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High effortful control is associated with reduced emotional expressiveness in young children

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ABSTRACT

The current study tested the claim that trait effortful control (EC), the ability to suppress a dominant response to perform a subdominant response, is associated with children's emotion expression. Participants were 206 community children between the ages of 3 and 7 years. Children completed a battery of 10 laboratory tasks to assess temperamental differences in EC, as well as positive and negative emotionality. We report on bivariate associations between laboratory-assessed and parent-reported EC and laboratory-assessed emotions of different valences and intensity levels. Children coded as high in lab-assessed EC exhibited fewer total emotional expressions (positive and negative emotions), and engaged in lower intensity expressions than children lower in EC. Parent-reported EC measures were weakly associated with laboratory measures of emotion.

1. Introduction

Individual differences in emotional reactivity and self-regulation, or temperament, are among the earliest emerging biobehavioral differences in children (Rothbart & Derryberry, 1981). Temperament has been defined as biologically based individual differences in attention, motor reactivity, emotion, and self-regulation (Rothbart & Derryberry, 1981) and consensus is emerging that it can be captured by three broad factors, Negative Emotionality (NE), Positive Emotionality (PE) or Extraversion, and Effortful Control (EC; Ahadi, Rothbart, & Ye, 1993; Casalin, Luyten, Vliegen, & Meurs, 2012; Rothbart, Ahadi, Hershey, & Fisher, 2001; Rothbart & Bates, 1998). In structural investigations of child temperament, PE is generally described as reflecting positive mood, engagement with the environment, and sociability. NE refers to individual differences in the frequency and intensity of experiencing negative emotions, including anger/frustration, sadness, and fear. EC is typically described as reflecting aspects of behavioral control, including control of cognitive resources as well as of impulses or behavioral tendencies. Moreover, temperament is thought to broadly consist of both reactivity and self-regulation components (Rothbart & Bates, 2006; Rothbart, Sheese, & Posner, 2007). Rothbart and colleagues describe reactive processes as encompassing automatic responses, in contrast to self-regulation, or voluntary control. Trait EC, or the ability to suppress a dominant response to perform a subdominant response, is thought to represent the regulatory components of temperament (Rothbart & Bates, 1998) that facilitate emotion regulation processes as well as other psychological mechanisms that require effortful modulation of behavior.

1.1. Associations between EC and NE

A growing body of literature indicates EC attenuates the risk associated with other temperament traits on psychopathology measures in childhood (e.g., Lonigan & Vasey, 2009; Muris, 2006; Muris, Meesters, & Blijlevens, 2007; Oldehinkel, Hartman, Ferdinand, Verhulst, & Ormel, 2007). For example, some evidence suggests high EC attenuates the effects of fearfulness on internalizing symptoms in adolescents (Oldehinkel et al., 2007). Another study found that EC moderated the association between NE and attentional bias to threat, such that only children rated low in EC and high in negative affectivity demonstrated an attentional bias (Lonigan & Vasey, 2009). Consistent with this research, other empirical work has identified that low levels of EC and high levels of negative affect result in a greater number of internalizing symptoms (e.g., Anthony, Lonigan, Hooe, & Phillips, 2002; Eisenberg et al., 2001). Similar results were obtained in a sample of young adults, such that high EC (assess via self-report on the ATQ-SF; Evans & Rothbart, 2007) was associated with lower dispositional negative affect, as well as lower expression of negative affect. These findings are consistent with the conceptualization of EC as

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a moderator of the effects of reactive elements of temperament (e.g., NE) on behavior. Additionally, executive functioning, which is conceptually and empirically similar to EC (e.g., Bridgett, Oddi, Laake, Murdock, & Bachmann, 2013; Zhou, Chen, & Main, 2012) mediated the relation between fearful temperament and anxiety symptoms in a sample of children between the ages of 7–10 years (Affrunti & Woodruff-Borden, 2015).

The joint contribution of EC and NE on child emotional behavior has often been assessed using a version of the disappointing toy paradigm (e.g., Carlson & Wang, 2007; Liew, Eisenberg, & Reiser, 2004; Saarni, 1984), which provides a face valid assessment of children's ability to adhere to social display rules. This task challenges children by presenting them with an undesirable toy, such that the expected emotional reaction (disappointment) is at odds with social display rules (i.e., one is expected to look pleased when receiving a gift). Thus, in this paradigm, emotion regulation entails inhibiting the presumed dominant response of displaying negative emotion, and engaging in a subdominant response, expressing positive emotions. For example, in one study, children rated by teacher and parent report as high on EC and low on NE made fewer verbal and gestural expressions of disappointment when presented with an unfavorable toy (Liew et al., 2004). In another study, children rated as high on laboratory-assessed inhibitory control measures exhibited fewer negative facial expressions when presented with an undesirable gift (Carlson & Wang, 2007). Similarly, a third study determined that children rated high on lab-assessed EC showed similar levels of positive affect after receiving both a desirable and undesirable toy; in contrast, children rated low in lab-assessed EC displayed less positive affect after receiving the undesirable toy (Kieras, Tobin, Graziano, & Rothbart, 2005).

