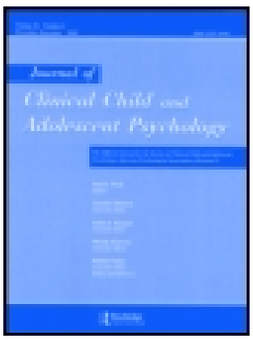

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Children's Executive Function Attenuate the Link Between Maternal Intrusiveness and Internalizing Behaviors at School Entry

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The goal of this study was to examine the independent and interactive roles of harsh-intrusive maternal behaviors and children's executive function in the development of internalizing behaviors across the first years of school. A diverse sample (58% African American, 42% European American) of 137 children (48% female) was followed from kindergarten (age 5 years) through school entry (ages 6–7 years). At age 5, maternal harsh-intrusive parenting behaviors were rated from a mother–child structured play task, and children completed 3 executive function tasks that measured inhibitory control, working memory, and attention set-shifting. Teachers reported on children's internalizing behaviors at ages 5, 6, and 7. Harsh-intrusive parenting behaviors at age 5 years were positively related to internalizing behaviors in the first years of school, whereas high executive function abilities at age 5 years were related to lower internalizing behaviors in the first years of school. In addition, executive function buffered the association between parenting behaviors and internalizing behaviors such that the link between harsh-intrusive parenting and child internalizing behaviors was evident only among children with low executive function and not among children with high executive function. Interventions that focus on reducing negative parenting behaviors and improving children's executive function may prevent internalizing behaviors from increasing during times of social and academic challenge.

Internalizing behaviors (IBs; anxiety, depression, withdrawal) are among the most common forms of psychopathology during childhood and adolescence (Brumariu & Kerns, 2010). These behaviors may originate in early childhood (Tandon, Cardeli, & Luby, 2009), and their prevalence increases over time (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003). Because IBs are related to multiple aspects of maladaptive functioning, including decreased psychosocial and academic functioning and an increased risk for substance

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abuse and suicide (Birmaher et al., 1996), research that elucidates risk and resilience factors in the developmental pathways of these behaviors is of critical importance. IBs often begin to present in early childhood, and longitudinal studies show that highly controlling, harsh, and intrusive parenting behaviors contribute to their emergence and stability (Hastings et al., 2015; McLeod, Weisz, & Wood, 2007a; McLeod, Wood, & Weisz, 2007b; Rubin, Burgess, & Hastings, 2002) and increase the risk of clinical presentations such as social anxiety disorder (Lewis-Morrarty et al., 2012). Thus, targeting parenting behaviors and factors that may mitigate their negative effects during this period may prevent IBs from increasing during times of social and academic challenge, such as the transition to formal schooling. What remains understudied in the developmental and clinical literature is the extent to which child characteristics may moderate the link between parenting and eventual IBs, a line of study that has potential for informing and developing critical intervention and prevention programs.

Efficient self-regulation abilities may serve to protect children and promote resilience under conditions of risk (Masten & Coatsworth, 1998). Previous research has found that temperamental qualities (e.g., high effortful control, high positive emotionality, low fearfulness), cognitive abilities (e.g., high verbal ability), and physiological regulation (e.g., efficient autonomic functioning) can mitigate the negative effects of environmental risk on the development of IBs (Flouri, Midouhas, & Joshi, 2014; Gallagher, 2002; Lengua, Bush, Long, Kovacs, & Trancik, 2008; Lengua, Wolchik, Sandler, & West, 2000; Muhtadie, Zhou, Eisenberg, & Wang, 2013; Wagner, Propper, Gueron-Sela, & Mills-Koonce, 2016). However, to the best of our knowledge the role of children's executive function (EF) as a protective factor has not yet been explored. EF abilities are related to successful behavioral and emotional adaptation during the transition to school (Hughes & Ensor, 2011). Furthermore, EF is considered a potentially modifiable protective factor that can be effectively improved by the implementation of intervention programs in the school context (Diamond & Lee, 2011). Thus, in the current study we examined the role of children's EF as a buffer against the negative implications of harsh-intrusive parenting behaviors on children's IBs during the first years of school.

