

The developmental cascade of early parenting, emergence of executive functioning, and emotional symptoms across childhood

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ABSTRACT

Many studies focus on proximal associations between parental sensitivity and emotional well-being in early childhood, with less data examining how parenting in infancy predicts children's emotional trajectories across childhood, in particular negative emotional symptoms of anxiety and depression. Thus, this study utilized data from The Family Life Project ($N = 1015$), a prospective study of child development in rural poverty, and assessed whether sensitive parenting in the first 4 years of life predicted child internalizing emotional symptoms (i.e., anxiety and depression) from kindergarten to fifth grade and whether early child executive functioning mediated this relationship. Path models indicated that observation of sensitive parenting predicted a decrease in teachers' report of child negative emotional symptoms over time and predicted fewer negative emotional symptoms in fifth grade. Moreover, though executive functioning performance did not mediate change in symptoms over time, executive functioning did mediate the relationship between sensitive parenting and fifth-grade symptoms, suggesting that executive functioning is one mechanism by which early sensitive parenting buffers long-term emotional development. Findings highlight the importance of early parenting and executive functioning in development of anxiety and depression symptoms and suggests potential targets for transdiagnostic intervention.

KEYWORDS

anxiety, depression, emotion development, executive functioning, sensitive parenting

1 | INTRODUCTION

In infancy, the external expression of emotional distress (e.g., crying as an expression of sadness, fear, irritability, etc.) serves an adaptive purpose in eliciting care or soothing that the infant is not capable of providing to itself. As children's cognitive and motor skills become more developed, there is an increasing expectation that the child

will begin to regulate their own needs through instrumental actions and communicative language, reducing their reliance on external displays of emotional distress. Children who enter school developmentally behind in the ability to regulate negative distress may be more likely to experience peer rejection, and may be at an increased risk for developing psychopathology, highlighting the importance of understanding factors that facilitate children's

early emotional development (Bierman et al., 2015; Bornstein et al., 2010; Kalvin et al., 2016). Extensive research has highlighted the importance of parental sensitivity in responding to infants' and toddlers' emotional distress as a proposed mechanism by which children internalize the ability to regulate their own emotions (Kim-Spoon et al., 2013; Morris et al., 2007). However, many studies focus on proximal associations between parental sensitivity and emotional well-being in early childhood, with less data examining how parenting in infancy predicts children's emotional trajectories across childhood. Furthermore, although several studies assess long-term associations in the context of externalizing emotions (i.e., hyperactivity and conduct problems), little attention is given to the role of early sensitivity in internalizing emotion development (i.e., anxiety and depression) across time (Baker & Kuhn, 2018; Belsky et al., 2017). Thus, the present study seeks to examine how sensitive parenting experienced over the first 4 years of life is related to children's internalizing emotional symptoms, specifically anxiety and depression when they begin school, as well as their emotional trajectories across elementary school. In addition, we examine whether effects of early parenting on children's emotional functioning at the end of elementary school are mediated by the effect of parenting on the development of strong executive function skills, which have been shown to support emotion regulation (Suchy, 2009).

1.1 | Relationship between early sensitive parenting and child emotional symptoms

Early sensitive parenting refers to socially appropriate, consistent responses to child cues and the ability to engage with a child to provide structured and appropriate environments for proper development. This includes parental demonstration and provision of emotional warmth, stimulation, and responsiveness (Deans, 2020). As parents respond to infants' cues of emotional distress, consistent parental warmth and responsiveness help return the child to a state of emotional calm. Over time, this pattern promotes the child's understanding that their world is a safe predictable place and that their distress can be appropriately assuaged, helping reduce the propensity for the child to become distressed, as well as enable constructive strategies for regulating distress when it occurs. Over time, this is likely to reduce the risk for the development of emotion dysregulation and associated psychopathology (Drake & Ginsburg, 2012). In contrast, however, a lack of parental warmth and responsiveness to infant cues may diminish provision of such environments, contributing to

Key Findings and their Implications for Practice/Policy

1. Early sensitive parenting predicted a decrease in teachers' report of child negative emotional symptoms over time and predicted fewer negative emotional symptoms in fifth grade.
2. Early executive functioning performance did not mediate change in emotion symptoms over time.
3. However, early executive functioning did mediate the relationship between sensitive parenting and fifth-grade symptoms.

Statement of relevance to the field of infant and early childhood mental health

This study is relevant to the field as it provides further insight on the important relationship between early parenting and executive functioning in development of anxiety and depression symptoms over time and suggests potential targets for early childhood transdiagnostic intervention.

increased emotional instability and vulnerability to related psychopathologies.

Several studies document associations between lower levels of early sensitive parenting and higher levels of negative emotional symptoms in children. Previous meta-analyses indicate that adverse parenting behaviors such as withdrawal, aversiveness, and a lack of warmth predict 4% of the variance in child anxiety symptoms, and 8% of the variance in child depression symptoms across children 2–18 years old (McLeod, Weisz, et al., 2007; McLeod, Wood, et al., 2007). Although these results are relatively modest, the majority of studies included in these analyses relied on concurrent assessments of parenting and children's emotional symptoms, resulting in a lack of standardization with regard to the developmental processes being examined. For instance, many of these studies varied regarding how parenting was assessed, ranging from researcher-coded observations of parent-child interactions (Hudson & Rapee, 2001), to concurrent parent or child self-report (Muris, 2002) or retrospective recall of earlier parenting practices (Rapee, 1997). Although these meta-analyses confirm a significant association, they do

not directly examine the developmental cascade from infancy through middle childhood.

Several prospective longitudinal studies have demonstrated associations between parental sensitivity and child emotional symptoms, although the majority of these are limited to early childhood outcomes (Bayer et al., 2006; Conway & McDonough, 2006; Kim-Spoon et al., 2013; Leerkes et al., 2009). For example, Kok et al. (2013) assessed the relationship between maternal sensitive parenting and child internalizing problems across preschool using two large longitudinal cohorts from the Generation R Study and the National Institute of Child Health and Human Development Study of Early Child Care and Youth Development (NICHD SECCYD). Sensitive parenting in both cohorts was assessed through an observational interaction task between mother and child, and internalizing symptoms were assessed through mother's report of child's emotional symptoms. Findings of the Generation R cohort indicated that lower levels of sensitive parenting at 1 and 3 years old significantly predicted higher levels of child internalizing problems at 6 years old. Similarly, findings of the NICHD SECCYD cohort reported a protective effect of higher levels of sensitive parenting at 1 year old and lower internalizing problems 1 year later. Using repeated assessments of both sensitive parenting and child emotional symptoms in a sample of adoptive parents and their children, Lipscomb et al. (2011) demonstrated that decreases in sensitive parenting over time were associated with increases in children's emotional problems from 9 to 27 months, indicating that the association between early sensitive parenting and children's emotional development is not restricted to shared genotype.

