



Autonomy-supportive parenting and associations with child and parent executive function



Rebecca Distefano^{a,*}, Ellen Galinsky^b, Megan M. McClelland^c, Philip David Zelazo^a,
Stephanie M. Carlson^a

^a Institute of Child Development, University of Minnesota Twin Cities, 51 East River Road, Minneapolis, MN 55455, USA

^b Bezos Family Foundation, 7683 S.E. 27th Street, Mercer Island, WA 98040, USA

^c Human Development and Family Sciences, Oregon State University, 2631 S.W. Campus Way Corvallis, OR 97331, USA

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ABSTRACT

Autonomy-supportive parenting appears to play an important role in children's executive function (EF) development. However, few studies have accounted for parents' EF skills when examining the link between parenting and child EF in families from diverse socioeconomic backgrounds. In the current study, parents and their 3- to 5-year-old children ($N = 85$ dyads) were assessed in the fall of preschool on well-validated behavioral assessments of EF and participated in a dyadic problem-solving task. We found that parent EF and child EF were correlated, both were associated with autonomy-supportive parenting, and these links were not moderated by socioeconomic status. Autonomy support was a predictor of child EF skills above and beyond parent EF, and bootstrapping mediational analyses confirmed that autonomy-supportive behaviors mediated the link between parent-child EF. These results provide initial evidence for the intergenerational transmission of EF through autonomy support.

Introduction

Decades of research have documented the importance of executive function (EF) skills for academic success and social competence (e.g., Best, Miller, & Naglieri, 2011; Blair & Razza, 2007; Carlson & Moses, 2001; McClelland et al., 2007). EF skills are neurocognitive processes employed in goal-directed actions and are comprised of working memory, inhibitory control, and cognitive flexibility (Miyake, Friedman, Emerson, Witzki, Howerter, & Wager, 2000). Given the importance of EF skills for positive child outcomes, there is immense interest in understanding the factors that influence EF development in the preschool years when these skills are rapidly developing (Carlson, 2005; Diamond & Taylor, 1996). Identifying factors that bolster EF is particularly critical for children from low socioeconomic backgrounds, who tend to have lower EF skills compared with peers from higher socioeconomic families (Noble, McCandliss, & Farah, 2007). Parenting has been linked to EF development in children (for review, see Fay-Stammach, Hawes, & Meredith, 2014; Valcan, Davis, & Pino-Pasternak, 2018), and prior research has shown that parenting may be a key mechanism for the intergenerational transmission of self-regulation (Cuevas, Deater-Deckard, Kim-Spoon, Watson, Morasch, & Bell, 2014).

Few studies, however, have focused specifically on parent EF and relations to both parenting and child EF. Furthermore, these processes are rarely examined in families from lower and middle socioeconomic backgrounds. The present study investigated associations between parent EF, autonomy-supportive parenting behaviors, and early childhood EF skills, as well as the extent to which autonomy support mediated associations between parent EF and child EF during the preschool years. Additionally, we explored whether families' socioeconomic background moderated associations between parent EF, parenting behaviors, and child EF to examine whether these processes function differently across socioeconomic gradients.

Parenting and Child EF

Parenting behaviors that are autonomy-supportive appear to be uniquely important for bolstering EF development in young children (Bernier, Carlson, & Whipple, 2010). Autonomy support consists of distinct parenting behaviors: (1) providing children with the appropriate amount of help for their skill level (i.e., scaffolding); (2) encouraging and appropriately praising children; (3) taking children's perspectives; (4) following children's lead and providing them with

* Corresponding author.

E-mail addresses: diste020@umn.edu (R. Distefano), egalinsky@bezosfamilyfoundation.org (E. Galinsky), megan.mcclelland@oregonstate.edu (M.M. McClelland), zelazo@umn.edu (P.D. Zelazo), smc@umn.edu (S.M. Carlson).

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choices (Bernier et al., 2010; Grolnick, Gurland, DeCoursey, & Jacob, 2002; Whipple, Bernier, & Mageau, 2011). Autonomy-supportive behaviors may promote EF development because EF skills are strengthened when children engage in tasks that are challenging, but not overly so (Diamond & Ling, 2016; Ericsson, Nandagopal, & Roring, 2009). Autonomy support works within children's zone of proximal development: this is the area just beyond what they can do on their own, but what they can accomplish with the support of a more knowledgeable social partner (Vygotsky, 1987). EF skills are used during effortful (as opposed to automatic) goal-directed tasks (Miyake et al., 2000), and autonomy-supportive parents ensure that their children are given an opportunity to utilize their EF skills within their zone of proximal development.

Researchers have assessed autonomy-supportive parenting behaviors with preschoolers in a puzzle-building task that is too challenging for children to complete on their own (Bernier et al., 2010; Whipple et al., 2011). To complete a farm puzzle, for example, a child needs to focus on a specific section of the puzzle (e.g., the barn) and use inhibitory control to ignore the irrelevant pieces (e.g., the horse in the field). With many pieces, a preschooler may become overwhelmed with the number of options, and an autonomy-supportive parent can draw the child's attention to the barn pieces and move the animal pieces to the side. Here, the preschooler still needs to use inhibitory control to find the correct piece among all the barn pieces, but the parent's support helps ensure the child's capabilities are not overloaded by every possible option. Similarly, an autonomy-supportive parent may remind a child which pieces the child is looking for to ensure the goal is retained in the child's working memory. Finally, if a child is perseverating by continuing to put a roof piece where the barn door is, an autonomy-supportive parent may suggest alternate options to redirect the child's attention, which helps the child practice cognitive flexibility. Autonomy-supportive parents not only support EF skills during a task at hand, but they also support children's sense of competence and self-efficacy by providing children with choices, acknowledging their perspective, and allowing them to feel a sense of accomplishment. Children may take these feelings of self-efficacy to other challenging tasks, which continue to strengthen their EF skills (Bernier et al., 2010). Taken together, autonomy-supportive parents provide both a manageable context for practicing EF skills in a given moment and bolster children's self-efficacy to pursue future opportunities to strengthen their EF skills.

