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Attentional control and executive functioning in school-aged children: Linking self-regulation and parenting strategies

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ABSTRACT

Good parenting strategies can shape children's neurocognitive development, yet little is known about the nature of this relation in school-aged children and whether this association shifts with age. We aimed to investigate the relation between parenting strategies observed during a home visit and children's performance-based attentional control and executive functioning ($N = 98$, aged 4–8 years). Linear and curvilinear regression analyses showed that children of parents who were more supportive, were less intrusive, and asked more open-ended questions displayed better inhibitory control. In addition, children of parents who asked relatively more open-ended than closed-ended questions showed better performance on inhibition, working memory, and cognitive flexibility tasks. Curvilinear relations indicated the presence of an optimal amount of closed-ended and elaborative questions by parents—that is, not too few and not too many—which is linked to increased performance on attentional and inhibitory control in children. Higher parental intrusiveness and more frequent elaborative questioning were associated with decreased inhibitory control in younger children, whereas no such negative associations were present in older children. These results suggest that susceptibility to certain parenting strategies may shift with age. Our findings underscore the importance of adaptive parenting

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strategies to both the age and needs of school-aged children, which may positively affect their self-regulation skills.

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Introduction

As children grow up, executive functions (EFs) and attentional control (AC) become increasingly important for children's successful navigation in their educational environment and daily functioning at home (Best, Miller, & Jones, 2009; Diamond, 2013; Garon, Bryson, & Smith, 2008). EFs are adaptive effortful mental processes that enable us to plan, guide, and control goal-oriented behavior and are especially critical when solving novel problems (Best et al., 2009; Garon et al., 2008). There is general agreement that three core EFs can be defined, namely inhibition, working memory, and cognitive flexibility (e.g., Miyake et al., 2000). Miyake et al. (2000) argued that these three EF components share a common underlying mechanism, often referred to as effortful attentional control (Garon et al., 2008). AC is tightly intertwined with EFs, both as a foundation on which EF components build and as an ongoing process playing an important role during EF development (Garon et al., 2008).

Inhibitory control is commonly described as the ability to suppress a dominant or automatic response (Best et al., 2009; Diamond, 2013). Inhibitory control is often studied in congruence with this definition of response inhibition, but it also encompasses an attentional component known as interference control—the ability to selectively attend to certain stimuli and ignore irrelevant stimuli (Diamond, 2013). Inhibitory control shows rapid development during the preschool years but also improves between 5 and 8 years of age (Best et al., 2009). Working memory (WM) refers to the ability to temporarily hold, manipulate, and control information in the mind (Garon et al., 2008). WM is commonly subdivided by content and conceptualized as verbal WM and visual-spatial WM (Diamond, 2013). WM emerges during the preschool years and shows a linear development between 4 and 15 years of age, although the development of visual-spatial WM seems to reach its peak at around age 11 (Best et al., 2009; Davidson, Amso, Anderson, & Diamond, 2006). The final core EF component is cognitive flexibility, the ability to shift between mental sets or tasks and adapt to changing situations (Best et al., 2009). Cognitive flexibility builds on both WM and inhibition, and it shows a longer developmental trajectory, at least until early adolescence (Davidson et al., 2006). Research on AC differentiates between focused and sustained attention as underlying processes. Focused attention refers to being able to actively focus on one thing without being distracted by other stimuli, and sustained attention can be defined as the ability to maintain concentrated attention over prolonged periods of time (Cohen, 2014). Early AC development peaks during the preschool years, although AC continues to develop during the primary school period alongside the emergence of the core EF components (Garon et al., 2008).

The development of AC and EFs in children is influenced by their relationship with their significant caregivers and the conditions in their environment (Diamond, 2013; Yu & Smith, 2016). This is not a novel insight; Vygotsky (1978) posed nearly 40 years ago that social interaction is essential to the development of self-regulation, as did Kopp (1982) and Calkins (1994) during the decades that followed. Building on Vygotsky's work, Sigel's (2002) model of psychological distancing incorporates how parents can promote the development of self-regulation in children. Sigel stated that parents can help children to take a step back during problem solving and reflect on the problem at hand (i.e., create psychological distance) by nonverbal or verbal actions such as asking questions (Giesbrecht, Muller, & Miller, 2010). For instance, asking questions to focus the child's attention on important aspects of the problem that the child was not yet able to notice on his or her own will challenge the child's mental representations and will facilitate internalization of self-regulatory skills. Studies on quality of parenting in relation to child AC and EFs have focused on four dimensions of parenting: (a) sensitivity, (b) scaffolding, (c) stimulation, and (d) control (Fay-Stammach, Hawes, & Meredith, 2014). The majority of these studies focus on parent-child interactions during infancy

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