



Emotional reactivity and executive control: A pathway of risk for the development of childhood worry



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ABSTRACT

Though risk factors associated with the development of anxiety have been examined, less is known about childhood worry. Current literature suggests that adult worriers may be more likely to avoid increases in negative affect (emotional contrast avoidance), and less likely to effectively regulate their emotions. The current study tested a mediational model to examine the role of emotional and attentional control in the relation between emotional reactivity and child worry. Participants were 99 children between 7 and 10 years old, and their parents, from a community sample. Parents completed measures of child temperament and executive function, and children completed a measure of worry. Overall the data supported the study hypotheses. Child temperaments rated as low in soothability were significantly related to higher worry symptoms. Attentional shift and emotional control acted as serial mediators in the relation between temperament and worry, and fully mediated the relation. These findings suggest a model for the development of childhood worry that combines emotional contrast avoidance and emotional dysregulation.

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1. Introduction

Worry is a common cognitive phenomenon, with approximately two thirds of the population reporting one or more worries (Gonçalves & Byrne, 2013). For individuals diagnosed with Generalized Anxiety Disorder (GAD), these worries become perseverative and overwhelming (American Psychiatric Association, 2013). Individuals with GAD report lower quality of life, less life satisfaction, and greater impairment in social functioning and interpersonal relations (Henning & Turk, 2007). GAD has far reaching effects, with 3% of the population having received the GAD diagnosis, and many of these adults reporting that their worries began in childhood (Costello, Egger, & Angold, 2005). Further, 30% of children report subclinical levels of worry in community samples (Bell-Dolan, Last, & Strauss, 1990). Identifying why and how worry develops to reach clinical levels is vital to its treatment. Current literature suggests that treatment of GAD may become more difficult as a person ages, and therapy is more effective for children with emerging worry symptoms than adults who report a lifetime history of symptomatology (Covin, Ouimet, Seeds, & Dozois, 2008).

Worry, the cardinal feature of GAD, is described as patterns of anxious, future-tense cognitions. Worry is verbal in nature

and serves as an attempt to avoid experiencing upsetting mental imagery, negative affect and physiological experiences of anxiety (Borkovec, Alcaine, & Behar, 2004). Current models of GAD posit that uncontrollable worry arises in individuals who experience dysfunction at multiple stages of emotion. The Contrast Avoidance theory of worry proposes that high levels of emotional reactivity may predispose an individual to developing worry as a maladaptive coping mechanism (Llera & Newman, 2014). Building on both the Cognitive Avoidance model of worry (see Borkovec et al., 2004) and Affective Contrast theory (see Dermer, Cohen, Jacobsen, & Anderson, 1979), Newman and Llera demonstrate that worried individuals are hypersensitive to shifts in emotional states, and may employ worry as a means of maintaining a negative mood state, rather than experiencing the unpleasant effect of shifting from positive to negative mood (Newman, Llera, Erickson, Przeworski, & Castonguay, 2013; Newman & Llera, 2011).

Emotion regulation is also impaired in individuals with GAD (Mennin, Heimberg, Turk, & Fresco, 2002). An emotion dysregulation model of worry characterizes individuals with GAD as being less able to identify their emotions and more likely to employ maladaptive attempts to modulate these intense emotional experiences, in addition to experiencing more intense emotional states and more reactivity to these emotions (Mennin, Heimberg, Turk, & Fresco, 2005). Maladaptive emotion regulation may include behaviorally avoidant or aggressive strategies, such as negative self-talk or refusal to participate in feared situations (Suveg et al., 2008).

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Consistent with current theories of emotional processes (Gross, 2002), pathological worriers appear to experience dysfunction at each level of emotional reaction, regulation and response. Indeed, individuals diagnosed with GAD report more emotional reactivity, less adaptive coping attempts, and more distress surrounding their worries. Emotion regulation deficits such as lack of emotional clarity, difficulty accepting emotions, and an inability to access emotion regulation strategies are associated with worry and GAD symptoms in both self-reports (Salters-Pedneault, Roemer, Tull, Rucker, & Mennin, 2006) and daily diary studies (Decker, Turk, Hess, & Murray, 2008).

Currently, testing of these models has been limited to adult populations, leaving little known about the emotional regulation abilities of worried children, and subsequent development of worry to clinical levels. Developmental perspectives posit that temperamental reactivity underlies emotional experiences, which are modulated by regulatory processes (Rothbart & Sheese, 2007). Reactivity is observable from infancy and remains relatively stable through age 5 (Kagan, Snidman, & Arcus, 1998). Distraction can be used to soothe infants by shifting their attention (Harman, Rothbart, & Posner, 1997), but self-regulated attentional control does not develop until around 24 months (Ursache, Blair, Stifter, & Voegtline, 2013) and emotional control cannot begin to develop until the pre-school years, when children gain an understanding of what emotion is and what it means (Thompson & Lagattuta, 2006). Higher order cognitive development, such as the purposeful employment of executive attention, effortful control and related regulatory processes are observable by 7 to 10 years of age (Simonds, Kieras, Rueda, & Rothbart, 2007).