PARENTING BEHAVIORS AND IBs

Parental behaviors such as withdrawal, hostility, negative emotional expressivity, and low autonomy granting have been related to higher levels of children's IBs (McLeod et al., 2007a, 2007b; Muhtadie et al., 2013; Valiente et al., 2006). These behaviors may evoke distress in children and lead to the development of negative cognitions such as reduced control over threat and a perception of social relationships as untrustworthy and dangerous (Bayer, Sanson, & Hemphill, 2006). Parental harshness and intrusion in particular may maintain and aggravate children's IBs by denying opportunities for exploration, constraining the growth of autonomy, and restricting the acquisition of adaptive coping skills with stressful events (Barlow, 1988). The effects of these negative parental behaviors on the course of IBs may be particularly salient during the first years of school, a period characterized by increased social and academic demands that require children to frequently employ coping skills and self-regulatory abilities (Blair et al., 2007). Indeed, research has shown that harsh-intrusive parenting behaviors during the preschool period were associated with exacerbation of IBs over the transition from preschool age to school age (Hastings et al., 2015).

CHILD EF AND IBs

There is also evidence that certain self-regulatory abilities are related to children's IBs (e.g., Eisenberg et al., 2009; Hughes & Ensor, 2011; Muhtadie et al., 2013; Valiente et al., 2006). For example, effortful control (EC), a temperamental quality that refers to the ability to inhibit a dominant response and initiate a subdominant response (Posner & Rothbart, 2000), has been related to children's IBs (Eisenberg et al., 2009; Muhtadie et al., 2013; Valiente et al., 2006). Specifically, deficits in EC have been related to more IBs over time, indicating that poor regulatory abilities may increase initial levels of IBs (Eisenberg et al., 2009; Valiente et al., 2006).

Less is known about the links between children's EF and IBs. EF refer to a set of cognitive control processes (i.e., inhibitory control, working memory and set-shifting) that regulate lower level automatic processes, allowing individuals to plan, prioritize, and sequence their actions (Miyake & Friedman, 2012). Individual differences in EF are considered to be genetic in origin (Miyake & Friedman, 2012), although there is a growing body of evidence suggesting that early caregiving experiences also play an important role in the development of children's EF. For example, higher levels of maternal sensitivity during toddlerhood were related to later improved performance on EF tasks (e.g., Bernier, Carlson, Deschênes, & Matte-Gagné, 2012; Gueron-Sela et al., 2017), whereas harsh-intrusive mother–child interactions were negatively related to children's EF (e.g., Blair et al., 2011).

There are multiple domains that fall under the category of EF, including *inhibitory control* (i.e., the ability to inhibit automatic, or prepotent responses to facilitate task completion), which shares common characteristics

with EC just described. Both constructs have been related to children's self-regulation and adaptive social functioning (Zhou, Chen, & Main, 2012). However, EF includes two additional cognitive control processes that may facilitate children's ability to utilize adaptive self-regulatory skills. The first is *working memory*, the ability to maintain and manipulate information over brief periods. Working memory and inhibitory control support each other such that the ability to hold a rule in mind and manipulate it, based on environmental demands, increases the likelihood that this information will guide children's behavior and decrease inhibitory error (Diamond, 2013). The second additional EF process is *set-shifting*, or cognitive flexibility, which refers to the ability to shift between mental states, operations, or tasks to adjust to new demands (Diamond, 2013; Miyake & Friedman, 2012). High set-shifting ability may facilitate goal directed behavior and self-regulation by allowing individuals to abandon suboptimal means (e.g., obstructed or costly means) and pursue alternative means to reach a desired goal (Hofmann, Schmeichel, & Baddeley, 2012).

To the best of our knowledge only one study has tested the longitudinal associations between child EF and IBs across the transition to formal schooling (Hughes & Ensor, 2011). This study found that improvements in children's EF from ages 4 to 6 years were related to less IBs at school entry (Hughes & Ensor, 2011). However, this study did not control for earlier levels of children's IBs, precluding the examination of change in children's IBs over time. In this study we expand the findings reported by Hughes and Ensor (2011) by testing whether high EF prior to school entry are related to a decrease in IBs across the transition to school. We suggest that because high EF abilities enable better adaptation to both social and academic aspects of the school context (Blair, 2002), they can consequently improve behavioral adjustment and decrease IBs.

