



A longitudinal investigation of predictors of the association between age 3 and age 6 behavioural inhibition [☆]



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ARTICLE INFO

Article history:

Received 28 May 2015

Revised 28 March 2016

Accepted 29 April 2016

Available online 30 April 2016

Keywords:

Behavioural inhibition

Positive emotionality

Child temperament

Parenting

ABSTRACT

Children who exhibit elevated levels of the temperament trait behavioural inhibition (BI) across time may be at greatest risk for anxiety. However, little research has investigated the influence of other temperamental traits, particularly positive emotionality (PE), on the continuity of BI in childhood, nor whether parental overprotection influences associations between early and later child BI. To explore whether PE and overprotection shape associations between early and later BI, this longitudinal study of three-year-olds ($N = 446$) followed up at age 6 included tasks tapping child temperament, and parental overprotection was assessed via interview ratings and parent-report. Lower levels of child PE and higher levels of caregiver overprotection at baseline predicted stronger associations between laboratory-assessed BI at ages 3 and 6. Findings elucidate influences shaping the developmental continuity of BI.

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1. Introduction

Behavioural inhibition (BI) is a temperament trait that refers to individual differences in fearfulness and reticence in the context of novel social and non-social situations (e.g., Fox, Henderson, Marshall, Nichols, & Ghera, 2005). Temperament researchers and developmental psychopathologists have a longstanding interest in BI, given its associations with various internalizing disorders (e.g., Rotge et al., 2011). For example, a recent meta-analysis found a greater than sevenfold increase in risk for developing social anxiety disorder among individuals with elevated BI (Clauss & Blackford, 2012). This heightened risk has been found in studies using different methods and measures, including longitudinal studies (e.g., Hirshfeld-Becker et al., 2007).

A considerable body of research establishes the trait-like (i.e., stable) properties of BI. For example, Gest (1997) found evidence for the stability of interviewer-rated BI in both childhood and adolescence, reporting an average correlation of 0.57 between BI scores across 5.5-year follow-ups, and Scarpa, Raine, Venables, and Mednick (1995) reported moderate stability of informant- and observer-rated BI assessed from toddlerhood to late childhood. However, there is also evidence for change in BI over time, such that some children transition from being relatively inhibited to being less so, and vice versa (e.g., Essex, Klein, Slattery, Goldsmith, & Kalin, 2010; Rubin, Burgess, & Hastings, 2002). Understanding factors that account for such shifts is important given evidence that it is the persistence of elevated BI over time that marks children's risk for anxiety more so than elevated BI at a single time point. For example, Chronis-Tuscano et al. (2009) assessed maternal reports of BI in infancy and early childhood, finding that stable, elevated BI was related to elevated risk for social anxiety in adolescence; children with maternally reported BI in the top one-third of the sample across all four time points (i.e., 14 months, 24 months, 4 years, and 7 years) showed a nearly four times increased risk for a social anxiety disorder diagnosis at ages 14–16 compared to children in the bottom two-thirds. Essex et al. (2010) observed

[☆] This research was supported by National Institute of Mental Health grant R01 MH069942 (Klein), General Clinical Research Center grant M01 RR10710 (Stony Brook University, National Center for Research Resources), and the Children's Health Research Institute.

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similar findings, finding that persistently high inhibition (i.e., BI scores in the upper 25% of the sample at a minimum of four of the five assessments, and no BI score in the lower 25% of the sample) was associated with greater risk for social anxiety disorder in adolescence (Essex et al., 2010). Therefore, stably elevated BI seems especially relevant to risk for anxiety disorders.

A greater understanding of factors that influence the course of BI over time would help identify those children at greatest temperamental risk for anxiety, and could potentially inform prevention and early intervention strategies that are targeted and cost-effective. Other temperament/personality traits, particularly those contributing to engagement with novel environmental stimuli, may influence BI over time. For example, positive emotionality (PE) includes positive affect, approach-related and exploratory behaviours, and interest and engagement with the environment as important facets (e.g., Laptook, Klein, Olino, Dyson, & Carlson, 2010). Children who are initially high in both BI and PE may become less inhibited over time as elevated PE facilitates exposure and acclimatization to novelty. This would be consistent with conceptually related models; for example, Gray (1970) described two orthogonal motivation systems, the Behavioral Inhibition System (BIS) and the Behavioral Activation System (BAS), linking BIS to negative affect and fearful responding, and BAS to extraversion and positive affect (e.g., Coplan, Wilson, Frohlick, & Zelenski, 2006). In Gray's model, these systems control avoidance and approach and jointly influence behavioural outcomes. Relatedly, Asendorpf (1990) suggested that shy children are caught in an approach-avoidance conflict and their subsequent inhibited or uninhibited behaviour depends on the result of this conflict. Further, models positing such trait interactions are consistent with research indicating a weakened association between shyness and internalizing problems in young boys with elevated levels of both shyness and activity levels, which suggests that increased activity levels may buffer the risk of internalizing disorders associated with elevated shyness (Karevold, Coplan, Stoolmiller, & Mathiesen, 2011).

