Friedman-Weieneth, et al., 2007), so it is critical to document these foundational developmental pathways. Further, demonstrating links between early behavior problems and later reading would offer support for intervention programs that target behavior problems to promote school readiness. In this study, toddler trajectories of distinct dimensions of externalizing behaviors – aggression, overactivity, and inattention – and their relationship to reading achievement in second grade are examined.

Reading is a foundational academic skill on which later academic performance depends. Its consequences extend well beyond the act of reading itself to a wide array of cognitive domains including vocabulary, declarative knowledge, and broader verbal intelligence (Cunningham & Stanovich 1998). An emergent literacy approach suggests that reading competencies – and reading difficulties – emerge before school age, as children gain exposure to oral language, phonological processing, and print knowledge skills that form the basis for early literacy (Lonigan, Burgess et al. 2000). And just as reading competencies and challenges begin developing before school age, so do behavior problems (Briggs-Gowan, Carter et al. 2006).

Estimates of co-occurrence between externalizing disorders and academic underachievement in school-aged children range from 10 to 50% (Hinshaw 1992). Academic problems that are evident in the early school years, particularly in basic skills such as reading, have significant consequences for later negative outcomes, including school dropout (McGee, 2002), smoking (Tucker, Martinez et al. 2008), drug use (Fothergill, Ensminger et al. 2008), and partner abuse (Magdol, Moffitt et al. 1998). Identifying early pathways underlying the relation between externalizing behaviors and academic underachievement supports building interventions that can address the impacts, individual and societal, of these problems across the lifespan.

Early learning and behavior problems share a number of early risk factors, including sociodemographic risks like poverty (NICHD, 2004). These common factors, which may underlie the unfolding of both academic underachievement and externalizing problems, are not always controlled in studies of the relation between academic failure and externalizing problems (Masten, Roisman et al. 2005). To account for shared risk to behavioral and learning problems, the current study examined models that included sociodemographic risk and early low language.

Specific externalizing behaviors such as aggression, inattention, and overactivity tend to be moderately correlated (Jensen, Hinshaw et al. 2001). However, these dimensions are distinct in young children as they are in older children, with unique risk factors, developmental courses, and clinical correlates (Carter et al., 2013; Keenan & Wakschlag 2004). Distinction between inattention and overactivity has been supported in factor analysis (Burns, Walsh et al. 1997; Lahey, Pelhman et al. 1998), including among preschoolers (Hardy, Kollins et al. 2007).

Specific dimensions of early externalizing may also differentially relate to reading achievement (Hinshaw 1992; Keenan and Wakschlag 2004; Friedman-Weieneth, Harvey et al. 2007). Evidence from longitudinal studies among school-aged children supports

distinctions between the impacts of aggression, inattention, and overactivity on reading (Hinshaw 1992). Examining longitudinal multi-domain pathways from early schooling to high school, attention problems predicted later academic achievement more strongly than aggression or oppositionality (Vitaro, Brendgen et al. 2005). In a longitudinal study from kindergarten through fifth grade in which inattention and hyperactivity were modeled separately, inattention contributed uniquely to reading achievement (Rabiner and Coie 2000).

Thus, it seems that inattention may play a particularly important role in the emergence of reading difficulties in the school years; whether this pattern extends down to the toddler years remains an open question. In early childhood, researchers have examined the relation of trajectories of aggression in early childhood to school-aged reading, finding prediction (NICHD, 2004 (Campbell, Spieker et al. 2006). In separate work, no association was observed between trajectories of the broad domain of externalizing behaviors in early childhood to school-aged reading (Bub 2007). No study that we are aware of has investigated toddler trajectories of inattention and overactivity and their relation to later reading. Evidence from a cross-sectional study among 3-year-olds suggests that inattention and overactivity may be particularly salient for pre-reading skills: hyperactivity and inattention were both correlated with cognitive difficulties and preacademic skills, whereas aggression was not (Friedman-Weieneth, Harvey et al. 2007).