THE MODERATING ROLE OF EF

Research indicates that self-regulatory abilities may also protect children against the negative effect of environmental risk factors on IBs (Flouri et al., 2014; Lengua et al., 2008; Muhtadie et al., 2013), suggesting that the interaction between dispositional and environmental factors may contribute to the stability or exacerbation of IBs over time (Hastings et al., 2015). For example, Lengua et al. (2008) found that maternal risk (e.g., adolescent parent status, maternal depression) and environmental risk (i.e., quality of the home and neighborhood environment) predicted children's mean level and growth in IBs through middle childhood only for children with low EC and not for children with high EC (Lengua et al., 2008). These findings suggest that children with high EC may be better able to employ adaptive coping strategies in the face of stress that mitigate the negative effects of high risk environments, reducing the negative emotions elicited by such risk.

The role of EF as a protective factor against the negative effects of environmental risk on IBs has not been examined thus far. However, there is evidence that EF processes can further support the ability to gain control over reactivity to stressful experiences, and as such buffer the negative implications of harsh-intrusive caregiving environments on behavioral adjustment. For example, set-shifting abilities have been negatively correlated with rumination, the tendency to passively focus on negative mood and problems (De Lissnyder, Koster, Derakshan, & De Raedt, 2010). Similarly, higher working memory capacity has been related to an increased ability to suppress ruminative thoughts and to down-regulate undesired and inappropriate affective expressions (Hofmann et al., 2012). Thus, children with high EF abilities may be better able to modulate their negative affect associated with exposure to harsh-intrusive caregiving environments by preventing them from carrying over their perceptions of danger and threat from the home environment and enabling them to flexibly change their expectations and behaviors in other contexts, such as the school environment.

THE CURRENT STUDY

The current study aimed to expand the literature by examining the link between child EF, a broad measure of cognitive regulatory abilities, and the development of IBs across the first years of school. We examined both the direct effect of EF on children's IBs and the role of EF as a protective factor against the negative effects of harsh-intrusive parenting on subsequent child IBs. Further, the current study included independent observers of child behavior and parenting in order to avoid maternal reporting bias. The inclusion of observed parenting behaviors at age 5 years and teacher report of child IBs at kindergarten, first, and second grade provides a unique and objective assessment of these relationships over time.

We hypothesized that mothers' harsh-intrusive parenting behaviors observed while children were in kindergarten (age 5 years) will be associated with increased levels of IBs from kindergarten to the first years of school (first and second grade; ages 6 and 7). In addition, children's EF in kindergarten will be associated

with decreased levels of IBs in the first years of school. Finally, child EF at age 5 will moderate the link between parenting and IBs, such that harsh-intrusive parenting will predict elevated IBs only among children with low EF and not among children with high EF.

METHODS

Participants

Participants in this study were a subsample of the Durham Child Health and Development Study (DCHDS), a longitudinal study of 206 socioeconomically and racially diverse families living in and around a midsized southeastern city in the United States. The participants were full-term, healthy infants that were recruited at age 3 months using fliers and postings at birth and parenting centers or through phone contact via birth records. Participants were recruited according to a stratified sampling plan in an effort to assemble a sample with approximately equal numbers of European American and African American families from low- and middle-income groups. The subsample used in the current study included families in which the participating child completed an EF battery at age 60 months (n = 137). In this subsample, 48% of the children were female, 58% were African American (41.6% were European American), and approximately 42% of the sample was low income (below 200% of the poverty level). This subsample did not differ significantly from the complete sample on any of these variables. Children's EF and maternal parenting behaviors were assessed during laboratory at age 5, and children's IBs was assessed by teachers at ages 5, 6, and 7.

