



Sociodemographic risk, parenting, and executive functions in early childhood: The role of ethnicity[☆]



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ABSTRACT

The current study examined whether parenting behaviors in early childhood mediated the effects of cumulative risk on executive functions at school entry, and whether these effects differed as a function of ethnicity. Risk and parenting were assessed in infancy (3–12 months) and toddlerhood (24–36 months) using parent-report and observational measures; executive functions were assessed at 60 months using a battery of behavioral tasks. A series of structural equation models revealed that while risk predicted lower levels of maternal sensitivity and higher levels of negative intrusiveness in a manner that was consistent across ethnic subsamples, the effects of parenting behaviors on executive functions varied by ethnicity. Higher levels of sensitivity predicted higher levels of executive functions only among European American participants, while higher levels of negative intrusiveness predicted lower levels of executive functions only among African American participants. These findings underscore the importance of incorporating an understanding of parenting behaviors in their cultural context into early-education programs designed to improve executive functions among children at risk.

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1. Introduction

Executive functions are a set of cognitive processes that allow individuals to organize their behavior in pursuit of goals (Brocki & Bohlin, 2004; Friedman et al., 2008; Wiebe et al., 2011). Teachers rate these processes as essential for school readiness (Brock, Rimm-Kaufman, Nathanson, & Grimm, 2009), and thus it is not surprising that higher levels of executive functions predict better academic performance in school (Blair & Razza, 2007; Bull, Espy, & Wiebe, 2008; Clark, Pritchard, & Woodward, 2010; Lan, Legare, Ponitz,

Li, & Morrison, 2011). Differences in executive functions between African American students and their European American counterparts at school entry (Nesbitt, Baker-Ward, & Willoughby, 2013) may therefore contribute to the observed gap in academic achievement between these groups in the early school years (Downey, 2008; Fryer & Levitt, 2004). Given this, it is important to understand the contextual factors that influence the emergence of executive functions, particularly during infancy and toddlerhood, when the rapid maturation of the prefrontal cortex lays the foundation for the emergence of higher order cognitive processes.

There is accumulating evidence that poverty and parenting predict executive functions in late toddlerhood and preschool (cf., Blair et al., 2011), but less is known about how cumulative risk – a concept that encompasses both poverty and other risk factors – and parenting may work in tandem to predict executive functions at school entry. Integrating the concept of cumulative risk with the family stress model (e.g., Conger, Ge, Elder, Lorenz, & Simons, 1994; McLoyd, 1990) suggests that the effects of risk on executive functions are transmitted by parenting behaviors, but this account has been empirically evaluated in only a small number of studies (cf., Blair et al., 2011), and none of these examined executive functions

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at school entry. Moreover, it is possible that the effects of risk on executive functions and the mediating role of parenting behaviors differ by ethnicity. African American families are exposed to higher levels of environmental risk than their European American counterparts (DeNavas-Walt, Proctor, & Smith, 2015; U.S. Census Bureau, 2012, 2013), and both the frequency (Ispa et al., 2004; McLoyd & Smith, 2002) and meaning (cf., García Coll & Magnusson, 1999) of certain parenting behaviors differ by ethnicity. Thus, differences in relative levels of risk and parenting behaviors, together with variation in the meaning of these factors by ethnicity, may lead to differences in the relationships among risk, parenting, and executive functions in early childhood.

In this study, we investigate how risk and parenting during two developmental periods in early childhood – infancy and toddlerhood – predict executive functions at school entry. By excluding parenting behaviors from our index of distal risk, we are able to test whether the effects of risk on executive functions are mediated by parenting behaviors, consistent with the family stress model. Moreover, by testing this model in a diverse sample, we are able to examine whether the relationships among risk, parenting and executive functions differ among African American and European American children.

2. Cumulative risk and parenting as predictors of executive functions

2.1. Cumulative risk and executive functions

Though the specific processes counted among executive functions varies (cf., Willoughby, Holochwost, Blanton, & Blair, 2014), those most commonly cited are working memory, behavioral inhibition, and the ability to flexibly shift attention (also referred to as set shifting; Blair, Granger, & Razza, 2005; Blair et al., 2011; Miyake, Friedman, Emerson, Witzki, & Howerter, 2000; Ursache, Blair, & Raver, 2012). Each of these component abilities undergoes rapid development during infancy and toddlerhood (see Garon, Bryson, & Smith, 2008, for a review) as the prefrontal cortex (the area of the brain most strongly associated with executive functions) increases in both volume (Sowell, Thompson, Holmes, Jernigan, & Toga, 1999) and synaptic density (Huttenlocher & Dabholkar, 1997). Given the importance of early childhood for the development of executive functions, it is not surprising that exposure to risk factors (Gerard & Buehler, 2004) during this period is associated with lower levels of performance on executive functions tasks.