Sex differences in behavior problems and their relation to reading have been documented. Boys are at greater risk than girls for behavior problems across early and middle childhood (Baillargeon, Zoccolillo et al. 2007). Moreover, boys with reading problems demonstrate higher rates of physical aggression than girls with reading problems (Trzesniewski, Moffit et al. 2006). Thus, exploration of sex differences in the relation between early externalizing problems and later reading seems warranted.

Research questions explored in this report are whether there are bivariate and multivariate associations between early inattention, overactivity, and aggression and reading attainment at second grade. We hypothesized that parent reports of aggression, overactivity, and inattention measured at ages 12–36 months, and changes in these dimensions through early childhood, would predict direct assessment of reading at second grade. We further hypothesized that these predictions would remain strong even when accounting for the shared risks of early low language and sociodemographic factors. Finally, we hypothesized that, when these dimensions were considered together, inattention would contribute uniquely to later reading. The possible moderation effect of child sex on these associations was explored.

Methods

Participants

Participants ($n=359$) were drawn from an epidemiological, longitudinal study of social-emotional development. Children in the primary study were an age- and sex stratified sample randomly selected from 8,404 birth records of children delivered at a large New England hospital. Among the randomly selected children ($n = 1,491$), parents of 1,329 children filled

out one or more early childhood surveys (89.1% response rate). Of these 1,329 children, 541 were invited to participate in in-person assessments at second grade (Intensive Assessment Subsample). Of the 413 directly assessed, 359 Woodcock Johnson reading data and were included in the presented analyses (one outlier excluded).

The invited Intensive Assessment Subsample ($n=541$) was enriched for behavior problems; 80% of participants were selected based on meeting at least one of the following three criteria: (1) *Persistent Social-Emotional Problems in Early Childhood* (i.e., parent reported social-emotional problems at both 2 and 3 years of age on standardized measures); (2) *Social-Emotional Problems in Early School-Age* (i.e., parent or teacher reported social-emotional problems on the standardized measures or indicated service need); and (3) *Risk for Language/Learning Difficulties* (i.e., low language reported by parent or teacher on the Child Development Inventory at age 3, indicated diagnosis/treatment for language, or significant concern about the language in early school-age by teacher or parent). A total of 433 children were selected based on one or more of the inclusion criteria (252 for social-emotional problems only, 83 for language problems only, and 98 for problems in both areas). In addition, a random sample of 20% of the remaining 790 children ($n = 134$) with no previously identified problems was also selected for inclusion.

Overall, then, this sample can be described as an at-risk subsample of a larger epidemiological sample. Children with reading assessment data did not differ significantly from the initial eligible sample ($n = 1,491$) with respect to child ethnicity, child sex, marital status, poverty status, teen motherhood, or maternal education (χ^2 ranged from 0.02–1.62, $ps > .05$). However, the 359 children with reading scores were more likely than children who were invited to participate in the intensive substudy but were missing reading data ($n = 207$) to be white and to have a higher gestational age and birthweight ($ps < .05$). Mean child age from this sample at Time 1 (T1) was 25 months (range: 11.5–42.1); at Time 2 (T2), 37 months (range: 23.9–52.6); at Time 3 (T3), 39.9 months (range: 32.6–51.3 months); and at second grade, 8.0 years (range: 6.9–9.3 years). Exclusion criteria from the overall study included: low birth weight ($<2,200$ g); preterm (<36 weeks gestation); known genetic or congenital anomalies; low Apgar scores; no parent able to participate in English; no biological parent had custody of the child; or family moved out of state at time of first survey (1998–1999).