Measures

Harsh-intrusive parenting

During a laboratory visit at age 5, mothers and their children completed two interactive tasks, which lasted a total of 15 min. The first task involved building towers with wooden blocks, and the second was a card game called "Slap Jack," in which mothers and their child competed to win cards. Interactions were videotaped and coded based on coding schemes that were used in additional studies with ethnically and socioeconomically diverse samples, such as the National Institute of Child Health and Human Development Early Child Care Research Network (1997) and the Family Life Project (Blair et al., 2011). The current study used the *negative regard/hostility* and the *respect for child autonomy* scales, that were both rated on a 7-point scale ranging from 1 (*very low*) to 7 (*very high*). The negative regard scale rated mother's frequency and intensity of negative affect toward the child. Some markers of negative regard included disapproval, negative voice when correcting, tense facial muscles and strained expression, threatening the child or punishing without explanation, roughness and calling the child unflattering names. The respect for child autonomy scale rated the degree to which the mother acted in a way that recognized and respected the validity of the child's individuality, motives, and perspectives. A high score on this scale represented mothers who interacted with their child in a way that acknowledged the validity of the child's perspective, encouraged the child to acknowledge his or her intentions, and to negotiate the course of interactions in the session. A low score on this scale represented mothers who denied the child's individuality and displayed minimal support and/or pervasive intrusion (e.g., interrupted the child, did things before the child can on his or her own, exerted her own expectations/agenda on the child). The negative regard and respect for child autonomy scales were significantly correlated (r = –.52, p < .001). Based on previous factor analysis within this sample (Mills-Koonce et al., 2009), a composite measure of harsh-intrusive parenting was created by averaging the negative regard and respect for autonomy (reversed score) scales.

Trained coders, who were unaware of other information about the families, rated the interactions for maternal negative hostility and respect for child autonomy. Two lead graduate student coders trained all other coders until acceptable reliability (intraclass correlation coefficient [ICC] > 0.80) was reached for each coder on every scale. In addition, two highly experienced coders double-coded 30% of randomly selected cases and an interrater reliability of ICC > 0.80 was maintained throughout the coding process. In the case of disagreements between coders in the double coded cases, consensus scores were reached by consulting with one of the two lead graduate students.

Child EF

Children's EF was measured with three widely used tasks that were administered to the child at 5 years of age. Children completed the Day/Night Task to assess inhibitory control (Gerstadt, Hong, & Diamond, 1994), the Backward Digit Span Task to assess working memory (McCarthy, 1972), and the Flexible Item Selection Task to assess set-shifting (Jacques & Zelazo, 2001). A detailed description of these tasks can be found in Gueron-Sela et al. (2017). These three tasks have been widely used to measure children's EF, including in ethnically diverse low income samples (e.g., Blair et al., 2011; Marcovitch et al. 2010).

The extant literature has characterized the structure of EF during adulthood in two main ways (Miyake &

Friedman, 2012): a unity approach (i.e., all three components tap on a common underlying ability) and a diversity approach (i.e., the components also show some degree of separability). Due to recent evidence suggesting that preschool EF is best described as a single unitary factor (Hughes, Ensor, Wilson, & Graham, 2009; Willoughby, Wirth, & Blair, 2012), the current study adopted the unity approach and refer to EF as a single factor that includes children's performance on tasks that assess inhibitory control, working memory, and attention set-shifting. Previous factor analytic work with this sample suggests that the three EF tasks load on one latent EF factor in a structural equation framework (Nesbitt, Baker-Ward, & Willoughby, 2013). Thus, an unweighted mean of the *z*-standardized scores on the three measures was used in the current analyses.

Child internalizing behaviors

Teacher reports of children's internalizing behaviors were assessed with the Child Behavior Checklist Teacher's Report Form (Achenbach & Rescorla, 2001) that was obtained by mail at ages 5, 6 and 7. The Child Behavior Checklist Teacher's Report Form has been widely used in community studies, including samples of low-income African American children (e.g., Smith, 2001). The internalizing scale included the items from the Withdrawn, Somatic Complaints, and Anxious/Depressed scales.

The correlation between the IBs scores at 6 and 7 years was $r = .40$, $p = .002$. To capture overall IBs during the early school years and to improve the reliability of measurement, we averaged children's raw IBs scores from ages 6 and 7 to create a composite of IBs at this period ($n = 101$). Children's IBs at age 5 were included in the analysis to control for initial levels of IBs.