Though a confluence of studies has demonstrated associations between sensitive parenting in infancy and children's development of emotionality and emotion regulation abilities, far less is known regarding the persistence of these effects over time. Once children enter school, they are subjected to additional explicit and implicit instructions via teachers and peers regarding the social expectations for emotionality, as well as having access to new relationships from which to draw regulatory support. Such environmental changes could serve to compensate for less sensitive parenting early on, and mitigate differences in emotional symptoms between children with and without sensitive parents over time (Hay et al., 2004; O'Connor et al., 2011). Given the dynamic nature of developmental processes, it is important to consider how experiences in early childhood, such as early parenting, may continue to play a risk or protective role in the development of emotionality and related psychopathology over extended periods of time.

1.2 | Relationship between early sensitive parenting and child executive functioning

Although sensitive parenting is likely to exert direct effects on how children react to distress, parental sensitivity has been associated with a range of developmental outcomes, which may also serve to indirectly promote positive emotional development (Barlow et al., 2014; Fay-Stammach et al., 2014). One such pathway may be through the effects of parental sensitivity on children's executive functioning development. Executive functioning is conceptualized as several interrelated cognitive components including inhibitory control (i.e., ability to stop a prepotent response), cognitive flexibility (i.e., ability to switch between tasks as necessary for a particular goal), and working memory (i.e., ability to manipulate information, including monitoring, coding, and revising; Ionescu, 2012; Miyake et al., 2000; Williams et al., 1999). Within the context of normative development, executive functioning emerges in early childhood and continues to increase with age and brain maturation including frontal lobe development and brain myelination (De Luca et al., 2003; Hughes, 2011; Welsh et al., 1991). Research suggests that children begin to exhibit rudimentary cognitive flexibility between 3 and 4 years old, demonstrating the ability to switch between tasks when switching rules remain relatively simple. This skill rapidly improves between 7 and 9 and continuing into adolescence along with increased attentional control, efficiency, and resistance to distraction. Similarly, children begin to exhibit inhibitory processes around age 4 with significant improvements occurring around age 6 and continuing into late adolescence (Jones et al., 2003; McAuley & White, 2011). Following this maturation trajectory, working memory also emerges during the preschool years, with studies indicating an increasing capacity to hold larger amounts of information in mind, and to combine information into more complex and efficient representations (Luciana et al., 2005). Although executive function skills continue to expand and strengthen across childhood, research consistently demonstrates the importance of executive function skills at the transition to formal schooling (Blair, 2002).

Extensive evidence supports an association between parenting behaviors/characteristics, including early sensitive parenting and early childhood executive functioning performance (Bernier et al., 2010, 2012; Fay-Stammach et al., 2014; Merz et al., 2017). In a recent meta-analysis, Valcan and colleagues (2018) investigated the relationship between types of parenting behaviors and executive functioning in early childhood. Results incorporating 42 longitudinal studies demonstrated that parental warmth

and sensitivity was as strongly associated with children's executive function ($r = .25$) as were parenting practices that directly scaffolded children's cognitive functioning ($r = .20$). It is likely that warm and sensitive parenting in infancy creates a fertile learning environment in which children's experience of stress is less frequent and they experience recovery from distress more rapidly, which supports effective development of the prefrontal cortex (Kolb et al., 2012).

1.3 | Relationship between child executive functioning and emotional symptoms

Executive functioning skills are critical in supporting children's ability to regulate behavior in structured environment such as school, as well as the ability to regulate negative emotions (Calkins & Marcovitch, 2010; Mann et al., 2017). For instance, inhibitory control enables children to maintain control over how they express themselves when distressed, such as resisting the urge to respond with aggression or crying. Similarly, cognitive flexibility serves as a protective factor against the development of anxiety and depression by enabling children to disengage from distressing stimuli (Eisenberg et al., 2009). In a cross-sectional study of preschool children ages 4–5, researchers found a correlation between children's lower performance on an inhibitory control task and higher teacher ratings of internalizing symptoms (Rhoades et al., 2009). Additional cross-sectional research has reported lower performance in cognitive flexibility and working memory among children with internalizing problems and high negative emotional symptoms (Lundy et al., 2010; Muris et al., 2008; Riggs et al., 2006). Although some studies have suggested associations between higher inhibitory control and internalizing problems, this has been suggested to be more likely to reflect associations with temperamental behavioral inhibition than with symptoms of negative emotion (Eisenberg et al., 2010; Spinrad et al., 2007; White et al., 2011).

1.4 | Mediation and the present study

Following evidence that both early sensitive parenting and children's executive functioning are associated with children's negative emotionality, the present study seeks to examine whether executive function at school entry mediates associations between early sensitive parenting and children's emotional trajectories of anxiety and depression over time. Previous analyses in the current sample found that child executive functioning mediated an association

between early sensitive parenting and externalizing behaviors at age 90 months (Sulik et al., 2015). Additional studies assessing this relationship with externalizing behaviors demonstrate similar results (Baker & Kuhn, 2018; Belsky et al., 2017).

Collectively, this suggests that the relationship between early sensitive parenting and child executive functioning is a salient pathway for developmental outcomes. Because the pathway to externalizing symptoms up to early school years has been examined in this sample in another study (Sulik et al., 2015), and that there was relatively high rank order stability in children's externalizing symptoms from kindergarten to the fifth grade ($r = .54$ – $.63$ across consecutive assessments), we did not repeat the analysis on externalizing symptoms. Instead, we focused on the potential role of early parenting and executive functioning in the development of emotional symptoms and internalizing outcomes of anxiety and depression, which has been given little attention in the literature. Understanding relationships in this context can further our understanding of internalizing symptom development and improve intervention and prevention for internalizing problems. As such, the present study builds on previous research in the following ways: (a) assessing the association of early parenting and children's executive function skills on emotional symptoms of anxiety and depression at school entry as well as the trajectory of emotional development through elementary school, and (b) employing a multimethod assessment approach with researcher-coded observations of parent–child interactions, neuropsychological assessments of children's executive function skills, and teacher-rated emotional symptoms across schooling. One limitation of previous research discussed is the frequent reliance on parental report either to assess sensitivity, children's emotional symptoms, or both. Reliance on parental report may confound constructs through shared rater variance and parental bias. Thus, employing a multimethod approach avoids this confound and the risk that parents low in sensitivity are more inclined to report their child as having difficult emotions.