Procedure

At T1 and T2, eligible parents were notified of their selection and mailed a survey booklet; 91.3% participated at T2. At T3, only families whose children were between 12–23 months at T1 received surveys, of whom 95% participated ($n = 537$); thus, half of participants are missing T3 data by design. Parents received \$25 for completing surveys. Families selected into the school-age intensive assessment subsample were invited to schedule a visit during the child's second grade year and received \$100 for participation. Reading achievement was measured during this visit.

Measures

Early behavior problems

Infant-Toddler Social and Emotional Assessment: ITSEA (Carter and Briggs-Gowan 2006): The ITSEA is a parent-report questionnaire assessing behavior problems and competencies in 12- to 48-month olds. Items are rated on a 3-point scale: (0) *Not true/rarely*, (1) *Somewhat true/sometimes*, and (2) *Very true/often*. The ITSEA has demonstrated acceptable internal consistency, test-retest reliability, and validity relative to other parent report checklists and independent behavioral observations (Carter and Briggs-Gowan 2006).

Scale building: To investigate trajectories of inattention, overactivity and aggression, the Attention latent construct comprised the 5 Attention Scale items in the Competence Domain, reverse-coded. The Overactivity latent construct comprised the 7 ITSEA Activity/Impulsivity Scale items. The Aggression latent construct comprised 18-items from the ITSEA Aggression/Defiance and Peer Aggression Scales. Three items (“swears;” “teases;” “won’t let others play”) were removed due to high rates of missing data in year 1. Resulting scales demonstrated acceptable-to-good reliability in this sample (α s = .66–.85).

Reading achievement

Woodcock-Johnson III Tests of Achievement: WJ III ACH (Woodcock, McGrew et al. 2001): The WJ III ACH is an assessment of academic achievement with demonstrated validity and excellent reliability. The WJ III broad reading composite, administered at second grade, was the outcome measure. This reading cluster standard score is based on age-specific norms ($M = 100$, $SD = 15$) and includes tests of letter-word identification (naming letters and reading words aloud from a list) and word attack (reading nonsense words to assess phonemic skills).

Covariates

Child Development Inventories: CDI (Ireton 1992): Low receptive and expressive language, as measured by parent-rated report measured at Time 2, were used as a covariate in the models predicting reading outcomes.

Cumulative Sociodemographic Risk (CSR): The CSR is a multiple-risk score of sociodemographic variables measured at second grade; higher scores reflect higher risk, with families assigned a score of 1 for each of the following variables: living in poverty, low household education, teenage mother, minority ethnicity, unemployment, and single parent household.

Analytic Approach

Latent growth curve trajectories were modeled using MPlus5. These trajectories estimated intra-individual change in aggression, overactivity, and inattention problems over time between T1 and T3, estimating a latent intercept and slope for each individual. For all models, intercept was set at T1, meaning that the intercept is interpreted as the level of aggression, overactivity, or inattention at the first assessment point, when children were 12–36 months of age. Linear growth between assessment time points was assumed. Measures of

fit included the Comparative Fit Index (CFI; .90–.95 adequate fit, >.95 good fit); the Root Mean Square Error of Approximation (RMSEA; .05–.10 adequate fit, <.05 good fit), and the Standardized Root Mean Square Residual (SRMR <.08 indicates good fit; Bollen and Long 1993). Once growth models were specified and good fit and individual variability established, relation between trajectories and second grade reading was modeled.

All cases with WJ Reading Composite scores were included in analyses ($n = 359$); one outlier was excluded. Missing data for overactivity, aggression, and inattention was minimal at T1 and T2 but higher at T3 due to study design (T1: 85–96%; T2: 90–98%; T3: 43–45%). Full Information Maximum Likelihood (FIML) was used to estimate missing data.

Results

Descriptive Results

Boys and girls did not differ on the reading outcome or control variables. However, boys had significantly higher scores on inattention at T2 and overactivity at T1. Table 1 shows correlations between variables of interest. There was evidence for intra-individual stability in attention, overactivity, and aggression, with moderate to high correlations within dimensions across time. Reading was correlated with predictor and risk variables in expected directions.