Covariates

Because the sample was diverse in terms of socioeconomic status and ethnicity, we included *child ethnicity* and *family income-to-needs ratio* (determined using the mother's or primary caregiver's report of the total family yearly income at the first-grade visit, the size of the family, and the 2003 federal poverty guidelines) as covariates in all analyses. We also chose to control for *child sex* because it has also been related to all key variables in the study including IBs, negative parenting behvaiors, and child EF (Hastings et al., 2015; Willoughby & Blair, 2016).

MISSING DATA

Of the 137 children who composed the sample of the current study, teacher reports on IBs were obtained for 59 children at age 5, 76 children at age 6, and 83 children at age 7. Because the age 6 and age 7 assessments of IBs were combined, a total of 101 children had an age 6–7 IBs composite score. The main reasons for missing data were difficulty in contacting the teachers and their unwillingness to fill out the questionnaires. Children with missing teacher reports at ages 5 and 7 had significantly lower family income-to-needs ratios compared to children without missing data, $t(134) = 2.88$, $p = .005$; $t(134) = 2.95$, $p = .004$, respectively. No differences were found between children with and without missing teacher data in terms of ethnicity and *child sex* distributions. Further, 124 children had data on harsh-intrusive parenting. No differences were found between children with and without missing mother–child interaction data in terms of family income, ethnicity, and *child sex* distributions.

To account for missing data, we utilized a full maximum likelihood (FIML) estimator for all analyses. FIML is well recognized as an effective method for analyzing longitudinal data with moderate to large amounts of missing data and has been demonstrated to provide less biased parameter estimates than other commonly used techniques, such as listwise deletion (Enders, 2013; Widaman, 2006). FIML is particularly effective and recommended compared to other missing data procedures when variables related to missingness can be included in analytic models (e.g., family income; Widaman, 2006). Because FIML procedures allow for the use of all available data from each participant, the full sample of $n = 137$ was retained in all primary analyses.

ANALYTIC STRATEGY

The primary analytic strategy involved estimating a series of regression models using AMOS 23 software. Continuous predictors were centered prior to the creation of the interaction terms. Significant interactions were probed using the online utility and computational tools for probing interactions (Roisman et al., 2012). Specifically, significant interactions were probed by estimating simple slopes at ±1 standard deviation of child EF, followed by regions of significance (RoS) analysis. The RoS analysis computes and graphically represents the specific upper and lower values of both the moderator variable (i.e., child EF) and the predictor (i.e., harsh-intrusive parenting) in which the simple slopes are significantly different from zero. Consequently, this approach allows for much greater precision in identifying the moderating effects than the conventional representation of the slopes (Roisman et al., 2012). For example, the RoS enable to detect the specific level of EF abilities that are required to buffer the effects of harsh-intrusive parenting on IBs.

TABLE 1
Zero-Order Bivariate Correlations Between Study Variables and Covariates

	1	*2*	*3*	*4*	*5*	*6*	*7*
1. Child Ethnicity (0 = European American)	—						
2. *Child Sex* (0 = Male)	.08	—					
3. Household Income-to-Needs Ratio	−.30***	−.03	—				
4. EF Composite (5 years)	−.29***	−.00	.24**	—			
5. Intrusive Parenting (5 years)	.37***	−.00	−.26**	−.15†			
6. IB (5 years)	−.06	−.06	−.07	−.07	−.00		
7. IB (6, 7 years)	.04	−.13	−.11	−.33**	.24*	.46**	
N	137	137	136	137	124	59	101
M	—	—	4.55	.00	2.81	3.06	3.47
SD	—	—	3.48	.69	1.39	4.05	3.56

Note: EF = executive function; IB = internalizing behaviors.
*$p < .05$. **$p < .01$. ***$p < .001$. †$p < .10$.

RESULTS

Preliminary Analyses

Table 1 presents the bivariate correlations, means, and standard deviations for the model covariates and variables of interest. Harsh-intrusive parenting at age 5 was positively correlated with children's IBs at ages 6 and 7 and with family income-to-needs. Further, harsh-intrusive parenting was positively correlated with child ethnicity, such that mothers of African American children had higher scores on the harsh-intrusive parenting scale than mothers of European American children. Children's EF at age 5 was negatively related to later IBs and to child ethnicity, such that African American children had lower EF scores that European American children. Finally, family income-to-needs was positively related to children's EF.