2 | METHODS

2.1 | Participants

Data used in the present study were drawn from the Family Life Project, a prospective longitudinal cohort study. Complete details of the sampling structure can be found in Vernon-Feagans, Cox, et al. (2013). Briefly, participants were recruited from hospitals at the time of the child's birth in six counties in North Carolina and Pennsylvania, selected for rurality and higher rates of poverty.

Participants at both sites were oversampled for poverty, and African American families were oversampled in the North Carolina counties. The recruitment phase took place between September 2003 and August of 2004, and resulted in the enrollment of 1292 families. Over the ensuing decade, participants completed assessments during a series of home and school visits. When children began attending school, teachers were asked to provide behavioral ratings. All procedures were approved by the Institutional Review Board (IRB) at the University of North Carolina, with reliance from the Pennsylvania State University IRB. Parents provided written consent for their participation, as well as for their child's participation, and permission to contact the child's teacher.

The analysis sample for the present study includes 1015 children (49.5% female) who had data for at least one time point for all main study variables (i.e., sensitive parenting, executive functioning, and emotional symptoms). The 277 families that were not included in the current analyses did not differ significantly from the analysis sample in terms of demographic variables (i.e., child sex, race, and family income-to-needs ratio) or main study variables. Slightly over half of the analysis sample identified their child as Caucasian (56.5%), with the remaining identifying their child as African American (42.4%), or other races (1.1%). At the time of the child's birth, 64.3% of the families had annual incomes <200% of the federal poverty threshold (i.e., very poor or nearly poor), and 75% of the primary caregiver (98.6% biological mother, 1.4% step-mother or other female relative; $M_{\text{age}} = 25.75$ years, $SD = 6.43$) completed high school.

2.2 | Measures

2.2.1 | Sensitive parenting

When the participating child was 6, 15, 24, and 36 months of age, research assistants completed home visits during which the mother-child dyad participated in a 10-min semistructural interactive task. A free-play task was used in the 6- and 15-month assessments, where dyads were provided with a standardized set of toys, and caregivers were instructed to play with the child as they normally would. For the 24- and 35-month assessments, dyads participated in a puzzle task, where caregivers were told to assist the child in completing a series of puzzles (up to three with increasing complexity). Interactions were video-recorded, and trained coders rated maternal sensitive responsiveness, detachment, intrusiveness, stimulation, positive regard, negative regard, and animation on 5-point Likert scales (from 1 = *not at all characteristic* to 5 = *highly characteristic*). Based on previous work (National

Institute of Child Health and Human Development Early Child Care Research Network, 1999; Vernon-Feagans, Cox, & FLP Key Investigators, 2013), a composite score reflecting *sensitive parenting* was created for each age by averaging ratings on the parent's sensitive responsiveness (awareness of, and prompt responses to, child signals), positive regard (expression of positive feelings toward the child), reversely coded detachment (emotional disengagement and failure to attend to the child's needs or facilitate interaction), animation (level of energy during the interaction), and stimulation of development (appropriate attempts to facilitate/scaffold activities). Thirty percent of the families were double-coded, and the intraclass correlation coefficients for all subscales as well as the *sensitive parenting* composite were above 0.80. As reported in Table 1, sample means (M_s) for *sensitive parenting* across the 6-, 15-, 24-, and 36-month assessments ranged from 2.79 to 2.90 ($SDs = 0.72$ to 0.81). Given the relatively high correlations among consecutive timepoints ($r = .61-.65$), an average *sensitive parenting* score was computed.

2.2.2 | Executive functioning

A battery of executive functioning tasks was administered during the home visit when the child was 60 months of age. Details about the task battery and psychometric validation of the resultant factor score can be found in Willoughby et al. (2012). Briefly, six tasks were administered assessing working memory (Working Memory Span task; Pick the Picture game), inhibitory control (Spatial Conflict Arrow task; Silly Sounds Stroop task; Animal Go No-Go task), and attention shifting (Something is the Same game). A global executive functioning score was extracted as a factor score across the battery of tasks (see Willoughby et al., 2012).

2.2.3 | Emotional symptoms

Teachers were asked to complete the Strengths and Difficulties Questionnaires (Goodman, 1997) when children were in kindergarten, first, third, and fifth grade. Emotional symptoms were assessed using a five-item subscale, which assessed symptoms such as somatic complaints (e.g., "Often complains of headaches, stomachaches or sickness"), worries (e.g., "Many worries or often seems worried"), depressive symptoms (e.g., "Often unhappy, depressed, or tearful"), and fearfulness (e.g., "Many fears, easily scared"). Each item was rated on a 3-point Likert scale ranging from 0 (*not true*) to 2 (*certainly true*) and the average of the five items was computed as the score for each year. The internal reliability of the Emotional Symptoms subscale was satisfactory in the current sample at

TABLE 1 Descriptive statistics and bivariate correlations of study variables

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|-----------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------------|------------|------------|------|
| 1. Child sex | – | | | | | | | | | | | |
| 2. I–N ratio | .03 | – | | | | | | | | | | |
| 3. Race | –.05 | –.18 | – | | | | | | | | | |
| 4. Maternal Int | –.07 | –.15 | .00 | – | | | | | | | | |
| 5. Maternal IQ | –.01 | .48 | –.22 | –.04 | – | | | | | | | |
| 6. Ext K | .17 | –.22 | .04 | .09 | –.22 | – | | | | | | |
| 7. Sensitivity | –.02 | .49 | –.17 | –.07 | .57 | –.27 | – | | | | | |
| 8. EF 60 m | –.18 | .34 | –.15 | –.10 | .43 | –.42 | .43 | – | | | | |
| 9. Emo Sym K | –.08 | –.03 | –.01 | .07 | .00 | .18 | .02 | –.08 | – | | | |
| 10. Emo Sym G1 | –.05 | –.06 | .02 | .02 | –.05 | .11 | –.05 | –.10 | .18 | – | | |
| 11. Emo Sym G3 | –.02 | –.16 | .04 | .08 | –.11 | .14 | –.13 | –.19 | .17 | .30 | – | |
| 12. Emo Sym G5 | .05 | –.09 | –.05 | .09 | –.11 | .11 | –.13 | –.14 | .11 | .21 | .28 | – |
| Mean | 0.51 | 1.84 | 0.44 | 4.39 | 91.86 | 0.50 | 2.86 | 1.15 | .29 | .31 | .31 | 0.29 |
| SD | 0.50 | 1.39 | 0.50 | 4.69 | 15.05 | 0.47 | 0.66 | 0.82 | 0.37 | 0.40 | 0.41 | 0.39 |
| Min | 0 | 0.05 | 0 | 0.00 | 57.00 | 0.00 | 1.00 | –1.53 | 0.00 | 0.00 | 0.00 | 0.00 |
| Max | 1 | 13.60 | 1 | 38.67 | 140.00 | 1.90 | 4.65 | 3.32 | 2.00 | 2.00 | 2.00 | 2.00 |