Although age-normed standard scores were used for reading achievement, child age at time of the reading assessment was included as a covariate due to the large range of ages at time of testing (mean age = 8.0 years, $SD = .4$; range: 6.9–9.3) and its negative association with the reading achievement outcome ($r = -.42, p < .001$). This large range and inverse relation may reflect study design in that children were assessed at second grade entry rather than at an age point; children assessed at older ages therefore may have been retained in grade. Though a retained in grade variable was not available, when models were run with only cases within 1 SD of the age mean, age was no longer a significant predictor in any model and patterns of coefficients in terms of magnitude of effects and significant from latent variables to reading outcome remained consistent.

The initial aggression, overactivity, and inattention trajectory models demonstrated excellent fit (see Table 2). On average, children's aggressive, overactive, and inattentive behaviors decreased over toddlerhood; there was significant inter-individual variation in intercepts and growth for all three domains. Residual variances were constrained over time for each time-varying variable to allow for estimation of parallel model; model fit was improved with this constraint.¹

Risk & Covariate Analyses

Modeling cumulative sociodemographic risk as a time-varying covariate failed to significantly improve model fit; therefore, second grade cumulative sociodemographic risk, the most proximal to the outcome, was used to test hypotheses. Early low language was not

¹ χ^2 difference tests were used to determine model fit; Aggression: $\chi^2 = .86, p = .15$; Inattention: $\chi^2 = 5.43, p = .07$; Overactivity $\chi^2 = 0.49, p = .78$.

a significant predictor of reading in any final, trimmed model so it was excluded from reported results for parsimony.

Aggression and Reading

The estimated intercept and slope latent aggression variables were regressed on the outcome measure of reading achievement, along with covariates, child age and sociodemographic risk (see Table 3); the model demonstrated good fit. Neither initial rates of aggression nor change in aggression over toddlerhood significantly predicted reading achievement. Covariates of sociodemographic risk and child age significantly predicted concurrent reading, with higher risk and higher child age at time of testing associated with lower reading scores.

Overactivity and Reading

The latent intercept and slope overactivity constructs, along with covariates of child age and sociodemographic risk, were regressed on the reading score; the model retained excellent fit (see Table 3). Initial levels of overactivity were associated with reading achievement at second grade; children with higher rates of initial parent-reported overactivity scored lower on reading achievement in second grade. The overactivity slope was not significantly associated with reading achievement in second grade. As with the aggression model, child age and sociodemographic risk were associated with reading, with higher risk and higher child age at time of testing associated with lower reading scores.

Inattention and Reading

The latent intercept and inattention slope, along with covariates of child age and sociodemographic risk, were regressed on reading scores; the model retained excellent fit (see Table 3). Initial level of inattention was associated with reading achievement in second grade (standardized estimate = $-.40$; $p < .001$), with higher levels of initial inattention predicting lower later reading scores. Change in inattention over time was associated with reading achievement at a trend level (-0.24 , $p = .10$), with increases in inattention associated with poorer reading. Child age was associated with reading outcomes, with higher age predicting lower reading scores, but sociodemographic risk was not. Thus, a trimmed model was tested with the path for cumulative risk removed but with retained (Bollen and Long 1993). The final, trimmed inattention model also demonstrated excellent fit. In the final model, initial level of inattention continued to be associated with reading achievement in second grade, with higher levels of early inattention predicting poorer later reading (see Table 3). Change in inattention over time was also associated with poorer reading, with increases in inattention over time associated with poorer reading at second grade.

