



Associations of anger and fear to later self-regulation and problem behavior symptoms[☆]



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ABSTRACT

The mediating and moderating roles of self-regulation in the associations of dispositional anger and fear to later conduct and anxiety symptoms were tested. Mothers and teachers rated children's anger and fear at 54 months ($N = 191$), and mothers reported on children's symptoms of anxiety and conduct disorders at 72 and 84 months ($Ns = 169$ and 144). Children's self-regulatory ability was assessed using the Tower of Hanoi task at 72 months. Children's self-regulation mediated the association between early dispositional fear and 84-month mother-reported anxiety disorder symptoms above and beyond the effects of earlier generalized anxiety symptoms. Children's anger directly predicted relatively high mother-reported conduct and anxiety disorder symptoms. Findings are discussed in terms of the importance of considering self-regulation as potential mechanism relating early childhood dispositional reactivity to later psychopathology symptoms.

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Emotion-related self-regulation has been defined as “the process of initiating, avoiding, inhibiting, maintaining, or modulating the occurrence, form, intensity, or duration of internal feeling states, emotion-related physiological, attentional processes, motivational states, and/or the behavioral concomitants of emotion” required to accomplish and guide goal-oriented behaviors (Eisenberg & Spinrad, 2004, p. 338), henceforth labeled self-regulation. The importance of self-regulatory behaviors for children's social-cognitive competence, school success, and academic achievement has been highlighted by previous researchers (e.g., Blair & Diamond, 2008; Meltzer, 2007; Valiente et al., 2011). Poor self-regulation also appears to be a risk for the development of internalizing and externalizing behavior problems, including anxiety and conduct disorders (Eisenberg, Spinrad, & Eggum, 2010; Riggs, Blair, & Greenberg, 2003; Webster-Stratton, Reid, & Hammond, 2001). Despite the well-established link between negative reactivity and poor self-regulation, relatively few attempts have been made to distinguish between distinct negative emotions and their longitudinal relations to self-regulatory abilities across early childhood (e.g., Cuevas, Hubble, & Bell, 2012; Hongwanishkul et al., 2005). Thus, the first goal of the current study was to examine the longitudinal relations of children's temperamental negative affectivity, specifically proneness to anger and fear,

to children's self-regulation during the transition to elementary school. Next, we examined the mediating and moderating role of self-regulation in the association of dispositional anger and fear to children's symptoms of conduct and anxiety disorders.

Self-regulation

Research on two overlapping, and related constructs can be used to inform the potential relations between emotionality, self-regulation and children's problem behavior symptoms: executive function and effortful control. Effortful control (EC) is defined 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” (Rothbart & Bates, 2006, p. 129). Similarly, executive function (EF) has been conceptualized as the ‘higher order, self-regulatory, cognitive processes that aid in the monitoring and control of thought and action’ (Carlson, 2005, p. 595). It should be noted that in both EF and EC constructs, the regulation/control of cognitive processes and behaviors is voluntary and goal-directed rather than reactive and involuntary (Diamond, 2006; Ursache, Blair, & Raver, 2012). Thus, both EF and EC constructs overlap considerably with the construct of effortful self-regulation (Eisenberg & Zhou, in press).

A few researchers to date have empirically tested the overlap between EF and EC measures, and their components (Blair & Razza, 2007; Hongwanishkul et al., 2005). The results of these studies have demonstrated that, despite slight distinctions between EF and EC (i.e., working memory as an important indicator of EF but not EC), these two constructs are positively related, or at least have common/overlapping

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components (e.g., Blair & Razza, 2007; Bridgett, Oddi, Laake, Murdock, & Bachmann, 2013). For example, Blair and Razza (2007) found positive relations of inhibitory control and attentional shifting components of EF to parent- and teacher-reported EC. Given considerable similarities between these two major regulatory constructs (i.e., EC and EF; Bridgett et al., 2013; Zhou, Chen, & Main, 2012), the literature reviewed below includes work focusing on both EF and EC.

The relation of negative reactivity to self-regulation

The theoretical and empirical evidence suggests that over-arousal or negative emotional reactivity, both situational and trait-like, may impair individuals' performance on tasks that require regulation of cognitive processes (e.g., attentional processes) and related behaviors (e.g., Philips, Bull, Adams, & Fraser, 2002). From a theoretical stance, the cue utilization and the processing efficiency theories (Easterbrooke, 1959; Eysenck & Calvo, 1992) posit that arousal or reactivity, either transient or trait-like, interferes with cognitive resources (e.g., attention, working memory) that are needed for efficient information processing. An abundance of empirical evidence in animals and humans (both adults and children) has supported these theories (Bell & Fox, 2003; Blair & Dennis, 2010; Burbridge, Larsen, & Barch, 2005; van der Staay, Schuurman, van Reenen, & Korte, 2009). For example, in a recent study, Ursache, Blair, Stifter, & Voegtline (2013) found that 15-month-old infants who displayed high levels of fear reactivity in response to viewing frightening masks had relatively poor EF skills at 48 months of age; however, this relation was stronger for children who had low levels of fear regulation during the task.