Notes: I–N Ratio = Income-to-needs ratio; Sensitivity = Sensitive parenting; EF = Executive functioning; K/G1–5 = kindergarten/first to fifth Grade; Ext = Externalizing symptoms; Emo Sym = Emotional symptoms. Child sex was coded as 0 for female and 1 for male. Race was coded as 0 for Caucasian and 1 for African American and others. Statistically significant correlations ($p < .05$) were bolded.

each of the four assessment years (Cronbach's α s = .71–.77). Means and correlations are reported in Table 1. A repeated-measures ANOVA using a mixed model approach did not identify any effect of time in the mean levels of emotional symptoms, $F(3, 2491) = 1.02$, $p = .38$. However, correlations of emotional symptoms scores in adjacent years were rather weak ($r = .11$ –.30), suggesting that there could be considerable variations in children's developmental trajectories.

2.2.4 | Covariates

Income-to-needs ratio

Family income-to-needs ratio was calculated by dividing the family's annual income by the poverty threshold corresponding to the family's household size for each year. Income-to-needs ratio scores were computed at seven time points (6-, 15-, 24-, 36-, 48-, 60-, and 90-month assessments) and an average was computed as an index of poverty in children's early life. Despite the wide range (see Table 1), the average income-to-needs ratio of the sample was below 2 (i.e., the threshold of “near poor”).

Maternal IQ

The Wechsler Adult Intelligence Scale—Third Edition (WAIS-III; Wechsler, 1997) was administered to the primary caregiver during the 48-month home visit. The present study used the full-scale IQ score, which is com-

posed of indices of verbal comprehension, perceptual reasoning, working memory, and processing speed. As indicated in Table 1, the mean IQ was slightly lower than the population average ($M = 91.86$, $SD = 15.05$).

Maternal internalizing symptoms

Primary caregivers completed the Brief Symptoms Inventory 18 (BSI-18; Derogatis & Savitz, 2000) assessing emotional state at the 2-, 6-, 15-, 24-, 60-, and 90-month home visits. An internalizing symptoms composite was created for each assessment by summing scores on the six items describing depression symptoms (e.g., “Feeling of worthlessness”) and the six items describing anxiety symptoms (e.g., “Feeling tense or keyed up”). Each item was rated on a 5-point Likert scale ranging from 0 (*not at all*) to 4 (*extremely*). The internalizing composite demonstrated satisfactory internal reliability at all time points (Cronbach's α s = .84–.90). An average score was computed across all available time points and is reported in Table 1.

Child externalizing symptoms

In order to examine whether effects for emotional symptoms are independent of externalizing symptoms, kindergarten teachers' report on the Conduct Problems and Hyperactivity subscales of the SDQ (Goodman, 1997) was also examined. Items were rated on a 3-point Likert scale (from 0 = *not true* to 2 = *certainly true*). The five-item Conduct Problems subscale (Cronbach's $\alpha = .81$ in the current sample) included items describing children's aggressive/

oppositional behaviors (e.g., “Often fights with other children and bullies them”) and antisocial behaviors (e.g., “Often lies or cheats”). The Hyperactivity subscale also contains five items (Cronbach’s $\alpha = .89$ in the present study) and evaluates children’s impulsivity/hyperactivity (e.g., “Restless, overactive, cannot stay still for long”) and inattentiveness (e.g., “Easily distracted, concentration wanders”). Scores on the items were averaged within each subscale, and a mean score of conduct problems and hyperactivity was calculated to represent the level of externalizing symptoms in kindergarten. As indicated in Table 1, externalizing symptoms in kindergarten were significantly but weakly correlated with emotional symptoms at all time points ($r_s = .11-.18$). However, externalizing symptoms in kindergarten were significantly higher among boys (indicated by the positive correlation coefficient), whereas emotional symptoms were significantly more common among girls (as indicated by the negative correlation coefficient).

2.3 | Analytic strategies

Preliminary analyses were conducted to obtain descriptive statistics and bivariate correlations (see Table 1) of sensitive parenting, executive functioning, emotional symptoms, and covariates. The main hypotheses were tested using latent growth modeling. A total effect path model was run first to examine the association of sensitive parenting with the linear growth of emotion symptoms from kindergarten to the fifth grade (path $c1$) and the final level of emotional symptoms at the fifth grade (path $c2$). Then, a mediational path model was tested to examine whether children’s executive functioning fully or partially accounted for the relation (if any) between sensitive parenting and the linear growth or fifth-grade level of emotional symptoms. For the mediation model, the regression paths from sensitive parenting to executive functioning (path a) and from executive functioning to the linear growth (path $b1$) or fifth-grade level (path $b2$) of emotional symptoms were evaluated. Means and p -values of the indirect effects (i.e., $a*b1$ and $a*b2$) were estimated using bootstrapping with 5000 replications. The remaining direct effects of sensitive parenting on the linear growth (path $c'1$) and fifth-grade level of emotional symptoms (path $c'2$) were also examined. All analyses were conducted in R, and structural equation modeling estimates were obtained using the *lavaan* package (Rosseel, 2012) version 0.5-23.1097. Full information maximum likelihood estimation was used, and robust (Huber–White) standard errors were obtained. Model fit was evaluated based on the Chi-squared fit test (χ^2), Comparative Fit Index (CFI), Tucker Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR).

