

Effortful Control

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Abstract

Effortful control, defined as the ability to voluntarily inhibit a dominant response and to activate a subdominant response, is believed to play an important role in children's development. In this essay, we distinguish between effortful control and aspects of control that are involuntary (i.e., reactive). The development of effortful control is summarized, and research on its relations to children's positive social behaviors and maladjustment is reviewed. Key areas for future work are also discussed, with an emphasis on interventions designed to promote self-regulation.

EFFORTFUL CONTROL

INTRODUCTION

The construct of effortful control has received considerable attention in recent years. In this essay, we first focus on definitional issues, considering the overlap with constructs such as the broader "self-regulation" and executive functioning. Next, conceptual distinctions between voluntary (effortful) aspects of control and more reactive, involuntary processes are summarized. We briefly review the normative development of effortful control and its relations to children's positive and maladaptive outcomes. We conclude with a discussion of applied interventions and key areas for future research. Owing to space constraints, we primarily refer to previously published reviews and focus on work that has not been reviewed elsewhere.

FOUNDATIONAL RESEARCH

Definitional Issues. Effortful control is a term used to refer to the regulatory aspect of temperament. Rothbart (Rothbart & Bates, 2006) defined temperament as "constitutionally based individual differences in reactivity and self-regulation, in the domains of affect, activity, and attention" and view it as the "the affective, activation, and attentional core of personality" (p. 100). They further defined self-regulation as processes that modulate emotional

and behavioral responsivity to the environment, and effortful control—the self-regulatory aspect of temperament—as “the efficiency of executive attention—including the ability to inhibit a dominant response and/or to activate a subdominant response, to plan, and to detect errors” (p. 129).

Thus, effortful control refers to individual differences in willful or effortful regulatory skills grounded in executive attention. It typically is viewed as including the ability to willfully deploy attention (attention focusing and shifting and including cognitive distraction) and to willfully inhibit or activate behavior (inhibitory control and activational control, respectively). It also includes abilities to detect errors and resolve cognitive conflict and to plan. Effortful control can be used to modulate behavior, cognitions/thoughts, and emotion. Consequently, effortful control is the building blocks for the development of self-regulation, emotional and otherwise, across the lifespan, and is the core of internally based, volitional self-regulation (Eisenberg, Hofer, Sulik, & Spinrad, 2014).

Eisenberg and colleagues (e.g., Eisenberg *et al.*, 2014) argued that although effortful control is generally an effortful willful process, people are not always aware of effortfully modulating emotion or behavior. Especially after rehearsal and practice, effortfully controlled behaviors may become relatively automatic and executed without much conscious awareness in contexts with relevant trigger cues. However, what is critical is that, if necessary, the individual can shift into a more volitional, cognitively accessible mode of functioning when it is adaptive to do so. Like a number of others in the field (e.g., Block & Block, 1980), we believe that well-regulated individuals are not overly controlled (e.g., highly inhibited) or overly undercontrolled and that they can be spontaneous and relatively undercontrolled if doing so does not undermine their goals.

Effortful control includes and partly overlaps with the construct of executive functioning skills, defined as “higher order, self-regulatory, cognitive processes that aid in the monitoring and control of thought and action” (p. 595; Carlson, 2005). Similar to effortful control, executive functioning is viewed as referring to “adaptive, goal-directed behaviors that enable individuals to override more automatic or established thoughts and responses” (p. 31; Garon *et al.*, 2008). Thus, both constructs include processes such as effortful deployment of attention, set shifting, and planning. Some aspects of executive functioning such as working memory are not part of the definition of effortful control although working memory no doubt contributes to effortful control in some contexts and for some tasks.

We view effortful control as providing tools used for self-regulation (Eisenberg *et al.*, 2014; Rothbart & Bates, 2006). However, consistent with arguments by Blair and Ursache (2011) in regard to executive functioning, the relation between emotion and effortful control is likely bidirectional: Although

effortful control can modify emotion, emotion can undermine or enhance the efficacy of effortful control, depending in part on the degree of emotional arousal. High arousal is believed to undermine attention and executive functioning whereas a moderate level may be optimal for self-regulation. Clearly, emotion and its self-regulation are highly interrelated and there is debate regarding the degree to which they can be considered distinct.