Also relevant is the small literature indicating that high PE buffers the impact of other vulnerabilities to negative outcomes (Clark, 2005; Mackrell et al., 2014; Park, Belsky, Putnam, & Crnic, 1997; Tugade & Fredrickson, 2004; Wichers et al., 2007; see Davis & Suveg, 2014 for a comprehensive review). For example, Mackrell et al. (2014) found that high PE in children interacted with maternal depression to predict lower cortisol stress reactivity in children, and Wichers et al. (2007) found that high positive affect buffered negative affect reactivity to stress. Like BI, PE appears moderately stable in childhood (e.g., Davis & Suveg, 2014; Durbin, Hayden, Klein, & Olino, 2007). However, we are unaware of any studies examining whether PE and BI interact to predict later BI, despite separate literatures on the stability of these traits. Indeed, Rothbart and Bates (2006) noted the lack of empirical studies examining interactions between multiple temperament traits; as temperament traits do not exist in isolation within an individual, they emphasized the importance of examining how traits work together to shape outcomes. They suggested that fearful temperament might differentially influence an individual's socio-emotional adjustment based on other temperament traits present within the individual (e.g., tendency toward dysregulation) as well as environmental factors (Rothbart & Bates, 2006). Increased understanding of interactions between temperament traits, particularly BI and PE, could provide a broader understanding of factors that contribute to child risk and resilience, with both theoretical and practical implications.

Like PE, certain parenting behaviours might serve to either facilitate or suppress children's exploratory and approach-related behaviours (e.g., Buss & Kiel, 2013). Such parenting patterns may be influential in shaping the stability of trait BI over time,

determining whether inhibited children remain so throughout childhood. Some literature implicates specific parenting styles in the stability of childhood BI, including maternal intrusiveness (Park et al., 1997; Rubin et al., 2002), oversolicitousness (i.e., parenting characterized by warmth, intrusiveness, and low responsiveness; Degnan, Henderson, Fox, & Rubin, 2008; Rubin, Hastings, Stewart, Henderson, & Chen, 1997), and negativity (i.e., hostility and negative control; Hane, Cheah, Rubin, & Fox, 2008). Degnan et al. (2008) found that maternal oversolicitousness moderated the relationship between observationally assessed social reticence at age 4 and social wariness at age 7, such that reticent preschoolers tended to be high in wariness when their mothers also exhibited high levels of solicitous behaviour.

Despite research examining related parenting constructs and child outcomes, no studies have looked specifically at whether the relationship between children's BI across time is moderated specifically by parental overprotection, typically defined as parenting behaviours that eliminate, or shelter children from, stress, as well as parents' excessively comforting and affectionate reactions when their children exhibit fear (e.g., Hutt, Buss, & Kiel, 2013; Kiel & Buss, 2010). Past research in preschoolers has focused on the role of overprotection as a mediator of links between fearful temperament and shyness/inhibition (Kiel & Buss, 2012). However, research on the moderating effects of overprotection on BI over time is lacking.

This gap in the BI literature is surprising given research implicating parental overprotection and related parenting behaviours in childhood anxiety (e.g., Kiel & Buss, 2010). Indeed, moderation effects have been reported in the child anxiety literature, finding interactions between child BI and parental overprotection when predicting child anxiety (e.g., Degnan, Almas, & Fox, 2010; Murray, Creswell, & Cooper, 2009). Elevated BI combined with high parental overprotection has been found to predict children's anxiety (e.g., Degnan et al., 2010; Murray et al., 2009). Parental overcontrol, a construct that overlaps with overprotective parenting and includes inappropriate and excessively protective, directive, and controlling behaviours, may also exacerbate the risk for anxiety associated with BI, such that stable, elevated BI in childhood has been associated with greater social anxiety in adolescence when mothers were overcontrolling (e.g., Lewis-Morrarty et al., 2012). Such findings suggest that childhood BI may confer greatest risk for anxiety in the presence of overprotective care. Although BI and anxiety share some features (e.g., heightened fear response; physiological correlates), the two constructs are distinguished by the extent to which such responses are pervasive and confer clinically significant, maladaptive repercussions (Goldsmith & Lemery, 2000). Little is known about whether overprotective care also serves to maintain early BI, such that inhibited young children exhibit persisting high levels of this trait when parents are overprotective prior to the development of clinically significant anxiety. Research has not examined parental overprotection specifically in the context of moderation models investigating BI assessed longitudinally in early childhood, despite its roles in moderating links between BI and children's anxiety and in mediating BI assessed at different time points during toddlerhood.

Various mechanisms potentially underlie the ways in which overprotective parenting may contribute to BI over time. For example, behavioural models suggest low parental overprotection may result in children's increased exposure to novelty, thereby increasing children's opportunities to develop abilities to cope with novel, anxiety-eliciting situations in the future, resulting in a decrease of BI over time (e.g., Muris, van Brakel, Arntz, & Schouten, 2011). Behavioural treatments of anxiety similarly stress the roles of exposure in reducing anxious behaviours (e.g., Abramowitz, Deacon, & Whiteside, 2010), while the principle of "steeling" also proposes that mild stress exposure is advantageous when considering children's resilience (e.g., Rutter, 2012). Research

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