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Severe Poverty and Growth in Behavioral Self-Regulation: The Mediating Role of Parenting

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Abstract

This study examined how exposure to severe poverty related to behavioral self-regulation growth during early childhood as mediated by parenting practices. Ethnic differences were tested. Data were collected across 4 waves from 359 low-income African American and Latino families. The frequency of exposure to severe poverty was indicated by how many times family income fell below 50% of the federal poverty line across 4 waves. Behavioral self-regulation was assessed when children were 3½, 6, and 7 years old (Wave 2–4), and parenting was observed when children were age 2½ years old (Wave 1). More frequent exposure to severe poverty was associated with slower behavioral self-regulation growth, and the effect was partially mediated through less

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sensitive and supportive parenting practices for Latino families. The mediation was not observed for African American families. Targeting the promotion of sensitive and supportive parenting practices may be an effective strategy for accelerating self-regulation development.

Keywords

self-regulation; executive functions; poverty; parenting; minority

Children from low-income families are more likely to enter kindergarten with lower self-regulation compared to their middle-class counterparts (Caughy et al., 2013; Obradović et al., 2012). Studies have linked poverty and related risks to less well-developed self-regulation and slower growth in self-regulation during early childhood (Evans & Rosenbaum, 2008; Mistry et al., 2010; Moilanen et al., 2009; Raver et al., 2013). African American and Latino children in the United States are disproportionately challenged by poverty (Li-Grining, 2012; Raver, 2004). In 2017, 33.7% of African American and 26.2% of Latino children under age 5 lived in families below the federal poverty line compared to 11.7% of White children (Child Defense Fund, 2017). African American and Latino children's self-regulation development is more likely to be at risk during early childhood due to these challenges (Currie, 2005; Evans & English, 2002; Evans & Rosenbaum, 2008; Magnuson & Waldfogel, 2005; Mistry et al., 2010), which can, in turn, contribute negatively to early childhood adjustment. For example, as early as kindergarten, African American and Latino children are more likely to show lower levels of school readiness compared to their White counterparts (Currie, 2005; Magnuson & Waldfogel, 2005; The Nation's Report Card, 2017).

Self-Regulation and Early Childhood Adjustment

Self-regulation is a multi-component construct that represents a child's ability to volitionally modulate behaviors according to the cognitive, emotional, and social demands to achieve a goal (Blair & Raver, 2012a, 2012b; Blair & Ursache, 2011; Calkins & Fox, 2002; McClelland & Cameron, 2012). Self-regulation is supported by executive functions. Executive functions are interrelated cognitive skills including working memory, which is the ability to hold and manipulate information in mind, inhibition, which is the ability to withhold a dominant response to engage in a subdominant response, and cognitive flexibility, which is the ability to shift the focus of attention flexibly according to different demands (Best & Miller, 2010; Blair & Raver, 2012a; Blair & Ursache, 2011; Garon et al., 2008; Willoughby et al., 2012; Zelazo & Carlson, 2012). Effective self-regulation requires coordination of working memory, inhibition, and cognitive flexibility to produce overt behaviors. Thus, observed self-regulation is often termed behavioral self-regulation (McClelland et al., 2007; McClelland et al., 2014; Montroy et al., 2016).

This study focuses on behavioral self-regulation, defined as the ability to utilize different cognitive processes of working memory, inhibition, and cognitive flexibility to regulate overt behaviors (McClelland et al., 2014; McClelland & Cameron, 2012). Behavioral self-regulation is associated with key aspects of early childhood adjustment, including better school readiness, better mathematics and literary achievement, better social competence and

peer relationships, and fewer problem behaviors (Blair, 2002; Blair et al., 2015; Eisenberg et al., 2005; McClelland & Cameron, 2011; McClelland et al., 2007; McClelland et al., 2014; Mills et al., 2018; Ponitz et al., 2009; Sawyer et al., 2015; Schmitt et al., 2017).

Poverty and Self-Regulation Development

According to the experiential canalization framework, poverty is associated with increased stress, which, in turn, can shape self-regulation development by disrupting the psychophysiological stress-related processes and the neurological system foundational to self-regulation (Blair & Raver, 2012a). Studies have found that during early childhood, higher levels of family poverty are associated with less-well developed self-regulation (Lengua et al., 2015, 2019; Ruberry et al., 2017). In longitudinal studies of preschoolers, extreme family poverty is associated with slower growth of effortful control and executive functions (Lengua et al., 2015; Moilanen et al., 2009). The chronicity of early poverty exposure appears to be particularly deleterious for child well-being in general (McLoyd, 1998) as well as for self-regulation development specifically (Evans & Kim, 2007; Raver et al., 2013). However, these studies examined the effect of chronic poverty on self-regulation development at only one point in time rather than the relation of chronic poverty with self-regulation growth.

Parenting as a Mediator of the Effects of Poverty on Self-Regulation Development

According to experiential canalization theory, as elaborated above, many experiences associated with poverty can shape an individual's behaviors (Blair & Raver, 2012a). Poverty is often associated with diminished parenting quality, and such experience can serve as a significant pathway through which poverty shapes self-regulation development (Blair & Raver 2012a; Bocknek et al., 2009; Lengua et al., 2014). Parenting practices that are responsive, flexible, supportive, and warm foster self-regulation development across developmental stages in childhood (Calkins & Fox, 2002; Calkins et al., 1998; Fay-Stammbach et al., 2014; Hughes & Devine, 2019; Valcan et al., 2018). In contrast, over-controlling and harsh parenting, characterized by directiveness, negative affect, criticism/blame, and use of physical discipline, can undermine self-regulation development (Calkins & Johnson, 1998; Calkins et al., 1998; Lucassen et al., 2015; Mathis & Bierman, 2015; Yu & Hsu, 2019).

Poverty and poverty-related risks such as low parental education, household density, and single parenthood are related to lower levels of parental sensitivity and warmth and elevated control and harshness, which in turn are linked to less advanced self-regulation and slower self-regulation growth during toddlerhood and the preschool years (Bocknek et al., 2009; Harvey et al., 2016; Lengua et al., 2007; Lengua et al., 2014). It is difficult for parents to provide effective parenting when they are under economic stress. Studies have found that poverty can harm parental mental health, resulting in elevated depressive symptoms and substance abuse which are associated with lower parenting quality (Bøe et al., 2014; Fitzsimons et al., 2017; Hoffman et al., 2006; Kelley et al., 2015; Maughan et al., 2007).

In sum, empirical evidence supports that poverty can undermine self-regulation development through diminished parenting quality.

Potential Differences in Parenting and Self-Regulation Development in African American and Latino Families

Both African American and Latino families are disproportionately affected by poverty, but how family processes shape child self-regulation development may not be identical between the two groups. Different aspects of parenting and their relations with child outcomes may differ among different cultural groups (Deater-Deckard et al., 2011). According to García-Coll et al.'s (1996) integrative model, families from different racial and ethnic backgrounds may exhibit distinctive parenting practices due to differences in both more distal processes associated with social stratification as well as more proximal family traditions and values. For example, African American parents have been described as having a "no-nonsense" but warm parenting style(García-Coll et al., 1995; Hill & Bush, 2001), whereas Latino parenting has been described as more directive, even authoritarian, but including high levels of warmth (Halgunseth et al., 2006; Livas-Dlott et al., 2010).

Likewise, the relation of parenting with child outcomes may differ by race/ethnicity. For example, Whiteside-Mansell et al. (2009) found that maternal cognitive stimulation, responsivity, and acceptance were related to fewer preschoolers' externalizing behavior problems for African American families but not for Spanish-speaking Latino families. Similarly, Caughy et al. (2017) reported that parental intrusiveness in early childhood predicted poorer reading achievement in early elementary school for African American but not for Latino American children who were mostly Mexican immigrants. Thus, it is important to examine whether the relation between parenting and self-regulation development is similar for African American and Latino families.

Current Study

Despite the abundance of research supporting the impact of poverty on self-regulation, the current literature is limited in important ways. Specifically, much of the existing research linking poverty to self-regulation development through parenting has measured self-regulation at a single point in time (e.g., Kim et al., 2003; Lengua et al., 2007). Treating behavioral self-regulation as a time-invariant variable may not capture the nature of early self-regulation development, as self-regulation develops rapidly in the first few years of life (Diamond, 2006; Kochanska et al., 2001; Kopp, 1982; Vaughn et al., 1984). The current study utilizes repeated measures to examine how poverty exposure affects the *growth* of behavioral self-regulation over early childhood and how parenting may mediate this relation. Factors that affect self-regulation at a single time-point may not be the same as the factors that shape the self-regulation trajectory during a period of rapid change in early childhood. Identifying factors that affect the trajectory of self-regulation during early childhood can enable intervention programs to address potential self-regulation growth problems in African American and Latino children living in poverty. Therefore, studies testing the link between poverty and self-regulation through parenting may benefit from treating self-regulation development as a dynamic and longitudinal construct.

Although most studies have not focused on self-regulation growth in early childhood, there are a few exceptions. A study of low-income African American families found that parental supportiveness predicted faster growth in self-regulation in the first three years of life (Bocknek et al., 2009). However, this study treated poverty as a control variable and did not examine whether parenting mediated the relation between poverty and self-regulation. Likewise, Moilanen et al. (2009) found that positive parental behaviors were associated with faster self-regulation growth, and extreme poverty was associated with slower self-regulation growth, but this study also did not examine the potential mediating role of parenting.