Based on theoretical relevance to the main study variables, child sex (0 = female, 1 = male), primary race (dichotomously coded as 0 = Caucasian, 1 = African American and others), family income-to-needs ratio, maternal internalizing symptoms, and maternal IQ were initially added as covariates for the models. Children’s externalizing symptoms measured in kindergarten were also included as a covariate in predicting the linear growth and fifth-grade level of emotional symptoms to account for potential comorbidity. Correlational estimates were added between all covariates and sensitive parenting. Executive functioning and the dependent variables (i.e., level and linear growth of emotional symptoms) were regressed on all covariates, with one exception that a correlation instead of regression was specified between executive functioning and externalizing symptoms at kindergarten due to the chronological order of the two measures. Correlations among covariates themselves were also added based on theoretical rationale, bivariate correlations, and modification indices (i.e., externalizing symptoms at kindergarten with all other covariates; income-to-needs ratio with race; maternal IQ; and internalizing symptoms with income-to-needs ratio and race). Statistically nonsignificant regressions or correlations involving covariates were trimmed out of the final model for parsimony. Furthermore, we explored whether child sex or race interacted with sensitive parenting in relation to executive functioning or the level and linear growth of emotional symptoms.

3 | RESULTS

3.1 | Sensitive parenting and trajectories of emotional symptoms

Zero-order correlations indicated no significant association between observations of sensitive parenting in early childhood and teacher-rated emotional symptoms in kindergarten or first grade (see Table 1). However, significant negative correlations did emerge with teacher ratings of emotional symptoms in later years (third and fifth grade). As predicted, higher levels of sensitive parenting were correlated with better child executive functioning measured at 60 months of age, and higher executive functioning at 60 months was significantly, albeit weakly, correlated with lower levels of emotional symptoms in all grades.

In structural equation modeling, the total effect model where sensitive parenting predicted the linear growth and the fifth grade level of emotional symptoms fits well: $\chi^2(31) = 54.42, p = .01, CFI = 0.98, TLI = 0.97, RMSEA = 0.03,$ and $SRMR = 0.03$. Although the correlation suggested no relation between sensitive parenting and emotional

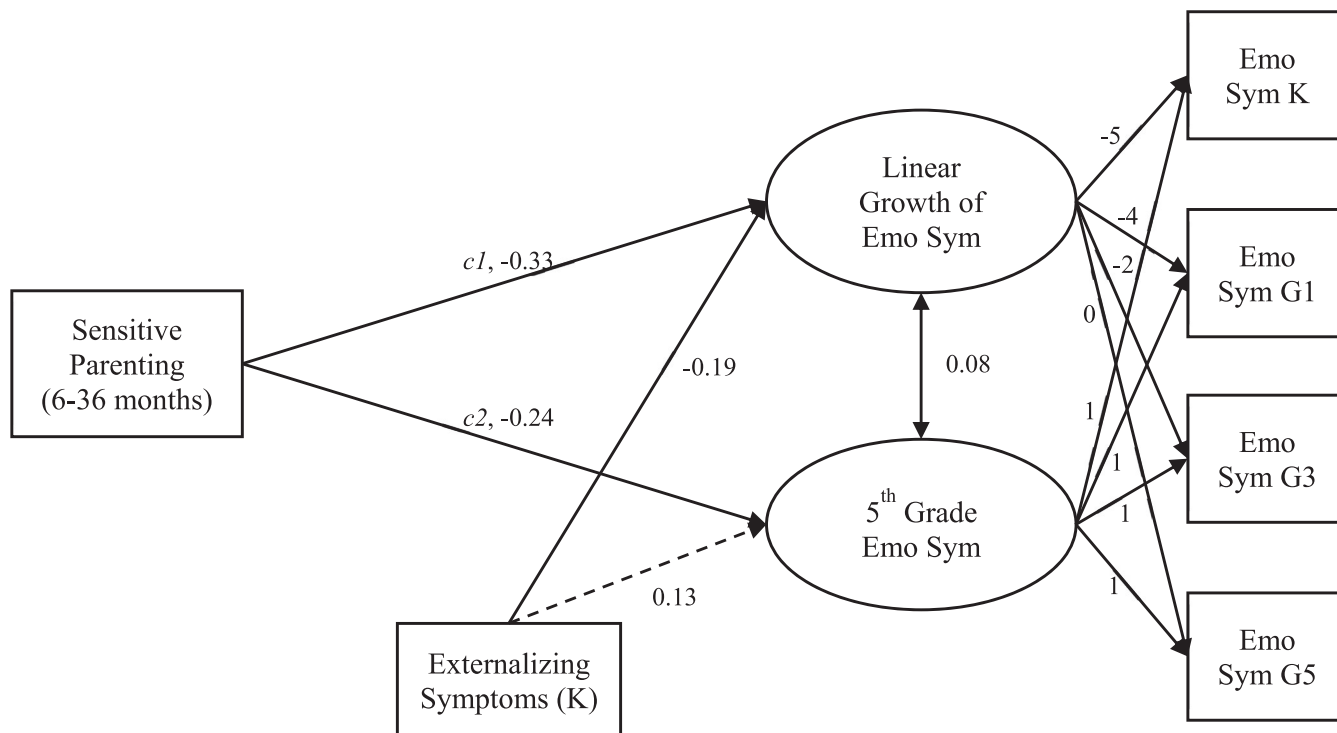


FIGURE 1 Total effect model: Early sensitive parenting predicting the linear growth and fifth-grade levels of emotional symptoms. *Notes:* Emo Sym = emotional symptoms; K/G1–5 = kindergarten/first to fifth grade. Only main study variables and kindergarten externalizing symptoms were shown with standardized regression coefficients or correlation coefficients (see Table 2 for regression paths involving other covariates). Variances of all latent and observed variables were specified in the model, but not depicted in this figure. Solid lines represent statistically significant ($p < .05$) paths

TABLE 2 Parameter estimates of regression paths in the total effect model

| Dependent variable Predictors | Parameter estimates | | | |
|-------------------------------------|---------------------|-----------|---------|----------|
| | <i>b</i> | <i>SE</i> | β | <i>p</i> |
| Linear growth of emotional symptoms | | | | |
| Child sex | 0.02 | 0.004 | 0.20 | <.01 |
| Race | 0.002 | 0.01 | 0.03 | .76 |
| Maternal internalizing symptoms | 0.001 | 0.001 | 0.13 | .10 |
| Child externalizing symptoms K | -0.02 | 0.01 | -0.19 | .02 |
| Sensitive parenting (<i>c1</i>) | -0.02 | 0.01 | -0.33 | <.01 |
| G5 level of emotional symptoms | | | | |
| Race | -0.04 | 0.03 | -0.08 | .18 |
| Maternal internalizing symptoms | 0.01 | 0.003 | 0.14 | .02 |
| Child externalizing symptoms K | 0.07 | 0.03 | 0.13 | .03 |
| Sensitive parenting (<i>c2</i>) | -0.09 | 0.02 | -0.24 | <.01 |

Notes: K/G5 = kindergarten/fifth grade; *b* = unstandardized coefficient; *SE*, standard error; β , standardized coefficient. Statistically nonsignificant regression paths involving covariates were trimmed out of the model (i.e., income-to-needs ratio and maternal IQ predicting the linear growth; child sex, income-to-needs ratio, and maternal IQ predicting the G5 level).

symptoms in kindergarten, the growth model suggested that higher levels of sensitive parenting were related to decreases (or less likelihood of increases) in emotional symptoms from kindergarten to the fifth grade (path *c1*), and overall significantly lower levels of emotional symp-

toms in fifth grade (path *c2*; see Figure 1 and Table 2 for paths estimations) after controlling for covariates.