Effortful versus Reactive Control. Eisenberg and colleagues (e.g., Eisenberg *et al.*, 2014) have argued that it is useful conceptually to differentiate effortful control from reactive control. Building on Rothbart's (Rothbart & Bates, 2006) distinction between reactivity and regulation, we differentiate between emotional and behavioral reactivity (e.g., behavioral approach and inhibition) and contrast this behavioral reactivity—labeled reactive control—with effortful control. Reactive control pertains to aspects of control (or the lack thereof) that are relatively nonvolitional and usually automatic, and difficult to modulate effortfully; reactive control is viewed as less flexible and often less adaptive than volitional self-regulation (i.e., effortful control). For example, children who are labeled as “behaviorally inhibited” (Kagan & Fox, 2006) tend to be wary and overly constrained in novel or stressful situations and have difficulty modulating (e.g., relaxing) their inhibition. Their inhibition or constraint is relatively involuntary and difficult for them to effortfully modulate. Conversely, the impulse to approach people or inanimate objects often may be relatively involuntary. People who are impulsive appear to be “pulled” to rewarding or positive situations or stimuli. Such overly inhibited and impulsive behavior reflects two aspects of *reactive control*—reactive overcontrol and undercontrol. The constructs of reactive undercontrol and overcontrol are similar to what the Blocks (1980) labeled as the extremes of ego control (i.e., ego undercontrol and overcontrol), with ego control defined as the “threshold or operating characteristic of an individual with regard to the expression or containment of impulses, feelings, and desires” (p. 43). Moreover, this distinction is similar to that of Pickering and Gray's (1999) behavioral inhibition and behavioral activation systems (BIS and BAS). Effortful and reactive control have been found to load on different latent constructs and sometimes provide unique prediction of developmental outcomes (see Eisenberg *et al.*, 2014; Eisenberg, Spinrad & Eggum, 2010).

Development of Effortful Control. Although young infants are thought to rely almost exclusively on caregivers to regulate their emotions and behavior, rudimentary forms of effortful control are thought to emerge around the end of the first year of life and improve dramatically with age. Moreover, changes

in effortful regulation are thought to occur as a result of motor and cognitive maturation. One aspect of effortful control involves the ability to sustain and focus attention, and this skill appears to develop in late infancy. Indeed, increases in attentional control have been observed from late infancy to toddlerhood/preschool, whereas distractibility decreases from the infancy to preschool period (see Rothbart & Bates, 2006; Eisenberg *et al.*, 2014).

In addition to changes in attention, there are developments in aspects of executive functioning in late infancy. For instance, older infants have the ability to reach for a toy not in their line of sight, demonstrating the ability to coordinate reach and vision and attend to both. This ability is believed to involve the execution of intentional behavior, planning, and the resistance of more automatic tendencies. Similarly, infants are capable of looking to the location of a target before its appearance in that location (see Eisenberg *et al.*, 2010).

With advances in cognitive and language skills, there is considerable development in effortful control and executive attentional skills in the preschool years. Using a comprehensive battery of tasks designed to measure effortful control, Kochanska and colleagues (2000) showed improvements in effortful control across the second and third years of life. Executive attentional skills that require children to switch attention and inhibit behavior also improve during this period; children are able to perform well on spatial conflict tasks in the third year of life, with significant improvements in the fourth year of life (see Eisenberg *et al.*, 2010).

There are further increases in effortful control and executive functioning skills in preschool, the grade-school years, and into adolescence. These skills may continue to develop at a slower pace into adulthood (see Eisenberg *et al.*, 2010, 2014).

