



Effortful control, positive emotional expression, and behavior problems in children born preterm[☆]



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ABSTRACT

The present study focused on the role of high effortful control in the expression of positive emotion and development of behavior problems in children born preterm (mean gestational age = 31.4 weeks). Using data from a prospective longitudinal study, the present study assessed effortful control and behavior problems at 24 and 36 months and positive emotional expression at 24 months in a sample of 173 children born preterm. Less positive emotional expression was associated with higher effortful control for boys but not girls. Higher effortful control was associated with fewer total behavior problems, but this relation was attenuated when socioeconomic assets were included in the model. More socioeconomic assets were associated with fewer behavior problems for both boys and girls and higher effortful control for girls. Socioeconomic assets appear to be an important factor in the development of effortful control and behavior problems in children born preterm regardless of gender, whereas positive emotional expression was important for boys. Future intervention research should examine fostering adaptive levels of effortful control in high-risk populations as a means to facilitate resilience processes.

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1. Introduction

Although infants born preterm (<37 weeks gestation) are more likely to survive than ever before, preterm infants continue to experience elevated morbidity rates such as cognitive delays and behavior problems. Estimates suggest that 50–70% of infants born preterm may develop behavioral difficulties, including externalizing and internalizing problems (Aylward, 2005; Bhutta, Cleaves, Casey, Cradock, & Anand, 2002; Pinto-Martin et al., 2004; Taylor, Klein, & Hack, 2000). These behavioral disturbances in preterm infants may be related to early impairments in self-regulation (e.g., Davis & Burns, 2001), including problems with sustained attention, inhibitory control, and emotion regulation (Berger et al., 2007). One temperament-related construct that reflects emerging self-regulation (Zhou, Chen, & Main, 2013) is effortful control (EC), the capacity to suppress a dominant response in order to express a subdominant response (Rothbart & Bates, 2006). The present study examined the associations among effortful control, positive emotional expression, and children's behavior problems in boys and girls born preterm. The study sought to examine whether high effortful control was associated with less positive emotional expression

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and higher internalizing behavior problems in children born preterm, and if these associations differed between girls and boys.

1.1. *Effortful control and behavior problems*

Temperament theory describes effortful control as the regulatory aspect of temperament that serves to modulate reactivity (Rothbart & Bates, 2006). Behavior problems are thought to reflect, in part, impairments in the ability to self-regulate. Therefore, children low in EC, including delay of gratification, slowing motor activity, lowering one's voice, suppressing and initiating an activity upon signal, and effortful attention (Kochanska, Coy, & Murray, 2001), are expected to exhibit higher behavior problem scores than children high in EC. In healthy full-term children, low EC predicts higher externalizing behavior problem scores (e.g., Eiden, Colder, Edwards, & Leonard, 2009; Kochanska & Knaack, 2003; Kochanska, Barry, Jimenez, Hollatz, & Woodard, 2009), especially behavior problems that reflect impulsivity or attentional difficulties (Murray & Kochanska, 2002; Olson, Sameroff, Kerr, Lopez, & Wellman, 2005). However, the association between EC and internalizing behavior problems appears more complex. Some studies have found that high EC predicts higher internalizing behavior problem scores (Kochanska, Murray, & Harlan, 2000; Murray & Kochanska, 2002), whereas other studies have documented no association (e.g., Dennis, Brotman, Huan, & Gouley, 2007). Moreover, in a sample of low-risk children, Murray and Kochanska (2002) found a curvilinear relationship between EC and behavior problems, in which moderate levels of EC predicted the fewest total behavior problems. Post hoc tests indicated that high EC was associated with higher internalizing behavior problem scores whereas low EC was associated with higher externalizing behavior problems.

Few studies have examined links between EC and behavior problems in children born preterm. In one exception, Poehlmann et al. (2010) documented a link between low EC and concurrent symptoms of inattention and Attention-Deficit/Hyperactivity Disorder (ADHD) but not broadband behavior scales. High EC is often conceptualized as an asset or optimal outcome, as children may be protected from developing disorders related to inattention and disinhibition when they excel at suppressing a dominant (or impulsive) response. However, given previous findings regarding EC and internalizing problems in low-risk samples, it is possible that very high levels of EC may represent a tendency toward over-control. Eisenberg and colleagues (e.g., Eisenberg & Morris, 2002; Eisenberg et al., 2005) have proposed a model regarding three types of control: undercontrol, overcontrol, and optimal control. Overcontrolled individuals are hypothesized to reflect a combination of optimal and less optimal aspects self-regulation. Specifically, high reactive control and low impulsivity are thought to reflect better self-regulation, whereas low effortful attention is thought to reflect poorer self-regulation (Eisenberg, Hofer, & Vaughan, 2007). In addition, overcontrolled individuals are thought to develop internalizing behavior problems and low levels of positive emotion, and they may find it difficult to engage with attractive stimuli or be spontaneous (Eisenberg et al., 2009, 2007). Following these hypothesized relations, some researchers suggest that higher internalizing problems are associated with low impulsivity and attentional regulation, although the associations are complex (Eisenberg et al., 2009). Studies with preterm children have not examined such possibilities, nor have they examined the relation between positive emotion expression and EC. Optimal effortful control may represent a possible source of resilience for preterm infants (Poehlmann et al., 2010). In order to promote positive development in these vulnerable infants, very high and low levels of effortful control and positive emotion expression and their relations to behavior problems should be investigated.

1.2. *Positive emotional expression and effortful control*

Temperament theory, as described by Rothbart and colleagues (e.g., Rothbart & Bates, 2006), posits two broad temperamental systems: reactive and regulatory. EC is viewed as a regulatory temperament construct, whereas positive affect can be viewed as a reactive temperament construct. EC serves as the “brakes” on the “acceleration” of the temperamental reactive system, which include positive affect and approach (Rothbart, Ellis, & Posner, 2004). According to Rothbart and colleagues, the strength of the brakes and the force of the acceleration can influence each other. High levels of EC can serve to modulate expression of intense emotions; therefore children who exhibit few emotional expressions may also have high EC. High EC may not be adaptive or desirable in all situations, as when it results in difficulty expressing positive emotions. Rothbart and Ellis warn, “The ends achieved through EC may or may not be adaptive ones, however, and when control results in rigid response to social situations, the outcomes may not be favorable ones (1994, p. 452).” Therefore, it is possible that high levels of EC may inhibit children's ability to express positive emotions, even in socially acceptable circumstances.

Low levels of positive emotions appear to be associated with high EC in healthy full-term children. For example, Kochanska and Knaack (2003) found that both parent-reported and observed joy was negatively associated with EC scores at 33 and 45, but not 22 months in typically developing children. Similarly, Kochanska et al. (2000) found that children who exhibited less intense joy displays had higher EC scores at 22 and 33 months. Consistent with temperament theory, the authors suggest that EC may serve to modulate intense emotions, and therefore a stronger EC system would be associated with less intense emotional displays. This modulation, however, may not always be optimal when it occurs in excessive amounts, especially in vulnerable children. It is possible that preterm children with high EC may find it difficult to express positive emotions, even when appropriate. Moreover, difficulty expressing positive emotions has been associated with elevated anxiety and internalizing problems (Cole, Zahn-Waxler, Fox, Usher, & Welsh, 1996). Children who demonstrated low positive affect during a laboratory temperament assessment had a frontal EEG asymmetry, which is associated with depression (Shankman et al., 2005). In addition, Lengua, Sandler, West, Wolchik, and Curran (1999) found that higher positive emotionality in

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