Previous studies have demonstrated that poverty during infancy predicts poorer performance on measures of executive functions in toddlerhood (Blair et al., 2011) and at school entry (Nesbitt et al., 2013). However, as Appleyard, Egeland, van Dulmen, and Sroufe (2005) noted, it is the accumulation of risk factors, rather than the presence of one particular risk factor such as poverty, that most strongly predicts developmental outcomes. Though this may be especially true for cumulative risk indices that include aspects of parenting, only indices limited to distal or sociodemographic factors allow an examination of whether parenting processes mediate risk's effects (e.g., Ackerman, Izard, Schoff, Youngstrom, & Kogos, 1999; Trentacosta et al., 2008). While there is no common catalog of factors to include in indices of cumulative sociodemographic risk, a selective review of studies in which cumulative risk predicted developmental outcomes indicated that single parenting, low maternal education, poverty, a high number of children in the home, and teenage pregnancy or motherhood were the most commonly included distal risk factors (see online supplementary materials, Tables S1a and S1b).

To date two studies have investigated the effects of cumulative sociodemographic risk on executive functions. Hughes and Ensor

(2005) found that cumulative risk – which they defined as the number of indicators of social disadvantage, including low income, education, and unemployment – was associated with lower scores on tasks of executive function in a cross-sectional study of toddlers (ages 24–36 months). Rhoades, Greenberg, Lanza, and Blair (2011) found similar results, reporting that children whose families were classified as evidencing low levels of risk in infancy (2–7 months) performed significantly better on tasks of executive functions at 36 months than children whose families were classified as evidencing higher levels of risk (Rhoades et al., 2011).

Using the same sample as Rhoades et al. (2011); Blair et al. (2011) found that African American children at 36 months of age performed more poorly on tasks of executive functions than their European American peers; the same relationship was reported at school entry by Nesbitt et al. (2013). These findings may be driven, in part, by higher levels of exposure to sociodemographic risk factors among African American children, including single parenting (U.S. Census Bureau, 2012), lower maternal education (U.S. Census Bureau, 2013), and poverty (DeNavas-Walt et al., 2015). However, it is also possible that the effects of these risk factors on executive functions vary by ethnicity (Berger, Brooks-Gunn, Paxon, & Waldfogel, 2008; Raver, Gershoff, & Aber, 2007).

In their study, Rhoades et al. (2011) assessed this possibility by estimating parallel models that predicted executive functions from risk profiles for African American and European American children. Both models indicated that membership in profiles corresponding to higher levels of risk predicted lower levels of executive functions (though as the authors note, differences in models were not formally assessed). These results parallel those reported for a cross-sectional study of preschoolers drawn from the same sample, which found that ethnicity (African American vs. European American) did not moderate contemporaneous relationships between poverty and executive functions (Raver, Blair, & Willoughby, 2013). Thus there is some evidence that risk and poverty may exert similar effects on executive functions among African American and European American children.

2.2. Parenting behaviors and executive functions

Three broad dimensions of parenting – sensitivity, negativity, and intrusiveness – have been linked to executive functions. Sensitivity is a composite of awareness and interpretation of child cues and the promptness and appropriateness of response (Ainsworth, Bell, & Stayton, 1974; Mills-Koonce, Propper, & Barnett, 2012). Negativity describes flat, hostile, or negative affect directed toward the child (Mills-Koonce et al., 2012; Rubin, Burgess, Dwyer, Hastings, 2003). Studies conducted with predominantly European American or Caucasian samples have linked higher levels of maternal sensitivity with improved performance on tasks of sustained attention (NICHD Early Child Care Research Network, 2003), working memory (NICHD Early Child Care Research Network, 2005), and executive functions (Bernier, Carlson, Whipple, 2010). This predictive relationship was replicated by Blair et al. (2011) and Rhoades et al. (2011) in a pair of studies that used a common, ethnically diverse data set: for both African American and European American children, higher levels of maternal sensitivity in infancy predicted higher levels of executive functions in toddlerhood.

The relationships among negativity, intrusiveness, and executive functions are more complex. Intrusiveness is defined as non-contingent responses to a child's behavior, maternal behavior meant to override the child's actions, and maternal demands of compliance (Biringen & Robinson, 1991; Carlson & Harwood, 2003; Egeland, Pianta & O'Brien, 1993; Isabella & Belsky, 1991; Nolen-Hoeksema, Wolfson, Mumme, & Guskin, 1995; Smith & Pederson, 1988). In a predominantly European American sample, lower levels of firm parenting control in preschool predicted higher levels of

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