Model Results

We estimated a series of regression models to test the direct and interactive associations between harsh-intrusive parenting and children's EF at age 5 in the prediction of IBs at ages 6 to 7 (Table 2). First, child IBs were regressed on model covariates ($R^2 = .34$). Only child IBs at age 5 was a significant predictor of later IB (β = .56, $p < .001$), 95% confidence interval (CI) [.261, .762]. Next, in Model 2, intrusive parenting and the child EF were added. In this model, intrusive parenting (β = .26, $p = .019$), 95% CI [.191, 1.337]; child EF (β= −.25, $p = .008$), 95% CI [−2.438, −0.283]; and IBs at 60 months (β= .52, $p < .001$), 95% CI [.215, .713], were significant predictors of children's later IB ($R^2 = .44$). Finally, in Model 3 the interaction term was entered, and a significant interaction was observed between child EF and intrusive parenting (β = −.20, $p = .047$), 95% CI [−1.725, .141], in the prediction of children's IBs. The final model accounted for 49% of the variance in children's IBs (see Table 2).

Simple slopes and RoS analyses

The significant interaction between child EF and harsh-intrusive parenting was probed at high (+1 *SD*) and low (−1 *SD*) levels of child EF (Figure 1). The positive association between intrusive parenting and children's IBs was significant only for children with low EF (simple slope = 1.23, $t = 3.09$, $p = .002$) and not for children with high EF (simple slope = .02, $t = .06$, *ns*). RoS analysis indicated that when

TABLE 2
Regression Analysis Using the EF Composite as a Moderator of the Link Between Intrusive Parenting and Children's Later Internalizing Behaviors

	Model 1 β (SE)	*Model 2 β (SE)*	*Model 3 β (SE)*
Child Ethnicity	.10 (.73)	−.01 (.74)	−.00 (.72)
Child Sex	−.13 (.67)	−.12 (.62)	−.12 (.60)
Household Income-to-Needs Ratio	−.01 (.09)	.08 (.08)	.08 (.08)
IB (5 years)	.56*** (.09)	.52*** (.08)	.50*** (.08)
Intrusive Parenting (5 years)		.26* (.28)	.24* (.27)
Child EF Composite (5 years)		−.25** (.49)	−.28** (.49)
Child EF × Intrusive Parenting			−.20* (.43)
R^2	.34	.44	.49

Note: IB = internalizing behaviors; EF = executive function.
*$p < .05$. **$p < .01$. ***$p < .001$.