Putting it Together: A Comprehensive Parallel Process Model

To examine the relative contribution of the significant predictors of later reading, trajectories of inattention, overactivity, and aggression were modeled together in a parallel process model. In this parallel process model, there was significant variance around all intercepts and slopes (ps ranging from $.02$ to $< .001$; see Table 4 for correlation matrix of latent variables). The intercepts of inattention, aggression, and overactivity were all positively

correlated, as were the slopes of all three dimensions; the slopes and intercepts of aggression and of inattention were also negatively correlated with one another. However, the size of these associations was small. Next, latent intercepts and slopes were regressed on the Reading Composite score. The model retained good fit, with only initial rates of inattention predicting significantly to second grade reading levels. In the final, trimmed model, with the nonsignificant path from cumulative risk removed, these predictors remained constant (see Table 5, Figure 1).

Testing Multi-Group Models

As child sex was not correlated with the outcome variable of reading scores ($r = 0.06$, $p = 0.28$), it was not included as a covariate; however, given its strong association with predictor variables and previous theoretical work suggesting different pathways for boys and girls (Hill, Degnan, Calkins, & Keane, 2006), a multi-group model was tested using cross-group equality constraints (Kline, 2005). Model fit was not diminished when the same models were employed for boys and girls. Thus, patterns of growth and prediction to second grade reading were not moderated by child sex.

Discussion

To our knowledge, this is the first study using latent growth curve modeling to examine the contributions of developmental trajectories of separate dimensions of externalizing behavior during the toddler years, including inattention, overactivity, and aggression, to later reading outcomes. By modeling multiple dimensions of externalizing problems longitudinally, these analyses demonstrate that early emerging inattention appears to have a uniquely strong negative relationship with later reading attainment.

Consistent with expectations based on increase in inhibitory skills from the toddler to preschool period (Calkins 1994), on average, aggressive, overactive, and inattentive behaviors decreased over time from the first to the final assessment point (an approximately two-year period). In accordance with an emergent literacy perspective in which literacy development begins before school age, these findings demonstrate that externalizing behaviors from the toddler period, specifically inattention, predict reading outcomes at second grade. This finding is consistent with cross-sectional studies in young children that have examined comorbidity in attention, overactivity, and aggression and found that inattention appears to drive the preliterate engine (Friedman-Weieneth, Harvey et al. 2007); it is also consistent with longitudinal work from school-aged children suggesting that inattention contributes uniquely to reading achievement (Rabiner, Coie, et al., 2000; Breslau et al, 2009; Pingault et al., 2011). Addressing associations between early behavior problem trajectories and later reading controlling for sociodemographic risk and early low language provided a conservative test of the relationship between early emerging behavior problems and later reading competence. These developmental patterns do not appear to differ across child sex, despite differences in some mean levels of early externalizing behaviors between boys and girls.

Findings of early inattention conferring unique risk to reading achievement suggest that a third, reading-specific variable is being disrupted by problems in attention regulation in

young children. This interruption may in turn lead to a developmental cascade (Masten, Roisman et al. 2005) of variables, unmeasured in this study, that results in attenuated reading skills among children with early-emerging attention regulation problems. Possible developmental processes that may be implicated include: 1) Executive functioning processes, such as inhibition, working memory, set shifting, and planning, and 2) the development of phonological awareness or other pre-literacy skills, as children's limited attentional capacities may reduce their exposure to print material or to other language stimuli. Executive functioning processes are critical to learning and memory and are known to be implicated in ADHD as well as reading problems (Sergeant, Geurts et al. 2001; Cutting, Materek et al. 2009). These executive functioning skills also appear to be amenable to intervention in preschool children (Thorell, Lindqvist et al. 2009). Thus, early detection efforts coupled with appropriate intervention may lead to improvements in both attentional processes and reading achievement.

Strengths and Limitations

The longitudinal design of the study allows for analyses of the unfolding of dimensions of behavior over time and their relationship to more distal outcomes. This study's sampling frame – a risk-enriched subsample of a representative community sample that is diverse with respect to race, ethnicity, and income – allows for generalizing beyond clinical populations to look at patterns of the development of attention, overactivity, and aggression in a sample enriched for language problems and psychopathology. This sampling also has its limitations: we examined a continuum of behaviors rather than focusing on clinically-concerning behaviors.