Another limitation of the extant literature is that it primarily compares children living in poverty to their more affluent counterparts and fails to capture the range of experiences of exposure to extreme poverty within low-income populations when examining the mechanisms by which poverty shapes self-regulation. There is significant variation in the level of cumulative exposure to extreme poverty within low-income families, with some families being exposed to severe poverty chronically and some families never experiencing extreme economic hardship. Severe or “deep” poverty, defined as less than 50% of the federal poverty, has been identified as being particularly deleterious for child development (Blair et al., 2011; Blair & Raver, 2012b; Cook et al., 2012). Lengua et al. (2014) found that family income can negatively affect executive functions via decreased parenting quality, but the study did not capture the wide range of different levels of exposure to extreme poverty among the participants. Moreover, Lengua et al.’s (2014) study sample was predominantly White, thereby precluding the examination of potential ethnic differences. As such, research is needed to explore the pathway by which different levels of exposure to extreme poverty impact self-regulation growth through parenting in low-income minority families and potential ethnic differences in these paths. Studies focusing on low-income participants experiencing different levels of poverty have found that higher level of poverty is associated with lower self-regulation performance (Blair et al., 2008; Chang et al., 2012; Mistry et al., 2010; Moilanen et al., 2009; Raver et al., 2013). However, none of these studies measured different levels of cumulative exposure to extreme poverty or examined the mediating role of parenting between poverty and growth in self-regulation.

Research has documented the deleterious effects of chronic poverty and, in particular, severe poverty on a child’s developing capacity for self-regulation. However, most of this research is not longitudinal nor has examined the effects of poverty on growth in self-regulation over time. To address the limitations of existing research, this study examined the association between the frequency of exposure to severe poverty and the trajectory of behavioral self-regulation in a low-income African American and Latino sample. It was hypothesized that a greater frequency of exposure to extreme poverty would be associated with slower growth in behavioral self-regulation across early childhood. Furthermore, it was hypothesized that this association would be mediated by the association between the frequency of exposure to extreme poverty with less positive and more negative parenting practices. Last but not least, this study will examine whether the mediation model is equivalent across African American and Latino families.

Method

Participants

Participants were African American and Latino mothers and their young children from a large urban area in the southwest United States. Participants were a convenience sample recruited through community-based strategies, including distribution of study information to organizations and agencies serving low-income families (e.g., Head Start programs and WIC clinics) as well as direct recruitment at community fairs. All of the families had household incomes below 200% of the federal poverty line. Other eligibility criteria included (1) child 2½ years old at time of enrollment; (2) child had at least one parent who self-identified as either African American or Latino; (3) child hospitalized for less than 7 days at birth; and (4) family intended to remain in the area for the next year. A total of 407 families were enrolled in this study, and families were followed up at three subsequent time points: one year later (Wave 2, age 3½), after children entered school when most study children were in kindergarten (Wave 3, age 6), and one year later when most study children were in first grade (Wave 4, age 7).

The current study focused on behavioral self-regulation as the outcome, data for which were collected when children were 3½, 6, and 7 years old. Thus, children who did not have any behavioral self-regulation scores at any of these age points ($N = 46$) were excluded. Excluded families did not differ from other families enrolled in the study in terms of child gender, family income-to-needs ratio when children were 2½ years old, or maternal education. African American children were more likely to be excluded (15.8%) compared with Latino children (7.6%), χ^2 (1) = 6.85, $p < .01$. Two children were later excluded because they were diagnosed with a significant developmental disability.

The remaining 359 families comprise the sample for the current analysis, and the demographic characteristics of this sample are shown in Table 1. Among these participants, 43.3% were African American, and 56.7% were Latino. All the primary caregivers were mothers or mother-figure female relatives. More than half of African American children and Latino children were boys, and the child gender ratio did not differ by ethnicity. African American family incomes fell below 50% federal poverty line between age 2½ and age 7 more often than Latino families, even though more African American mothers than Latino mothers attained a high school degree/GED or higher. Among Latino mothers, the majority of them were born outside of the US, primarily in Mexico, and the majority of them spoke Spanish as their primary language.

Procedure

Data collection was completed during home visits at four time points when the child was 2½ years old (Wave 1), 3½ years old (Wave 2), 6 years old (Wave 3), and 7 years old (Wave 4). A team of two home visitors visited participants' homes, and the visits lasted between 1.5 and 2 hours. The visit consisted of an interview with the primary caregiver, assessments of the child, and a semi-structured video-recorded parent-child interaction. One visitor would interview the primary caregiver, while the other would carry out the child assessment. All measures were administered to parents and children in their preferred language. For

Spanish-speaking families, both home visitors were bilingual. When measures were not available in Spanish, they were forward-translated and then back-translated by a team of bilingual members, and differences were resolved by consensus.

Measures

Behavioral Self-Regulation—At ages 3½, 6, and 7 years, behavioral self-regulation was measured using the Heads-Toes-Knees-Shoulder (HTKS) task (McClelland et al., 2007; Ponitz et al., 2008; Skibbe et al., 2012). The HTKS was not used to measure behavioral self-regulation at Wave 1 because the task was too difficult for children when they were 2½ years old. In this task, the child is asked to follow the rules and regulate his/her overt behaviors using components of executive functions, including working memory, inhibitory control, and cognitive flexibility (McClelland et al., 2014; Montroy et al., 2016). The HTKS task has been found effective in capturing variation in behavioral self-regulation throughout early childhood, which makes it suitable to measure developmental self-regulation change across time from preschool age to early elementary school age (McClelland et al., 2007; Ponitz et al., 2008; Skibbe et al., 2012). The HTKS shows good construct validity as it is correlated with other self-regulation measures, including classroom self-regulation performance and parental-reported self-regulation (McClelland et al., 2007; Ponitz et al., 2009). The HTKS also shows good predictive validity, as HTKS performance predicts academic achievement and other child outcomes such as externalizing problems across racially and ethnically diverse populations (Lipsey et al., 2014; McClelland et al., 2007; McClelland et al., 2014; von Suchodoletz et al., 2013; Wanless et al., 2011). Past studies further indicate that the HTKS has strong reliability, including interrater reliability and internal consistency (Matthews et al., 2009; Ponitz et al., 2008; Wanless et al., 2011). Moreover, the increase in the HTKS score is not a result of practice (Ponitz et al., 2008).

The task consisted of 3 phases. During each phase, children could only move on to the test trials when they responded correctly in at least 3 practice trials. The first phase consisted of 6 practice trials and 10 test trials, and the second and the third phases, each consisted of 5 practice trials and 10 test trials. Each trial consisted of a set of paired rules. In the first phase, the researcher told the child to touch his/her toes when the researcher touched his/her head and vice versa. After 10 trials of “heads and toes,” the next 10 trials added in a new set of paired rules: a child was expected to touch his/her shoulders when the researcher touched his/her knees and vice versa. Finally, the last 10 trials re-combined the paired rules used in the first two phases (i.e., “touch your head” was paired with “touch your knees,” and “touch your shoulders” was paired with “touch your toes”).

The HTKS task was video recorded and scored from the video recordings. Each test trial was coded as incorrect (0), self-correct (1), or correct (2). A total score was computed as the total of all test trials, so the possible score ranged from 0 to 60. Based on an intra-class correlation coefficient, interrater reliability based on double-coding the cases were .89 at ages 3½ and 6 years, and .90 at age 7 years.

Parenting—Maternal parenting practices were assessed when children were 2½ years old (Wave 1) using a semi-structured mother-child interaction task adapted from the “Three

Bags" task used for the NICHD Study of Early Child Care and Youth Development (SECCYD) (NICHD Early Child Care Research Network, 1999). The original NICHD study showed that this task has good internal consistency (NICHD Early Child Care Research Network, 1999). Three numbered bags containing toys, and a book were used for a 15-minute interaction. The first bag included a wordless picture book – *Good Dog, Carl* (Day, 1996), the second bag contained a small kitchen that came with frying pan and salt/pepper shakers, and the third bag contained a small toy house that included toy figures and a vehicle. The mothers were asked to introduce the toys to the children in bag order and to spend some time with their children with each of the toys.

The interactions were video-recorded and rated using 5-point Likert global rating scales ranging from 1 (*not at all characteristic*) to 5 (*highly characteristic*) on six dimensions of parenting including sensitivity, intrusiveness, detachment, cognitive stimulation, positive regard, and negative regard (Owen et al., 2010). Sensitive practices deliver emotional support and attend a child's needs. Intrusive behaviors involving imposing the mother's agenda on the child regardless of the child's needs or desire. Detached mothers do not respond contingently to the child's needs or facilitate a child's activity. Cognitive stimulation involves the parent's effortful scaffolding of cognitive development. Positive regard is evident when the mother expresses positive feelings towards the child. Negative regard is evident when the mother expresses negative feelings towards the child. Video-recordings in Spanish were rated by bilingual raters. Interrater reliability (IRR) was determined by a second coding of 29% of the interactions and calculated using an intra-class correlation coefficient. Interrater reliability ranged from .81 to .87 for the six rating items.

Frequency of Exposure to Severe Poverty—Severe poverty was defined as being below 50% of the federal poverty level (U.S. Census Bureau, 2019). The frequency of exposure to severe poverty was measured by how many times the family's income fell below 50% of the federal poverty level at the time of each home visit from age 2½ to age 7. The total family income at each time point was compared to the federal poverty line based on family size provided by the U.S. Census Bureau. The number of exposures to severe poverty ranged from 0 to 4. The average number of times study children were exposed to severe poverty was 1.04, $SD = 1.26$. African American children were more likely to experience chronic severe poverty compared to Latino children (see Table 1).