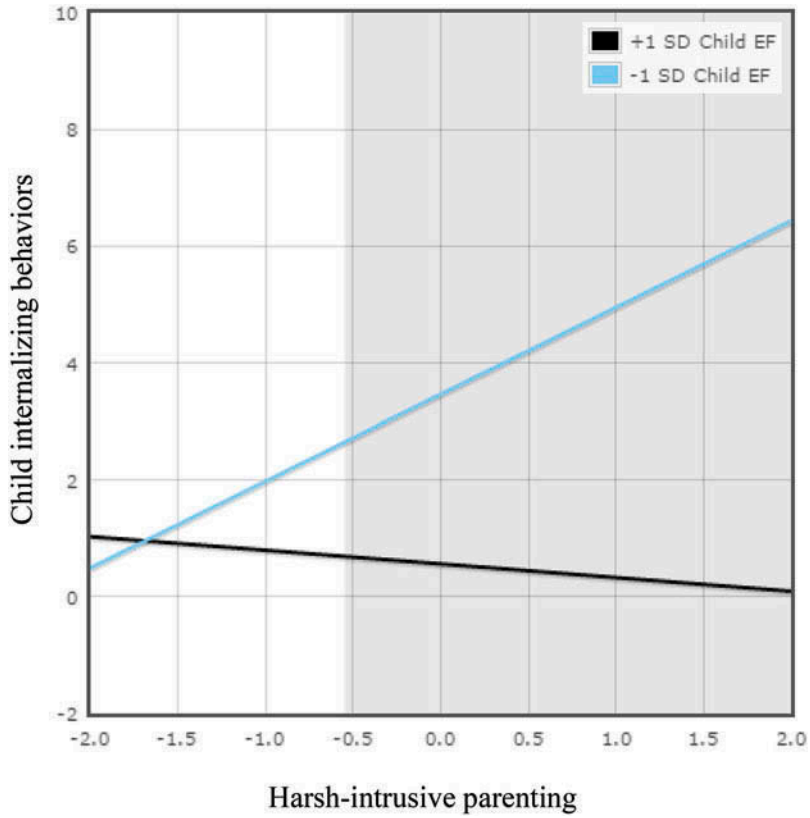

FIGURE 1 Regions of significance (RoS) analysis for the interaction between child executive function (EF) and harsh-intrusive parenting on children's IBs. *Note*: The shaded area represents the RoS: the values of harsh-intrusive parenting for which there is a significant difference in internalizing behaviors between children with high and low EF.

children had EF scores below .08 (approximately the sample mean of zero), harsh-intrusive parenting was significantly related to children's IBs. We also estimated simple slopes for high (+1 *SD*) and low (−1 *SD*) levels of intrusive parenting and found that the association between child EF and IBs was significant under high (simple slope = −2.65, $t = 3.05$, $p = .003$) but not under low (simple slope = −.25, $t = .36$, *ns*) levels of intrusive parenting. RoS indicated that when intrusive parenting scores were above −.54 (slightly below the mean), children with low EF had significantly more IBs than children with high EF.

DISCUSSION

The current study sought to examine how harsh-intrusive parenting behaviors and children's EF contribute to the exacerbation or amelioration of IBs across the first years of formal schooling, in an ethnically and socioeconomically diverse sample of mothers and their children. Given that IBs are related to multiple aspects of maladaptive functioning during adolescence (Birmaher et al., 1996), identifying dysfunctional parenting behaviors and factors that may buffer their negative effects during early childhood is an important step for preventing IBs from increasing during challenging transitions across development. This study focused on the protective role of children's EF because they enable self-regulation and self-directed behaviors that allow individuals to adaptively cope with novel and possibly stressful situations (Snyder, Miyake, & Hankin, 2015).

Consistent with previous literature (Eisenberg et al., 2009; Hughes & Ensor, 2011; McLeod et al., 2007a, 2007b), higher levels of harsh-intrusive parenting in kindergarten were related to increased levels of IBs at school entry, whereas high EF abilities were related to a decrease in IBs. However, EF also moderated the association between early harsh-intrusive parenting and IBs across the first years of school. Specifically, the link between maternal harsh-intrusive parenting behaviors and children's later IBs was evident only among children with low EF abilities, not among children with high EF abilities. As demonstrated in Figure 1, whereas children with high EF exposed to harsh parenting exhibited no IBs, children with low EF exhibited

approximately 1.5 *SD* more IBs, which is approximately 1 *SD* above the mean of the current sample. In a nonclinical sample differences of 1 *SD* above the mean may be meaningful and are likely to pose challenges in the context of typical development including peer difficulties. Our findings are in line with previous studies that identified self-regulatory abilities such as EC as protective factors against the negative effect of environmental risk factors on IBs (Lengua et al., 2008). Children with high EF abilities may be better able to regulate their negative emotions elicited by harsh-intrusive parenting behaviors and employ more adaptive coping strategies. For example, high working memory abilities are related to a better ability to suppress ruminative thoughts and down-regulate negative affect by supporting active representations of goals (Hofmann et al., 2012). Children with high EF abilities may be able to actively maintain adaptive social goals, facilitating their ability to overcome feelings of depression and anxiety that are associated with harsh-intrusive parenting, and pursue adaptive social bonds in the school context. In addition, EF are related to the ability to flexibly shift attention in response to environmental demands, which is thought to play an important role in adaptive regulation of negative emotions (White, McDermott, Degnan, Henderson, & Fox, 2011). Efficient set-shifting abilities can enable children to abandon dysfunctional social cognitions and behaviors that characterize the mother–child social dynamic and pursue alternative behaviors that are more adaptive for establishing social relations with peers.