Executive attention is the aspect of attention that relates to self-regulation of cognition and emotion (Rueda, Posner, & Rothbart, 2011). Executive attention, or attentional control, is important for goal directed behaviors and both internal (discrepancies between emotional, cognitive and physiological states) and external (such as threat in the environment) conflict monitoring and detection (Rueda, Posner, & Rothbart, 2005). Attentional control is disrupted in individuals with GAD, particularly in ambiguously threatening situations (Hayes, Hirsch, Krebs, & Mathews, 2010). Attentional bias to perceived threat has been implicated as a risk factor for the later development of anxiety disorders (Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & van IJzendoorn, 2007; Puliafico & Kendall, 2006). Worried children specifically tend to search for information that confirms threat, while healthy children are able to flexibly attend to information that disconfirms threat (Muris, Debipersad, & Mayer, 2013). Among children, high levels of temperamental negative affectivity, a broad construct that includes emotional reactivity, predicts attentional bias to threat in the presence of low levels of effortful control (Lonigan & Vasey, 2009).

Negative affect is reliably associated with the development of anxiety disorders (Brown, Chorpita, & Barlow, 1998; Lonigan & Vasey, 2009), but emotion dysregulation predicts psychopathology above and beyond the influence of negative affect (Bradley et al., 2011). This effect is observed in individuals with GAD especially, and emotional dysregulation in adult populations appears to be a unique pathway through which negative affect relates to GAD symptoms (Salters-Pedneault et al., 2006). Heightened negative emotional responding and use of emotion regulation strategies linked to poorer outcomes (Gross, Richards, & John, 2006; Webb, Miles, & Sheeran, 2012) have been associated with anxiety disorder diagnoses in children ages 10–17 years (Carthy, Horesh, Apter, & Gross, 2010). Further, attentional bias to threat has been implicated as a mediator in the relation between negative affect and pathological anxiety (Lonigan, Vasey, Phillips, & Hazen, 2004). Attentional control, emotional control and emotional reactivity are all separable constructs that predict vulnerability to pathological anxiety,

but it is not yet clear how these variables relate to one another or whether they interact to predict childhood psychopathology.

The current study sought to test attention and emotion regulation characteristics in worried children using developmentally appropriate measures of temperament and executive function. The study hypothesized that emotionally reactive temperaments, as identified by Rothbart and colleagues (Rothbart & Sheese, 2007), would predict worry symptoms, such that greater temperamental emotional reactivity would be associated with greater reports of worry. The study also hypothesized that attentional and emotional control would mediate the relation between reactive temperaments and worry symptoms. Path analytic examinations have modeled emotional dysregulation as a mediator of the relation between behavioral inhibition and anxiety in general (Suveg, Morelen, Brewer, & Thomassin, 2010), but no comparable analysis has been undertaken for the relation between temperamental risk factors and worry symptoms in children, and no models have tested the role of executive attention in this relation.

2. Method

2.1. Procedure

Participants for this study were recruited from local schools and community locations such as churches, doctor's offices and coffee shops with the use of fliers as part of a larger, longitudinal study of the development of childhood worry based on a number of cognitive, emotional and familial vulnerability factors. For the first wave of this study, eligible families were either brought to the lab to complete age appropriate measures of anxiety, depression, temperament and family functioning, or were sent packets to fill out and mail back to the lab. Recruitment and study materials were submitted and approved by University of Louisville's Institutional Review Board prior to use, and both child assent and parent consent were required for participation in the study. No monetary compensation was given to families. Exclusion criteria for children included being younger than 7 years or older than 12 years, being the non-biological child of their parent, and having developmental delays.

2.2. Participants

Participants were ninety-nine parent-child dyads; 59 children were male and 40 were female. An a priori power analysis indicated that at least 54 participants would be needed to observe a large effect size (Cohen's $f = .35$) with an α -level of .05 and power of .95 (Faul, Erdfelder, Lang, & Buchner, 2007). The children were 7–12 years old, with a mean age of 8.46 years ($SD = 1.2$), and almost all were self-described as European American (93.9%). Most parents were mothers (89.9%), and the mean age of the parents was 39.7 years ($SD = 6.56$). Most parents reported being currently married (88.9%) and reported a household income of over \$60,000 a year (72.7%). Children in our sample reported an average level of worry ($M = 12.95$, $SD = 5.62$) that is below the suggested diagnostic level for children diagnosed with GAD (24.09) according to the Penn State Worry Questionnaire-Child Version (PSWQ-C) (Pestle, Chorpita, & Schiffman, 2008). Only 7 children in our sample exceeded this clinical cutoff, suggesting an overall non-clinical sample.

2.3. Measures

2.3.1. Penn State Worry Questionnaire—child version

The Penn State Worry Questionnaire for children and adolescents (PSWQ-C) is an adaptation of the Penn State Worry Questionnaire (Meyer, Miller, Metzger, & Borkovec, 1990). The

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