Stability. Individual differences emerge early and are somewhat stable across time. Parents' and observer ratings of infants' attention have been significantly correlated across infancy and the early toddler years, and there is moderate stability in the broader construct of observed effortful control in the early years (see Eisenberg *et al.*, 2010). Similar stability has been reported by Spinrad and Eisenberg (e.g., Eisenberg *et al.*, 2010, Spinrad *et al.*, 2012) for latent constructs consisting of adult-rated effortful control combined with one or more behavioral measures, over 1–2 years of time between 18 and 54 months of age. Individual differences in adult-reported effortful control also have been found to be stable across the elementary school years and in early adolescence (see Eisenberg *et al.*, 2010).

Age-appropriate measures of self-regulation also relate to other, somewhat different measures of self-regulation at older ages (see Eisenberg *et al.*, 2010).

Prediction over long periods of time also has been found for measures of self-regulation. For example, Friedman, Miyake, Robinson, and Hewitt (2011) found toddlers' self-restraint when told not to touch an attractive toy predicted measures of executive functioning (including those that overlap with self-regulation) 14 years later. Observed undercontrol at age 3 also has predicted less control (reflective, cautious, careful, rational, planful, not impulsive) at age 18. Finally, the ability to delay gratification in the late preschool years has been found to predict coping (including self-control, attentional control, and other constructs) in adolescence (Shoda, Mischel, & Peake, 1990) and efficiency (greater speed without reduced accuracy) during a go/no-go task (requiring attention, inhibitory control, and activation to signals) more than 10 years later (Eigsti *et al.*, 2006).

CUTTING-EDGE RESEARCH

Effortful control is believed to play an important role in a wide range of developmental outcomes. In particular, we focus on the relations of effortful control to children's positive and negative socioemotional outcomes.

Relations of Effortful Control to Children's Positive Behaviors. Children's effortful control is thought to contribute to positive outcomes in children. Children who are able to control their attention and behavior are expected to manage their emotions, get along with others, and to engage in socially competent behaviors. Consistent with these expectations, researchers have shown positive relations between effortful control and children's social competence (see Eisenberg *et al.*, 2014).

In addition, effortful control has been positively related to children's ego-resiliency, reflecting children's ability to bounce back from stress. It is likely that children who are high in effortful control are better able to modulate their arousal and respond to stressors in a more flexible manner. Using a longitudinal panel model in which stability of the constructs were controlled, Taylor and colleagues (2013) found 2.5-year-olds' effortful control predicted ego-resiliency a year later, although this prediction was not significant when the toddlers were 18 months of age (when ego-resiliency is likely just emerging).

Effortful control also may help children to follow rules and comply with adults' requests. Kochanska and colleagues have identified two forms of compliance: committed compliance, defined as children's wholehearted compliance to adults' requests and situational compliance, defined as parent-monitored cooperation in which the child lacks sincere commitment

to the task (Kochanska, Coy, & Murray, 2001). By definition, committed compliance, but not situational compliance, is indicative of children's conscience development (Kochanska *et al.*, 2001). As expected, effortful control has been found to predict children's committed compliance and higher conscience (i.e., moral self and internalization of rules; see Eisenberg *et al.*, 2014).

There is also considerable evidence that effortful control (or aspects of effortful control) is positively related to children's empathy-related responding and prosocial behavior (see Eisenberg, Fabes, & Spinrad, 2006 for review). Children high in effortful control are thought to experience sympathy (an other-oriented response to another's emotion or condition) rather than personal distress (a self-focused, aversive response to another's emotion or condition) because empathic overarousal is aversive and leads to self-focus and self-concern. Consistent with this notion, positive relations between effortful control and empathy and/or sympathy have been found in numerous studies (Eisenberg *et al.*, 2006). In a recent long-term longitudinal study, Kanacri and colleagues (2013) showed that effortful control measured at age 13 was related to lower declines in prosociality in adolescence.

Researchers also have documented an association between effortful control and the quality of children's relationships with peers and teachers. Children's effortful control has been related to lower teacher-child conflict and greater teacher-child closeness (Silva *et al.*, 2011). Further, children high in effortful control tend to be less vulnerable to peer victimization (Hanish *et al.*, 2004) and tend to exhibit greater peer competence (Calkins, Gil, Johnson, & Smith, 1999).