Consistent with findings for the negative relations between context-specific negative reactivity and self-regulation, there is some evidence to suggest that children's temperamental negative reactivity (trait-like characteristic) is also related to low self-regulation (e.g., Golan & Neufeld, 1996; Lawson & Ruff, 2004; Perez & Gauvain, 2005; Valiente, Swanson, & Eisenberg, 2012). For example, Hongwanishkul et al. (2005) found that preschoolers' performance on two EF tasks (i.e., card sorting and self-ordered pointing) was negatively related to parents' reports of children's dispositional negative reactivity. Furthermore, Perez and Gauvain (2005) found that mother-reported dispositional emotional intensity (both positive and negative emotions) predicted second-graders' poor performance on a problem solving task that required planning and use of working memory. The negative association between dispositional negative reactivity and children's aspects of self-regulation is not surprising given that situational and dispositional negative emotionality measures often are found to be positively correlated (Murphy & Eisenberg, 2002; Rothbart & Ahadi, 1994).

There is also evidence for the relation between specific negative emotions, including anger and fear, and children's self-regulation. For instance, anger proneness during early childhood has been found to negatively predict children's inhibitory control (a component of self-regulation; Rothbart, Ahadi, Hershey, & Fisher, 2001). Furthermore, findings from several studies have demonstrated that children's dispositional anger and fear were negatively related to children's EC (Derryberry & Rothbart, 1997; Hanish, Eisenberg, Fabes, Spinrad, Ryan, & Schmidt, 2004; Kochanska & Knaack, 2003). Similar results also have been found in non-Western samples (e.g., Chinese and Indonesian children, Zhou, Eisenberg, Wang, & Reiser, 2004; Eisenberg, Liew, & Pidada, 2004). In the current research, we examined the associations of two distinct temperamental negative emotions (anger and fear) to children's later self-regulation. Anger and fear reactivity were expected to predict children's lower self-regulation skills.

The relation of self-regulation to psychopathology

There is a wealth of evidence demonstrating that poor self-regulatory abilities pose a risk for the development of externalizing behavior problems, perhaps because children with poor self-regulation

abilities have difficulty modulating their impulses, as well as emotions such as anger that can lead to externalizing behaviors (Giancola, Roth, & Parrott, 2006; Schoemaker, Mulder, Deković, & Matthys, 2013; see Eisenberg et al., 2010, for a review). For example, Hughes and Ensor (2008) found that high levels of EF and engagement in goal-directed behaviors at age 3 predicted lower problem behaviors (e.g., disruptive behaviors) at 4 years of age after controlling for problem behaviors at age 3. Deficits in self-regulation also have been observed in samples of children with clinical levels of externalizing symptoms (Eiden, Colder, Edwards, & Leonard, 2009; Giancola, Martin, Tarter, Pelham, & Moss, 1996; Silk, Steinberg, & Morris, 2003).

Individuals with poor regulatory abilities may ruminate and remain in anxious states following stressful situations—which over time could contribute to the development of anxiety disorders (especially generalized anxiety disorder; see Cisler, Olatunji, Feldner, & Forsyth, 2010, for a review). Indeed, empirical evidence supports a negative relation between self-regulation and internalizing behavior problems (e.g., Eisenberg et al., 2001; Riggs et al., 2003). For example, Riggs et al. (2003) found that sequencing ability (the ability to order, remember, and reconstruct information to achieve a goal – a core aspect of EF) during 1st and 2nd grade – predicted declines in internalizing behavior problems. Similarly, Emerson, Mollet, and Harrison (2005) found that among 9 to 11-year-old boys, those with high anxiety and depression scored lower on tasks that required maintaining and/or shifting attention, hypothesis testing, and problem-solving skills compared to a control group.

It should be mentioned that researchers often have tested the relations of regulation to either externalizing or internalizing behavior problems, rather than both types of behavior problems, and often initial levels of problem behaviors have not been taken into account when predicting problem behaviors over time. Based on aforementioned evidence, in the current study, we expected children with poor regulation skills to display higher levels of internalizing (i.e., anxiety symptoms) and externalizing problem behaviors (i.e., conduct problems) a year later, even after controlling for earlier symptoms. The association of self-regulation skills to symptoms of psychopathology (i.e., anxiety and conduct disorders) was examined across the early school years. Understanding such relations during the early school years has obvious relevance to applied issues given the stability of behavior problems during this developmental period (Bufferd, Dougherty, Carlosn, Rose, & Klein, 2012; Heller, Baker, Henker, & Hinshaw, 1996).

The mediating and moderating role of self-regulation in the relation of negative emotionality to psychopathology

The results of a number of studies indicate that temperamental differences during early childhood, including differences in negative emotional reactivity and modulation of negative emotions, relate to the development of internalizing and externalizing behavior problems (e.g., conduct and anxiety disorders; Eisenberg et al., 2001; Eisenberg et al., 2009; Frick & Morris, 2004; Rothbart & Bates, 2006; Turner, Beidel, & Wolff, 1996). Specifically, irritability and the predisposition to anger during early childhood have been found to put children at risk for the development of conduct disorders (e.g., Frick & Morris, 2004; Holmes, Slaughter, & Kashani, 2001). Furthermore, high behavioral inhibition, shyness, and fearfulness in the early years have been viewed as developmental precursors or predictors of various anxiety symptoms (e.g., Biederman et al., 2001; Eisenberg et al., 2009; Muris, 2007). Anger and fear proneness often have been examined in relation to different behavior problems, with anger predicting relatively high externalizing problems and fear predicting internalizing problems. Evidence for the relation between anger and internalizing behavior problems has been inconsistent. Whereas some researchers have found anger to be a risk for the development of internalizing behavior problems (e.g., Eisenberg et al., 2005; Morris, Silk, Steinberg, Sessa, Avenevoli, & Essex, 2002), others have reported no or weak associations between anger and internalizing behavior problems (e.g., Lemery,

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