Analysis Plan

Means, standard deviations, and bivariate correlations were computed for African American and Latino participants respectively as the first step to examine whether the average HTKS score increased from age 3½ to 7 years and whether dimensions of parenting practices and exposure to severe poverty were correlated with HTKS scores. After descriptive analyses, structural equation modeling (SEM) analyses were conducted in M*Plus* 8.2 (Muthén & Muthén, 1998–2017) with full information maximum likelihood to account for missing data (Little & Rubin, 1987). An unconstrained linear growth curve model was conducted to capture the growth of HTKS from age 3½ to age 7 for African American and Latino participants, respectively. Across-group equivalence of the growth curve model was then tested by constraining the intercept and the slope to be equivalent and comparing model fit

chi-square change. If the chi-square change is significant, it indicates that the intercept (or the slope) is not equivalent across groups.

With regard to the parenting dimensions, the previous study with an almost identical sample found that a bi-factor confirmatory factor analysis model fit the parenting data the best, and a partially invariant model was achieved across African American and Latino groups (author reference). Finally, we fit a multiple group mediation model in which the exposure to severe poverty predicted the intercept and slope of HTKS via the partially invariant bi-factor model of parenting qualities. We conducted follow-up testing for any pair of coefficients that were significant in one group but not the other. We constrained the coefficient to be equivalent across groups and compared whether the model fit chi-square of the constrained model was significantly different from the unconstrained model. In the final multi-group mediation model, we freed the significantly different coefficients and constrained the rest to be equivalent across groups.

Results

Descriptive statistics and bivariate correlations for African American and Latino families, respectively, are displayed in Table 2. For both African American and Latino families, HTKS at age 3½ was not correlated with any parenting practice or frequency of exposure to severe poverty, which could have been a result of floor effect when the children were around 3½ years old. For African American families, HTKS at age 6 was positively associated with maternal sensitivity and negatively associated with exposure to severe poverty, but HTKS at age 7 was not significantly correlated with parenting or poverty. For Latino families, HTKS at age 6 was positively correlated with maternal cognitive stimulation, and HTKS at age 7 was associated with several parenting dimensions and exposure to poverty.

Trajectory of Behavioral Self-Regulation for African American and Latino Children

A multigroup linear growth curve model was tested to define the trajectory of self-regulation for African American and Latino children from age 3½ to age 7. The factor loadings on the intercept factor were constrained to 1. Because *t*-tests revealed that Latino children were significantly older on average than African American children at Wave 3, $t(318) = 3.88$, $p < .001$, and Wave 4, $t(302) = 4.64$, $p < .001$, the factor loadings for the slope in the growth model were constrained differently for African American and Latino groups to reflect the specific ages of each group. For African American children, the average ages for Wave 2, Wave 3 and Wave 4 were 41.65 months ($SD = 1.44$), 74.57 months ($SD = 4.11$), and 86.11 months ($SD = 3.97$), respectively; thus, the factor loadings on the slope factor were constrained to increase at 0, 2.74, and 3.70 based on the average interval between waves. For Latino children, the average ages for Wave 2, Wave 3, and Wave 4 were 41.53 months ($SD = .88$), 76.27 months ($SD = 3.63$), and 86.15 months ($SD = 3.61$), respectively; thus, the factor loadings on the slope factor were constrained to increase at 0, 2.90, and 3.89 based on the average age intervals between waves.

In the unconstrained model, both the intercept and the slope appeared to differ by ethnicity. When the intercepts were constrained to be equivalent for both groups, the model fit χ^2 changed significantly, $\Delta\chi^2 (1) = 9.25$, $p < .01$. Similarly, when the slopes were constrained

to be equivalent for both groups, the model fit χ^2 changed significantly, $\Delta\chi^2$ (1) = 11.35, p< .001. Moreover, the variance of the intercept for African American children was negative but non-significant, and the residual variance of HTKS score at age 3½ for Latino children was negative but non-significant. Thus, both were constrained to be zero in the final model.

The final multigroup linear growth curve model had a good model fit, $\chi^2(5) = 6.40$, $p = .27$; comparative fit index (CFI) = .97; Tucker-Lewis index (TLI) = .97; root mean squared error of approximation (RMSEA) = .04; and standardized root-mean-square residual (SRMR) = .04. For African American, there was a significant but small intercept, $b = 2.07$, $SE(b) = .35$, $t(152) = 5.95$, p< .001, variance = 0, $p = .99$, and a significant slope, $b = 11.30$, $SE(b) = .34$, $t(152) = 32.85$, p< .001, variance = 12.83, p< .001. For Latino, there was a significant but small intercept, $b = .75$, $SE(b) = .21$, $t(203) = 3.66$, p< .001, variance = 6.09, p< .001, and a significant slope, $b = 12.70$, $SE(b) = .20$, $t(203) = 62.56$, p< .001, variance = 4.27, p<.01. Both groups had a close to zero intercept, indicating that children may not have developed behavioral self-regulation as measured by the HTKS at age 3½ years. However, African American children had a significantly higher HTKS score than Latino children when they were 3½ years old. On the other hand, Latino children displayed faster improvement in HTKS performance between age 3½ and 7 years. There appeared to be within-group variability in the starting point of HTKS score for Latino children, and within-group variability in the growth of HTKS score for both African American and Latino children.

Partially Invariant Bi-Factor Parenting Measurement Model

Before assessing the role of parenting in mediating the impact of poverty experience on children's growth in behavioral self-regulation, confirmatory factor analysis was used to fit a bi-factor model to the six rating items of maternal behavior. A bi-factor model is an example of a complex factor structure, in which all items load on a general factor, and a subset of items also load on one or more specific factors (Reise, 2012). Previous confirmatory factor analyses with an almost identical sample revealed a bi-factor structure of the mother behavior rating items, and partial measurement invariance between African American and Latino groups was established (author reference). Simple factor structures such as a single factor model (i.e., all items loading on one latent factor) or a two-factor model (i.e., sensitivity, cognitive stimulation, and positive regard loading on one latent factor; intrusiveness, detachment, and negative regard loading on another latent factor) showed unacceptable model fits, whereas the bi-factor model had an excellent model fit (author reference). In this study, all of the parenting dimensions loaded on the general factor, and sensitivity, intrusiveness, detachment, and negative regard also loaded on a second factor — the specific factor. The general factor was labeled as Sensitive Support because it was indicated by high levels of sensitivity, cognitive stimulation, and positive regard, coupled with low levels of detachment, intrusiveness, and negative regard. The specific factor was labeled Intrusiveness because it shared variance common to Intrusiveness and only shared some variance with sensitivity, detachment, and negative regard.

Partial measurement invariance was established with the almost identical sample (author reference); thus, we applied this partially invariant model in the final multigroup mediation

analysis (Donahue, 2006). The factor loading patterns were consistent with previous analyses (author reference), and model fit indices were good for the partially invariant bi-factor model (see Table 3). The specific ethnic differences centered around intrusiveness, detachment, and negative regard. Intrusiveness loaded more negatively on the maternal Sensitive Support for Latino mothers, $b = -.48$, $SE(b) = .08$, $p < .001$, compared to African American mothers, $b = -.03$, $SE(b) = .08$, $p = .66$. Negative regard loaded more positively on the Intrusiveness factor for African American mothers, $b = .42$, $SE(b) = .06$, $p < .001$, than Latino mothers, $b = .22$, $SE(b) = .05$, $p < .001$. Additionally, the item intercept of negative regard was higher for African American mothers, $b = 1.63$, $SE(b) = .07$, $p < .001$, than Latino mothers, $b = 1.34$, $SE(b) = .06$, $p < .001$. According to the standardized intercept of the latent factors, Latino mothers also demonstrated higher levels of both Sensitive Support and Intrusiveness than African American mothers (see Table 3).

Multigroup Mediation Model

The multigroup mediation model tested the direct and indirect effects of the frequency of exposure to extreme poverty and two latent parenting factors on the HTKS intercept and slope. The significance of indirect effects was tested using bootstrapped standard errors (Shrout & Bolger, 2002). After testing individual pairs of coefficients, only the path between exposure to poverty and maternal Sensitive Support was identified as significantly different between African American and Latino families, $\Delta\chi^2(1) = 4.32$, $p < .05$.

In the final multigroup mediation model, all paths were constrained to be equivalent across groups, except for the path between exposure to poverty and maternal Sensitive Support. The model fit was excellent, $\chi^2(73) = 85.48$, $p = .15$; CFI = .99; TLI = .98; RMSEA = .03; SRMR = .10. The results are shown in Figure 1. For both African American and Latino families, a higher frequency of falling below 50% of the federal poverty line between age 2½ and age 7 was associated with slower HTKS score growth between age 3½ and age 7. However, a higher frequency of falling below 50% of poverty was associated with a lower level of maternal Sensitive Support for Latino but not African American mothers. For Latino families, the standardized indirect effect of poverty on the HTKS trajectory via Sensitive Support parenting practice was $(-.29) \times (.32) = -.09$. The bootstrapped unstandardized indirect effect was −.20, and the 95% confidence interval ranged from −.38 to −.01. Thus, the indirect effect was statistically significant. Maternal Sensitive Support partially mediated the association between exposure to severe poverty and growth in HTKS scores in Latino families. Such mediation was not detected in African American families.