Findings thus far offer a consistent view of the role of effortful control in children's positive social functioning. Further research on the unique prediction of effortful and reactive control to children's positive behaviors is needed, and there is a particular need for longitudinal, multimethod research in this area (Spinrad *et al.*, 2012).

Relations of Effortful Control to Children's Maladjustment. Children with poor effortful control skills are likely to have difficulty controlling their negative emotions, engage in more conflictual interactions with others, and may be prone to depression and anxiety. There is substantial evidence that children's low effortful control may serve as a risk for the development of problem behaviors, such as aggression and conduct disorders as well as internalizing symptoms (Rothbart & Bates, 2006).

A consistent negative association between effortful control and externalizing problems has been found across childhood. Moreover, some longitudinal results indicate that earlier effortful control predicts later externalizing problems, even after controlling for stability in problem behaviors. In some work,

however, no relations between effortful control and externalizing problems were found once earlier levels of problem behaviors were controlled (see Eisenberg *et al.*, 2010).

Findings on the relations between effortful control and children's internalizing problems are somewhat mixed. Negative relations between effortful control and internalizing problems are most often found. For example, effortful control has been negatively related to separation distress (an aspect of internalizing problems) in toddlerhood (see Eisenberg *et al.*, 2010). In contrast, Murray and Kochanska (2002) showed a quadratic relation between effortful control and problem behaviors in the preschool years. Specifically, children with high levels of EC (an aggregated score across a set of observational tasks) were rated higher on internalizing behaviors than were children with moderate levels of EC. However, it should be noted that in this study, severe internalizing problems were relatively infrequent. Thus, the relations between EC and children's internalizing problems are likely complex. The literature may be somewhat inconsistent because relations may vary depending on the aspects of effortful control examined (i.e., attentional control versus behavioral/inhibitory control), children's age, and if the measure of internalizing symptoms. Moreover, negative emotionality may moderate the relations between effortful control and internalizing problems. Thus, researchers should consider these complex relations in future work.

KEY ISSUES FOR FUTURE RESEARCH

Given the relatively consistent associations between effortful control and children's social and emotional outcomes, it is important to understand the ways in which children's regulation skills can be fostered. Directions for future research may include examining the conditions under which interventions can promote improved effortful control in children.

INTERVENTION STUDIES

In order to draw causal conclusions about the relations of effortful control to children's developmental outcomes, more experimental studies, especially intervention and prevention research are needed. Researchers have begun to conduct interventions to promote children's regulation, mostly in school settings. For example, students participating in the PATHS (Promoting Alternative Thinking Strategies) Curriculum have been found to outperform their control counterparts on measures of executive functioning and sustained attention (Bierman, Nix, Greenberg, Blair, Domitrovich, 2008). In this curriculum, teachers are provided with lessons to improve children's

emotional literacy, social competence, problem solving, and positive peer relationships. Because this program was designed to foster a number of social skills, the effects on regulation or effortful control may be indirect. Thus more intervention work directed at promoting children's effortful regulation is needed (see Eisenberg *et al.*, 2010).

Owing to space constraints, research on the role of socialization and the environment on children's effortful control was not reviewed, although it would be useful to consider ways in which interventions directed at parenting behaviors may improve children's effortful control. Further, children who are well regulated are likely to evoke more positive responses from others (i.e., parents, teachers, and peers), and such transactional relations should be examined in future longitudinal research.

In addition, the effectiveness of interventions in improving children's effortful control and children's developmental outcomes may be moderated by a number of factors, including age and other aspects of temperament. Children's emotional reactivity, for example, may moderate the relation between intervention status and effortful control. That is, interventions may be most effective for children who are most "at risk" for difficulties whereas such interventions may be less effective for children who are dispositionally less reactive. Clearly, it has become increasingly clear that effortful control is related to social, emotional, moral, and cognitive development in childhood. Although researchers are beginning to design intervention and prevention programs to improve children's effortful control, much more work should be done in this area.

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