Exclusion of children born preterm may have led to attenuation of effects, as premature birth is a risk for executive functioning deficits that have been linked to long-term reading achievement deficits in these children (Hille, den Ouden et al. 2001). Further exclusions of non-English-speaking families and children with developmental disorders mean that these data may not generalize to these populations.

In focusing only on externalizing problems, we did not examine the role of internalizing problems (Bub, 2007) or social-emotional competence; deficits in social-emotional competence may compromise peer and teacher relationships, and thus with a child's ability to learn (Hamre and Pianta 2001; Burchinal 2002; Doctoroff, Greer et al. 2006). Although sole reliance on parent report of externalizing problems can be viewed as a limitation, these findings link this inexpensive assessment method to later direct examination of reading.

Future Directions

These data support providing early intervention programs to toddlers with elevated inattention problems, as these children are at risk not only for future socioemotional difficulties but also for later academic difficulties. Evidence of the relationship of very early externalizing behaviors to later reading outcomes does *not* suggest a deterministic relationship between these variables. In this sample, the natural slope of inattentive behaviors does not predict to reading outcome. However, it may be that when *manipulated* via successful intervention, the slope of inattention may predict reading outcomes.

Interventions with preschool-aged children have been shown to improve children's attention and self-regulation. Modalities include both parent training (e.g., New Forest Parent Training program; Sonuga-Barke, Daley et al. 2001), school-based intervention (e.g., Head Start Redi and CSRP; Bierman, Domitrovich et al. 2008; Raver, Jones et al. 2011) and programs that combine these modalities (e.g., Incredible Years; Webster-Stratton, Reid et al. 2001). These results suggest that by improving early self-regulation, these interventions may have lasting effects on reading skills as well.

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Figure 1.

Parallel Process Latent Growth Curve Structural Model with Reading Outcome.

Note: *** $p < .001$ All observed variables have associated error variances that are not included in figure; observed variables are indicated by squares and latent estimated variables by circles; INATT = observed mean inattention score; AGG = observed mean aggression score; OVER = observed mean overactivity score.

Table 1

Two-Tailed Bivariate Pearson's Correlations and Descriptive Statistics

	T1 Inatt	T2 Inatt	T3 Inatt	T1 Over	T2 Over	T3 Over	T1 Agg	T2 Agg	T3 Agg	Reading	Low Lan	Risk
T2 Inattention	0.55**											
T3 Inattention	0.41**	0.58**										
T1 Overactivity	0.30**	0.33**	0.29**									
T2 Overactivity	0.32**	0.40**	0.36**	0.69**								
T3 Overactivity	0.20*	0.38**	0.40**	0.58**	0.54**							
T1 Aggression	0.26**	0.26**	0.11	0.56**	0.57**	0.26**						
T2 Aggression	0.24**	0.33**	0.30**	0.45**	0.70**	0.41**	0.66**					
T3 Aggression	0.15	0.29**	0.30**	0.46**	0.37**	0.70**	0.53**	0.70**				
SG WJ Read Comp	-0.21**	-0.31**	-0.34**	-0.21**	-0.25**	-0.17**	-0.10	-0.13*	-0.14			
CDI Low Lang	0.05	0.21**	0.18*	0.13*	0.07	0.01	0.02	-0.01	0.01	-0.15**		
Risk	0.13**	0.32**	0.41**	0.30**	0.32**	0.30**	0.18**	0.13**	0.19**	-0.29**	0.09	
Mean	0.57	0.41	0.27**	0.78	0.70	0.35	0.57	0.40	0.26	105.22	.23	1.01
Standard Deviation	0.42	0.33	0.33**	0.44	0.42	0.37	0.36	0.29	0.27	12.40	.06	1.35
N	346	346	290	336	345	297	306	310	333	359	349	350

Note.