The disappointing toy paradigm has some important limitations, primarily its assumption that observed levels of positive and negative facial expressions primarily reflect regulated emotions, rather than the child's level of emotional reactivity to the disappointment. Children who exhibit low levels of observed negative expression may be regulating their outward display of those emotions, or they may simply be less negatively affected by the disappointment (as would be expected for children who are temperamentally low on NE). In addition, many studies using this task rely solely on facial cues of emotion. This belies the importance of other indicators of emotion communication, including vocal and bodily expressions of emotion, which though less studied, play an important role in interpreting another's emotional state (e.g., Van den Stock, Righart, & deGelder, 2007). Vocal and bodily expressions may exhibit less specificity to particular discrete emotions (e.g., sadness versus anger) than do facial expressions, and instead may convey more information about the intensity of an emotional state (Russell, Bachorowski, & Fernandez-Dols, 2003; Wallbott, 1998). Intensity may be an important indicator of the degree to which an emotional expression has been regulated, as it may be easier to alter the degree to which one exhibits indicators of an emotion, rather than changing the emotion altogether or eliminating outwards signs of the emotional state.

1.2. Associations between EC and PE

Less is known about the regulatory function of EC on positive emotions. Some evidence suggests that high levels of EC are associated with reduced positive emotional expressiveness. For example, Kochanska, Murray, and Harlan (2000) found that children rated by trained coders as high on EC exhibited less intense joy during a positively valenced laboratory task. Similar results were obtained in a study examining the longitudinal associations between EC and emotionality (Kochanska & Knaack, 2003). Trait EC was assessed via a multitask lab battery at 22, 33, and 45 months of age, and parent report measures of child PE, NE, and EC were collected at 22 months. Children who were less prone to anger and joy (both parent-reported and observed in the lab) in the second year were rated as high on EC in the lab at 33 and 45 months, suggesting that high EC is associated with lower levels of both anger and joy. In another study of children born preterm (Burnson, Poehlmann, & Schwichtenberg, 2013), low levels of positive emotional expression observed during a lab task were associated with high lab-assessed EC in boys at 24 and 36 months of age; however, this relationship did not hold for girls. Children who display low levels of positive expression may be regulating their outward display of those emotions, or they may be less positively affected by the lab tasks (as would be predicted for children who are temperamentally low on PE). For children who exhibit high levels of EC, there may be a disconnection between the child's subjective experience of positive emotions and their outward expression of positive emotions.

Both theory and evidence point to the importance of high trait EC as a correlate of low emotional expressiveness in childhood, perhaps because high EC results in greater motivation or skill at downregulating behavioral expressions of emotion. However, most of the relevant evidence has explored associations between EC and negative emotions, with less focus on positive emotions. Thus, one of the aims of the current study was to investigate the relationship between EC and PE by examining child emotional expressions in response to lab tasks designed to elicit individual differences in PE. To understand the nature of the relationship between children's EC and regulation of emotion across development, it is important to demonstrate how these relationships manifest for multiple emotional states in order to explore the specificity of the findings to emotions with different motivational profiles.

One means of using children's reactions to laboratory provocations as evidence for individual differences in the regulatory function of EC is to consider the intensity of children's facial, bodily, and vocal emotional expressions (e.g., Kochanska et al., 2000). A straightforward approach is to assume that higher intensity expressions have been subjected to weaker efforts at downregulation than lower intensity expressions. Support for this interpretation comes from a study by Abe and Izard (1999), who explored correlates of individual differences in low and high intensity emotion expressions, as assessed in response to an emotion-eliciting lab task. Full-face (higher intensity) and partial face (lower intensity) expressions of positive and negative affect were coded in 18-month-old infants. Maternal ratings of children's personality were obtained at follow-up when participants were 3.5 years of age. Low and high intensity expressions were differentially associated with child traits. Specifically, high intensity negative expressions predicted higher neuroticism and lower agreeableness and conscientiousness (traits correlated with EC in children and adults; Cumberland-Li, Eisenberg, & Reiser, 2004; Grist & McCord, 2010; Jensen-Campbell et al., 2002), whereas low intensity negative expressions showed the opposite associations with these traits. These findings suggest that children who engage in a greater number of low intensity expressions and fewer high intensity expressions have more adaptive personality traits of planfulness and compliance, as one would expect for those higher in EC. Thus, lower intensity (as compared to higher intensity) expressions may be an index of greater overall regulation of one's emotional state. However, it is important to note that given the design of this study (emotional expressiveness was assessed prior to traits), the findings could also be interpreted as being consistent with the opposite direction of effect (high trait emotionality leads to lower EC).