As shown in Table 2, boys were more likely to be on increasing trajectories of emotional symptoms than girls, although there was no significant difference in their

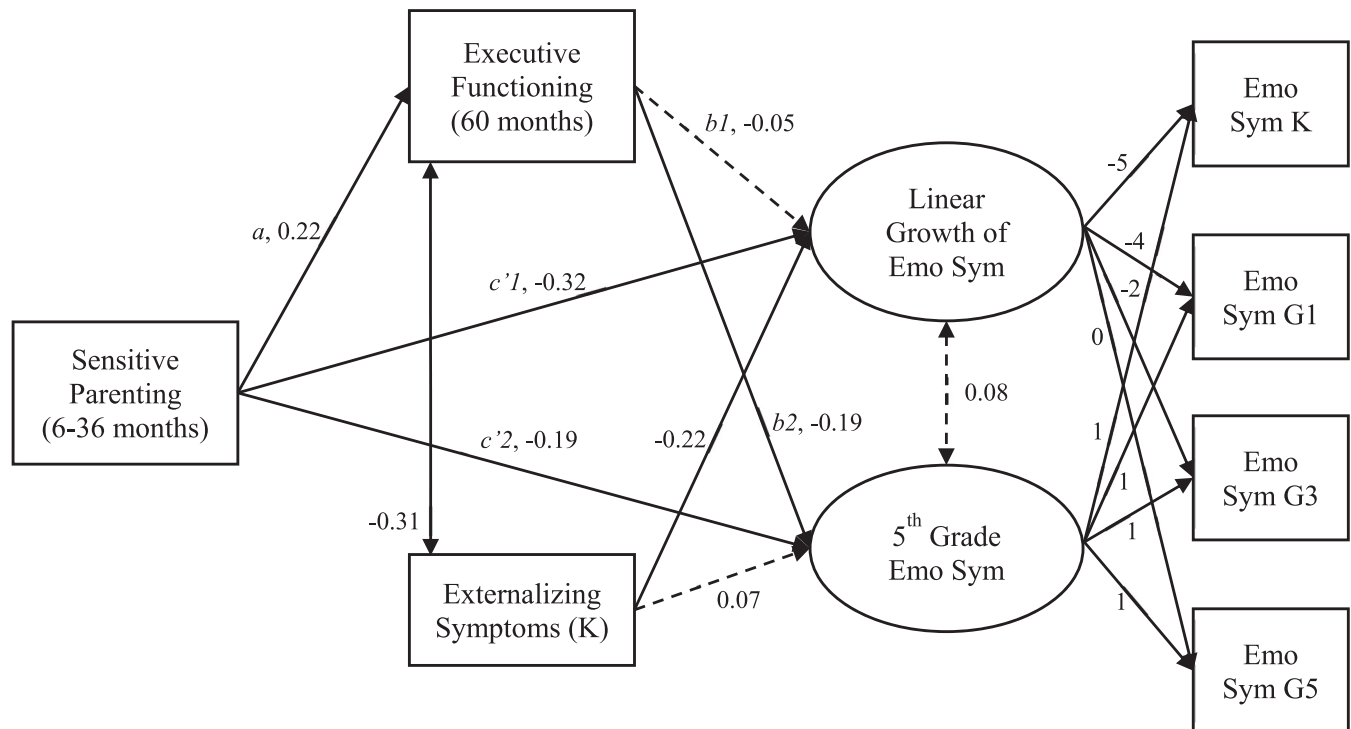


FIGURE 2 Mediation model: Examining the indirect effects through executive functioning. *Notes:* Emo Sym = emotional symptoms; K/G1-5 = kindergarten/first to fifth grade. Only main study variables and kindergarten externalizing symptoms were shown with standardized regression coefficients or correlation coefficients (see Table 3 for regression paths involving other covariates). Variances of all latent and observed variables were specified in the model, but not depicted in this figure. Solid lines represent statistically significant ($p < .05$) paths

fifth-grade levels. Maternal internalizing symptoms were positively associated with children's emotional symptoms in fifth grade, but not with the linear growth. Children who demonstrated higher externalizing symptoms in kindergarten tended to have smaller increases in emotional symptoms over time but still higher fifth-grade levels, suggesting that these children had already showed relatively high levels of emotional symptoms since kindergarten. No significant effects were found for other covariates in predicting the linear growth and fifth-grade level of emotional symptoms. The correlational paths between sensitive parenting and covariates were consistent in direction and statistical significance with the bivariate correlations shown in Table 1.

3.2 | The mediating role of executive functioning

Adding executive functioning as a mediator also resulted in good model fit: $\chi^2(33) = 52.57, p = .02, CFI = 0.99, TLI = 0.98, RMSEA = 0.03, \text{ and } SRMR = 0.03$. Based on path estimations (see Figure 2 and Table 3), there was a significant relation between sensitive parenting and

executive functioning (path a), but executive functioning was not associated with the linear growth of emotional symptoms (path $b1$). Thus, although there was still a direct association between sensitive parenting and the linear growth of emotional symptoms (path $c'1$), the indirect effect through executive functioning was not statistically significant ($a*b1$; unstandardized coefficient $b = -0.001, SE = 0.001, \text{ standardized coefficient } \beta = -0.01, \text{ bootstrapped } p\text{-value} = .30$).

However, higher levels of executive functioning were significantly related to lower levels of emotional symptoms in the fifth grade (path $b2$). Estimation of the indirect effects also showed that executive functioning partially mediated the relation between sensitive parenting and emotional symptoms in the fifth grade ($a*b2$; unstandardized coefficient $b = -0.02, SE = 0.01, \text{ standardized coefficient } \beta = -0.04, \text{ bootstrapped } p\text{-value} = .006$), although a direct effect of sensitive parenting remained significant even with executive function in the model (path $c'2$).