Unlike maternal Sensitive Support, maternal Intrusiveness was not associated with the frequency of exposure to severe poverty for both groups. Maternal Intrusiveness was also not predictive of growth in HTKS for both groups. The mediation path from the frequency of exposure to severe poverty to the growth of HTKS through maternal Intrusiveness was not significant. In addition, higher exposure to extreme poverty was not predictive of the intercept of HTKS for both groups. Neither maternal Sensitive Support nor maternal Intrusiveness was linked to the intercept of HTKS for either group.

Discussion

Self-regulation is associated with key aspects of early childhood adjustment. Compared to children from middle-class families, children living in poverty are more likely to develop lower levels of self-regulation, which contributes to undesirable adjustment outcomes. Previous studies of poverty and self-regulation failed to capture the wide range of cumulative exposure to extreme poverty within low-income populations and its impact on the growth of behavioral self-regulation. This study sought to expand our understanding of the relation between exposure to extreme poverty and self-regulation development in low-income African American and Latino families and potential cultural differences. We examined the association between the frequency of exposure to severe poverty and the trajectory of behavioral self-regulation, how early parenting may mediate the effects of poverty on individual differences in these trajectories, and the equivalence of these mediation pathways across two ethnic groups. It was hypothesized that more frequent exposure to severe poverty would be associated with less positive and more negative maternal parenting practices, which, in turn, would be linked to slower behavioral self-regulation growth. The study findings partially supported this hypothesis. For both African American and Latino families, maternal Sensitive Support was positively associated with growth in behavioral self-regulation. Results did not indicate that experiences of maternal Intrusiveness when children were 2½ years old played a significant role in growth in behavioral self-regulation. For Latino but not for African American families, lower levels of maternal Sensitive Support partially mediated the negative effect of the frequency of exposure to severe poverty on behavioral self-regulation growth in early childhood.

For Latino families, more frequent exposure to severe poverty was linked to less sensitive and supportive maternal parenting practices when children were 2½ years old, which, in turn, was associated with slower growth of behavioral self-regulation. The findings of partial mediation path for Latino families partially support the experiential canalization framework that posits exposure to extreme poverty is particularly devastating to self-regulation development, and poverty can shape self-regulation development through effects on parenting practices (Blair & Raver, 2012a). However, differences in parenting did not completely mediate the relation between poverty and self-regulation, indicating that all possible mediating processes were not accounted for. Poverty is often linked to household chaos, family conflict, and unsafe neighborhoods, all of which have been found to be detrimental to child socio-emotional development (Doom et al., 2018; Evans et al., 2010; Palamar et al., 2015). Future studies can explore potential mediating paths of other developmental contexts, such as neighborhood and household environment, on self-regulation trajectories during early childhood to expand our understanding of the mechanism by which poverty shapes self-regulation.

Although exposure to severe poverty was associated with slower self-regulation growth in both groups, only among Latino families was the effect of severe poverty exposure mediated by the negative effects of poverty on the quality of parenting. For African American families, maternal Sensitive Support at child age 2½ was positively related to growth in self-regulation, but poverty was not negatively associated with maternal Sensitive Support. These findings suggest the possible existence of unmeasured sources of resilience among

African American mothers when challenged by exposure to severe poverty. It is also worth noticing that African American families experienced a higher frequency of severe poverty despite African American mothers held a higher level of education than Latino mothers. A higher level of education could have buffered the negative impact of severe poverty on parenting practices for African American families.

Inconsistent with previous empirical findings regarding maternal intrusive parenting practices, more frequent exposure to severe poverty was not associated with more maternal Intrusiveness, and more maternal Intrusiveness was not associated with slower behavioral self-regulation growth during early childhood for neither African American nor Latino families. One plausible explanation is that the role of maternal intrusive parenting practices is complex in low-income ethnic minority families, especially in the presence of positive parenting practices. However, previous studies have been inconsistent on this issue. A study of African American preschoolers found that parenting practices characterized by both moderate intrusiveness and warmth were positively linked to better child school readiness (Dyer et al., 2014). Another study of African American children found that maternal intrusiveness companied by high levels of warmth was more detrimental to toddlers' executive functions than maternal intrusiveness companied by low levels of warmth (Holochwost et al., 2018). It is plausible that maternal intrusive parenting practices may have different meanings when combined with positive parenting practices (Dotterer & Pungello, 2012).

Another plausible explanation of the role of maternal intrusive parenting practices is that the nature of appropriate parenting practices changes with the developmental stage. When children are 3½ years old, intrusive parenting may be expected instead of detrimental. Studies of intrusive parenting with older children have found that intrusive and controlling parenting practices can be characterized as behavioral or psychological control (Bean et al., 2003, 2006). Only the psychological control components appeared to be detrimental to youth outcomes such as mental health and behavioral problems (Bean et al., 2003, 2006; Pettit et al., 2001). In this study, maternal intrusiveness evaluated during interaction with 2½-year-olds reflected behavioral rather than psychological control, which may explain why intrusiveness did not appear to be detrimental for child developmental outcomes. Another study by Landry et al. (2000) also found that maternal intrusive (i.e., directive) behaviors when the children were 2 years old was positively associated with children's cognitive ability when the children were 3½ years old, but the relation was revered between maternal intrusiveness when the children were 3½ years old and children's cognitive ability when the children were 4½ years old. This finding suggests that intrusive mothering may be appropriate at a young age but become detrimental as the children grow older and need more autonomy.

There are numerous strengths of the present study, including a longitudinal design, direct observation of both parenting and child self-regulation ability, and an ethnically diverse sample. Despite these strengths, there are a few limitations that should be kept in mind. Specifically, there appeared to be a floor effect of the HTKS at the first assessment point, when children were 3½ years old, which may have complicated the ability to examine determinants of self-regulation due to low variability in the measure at this time point.

Previous studies suggest that there is a rapid improvement of self-regulation during the preschool period, typically between age 3 and 5 years (Diamond, 2006; Kopp, 1982), but the HTKS task requires children to use different components of executive functions and can be difficult for children younger than 4 years old (McClelland & Cameron, 2012). Self-regulation develops rapidly during early childhood, and measurement tools that can capture the variation in self-regulation across different developmental stages in early childhood are needed. Moreover, the HTKS task was the only measure of behavioral self-regulation, which was different from the measures used in many prior studies on self-regulation development in early childhood. Although different behavioral assessments of self-regulation and related construct overlap in psychometric properties, they do not always measure the same construct, which makes it difficult to synthesize findings across studies in this field (Morrison & Grammer, 2016).

Another limitation of this study was that only three time points of behavioral self-regulation were included. With three time points, only a linear growth model of self-regulation could be estimated (Muthén & Muthén, 1998–2017). However, self-regulation development during early childhood may not be linear. Indeed, in a secondary analysis of over 1300 children drawn from three different samples, Montroy et al. (2016) modeled growth in HTKS performance between age 36 and 72 months, breaking time-points into twelve 3-month intervals, and substantiated an exponential growth pattern across this age span. Future studies should utilize more time points to increase the ability to capture nonlinear growth of self-regulation.

This study also did not capture the change in parenting practices and its impact on self-regulation growth, as it only included one time point of parenting practices when the child was 2½ years old. With one wave of maternal parenting captured, we cannot evaluate how exposure to poverty and child self-regulation can shape parenting over time. Although research indicates that positive aspects of parenting such as warmth are generally stable over time whereas negative parenting such as harshness and detachment are not (Bornstein et al., 2008; Dallaire & Weinraub, 2005; Else-Quest et al., 2011), these studies have relied heavily on White, middle-class samples. More research on the stability of parenting in relation to children's outcomes is needed in more ethnically and socioeconomically diverse families. With one wave of maternal parenting, we are also not able to study how the role of certain parenting practices change across developmental stages. As mentioned above, intrusive parenting could be appropriate for toddlers' cognitive development but became detrimental for cognitive development during preschool years (Landry et al., 2000). Another study found that supportive emotion socialization promoted children's socioemotional competence in early childhood, but failed to foster socioemotional competence among young school-aged children (Mirabile et al. 2018). Future studies that investigate the changing role of supportive and intrusive parenting practices across developmental stages are needed. Furthermore, this study only considered maternal parenting, although the support of other family members may be critical in shaping child self-regulation outcomes (Li-Grining, 2012). Future studies should include father figures or even important extended family members such as grandparents in studies of self-regulation development. This study was also not able to address the specific impact of the timing of exposure to severe poverty on parenting and behavioral self-regulation.

Finally, this study only captured exposure to extreme poverty as a challenge in the development of self-regulation in African American and Latino families. According to the experiential canalization framework, change in self-regulation is a result of adaptation to stress associated with poverty and other contextual factors on the community or societal level (Blair & Raver, 2012a; Raver & Blair, 2020). However, only focusing on poverty and its impact on behavioral self-regulation may inevitably implying a deficit model to children from low-income families (Raver & Blair, 2020). It takes the acknowledgment of and measuring contextual risks and resilience on the socioeconomic, community, cultural, political, and historical levels and a child's outcome across physiological, cognitive, emotional, and behavioral to fully demonstrate the "adaptation" to the specific environment the child is developing in. Take a study of African American children from low-income households as an example, exposure to neighborhood violence is associated with greater selective attention toward negative facial emotional cues as a result of adapting to coping with danger (McCoy et al., 2016). Taking neighborhood risk factors, which disproportionately impact low-income minority communities, into consideration, researchers are better equipped to approach self-regulation development using an "adaptation" framework. African American and Latino families face a series of systemic challenges beyond economic inequality due to racial and ethnic discrimination, as well as historical and structural inequalities in education, healthcare, and employment (Berends et al., 2008; Gregory et al., 2010; Ladson-Billings, 2006; Potter & Morris, 2017). In the current study, despite holding higher levels of education, African American mothers and families experience more frequent severe poverty, suggesting that African American families may face unique challenges that contribute to family poverty regardless of maternal education. Future studies on self-regulation development need to include comprehensive measuring of unique experiences of African American and Latino families (e.g., discriminative experiences and neighborhood segregation), and how the families dynamically adapt to and cope with such challenges, in order to achieve culturally sensitive findings and to avoid forcing a deficit model upon families from ethnic minority or low-income backgrounds.