It is also likely that children with low EF are more vulnerable to the negative effects of harsh-intrusive parenting behaviors on the development of IBs. This notion is consistent with the diathesis-stress model (Monroe & Simons, 1991), suggesting that children with inherent vulnerabilities are likely to exhibit more difficulties when raised in adverse contexts but will develop similarly to children without vulnerabilities in the absence of environmental adversity. Indeed, the RoS analysis indicates that children with low EF had significantly more IBs than children with high EF when exposed to high levels of harsh-intrusive parenting, but these differences were no longer present when exposed to low levels of harsh-intrusive parenting. These findings are consistent with previous studies showing that children with low EC are particularly vulnerable to the effects of adverse rearing environments on behavior problems (Choe, Olson, & Sameroff, 2014).

An additional explanation for these findings may be that for children with good EF, the transition to school opens up new opportunities to incorporate their EF skills into their daily behaviors in the school context, such as following directions, controlling motor activity, and attending to lessons. Children who were high on IBs in kindergarten but have high EF abilities may thus experience the transition to school as a positive, confidence-promoting experience that reduces IB in the school context. Conversely, IBs could be exacerbated in the face of the increasing social and academic demands for self-regulated behaviors among children with low EF abilities. Examining the role of self-esteem and self-efficacy in the link between EF and IBs could be an important next step in understanding this process.

The results from the current study should be considered in light of a few limitations. First, EF abilities were measured using "cold" EF tasks, which introduce neutral or very low emotional salience. Although it is possible that these EF abilities generalize to situations in which social-emotional content is present, future research should further assess how EF in an emotional context (i.e., "hot" EF tasks) may be related to the reduction of IBs for children exposed to harsh-intrusive parenting environments. Second, there was considerable amount of missing data in the teachers' report of children's IBs, particularly at the first time point (age 5). Although we employed appropriate statistical measures to account for the missing data, including the use of a FIML estimator in the analysis and inclusion of demographic covariates that were associated with missing data, it is possible that additional factors that were not measured in the study were related to rates of missing data. For example, teacher characteristics such as burnout and fatigue may have precluded teachers from filling out the questionnaires, and as a result only children with highly motivated teachers had full IBs data. Finally, the current study used a community sample rather than a clinical sample of children with IBs. Although the use of a community sample in this study expands generalizability, our ability to predict IBs at clinically meaningful levels, as well as the extent to which the findings can be directly compared to and integrated with studies using clinical samples, is limited. It is therefore imperative to examine whether children's EF have a protective role in the context of clinical levels of IBs. This would be a necessary step in translating these findings into intervention programs.

Conclusions and Clinical Implications

Findings from this study demonstrate that both endogenous and exogenous factors are related to children's development of IBs, suggesting that there are multiple ports of entry for intervention that may be leveraged. For example, the Turtle Program (Chronis-Tuscano et al., 2015), which involves both in vivo coaching of parents and social skills training for children in the context of a peer group, is a promising new intervention program that specifically targets children at risk for IBs (Chronis-Tuscano et al., 2015). Children at risk for IBs may also benefit from intervention programs that specifically improve EF. Diamond and Lee (2011) suggested that children's EF can be effectively improved by targeting EF abilities in the context of emotional and social development (e.g., verbalizing feelings and practicing conscious self-control strategies) and incorporating physical activities (e.g., aerobics, martial arts, and yoga) that

emphasize self-control, perseverance, and planning. These interventions could be effective in setting children with early IBs on a different trajectory toward better social-emotional functioning.

In summary, this study extends the extant literature by using multimethod longitudinal data to test the premise that children's EF moderate the relations between mothers' harsh-intrusive parenting and children's IBs at the first years of formal schooling. The findings demonstrate that children's high EF may act as a protective factor against the negative implications of unsupportive caregiving on the development of IBs. The pattern of findings raises a number of additional questions. For example, it is well-established that temperamental traits, such as behavioral inhibition, are also related to the later development of IBs and that behaviorally inhibited children are particularly vulnerable to the effects of parenting behaviors on changes in IBs over time (e.g., Rubin et al., 2002; Williams et al., 2009). In future work it would be useful to examine how the interactions between behavioral inhibition, EF and harsh-intrusive parenting impact the development of IBs.

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