All covariates were significantly associated with children's executive functioning. In the current sample, girls scored higher in executive functioning at 60 months when compared to boys, as did Caucasians when compared to African American and others. Higher

TABLE 3 Parameter estimates of regression paths in the mediation model

| Dependent variable Predictors | Parameter estimates | | | |
|--|---------------------|-----------|---------|----------|
| | <i>b</i> | <i>SE</i> | β | <i>p</i> |
| Child executive functioning 60 m | | | | |
| Child sex | -0.30 | 0.04 | -0.18 | <.01 |
| Income-to-needs ratio | 0.05 | 0.02 | 0.08 | .009 |
| Race | -0.21 | 0.05 | -0.12 | <.01 |
| Maternal IQ | 0.01 | 0.002 | 0.20 | <.01 |
| Maternal internalizing symptoms | -0.01 | 0.01 | -0.08 | .005 |
| Sensitive parenting (<i>a</i>) | 0.28 | 0.04 | 0.22 | <.01 |
| Linear growth of emotional symptoms | | | | |
| Child sex | 0.02 | 0.004 | 0.23 | <.01 |
| Race | 0.002 | 0.01 | 0.02 | .83 |
| Maternal internalizing symptoms | 0.001 | 0.001 | 0.13 | .11 |
| Child externalizing symptoms K | -0.02 | 0.01 | -0.22 | .02 |
| Child executive functioning 60 m (<i>b1</i>) | -0.003 | 0.01 | -0.05 | .60 |
| Sensitive parenting (<i>c'1</i>) | -0.02 | 0.01 | -0.32 | <.01 |
| G5 level of emotional symptoms | | | | |
| Race | -0.06 | 0.03 | -0.12 | .07 |
| Maternal internalizing symptoms | 0.01 | 0.003 | 0.12 | .03 |
| Child externalizing symptoms K | 0.04 | 0.03 | 0.07 | .25 |
| Child executive functioning 60 m (<i>b2</i>) | -0.06 | 0.02 | -0.19 | .004 |
| Sensitive parenting (<i>c'2</i>) | -0.07 | 0.03 | -0.19 | .004 |

Notes: 60 m/K/G5 = 60-month/kindergarten/fifth Grade; *b* = Unstandardized coefficient; *SE* = standard error; β = standardized coefficient. Statistically nonsignificant regression paths involving covariates were trimmed out of the model (i.e., income-to-needs ratio and maternal IQ predicting the linear growth; child sex, income-to-needs ratio, and maternal IQ predicting the G5 level).

income-to-needs ratio and maternal IQ were related to higher executive functioning scores, whereas maternal internalizing symptoms were negatively associated with child executive functioning. Executive functioning scores were negatively correlated with teacher-reported externalizing symptoms. The associations between covariates and the linear growth or fifth grade level of emotional symptoms remained the same as in the total effect model, except that the relation between externalizing symptoms in kindergarten and emotional symptoms in fifth grade was no longer statistically significant after including executive functioning.

We also explored whether child sex or race moderated the associations of sensitive parenting with the mediator and dependent variables by examining the effect of interaction terms (i.e., *sex*parenting*, *race*parenting*). Results suggested that there were no significant interactions between child sex or race and sensitive parenting in predicting child executive functioning or the level and linear growth of emotional symptoms. Additionally, including the interaction terms did not change the effect of parenting or other covariates in meaningful ways. Thus, the model held across variabilities in these two demographic measures,

and the interaction terms were removed from the final parsimonious model.

4 | DISCUSSION

This study sought to explore whether sensitive parenting over the first 4 years of life is related to trajectories of internalizing emotional symptoms across elementary school and whether sensitive parenting's effect on child emotional symptoms is mediated through child executive functioning. Contrary to expectations, sensitive parenting was not significantly associated with child emotional symptoms at school entry. However, sensitive parenting did predict a decrease in negative emotional symptoms over time and was a significant predictor of levels of emotional symptoms in fifth grade. Additionally, though executive functioning mediated the relationship between sensitive parenting and emotional symptoms in fifth grade, executive functioning did not mediate the change in symptoms over time. Together these findings provide several implications for further understanding the risk and protective roles of early parenting and cognitive functioning in

development of emotional symptoms, particularly anxiety and depression.

Results of this study support overall hypotheses that early sensitive parenting predicts child emotional symptoms. However, differing from previous studies, associations between sensitive parenting and emotional symptoms were not initially present in our earliest assessed years (Kok et al., 2013). This discrepancy may be due in part to differences in how emotional symptoms were assessed. For instance, many studies relied on parental report of children's emotional symptoms, which may have inflated the correlation with early parenting. In the current study, emotional symptoms were reported by the child's teacher at each year. It is possible that teachers are more reluctant to describe behavior at this age as problematic, or may have had less opportunity to observe the child compared with ratings provided by a parent. However, it is also possible that teacher report provides a more robust assessment of the extent to which children's negative emotional symptoms are problematic, as children who display negative emotions readily at home but who demonstrate appropriate social regulation in the school context may be less likely to be experiencing symptoms of pathology.

The finding that sensitive parenting predicted emotional symptoms in later elementary years suggests that there is likely substantial heterogeneity in the emotional vulnerability of children in kindergarten. For example, children may be more likely to display emotional symptoms in kindergarten for a wide range of reasons, making it difficult to identify which children are truly at risk for psychopathology, and which are likely to "outgrow" these behaviors. Though children who demonstrate high emotional problems in kindergarten are indeed at greater risk for later psychopathology, not all of these children will experience this outcome. Transient early symptoms may be due to a number of factors including normative age-related changes in emotional expression and regulation and interactions of early symptoms with later risk and protective factors. Supporting research indicates differential stability of early emotional symptoms, with some children remaining relatively high in emotional problems across childhood and others experiencing a relative decline (Letcher et al., 2009; Mathiesen et al., 2009).

It is worth noting that increases in strength of the observed relationship over time and ultimate significant prediction of emotional symptoms in fifth grade are consistent with evidence demonstrating increased manifestations of internalizing problems in middle childhood through adolescence (Buck & Dix, 2012; Degnan et al., 2010). This is plausibly a result of children's increased vulnerability to adjustment problems as they face an increasing number of developmental challenges in the later years

including emerging independence, puberty, and sexuality. Research documents an increased focus on more complex worries in middle childhood through late adolescence compared to early childhood (Muris et al., 2002; Vasey et al., 1994) and clinical anxiety literature suggests that approximately 75% of diagnosable anxiety cases begin during middle childhood (Kessler et al., 2005). Research also demonstrates an increase in depressive symptoms with age, with many clinical depressive cases diagnosed in adolescence (Essau & Chang, 2009). Given such patterns, the later school years may be a more conspicuous period for distinguishing adaptive from maladaptive regulation as it relates to traditional symptoms of internalizing problems in a public setting.