In conclusion, this study found that more frequent exposure to severe poverty was associated with slower behavioral self-regulation growth in low-income African American and Latino children, and this association was mediated by sensitive and supportive parenting practices. This finding acknowledges that within-group variation in cumulative exposure to extreme poverty among low-income populations was associated with individual differences in behavioral self-regulation development among both African American and Latino children living in poverty. For Latino families who are chronically exposed to severe poverty, parenting practices may be a good target for intervention. Furthermore, targeting the promotion of sensitive and supportive parenting practices may be more effective than reducing intrusive and insensitive parenting practices to promote self-regulation growth in early childhood. For African American families, parenting did not appear to mediate the relation between exposure to severe poverty and behavioral self-regulation. Although maternal sensitive and supportive parenting nevertheless were important in the development of self-regulation, future studies are needed to determine specific mediation pathways between exposure to extreme poverty and self-regulation development.

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References

Bean RA, Barber BK, & Crane DR (2006). Parental support, behavioral control, and psychological control among African American youth: The relationships to academic grades, delinquency, and depression. Journal of Family Issues, 27(10), 1335–1355. 10.1177/0192513X06289649

Bean RA, Bush KR, McKenry PC, & Wilson SM (2003). The impact of parental support, behavioral control, and psychological control on the academic achievement and self-esteem of African American and European American adolescents. Journal of Adolescent Research, 18(5), 523–541. 10.1177/0743558403255070

Berends M, Lucas SR, & Peñaloza RV (2008). How changes in families and schools are related to trends in Black-White test scores. Sociology of Education, 81(4), 313–344. 10.1177/003804070808100401

Best JR, & Miller PH (2010). A developmental perspective on executive function. Child Development, 81(6), 1641–1660. 10.1111/j.1467-8624.2010.01499.x [PubMed: 21077853]

Blair CB (2002). School readiness: Integrating cognition and emotion in a neurobiological conceptualization of children's functioning at school entry. American Psychologist, 57(2), 111–127. 10.1037/0003-066X.57.2.111

Blair CB, Granger DA, Kivlighan KT, Mills-Koonce WR, Willoughby MT, Greenberg MT, . . .Family Life Project Investigators (2008). Maternal and child contributions to cortisol response to emotional arousal in young children from low income, rural communities. Developmental Psychology, 44(4), 1095–1109. 10.1037/0012-1649.44.4.1095 [PubMed: 18605837]

Blair CB, Granger DA, Willoughby M, Mills-Koonce WR, Cox M, Greenberg MT, . . . FLP Investigators (2011). Salivary cortisol mediates effect of poverty and parenting on executive functions in early childhood. Child Development, 82(6), 1970–1984. 10.1111/j.1467-8624.2011.01643.x [PubMed: 22026915]

Blair CB, & Raver CC (2012a). Individual development and evolution: Experiential canalization of self-regulation. Developmental Psychology, 48(3), 647–657. 10.1037/a0026472 [PubMed: 22329384]

Blair CB, & Raver CC (2012b). Child development in the context of adversity: Experiential canalization of brain and behavior. American Psychologist, 67(4), 309–318. 10.1037/a0027493

Blair CB, & Ursache A. (2011). A bidirectional model of executive functions and self-regulation. In Vohs KD & Baumeister RF (Eds.), Handbook of self-regulation: Research, theory, and applications (Second ed., pp. 300–320). New York: The Guilford Press.

Blair CB, Ursache A, Greenberg M, & Vernon-Feagans L. (2015). Multiple aspects of self-regulation uniquely predict mathematics but not letter–word knowledge in the early elementary grades. Developmental Psychology, 51(4), 459–472. 10.1037/a0038813 [PubMed: 25688999]

Bocknek EL, Brophy-Herb HE, & Banerjee M. (2009). Effects of parental supportiveness on toddlers' emotion regulation over the first three years of life in a low-income African American sample. Infant Mental Health Journal, 30(5), 452–476. 10.1002/imhj.20224 [PubMed: 28543673]

Bøe T, Sivertsen B, Heiervang E, Goodman R, Lundervold AJ, & Hysing M. (2014). Socioeconomic status and child mental health: the role of parental emotional well-being and parenting practices. Journal of Abnormal Child Psychology, 42(5), 705–715. 10.1007/s10802-013-9818-9 [PubMed: 24150864]

Bornstein MH, Tamis-LeMonda CS, Hahn CS, & Haynes OM (2008). Maternal responsiveness to young children at three ages: Longitudinal analysis of a multidimensional, modular, and specific parenting construct. Developmental Psychology, 44(4), 867–874. 10.1037/0012-1649.44.3.867 [PubMed: 18473650]

Calkins SD, & Fox NA (2002). Self-regulatory processes in early personality development: A multilevel approach to the study of childhood social withdrawal and aggression. Development and Psychopathology, 14(3), 477–498. 10.1017/S095457940200305X [PubMed: 12349870]

Calkins SD, & Johnson MC (1998). Toddler regulation of distress to frustrating events: Temperamental and maternal correlates. Infant Behavior & Development, 21(3), 379–395. 10.1016/S0163-6383(98)90015-7

Calkins SD, Smith CL, Gill KL, & Johnson MC (1998). Maternal interactive style across contexts: Relations to emotional, behavioral, and physiological regulation during toddlerhood. Social Development, 7(3), 350–369. 10.1111/1467-9507.00072

Caughy MO, Mills B, Owen MT, Dyer N, & Oshri A. (2017). Ethnic differences in mothering qualities and relations to academic achievement. Journal of Family Psychology, 31(7), 855–866. 10.1037/fam0000334 [PubMed: 28627911]

Caughy MO, Mills B, Owen MT, & Hurst JR (2013). Emergent self-regulation skills among very young ethnic minority children: A confirmatory factor model. Journal of Experimental Child Psychology, 116(4), 839–855. 10.1016/j.jecp.2013.07.017 [PubMed: 24076382]

Chang H, Shelleby EC, Cheong J, & Shaw DS (2012). Cumulative Risk, negative emotionality, and emotion regulation as predictors of social competence in transition to school: A mediated moderation model. Social Development, 21(4), 780–800. 10.1111/j.1467-9507.2011.00648.x

Child Defense Fund. (2017). Child Poverty in America 2017: National Analysis. Retrieved from https://www.childrensdefense.org/wp-content/uploads/2018/09/Child-Povertyin-America-2017-National-Fact-Sheet.pdf

Cook GA, Roggman LA, & D'zatko K. (2012). A person-oriented approach to understanding dimensions of parenting in low-income mothers. Early Childhood Research Quarterly, 27(4), 582–595. 10.1016/j.ecresq.2012.06.001

Currie J. (2005). Health disparities and gaps in school readiness. Future of Children, 15(1), 117–138. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=EJ795844&site=eds-live

Dallaire DH, & Weinraub M. (2005). The stability of parenting behaviors over the first 6 years of life. Early Childhood Research Quarterly, 20(2), 201–219. 10.1016/j.ecresq.2005.04.008

Day A. (1996). Good dog, Carl. New York: Little Simon.

Deater-Deckard K, Lansford JE, Malone PS, Alampay LP, Sorbring E, Bacchini D, . . . Al-Hassan SM (2011). The association between parental warmth and control in thirteen cultural groups. Journal of Family Psychology, 25(5), 790–794. 10.1037/a0025120 [PubMed: 21875202]

Diamond A. (2006). The early development of executive functions. In Bialystok E. & Craik FIM (Eds.), Lifespan cognition: Mechanisms of change (pp. 70–95). New York: Oxford University Press.