A number of empirical studies have substantiated the theoretical importance of autonomy support for EF development. Hammond, Müller, Carpendale, Bibok, and Liebermann-Finestone (2012) found that scaffolding behaviors, which allow children to work in their zone of proximal development, were positively associated with preschool EF. Furthermore, Bernier and Carlson found that higher levels of autonomy support were both concurrently and predictively linked with higher EF skills in infants and toddlers, and predicted higher EF in preschoolers (Bernier et al., 2010; Bernier, Carlson, Deschênes, & Matte-Gagné, 2012). This relation held after controlling for the children's verbal ability, maternal sensitivity, and maternal mind-mindedness (i.e., the tendency to use mental state terms), suggesting that autonomy support provides a unique learning context for developing EF skills over and above other types of parenting behaviors. There is also longitudinal evidence that the positive link between early autonomy-supportive behaviors and academic achievement in high school is partially mediated by child EF in the preschool years (Bindman, Pomerantz, & Roisman, 2015). However, none of the aforementioned studies measured parent EF skills, which are associated with both child EF and parenting behaviors.

Parenting and Parent EF

What makes some parents more autonomy-supportive than others? Strong EF skills in parents themselves may be particularly important for employing autonomy support. For example, when autonomy-supportive

parents provide children with choices, give children opportunities to try, and allow children to work at their own pace, parents must use their inhibitory control to prevent themselves from completing the task for their children (Meuwissen & Carlson, 2015). Scaffolding behaviors (i.e., providing children with appropriate help) may be most successful when parents can flexibly switch between different approaches to helping their children, rather than perseverating on one suggestion that the children are not understanding (Mazursky-Horowitz et al., 2018). Finally, parents' working memory is necessary for remembering which strategies and supports they have given their children, as well as keeping the goals of the task in mind (Mazursky-Horowitz et al., 2018; Sturge-Apple, Jones, & Suor, 2017). One study demonstrated that autonomy-supportive behaviors were positively associated with fathers' performance on an inhibitory control task, but were not related to performance on a cognitive flexibility task (Meuwissen & Carlson, 2015). However, there was a ceiling effect in fathers' cognitive flexibility, and the authors concluded that more research is needed to explore the association between parent EF skills and autonomy support in a sample of mothers and fathers.

Although there is limited research regarding the relation between parent EF and autonomy support, a number of studies have examined aspects of parent self-regulation more broadly. Self-regulation refers to the bottom-up and top-down processes that work together to modulate one's own behaviors; EF has been conceptualized as one top-down aspect of self-regulation (Jones, Bailey, Barnes, & Partee, 2016; Nigg, 2017). Converging evidence suggests that parent self-regulation is positively associated with parental sensitivity, warmth, and involvement, and negatively related to harsh parenting (Azar, Reitz, & Goslin, 2008; Crandall, Deater-Deckard, & Riley, 2015; Deater-Deckard & Bell, 2017; Mazursky-Horowitz et al., 2018; Shaffer & Obradović, 2017; Sturge-Apple et al., 2017; Sturge-Apple, Suor, & Skibo, 2014; Zeytinoglu, Calkins, Swingle, & Leerkes, 2017). Furthermore, there is an emerging literature on parenting behaviors as an important mediator of the relation between parent self-regulation and child self-regulation, as discussed below.

Intergenerational Transmission of Self-Regulation

Bridgett and colleagues synthesized years of research that supports the intergenerational transmission of self-regulation and proposed a conceptual model of possible mechanisms to explain the link between parent and child self-regulation (Bridgett, Burt, Edwards, & Deater-Deckard, 2015). The model incorporates biological influences, such as genetic and epigenetic pathways, from parent to child, as well as the transmission of self-regulation through social influences, such as parenting behaviors, familial dynamics, and the broader ecological context. Indeed, recent empirical evidence has provided support for this model. One study showed that emotional support (i.e., parenting behaviors that serve to externally regulate a child) mediated the link between maternal effortful control and preschoolers' EF skills (Zeytinoglu et al., 2017). This study, however, used a self-report measure of maternal effortful control and a different set of measures of child EF; it is not clear whether these results would replicate with a performance-based assessment of EF given to both parents and children. A second study by Cuevas, Deater-Deckard, Kim-Spoon, Watson, et al. (2014) explored aspects of negative parenting (e.g., intrusiveness, negative affect), behavioral assessments of maternal EF, and EF in preschoolers and found that negative parenting behaviors mediated the link between maternal EF and changes in child EF from 36- to 48-months. This study provided initial evidence that both parent EF and negative caregiving each account for individual differences in child EF in the preschool years. However, the study focused on negative parenting behaviors, and past research has suggested that negative and positive aspects of parenting may have differential effects on EF development. For example, Blair et al. (2011) found that children's cortisol levels partially mediated the effect of positive parenting (e.g.,

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