Nonetheless, current findings imply that early sensitive parenting may have a modest yet enduring impact on emotional development as sensitivity plays a buffering role in the course of emotion regulation abilities. Specifically, it appears that parents demonstrating higher sensitivity are effectively able to provide mechanisms in early childhood that equip children to better regulate and decrease negative emotional symptoms throughout their later elementary school years. In contrast, parents demonstrating lower sensitivity do not provide this buffering mechanism during this critical time, resulting in maintained high or increased levels of negative emotional symptoms. That said, it is important to note that the current study did not include assessment of later levels of sensitive parenting, which prohibited control for or assessment of interaction with later effects of this construct. Sensitivity after the first 4 years of life is certain to play a role in child emotional development as well and one may debate that results reflect stability of sensitivity and alternatively depict effects of later parenting. To this point, there is burgeoning research in related domains of child development (e.g., externalizing symptoms, social competence, and academic achievement) assessing effects of sensitivity in the first few years of life while controlling for later effects. Findings of this research demonstrate a unique and enduring impact of early sensitivity above that of later parenting, with some studies even finding no effects of later sensitivity on outcomes (Haltigan et al., 2013; Raby et al., 2015; Sulik et al., 2015). Thus, in a similar fashion our results may support the importance of early context in shaping later emotion regulation abilities in school and further highlights the importance of early parenting skills as a prevention/intervention target in promoting healthy long-term emotional development.

As hypothesized, there was an association between sensitive parenting and child executive functioning, indicating that parents with higher levels of sensitivity were better able to facilitate development of executive functioning skills during the preschool period. Also as

hypothesized, executive functioning correlated with emotional symptoms measured at all years, and significantly predicted emotional symptoms at fifth grade. These results are consistent with research purporting that higher executive functioning may inherently convey lower risks for emotional problems (Riggs et al., 2006). Evidence of mediation in this study supports the hypothesis that executive functioning is one of the mechanisms by which early sensitive parenting buffers negative emotional development in later years. Specifically, it appears that parents demonstrating higher levels of sensitivity in the first 4 years of life foster development of effective executive functioning skills, which in turn enables children to better regulate emotional distress in school during middle childhood and likely decreases risk for development of anxiety and depression in this critical onset period. Such findings are in line with previous research demonstrating mediation with externalizing outcomes (Belsky et al., 2007; Sulik et al., 2015). Together, this suggests that early parenting's effect through executive functioning may be a common pathway for multiple disorders. Future research may wish to investigate causal factors influencing whether such pathways result in internalizing over externalizing behaviors, externalizing over internalizing behaviors, or comorbidity.

Interestingly, covariate findings indicated that race was a significant predictor of executive functioning, such that compared to Caucasian children, African American and other children performed lower on executive functioning tasks. However, further analyses showed no significant interactions between child race and sensitive parenting in predicting child executive functioning or the level and change in emotional symptoms. It is important to note that initial differences in executive functioning performance are likely not an inherent difference based on race, but rather reflect confounding risk factors disproportionately faced by African American children, which in turn may impact their executive functioning performance (Henriquez Gerken, 2015). For example, previous findings within the Family Life Project show that compared to Caucasian children, African American children experienced less access to stable and high-quality childcare services as well as additional neighborhood resources (Bratsch-Hines et al., 2015; Vernon-Feagans, Bratsch-Hines, et al., 2013). Considering no additional race differences were found in the current study (e.g., emotional symptoms level or change, interactions, etc.), this may highlight significant resilience among African American children and furthermore suggest sensitive parenting as a buffering mechanism for both African American and Caucasian children.

Similar findings between studies may also highlight key mechanisms for transdiagnostic prevention and intervention of internalizing and externalizing problems. For example, early prevention and intervention programs aimed at

reducing internalizing and externalizing disorders among high-risk samples may be most optimal for some children when they incorporate components explicitly designed to increase parental warmth, stimulation and responsiveness, and tasks to bolster child executive functioning skills. Simultaneously targeting these parent and child domains addresses the influential impact of sensitive parenting and provides additional support to an identified mechanism through which sensitive parenting works. It is important, however, to emphasize that executive functioning is only one mechanism through which parenting impacts emotional development. Although executive functioning was a mediator of emotional symptoms in fifth grade, it explained only a partial percentage of sensitivity's effect on emotional symptoms and furthermore was not a mediator in sensitivity's effect on course of symptoms over time. Thus, although sensitive parenting generally reduces vulnerability to negative emotional symptoms through executive functioning, there also appears to be an additional layer of resilience accounted for through other mechanisms. This is consistent with the dynamic nature of developmental processes, as risk and protective factors are likely to work through multiple mechanisms in their impact on developmental outcomes. Thus, future research will benefit from studying this mediational pathway in the context of additional factors related to emotional symptoms.

Notably, though this study provides valuable implications, results should be interpreted in the context of several limitations. First, although this study extended the literature in assessing long-term outcomes of sensitive parenting and executive functioning, we were unable to assess potential bidirectional relationships between these constructs. Tenets of social cognitive theory not only highlight interactions between multiple domains, but also emphasize potential bidirectional relationships between them. For example, just as early sensitivity impacts executive functioning, it is also likely that a child's executive functioning in preschool further elicits particular parenting behaviors, creating a cyclical contribution to internalizing vulnerability. Future studies including additional time points of sensitive parenting and executive functioning may be able to capture this additional layer of complexity. Such design will also address limitations related to controlling for and examining interactions with later parenting and executive functioning levels. It may be worthwhile to assess how effects of early parenting and executive functioning vary as a function of changes or stability in later levels of these constructs. Second, though a strength of this study was ethnic diversity of our sample, findings are most generalizable to rural high-risk families. Given contextual aspects often unique to rural settings, including higher risk for geographical isolation, less access to social services supporting child development, and closer family proximity,


parenting in rural families may have a larger impact on a young child's development compared to urban families. Thus, additional studies may wish to replicate findings within urban/suburban samples.

In conclusion, this study contributes to our understanding of how early factors may impact child emotional development in the school and peer context. Specifically, sensitive parenting in the first 4 years of life buffers long-term development of emotional problems in school, in part through its effect on child executive functioning. This highlights potential targets of transdiagnostic intervention and further points to the need for continued integration and investigation of parenting and executive functioning in models of emotional development.

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