Donahue BH (2006).The effect of partial measurement invariance on prediction (Doctoral dissertation, University of Georgia, Athens, Georgia). Retrieved from https://getd.libs.uga.edu/pdfs/donahue_barbara_h_200605_phd.pdf

Doom JR, Cook SH, Sturza J, Kaciroti N, Gearhardt AN, Vazquez DM, . . . Miller AL (2018). Family conflict, chaos, and negative life events predict cortisol activity in low- income children. Developmental Psychobiology, 60(4), 364–379. 10.1002/dev.21602 [PubMed: 29388194]

Dotterer AM, Iruka IU, & Pungello E. (2012). Parenting, race, and socioeconomic status: Links to school readiness. Family Relations: An Interdisciplinary Journal of Applied Family Studies, 61(4), 657–670. 10.1111/j.1741-3729.2012.00716.x

Dyer N, Owen MT, & Caughy MO (2014). Ethnic differences in profiles of mother-child interactions and relations to emerging school readiness in African American and Latin American children. Parenting: Science and Practice, 14(3–4), 175–194. 10.1080/15295192.2014.972756

Eisenberg N, Zhou Q, Spinrad TL, Valiente C, Fabes RA, & Liew J. (2005). Relations among positive parenting, children's effortful control, and externalizing problems: A three-wave longitudinal study. Child Development, 76(5), 1055–1071. 10.1111/j.1467-8624.2005.00897.x [PubMed: 16150002]

Else-Quest NM, Clark R, & Owen MT (2011). Stability in mother–child interactions from infancy through adolescence. Parenting: Science & Practice, 11(4), 280–287. 10.1080/15295192.2011.613724

Evans GW, & English K. (2002). The environment of poverty: Multiple stressor exposure, psychophysiological stress, and socioemotional adjustment. Child Development, 73(4), 1238–1248. 10.1111/1467-8624.00469 [PubMed: 12146745]

Evans GW, Eckenrode J, & Marcynyszyn LA (2010). Chaos and the macrosetting: The role of poverty and socioeconomic status. In Evans GW, Wachs TD, Evans GW, & Wachs TD (Eds.), Chaos and its influence on children's development: An ecological perspective. (pp. 225–238). Washington, DC, US: American Psychological Association.

Evans GW, & Kim P. (2007). Childhood poverty and health: Cumulative risk exposure and stress dysregulation. Psychological Science, 18(11), 953–957. 10.1111/j.1467-9280.2007.02008.x [PubMed: 17958708]

Evans GW, & Rosenbaum J. (2008). Self-regulation and the income-achievement gap. Early Childhood Research Quarterly, 23(4), 504–514. 10.1016/j.ecresq.2008.07.002

Fay-Stammbach T, Hawes DJ, & Meredith P. (2014). Parenting influences on executive function in early childhood: A review. Child Development Perspectives, 8(4), 258–264. 10.1111/cdep.12095

Fitzsimons E, Goodman A, Kelly E, & Smith JP (2017). Poverty dynamics and parental mental health: Determinants of childhood mental health in the UK. Social Science & Medicine, 175, 43–51. 10.1016/j.socscimed.2016.12.040 [PubMed: 28056382]

García-Coll C, Lamberty G, Jenkins R, McAdoo HP, Crnic K, Wasik BH, & García HV (1996). An integrative model for the study of developmental competencies in minority children. Child Development, 67(5), 1891–1914. 10.2307/1131600 [PubMed: 9022222]

García-Coll C, Meyer EC, & Brillon L. (1995). Ethnic and minority parenting. In Bornstein MH (Ed.), Handbook of parenting (Vol. 2, pp. 189–209). Mahwah, New Jersey: Lawrence Erlbaum Associates.

Garon N, Bryson SE, & Smith IM (2008). Executive function in preschoolers: A review using an integrative framework. Psychological Bulletin, 134(1), 32–60. 10.1037/0033-2909.134.1.31

Gregory A, Skiba RJ, & Noguera PA (2010). The achievement gap and the discipline gap: Two sides of the same coin? Educational Researcher, 39(1), 59–68.

Halgunseth LC, Ispa JM, & Rudy D. (2006). Parental control in Latino families: An integrated review of the literature. Child Development, 77(5), 1282–1297. 10.1111/j.1467-8624.2006.00934.x [PubMed: 16999798]

Harvey B, Matte-Gagné C, Stack DM, Serbin LA, Ledingham JE, & Schwartzman AE (2016). Risk and protective factors for autonomy-supportive and controlling parenting in high-risk families. Journal of Applied Developmental Psychology, 43, 18–28. 10.1016/j.appdev.2015.12.004

Hill NE, & Bush KR (2001). Relationships between parenting environment and children's mental health among African American and European American mothers and children. Journal of Marriage & the Family, 63(4), 954–966. 10.1111/j.1741-3737.2001.00954.x

Hoffman C, Crnic KA, & Baker JK (2006). Maternal depression and parenting: Implications for children's emergent emotion regulation and behavioral functioning. Parenting: Science & Practice, 6(4), 271–295. 10.1207/s15327922par0604_1

Holochwost SJ, Volpe VV, Iruka IU, & Mills-Koonce WR (2018). Maternal warmth, intrusiveness, and executive functions in early childhood: tracing developmental processes among African American children. Early Child Development and Care, 190(2), 210–218. 10.1080/03004430.2018.1461096

Hughes C, & Devine RT (2019). For better or for worse? Positive and negative parental influences on young children's executive function. Child Development. 90(2), 593–609 10.1111/cdev.12915 [PubMed: 28800148]

Kelley ML, Lawrence HR, Milletich RJ, Hollis BF, & Henson JM (2015). Modeling risk for child abuse and harsh parenting in families with depressed and substance-abusing parents. Child Abuse & Neglect, 43, 42–52. 10.1016/j.chiabu.2015.01.017 [PubMed: 25724658]

Kim S, Brody GH, & Murry VM (2003). Longitudinal links between contextual risks, parenting, and youth outcomes in rural African American families. Journal of Black Psychology, 29(4), 359–377. 10.1177/0095798403256887

Kochanska G, Coy KC, & Murray KT (2001). The development of self-regulation in the first four years of life. Child Development, 72(4), 1091–1111. 10.1111/1467-8624.00336 [PubMed: 11480936]

Kopp CB (1982). Antecedents of self-regulation: a developmental perspective. Developmental Psychology, 18(2), 199–214. 10.1037/0012-1649.18.2.199

Ladson-Billings G. (2006). From the achievement gap to the education debt: Understanding achievement in U.S. schools. Educational Researcher, 35(7), 3–12. 10.3102/0013189X035007003

Landry SH, Smith KE, Swank PR, & Miller Loncar CL (2000). Early maternal and child influences on children's later independent cognitive and social functioning. Child Development, 71(2), 358–375. 10.1111/1467-8624.00150 [PubMed: 10834470]

Lengua LJ, Honorado E, & Bush NR (2007). Contextual risk and parenting as predictors of effortful control and social competence in preschool children. Journal of Applied Developmental Psychology, 28(1), 40–55. 10.1016/j.appdev.2006.10.001 [PubMed: 21687825]

Lengua LJ, Kiff C, Moran L, Zalewski M, Thompson S, Cortes R, & Ruberry E. (2014). Parenting mediates the effects of income and cumulative risk on the development of effortful control. Social Development, 23(3), 631–649. 10.1111/sode.12071

Lengua LJ, Moran L, Zalewski M, Ruberry E, Kiff C, & Thompson S. (2015). Relations of growth in effortful control to family income, cumulative risk, and adjustment in preschool-age children. Journal of Abnormal Child Psychology, 43(4), 705–720. 10.1007/s10802-014-9941-2 [PubMed: 25253079]

Lengua LJ, Thompson SF, Moran LR, Zalewski M, Ruberry EJ, Klein MR, & Kiff CJ (2019). Pathways from early adversity to later adjustment: Tests of the additive and bidirectional effects of executive control and diurnal cortisol in early childhood. Development and Psychopathology, 10, 1–14. 10.1017/S0954579419000373

Li-Grining CP (2012). The role of cultural factors in the development of Latino preschoolers' self-regulation. Child Development Perspectives, 6(3), 210–217. 10.1111/j.1750-8606.2012.00255.x

Lipsey MW, Nesbitt KT, Farran DC, Dong N, Fuhs MW, & Wilson SJ (2014). Learning-related cognitive self-regulation measures for prekindergarten children with predictive validity for academic achievement (Working paper). Retrieved from https://my.vanderbilt.edu/cogself-regulation/files/2012/11/Self-Reg-summary-paper-5-7-141.pdf

Little RJA, & Rubin DA (1987). Statistical analysis with missing data. New York, NY: John Wiley.

Livas-Dlott A, Fuller B, Stein GL, Bridges M, Mangual Figueroa A, & Mireles L. (2010). Commands, competence, and cariño: Maternal socialization practices in Mexican American families. Developmental Psychology, 46(3), 566–578. 10.1037/a0018016 [PubMed: 20438171]

Lucassen N, Kok R, Bakermans-Kranenburg MJ, Van Ijzendoorn MH, Jaddoe VWV, Hofman A, . . . Tiemeier H. (2015). Executive functions in early childhood: The role of maternal and paternal parenting practices. British Journal of Developmental Psychology, 33(4), 489–505. 10.1111/bjdp.12112

Magnuson KA, & Waldfogel J. (2005). Early childhood care and education: Effects on ethnic and racial gaps in school readiness. Future of Children, 15(1), 169–196. Retrieved from https://files.eric.ed.gov/fulltext/EJ795848.pdf

Mathis ETB, & Bierman KL (2015). Dimensions of parenting associated with child prekindergarten emotion regulation and attention control in low-income families. Social Development, 24(3), 601–620. 10.1111/sode.12112 [PubMed: 26195853]

Matthews JS, Ponitz CC, & Morrison FJ (2009). Early gender differences in self-regulation and academic achievement. Journal of Educational Psychology, 101(3), 689–704. 10.1037/a0014240

Maughan A, Cicchetti D, Toth SL, & Rogosch FA (2007). Early-occurring maternal depression and maternal negativity in predicting young children's emotion regulation and socioemotional difficulties. Journal of Abnormal Child Psychology, 35(5), 685–703. 10.1007/s10802-007-9129-0 [PubMed: 17503175]

McClelland MM, & Cameron CE (2011). Self-regulation and academic achievement in elementary school children. New Directions for Child & Adolescent Development, 133, 29–44. 10.1002/cd.302