* $p < 0.05$;

** $p < 0.01$;

Inatt = Inattention; Over = Overactivity; Agg = Aggression; T1 = time point 1; T2 = time point 2; T3 = time point 3; SG WJ Read Comp = Second grade Woodcock Johnson Reading Composite; CDI = Child Development Inventory; Risk = Sociodemographic risk

Table 2

Trajectory Model Fit Statistics & Estimated Intercepts and Slopes

	Aggression	Overactivity	Inattention
($\chi^2(6, N = 359)$)	5.89 $p = .43$	3.48 $p = .75$	8.16 $p = .15$
CFI	1.00	1.00	.99
RMSEA	0.00	0.00	0.04
SRMR	0.02	0.02	0.03
	Aggression	Overactivity	Inattention
Estimated Intercept	0.51	0.85	0.56
Intercept Variance	0.08***	0.15***	0.12***
Estimated Slope	-0.01	-0.09	-0.10
Slope Variance	0.01***	0.02**	0.02**

Note.

**
 $p < 0.01$;

 $p < .001$.

Intercepts and slopes are based on the 0-1-2 Likert scale of the measure.

Table 3

Standardized and unstandardized path coefficients from structural models predicting second grade reading

		Unstandardized	Standardized
<u>Aggression Model:</u>			
Aggression Intercept		-3.00	-0.07
Aggression Slope		-23.41	-0.20
Child Age	SG	-9.84***	-0.35***
Sociodemographic Risk	SG	-2.92***	-0.32***
<i>Model Fit: ($\chi^2(6, N = 359) = 5.89, p = .44$; CFI = 1.00; RMSEA = .00; SRMR = .02)</i>			
<u>Overactivity Model</u>			
Overactivity Intercept		-5.04**	-0.16**
Overactivity Slope		0.80	0.01
Child Age	SG	-10.51***	0.38***
Sociodemographic Risk	SG	-2.16***	-0.24***
<i>Model Fit: ($\chi^2(6, N = 359) = 3.48, p = .75$; CFI = .1.00; RMSEA = .00; SRMR = .02)</i>			
<u>Trimmed Inattention Model</u>			
Inattention Intercept		-23.39**	-0.64***
Inattention Slope		-52.38**	-0.53**
Child Age	SG	-11.58***	-0.42***
<i>Model Fit: ($\chi^2(6, N = 359) = 8.16, p = .15$; CFI = .99; RMSEA = .04; SRMR = .04)</i>			

Note.

**
 $p < .01$;***
 $p < .001$;

SG = second grade

Table 4

Latent correlations in parallel process model

	Intercept Overactivity	Slope Overactivity	Intercept Aggression	Slope Aggression	Intercept Inattention	Slope Inattention
Slope Overactivity	−0.01					
Intercept Aggression	0.08***	0.00				
Slope Aggression	−0.01	0.01***	−0.01**			
Intercept Inattention	0.06***	0.00	0.04***	−0.01		
Slope Inattention	−0.01	0.01**	−0.01	0.01**	−0.03**	
Mean	0.85	−0.09	0.51	−0.01	0.56	−0.10

Note.

**
 $p < .01$;

 $p < .001$

Table 5

Standardized and unstandardized path coefficients from parallel process structural model predicting to second grade reading

	Unstandardized	Standardized
<u>Final Trimmed Parallel Process Model:</u>		
Inattention Intercept	−20.41 ***	−0.53 ***
Inattention Slope	−39.95	−0.41
Aggression Intercept	−1.99	−0.05
Aggression Slope	−16.97	−0.16
Overactivity Intercept	1.06	0.03
Overactivity Slope	21.54	0.26
Child Age	SG −11.40 ***	0.41 ***
Model Fit: ($\chi^2(30, N = 359) = 40.83, p = .09, CFI = .99, RMSEA = .03, SRMR = .03$)		

Note.

 $p < .001$;

SG = second grade