McClelland MM, & Cameron CE (2012). Self-regulation in early childhood: Improving conceptual clarity and developing ecologically valid measures. Child Development Perspectives, 6(2), 136–142. 10.1111/j.1750-8606.2011.00191.x

McClelland MM, Cameron CE, Connor CM, Farris CL, Jewkes AM, & Morrison FJ (2007). Links between behavioral regulation and preschoolers' literacy, vocabulary, and math skills. Developmental Psychology, 43(4), 947–959. 10.1037/0012-1649.43.4.947 [PubMed: 17605527]

McClelland MM, Cameron CE, Duncan R, Bowles RP, Acock AC, Miao A, & Pratt ME (2014). Predictors of early growth in academic achievement: The Head-Toes-Knees-Shoulders task. Frontiers in Psychology, 5, 1–14. 10.3389/fpsyg.2014.00599 [PubMed: 24474945]

McCoy DC, Roy AL, & Raver CC (2016). Neighborhood crime as a predictor of individual differences in emotional processing and regulation. Developmental Science, 19(1), 164–174. 10.1111/desc.12287 [PubMed: 25702532]

McLoyd VC (1998). Socioeconomic disadvantage and child development. American Psychologist, 53(2), 185–304. 10.1037/0003-066X.53.2.185

Mills B, Dyer N, Pacheco D, Brinkley D, Owen MT, & Caughy MO (2018). Developmental transactions between self-regulation and academic achievement among low-income African American and Latino children. Child Development,90(5), 1614–1631. 10.1111/cdev.13091 [PubMed: 29777541]

Mirabile SP, Oertwig D, & Halberstadt AG (2018). Parent emotion socialization and children's socioemotional adjustment: when is supportiveness no longer supportive? Social Development, 27(3), 466–481. 10.1111/sode.12226

Mistry RS, Benner AD, Biesanz JC, Clark SL, & Howes C. (2010). Family and social risk, and parental investments during the early childhood years as predictors of low-income children's school readiness outcomes. Early Childhood Research Quarterly, 25(4), 432–449. 10.1016/j.ecresq.2010.01.002

Moilanen KL, Shaw DS, Dishion TJ, Gardner F, & Wilson M. (2009). Predictors of longitudinal growth in inhibitory control in early childhood. Social Development, 19(2), 326–347. 10.1111/j.1467-9507.2009.00536.x [PubMed: 20376201]

Montroy JJ, Bowles RP, Skibbe LE, McClelland MM, & Morrison FJ (2016). The development of self-regulation across early childhood. Developmental Psychology, 52(11), 1744–1762. 10.1037/dev0000159 [PubMed: 27709999]

Morrison F, & Grammer JK (2016). Conceptual clutter and measurement mayhem: Proposals for cross-disciplinary integration in conceptualizing and measuring executive function. In Griffin JA, McCardle P, & Freund LS (Eds.), Executive function in preschool-age children: Integrating measurement, neurodevelopment, and translational research (p. 327–348). Washington, D.C.: American Psychological Association.

Muthén LK, & Muthén BO (1998–2017). Mplus user's guide. (8th ed.). Los Angeles, CA: Muthén & Muthén.

National Institute of Child Health and Human Development Early Child Care Research Network. (1999). Child care and mother-child interaction in the first 3 years of life. Developmental Psychology, 35(6), 1399–1413. 10.1037/0012-1649.35.6.1399 [PubMed: 10563730]

Obradović J, Portilla XA, & Boyce WT (2012). Executive functioning and developmental neuroscience: Current progress and implications for early childhood education. In Pianta RC, Justice L, Barnett WS, & Sheridan S. (Eds.), Handbook of Early Childhood Education. New York: Guilford.

Owen MT, Amos ML, Bondurant L, Hasanizadeh N, Hurst JR, & Villa A. (2010). Qualitative ratings for parent-childd interactions: Ages 2–4 years. Richardson, TX: The University of Texas at Dallas.

Palamar JJ, Calzada EJ, Theise R, Huang K-Y, Petkova E, & Brotman LM (2015). Family- and neighborhood-level factors as predictors of conduct problems in school among young, urban, minority children. Behavioral Medicine, 41(4), 177–185. 10.1080/08964289.2014.907770 [PubMed: 24673380]

Pettit GS, Laird RD, Dodge KA, Bates JE, & Criss MM (2001). Antecedents and behavior-problem outcomes of parental monitoring and psychological control in early adolescence. Child Development, 72(2), 583–598. 10.1111/1467-8624.00298 [PubMed: 11333086]

Ponitz CC, McClelland MM, Jewkes AM, Connor CM, Farris CL, & Morrison FJ (2008). Touch your toes! Developing a direct measure of behavioral regulation in early childhood. Early Childhood Research Quarterly, 23(2), 141–158. 10.1016/j.ecresq.2007.01.004

Ponitz CC, McClelland MM, Matthews JS, & Morrison FJ (2009). A structured observation of behavioral self-regulation and its contribution to kindergarten outcomes. Developmental Psychology, 45(3), 605–619. 10.1037/a0015365 [PubMed: 19413419]

Potter D, & Morris DS (2017). Family and schooling experiences in racial/ethnic academic achievement gaps: A cumulative perspective. Sociological Perspectives, 60(1), 132–167. 10.1177/0731121416629989

Raver CC (2004). Placing emotional self-regulation in sociocultural and socioeconomic contexts. Child Development, 75(2), 346–353. 10.1111/j.1467-8624.2004.00676.x [PubMed: 15056189]

Raver CC, & Blair C. (2020). Developmental science aimed at reducing inequality: Maximizing the social impact of research on executive function in context. Infant and Child Development, 29(1), 1–10. 10.1002/icd.2175

Raver CC, Blair CB, & Willoughby MT (2013). Poverty as a predictor of 4-year-olds' executive function: New perspectives on models of differential susceptibility. Developmental Psychology, 49(2), 292–304. 10.1037/a0028343 [PubMed: 22563675]

Reise SP (2012). The rediscovery of bifactor measurement model. Multivariate Behavioral Research, 47(5), 667–696. 10.1080/00273171.2012.715555 [PubMed: 24049214]

Ruberry E, Lengua L, Crocker L, Bruce J, Upshaw M, & Sommerville J. (2017). Income, neural executive processes, and preschool children's executive control. Development and Psychopathology, 29(1), 143–154. 10.1017/S095457941600002X [PubMed: 26817409]

Sawyer ACP, Miller-Lewis LR, Searle AK, Sawyer MG, & Lynch JW (2015). Is greater improvement in early self-regulation associated with fewer behavioral problems later in childhood? Developmental Psychology, 51(12), 1740–1755. 10.1037/a0039829 [PubMed: 26501724]

Schmitt SA, Geldof GJ, Purpura DJ, Duncan R, & McClelland MM (2017). Examining the relations between executive function, math, and literacy during the transition to kindergarten: A multi-analytic approach. Journal of Educational Psychology, 109(8), 1120–1140. 10.1037/edu0000193

Shrout PE, & Bolger N. (2002). Mediation in experimental and nonexperimental studies: New procedures and recommendations. Psychological Methods, 7(4), 422–445. 10.1037/1082-989X.7.4.422 [PubMed: 12530702]

Skibbe LE, Grimm K, Bowles R, & Morrison F. (2012). Literacy growth in the academic year versus summer from preschool through second grade: Differential effects of schooling across four skills. Scientific Study of Reading, 16(2), 141–165. 10.1080/10888438.2010.543446

The Nation's Report Card (2017). 2017 mathematics and reading results. Retrieved from https://www.nationsreportcard.gov/reading_math_2017_highlights/

U.S. Census Bureau (2019). CPS poverty tables footnotes. Retrieved from https://www.census.gov/topics/income-poverty/poverty/guidance/povertyfootnotes/cps-tables-footnotes.html

Valcan DS, Davis H, & Pino-Pasternak D. (2018). Parental behaviours predicting early childhood executive functions: A meta-analysis. Educational Psychology Review, 30(3), 607–649. 10.1007/s10648-017-9411-9

Vaughn BE, Kopp CB, & Krakow JB (1984). The emergence and consolidation of self-control from eighteen to thirty months of age: Normative trends and individual differences. Child Development, 55(3), 990–1004. 10.2307/1130151 [PubMed: 6734332]

von Suchodoletz A, Gestsdottir S, Wanless SB, McClelland MM, Birgisdottir F, Gunzenhauser C, & Ragnarsdottir H. (2013). Behavioral self-regulation and relations to emergent academic skills among children in Germany and Iceland. Early Childhood Research Quarterly, 28(1), 62–73. 10.1016/j.ecresq.2012.05.003

Wanless SB, McClelland MM, Tominey SL, & Acock AC (2011). The influence of demographic risk factors on children's behavioral regulation. Early Education and Development, 22(3), 461–488. 10.1080/10409289.2011.536132

Whiteside-Mansell L, Bradley R, & McKelvey L. (2009). Parenting and preschool child development: Examination of three low-income U.S. cultural groups. Journal of Child and Family Studies, 18(1), 48–60. 10.1007/s10826-008-9206-1

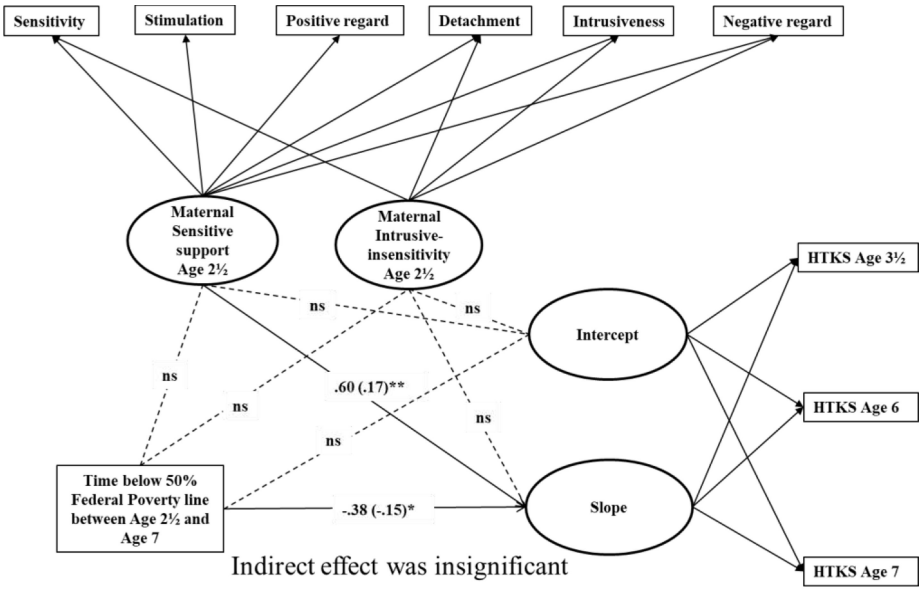
Willoughby MT, Kupersmidt JB, & Voegler-Lee ME (2012). Is preschool executive function causally related to academic achievement? Child Neuropsychology, 18(1), 79–91. 10.1080/09297049.2011.578572 [PubMed: 21707258]

Yu D, & Hsu H. (2019). Mother-child verbal communication and preschoolers' inhibitory control. Infant and Child Development, 28(5), 1–16. 10.1002/icd.2146

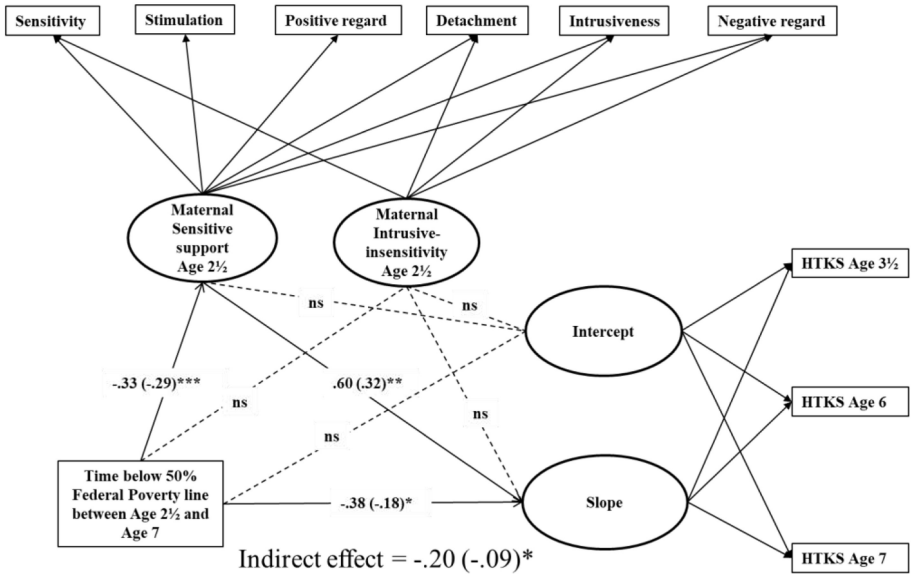
Zelazo PD, & Carlson SM (2012). Hot and cool executive function in childhood and adolescence: Development and plasticity. Child Development Perspectives, 6(4), 354–360. 10.1111/j.1750-8606.2012.00246.x

Highlights

- More frequent exposure to severe poverty was associated with slower growth in behavioral self-regulation between ages 2½ and 7 years in African American and Latino children.
- The association between exposure to severe poverty and growth in behavioral self-regulation was partially mediated through less sensitive and supportive parenting practices for Latino but not African American families.
- The association between exposure to severe poverty and growth in behavioral self-regulation was not mediated through intrusive and insensitive parenting practices when the child was 2½ years old for African American and Latino families.



a. African Americans



b. Latinos

Figure 1.

Multigroup Mediation Model Linking Poverty to SR Trajectory Through Parenting Quality

Note. Only significant unstandardized and standardized coefficients (in parentheses) are shown in the figures. Dash lines represent insignificant paths.

$^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Table 1

Demographic Characteristics of Participants

	Child Race/Ethnicity		
	African American (*N* = 154)	**Latino (*N* = 205)**	**x^2(*df*)**
Child gender			0.71 (1)
Boy	88 (57.1%)	108 (52.7%)	
Girl	66 (42.9%)	97 (47.3%)	
Times below 50% poverty			74.60** (4)
0	41 (26.6%)	134 (65.4%)	
1	31 (20.1%)	42 (20.5%)	
2	34 (22.1%)	19 (9.3%)	
3	30 (19.5%)	7 (3.4%)	
4	18 (11.7%)	3 (1.5%)	
Maternal education			32.26** (2)
Less than high school	23 (14.9%)	86 (42.0%)	
High school / GED	68 (44.2%)	72 (35.1%)	
More than high school	63 (40.9%)	47 (22.9%)	
Latino mothers only			
Nativity			
U.S.-born		54 (26.3%)	
Foreign-born		151 (73.7%)	
Country of origin if foreign-born			
Mexico		144 (95.3%)	
Central/South America		7 (4.7%)	
Primary language			
English-dominant		11 (5.8%)	
Spanish-dominant		118 (61.8%)	
Bilingual		62 (32.5%)	

* $p < .05$

** $p < .01$.

Table 2

Descriptive results and bivariate correlations for African American and Latino families.

		African American		Latino											
		N	**M (SD)**	**N**	**M (SD)**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1.	HTKS age 3½	133	2.09 (4.04)	147	0.81(2.46)		0.17	0.15	−0.01	0.08	−0.01	0.18*	−0.04	0.03	0.11
2.	HTKS age 6	114	31.54 (17.66)	173	38.92 (16.45)	−0.08		0.27**	0.12	0.18*	0.07	−0.12	0.02	−0.02	−0.14
3.	HTKS age 7	123	43.98 (13.69)	183	49.90 (11.05)	0.15	0.55**		0.17*	0.23**	0.17*	−0.16•	−0.09	−0.05	−0.16*
4.	Sensitivity	154	2.87 (1.00)	202	3.35 (0.89)	0.06	0.19*	0.14		0.59**	0.54**	−0.50**	−0.66**	−0.38**	−0.22**
5.	Cognitive stimulation	154	3.07 (0.93)	202	3.46 (0.88)	0.05	0.17	0.16	0.58**		0.55**	−0.54**	−0.32**	−0.22**	−0.24**
6.	Positive regard	154	3.05 (1.09)	202	3.62 (0.88)	0.06	0.10	0.09	0.69**	0.62**		−0.48**	−0.32**	−0.23**	−0.25**
7.	Detachment	154	1.77 (1.01)	202	1.38 (0.67)	−0.04	−0.10	−0.09	−0.51**	−0.55**	−0.52**		0.21**	0.24**	0.22**
8.	Intrusiveness	154	2.55 (1.10)	202	2.64 (1.07)	−0.06	−0.11	−0.11	−0.45**	0.03	−0.07	−0.13		0.43**	0.13
9.	Negative regard	154	1.64 (0.94)	202	1.24 (0.65)	0.02	−0.08	−0.07	−0.50**	−0.22**	−0.30**	0.15	0.50**		0.11
10.	Times below 50% FPL	154	1.69 (1.36)	205	0.55 (0.90)	−0.06	−0.29**	−0.11	−0.17*	−0.04	−0.07	0.02	0.16*	−0.05	

Below the diagonal is a bivariate correlation matrix for African Americans, and above the diagonal is for Latino Americans.

* $p < .05$.

** $p < .01$.

Table 3

Partially invariant bi-factor model of maternal parenting item ratings.

	African American		Latino	
	Sensitive support	**Intrusiveness**	**Sensitive support**	**Intrusiveness**
Variable	*b (β)*	*b (β)*	*b (β)*	*b (β)*
Sensitivity	0.76 (0.83) ***	–0.37(−0.40) ***	0.76 (0.79) ***	–0.37 (−0.39) ***.
Stimulation	0.65 (0.72) ***		0.65 (0.74) ***	
Positive regard	0.74 (0.75) ***		0.74 (0.77) ***.	
Detachment	–0.54 (−0.59) ***	–0.09 (−0.10) *	–0.54 (−0.75) ***	–0.09 (−0.12) *
Intrusiveness	–0.03 **(−0.03)	1.02 (1.00) ***	–0.48 (−0.43) ***	1.02 (0.91) ***
Negative regard	–0.26 (−0.29) ***	0.42(0.47) ***	–0.26 (−0.39) ***	0.22 (0.32) ***
Standardized intercept	0	0	0.72	0.43
Model fit				
x^2	34.33			
df	23			
p value	0.06			
CFI	0.99			
TLI	0.98			
RMSEA	0.05			
SRMR	0.13			

* $p < .05$.

** $p < .01$.

*** $p < .001$.

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