Temperamental Sensitivity to the Effects of Parenting in the Development of Child Anxiety

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Abstract

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The role of parenting behaviors, and their moderation by child temperament, in the development of child anxiety were examined using longitudinal data collected from mothers and their children (N=306) across the preschool period (3-5.5 years of age). Using hierarchical linear regression and regions of significance analyses, interactions were tested between affective parenting behaviors (warmth, negative affect), negative psychological control (intrusiveness) and positive behavioral control (scaffolding) and child fearfulness, across both general and novel/uncertain contexts, to gain better specificity in understanding when, and for which children, particular parenting behaviors contribute to continuities or discontinuities in child anxious behaviors. Parental negative affect and intrusiveness were hypothesized to predict higher later anxiety for temperamentally fearful children, whereas parental scaffolding was hypothesized to predict lower later anxiety for those same children. In contrast to hypotheses, parental warmth predicted lower child anxiety overall (main effect), and there was mixed support for interaction effects. As a secondary aim, parallel models predicting child depression symptoms were also conducted for

comparison, to address empirically whether different parenting behaviors contribute uniquely to separable aspects of child internalizing problems. Implications for preventive approaches in parenting children at risk for anxiety, and for incorporating more direct parenting instruction in the context of child anxiety treatment, are discussed.

Anxiety disorders are among the most common and persistent clinical diagnoses of childhood, with lifetime prevalence rates converging around 15-20 percent (Beesdo, Knappe, & Pine, 2009; Bittner et al., 2007; Walkup et al., 2008). For many individuals, the roots of anxiety start in childhood and problems persist into adulthood, continuing to disrupt functioning across social, academic and occupational domains. Only after we have identified key factors in the etiology of anxiety will we be able to identify individuals at heightened risk and develop effective early intervention or prevention approaches. Both parenting and temperament have been identified as such risk factors, and more than two decades of parallel lines of research have demonstrated their independent effects. Increasingly, studies have yielded evidence that temperament and parenting behaviors interact and transact over early childhood. Yet, the field still lacks a comprehensive process model that explains specifically how these two factors influence each other across development to produce anxiety outcomes in children. Based on findings from a recent review that revealed gaps and inconsistencies in the extant literature (Ruberry, unpublished), the proposed study will examine one piece of this model: the ways in which fearful temperament moderates the relation between specific parenting behaviors and the development of child anxiety.

Anxiety and Anxiety Disorders in Children

Anxiety disorders are characterized by heightened distress to stimuli perceived as threatening, leading to withdrawal (Degnan, Almas, & Fox, 2010). While the neurobiological response patterns of fear and anxiety may look topographically similar (increased arousal, narrowing of attention, increased scanning of the environment, priming of motor responses), it is important to draw the functional distinction that fear is elicited by actual confrontation with a dangerous stimulus, whereas anxiety comprises the perception of, and preparation for, possible

danger and a perceived lack of control over this potential future event (Chorpita & Barlow, 1998; Gray & McNaughton, 2003). When examining temperamental factors typically conceptualized as fearfulness or behavioral inhibition as predictors of later anxiety, one can imagine how these responses could become habitual, reinforced on both a behavioral and neurobiological level. This framework also begs the question of whether anxiety disorders represent an extreme end of a temperamental continuum, or whether temperamental traits that look quite similar to anxiety symptoms instead represent a vulnerability factor that leads to increased risk for anxiety problems when intersecting with other risk factors (Nigg, 2006). This highlights the importance of considering functional impairment related to anxiety symptoms. Because of the categorical rather than dimensional approach to current diagnostic systems, epidemiological estimates of anxiety disorder prevalence are limited in that they cannot provide a broader estimate of the frequency of sub-threshold anxiety symptoms that likely precede the development of full-blown anxiety disorders. These early expressions of anxiety are precisely the phenomena the proposed study seeks to understand, as they will provide clues as to etiology and opportunities for less intrusive, less costly prevention and intervention efforts. This may in turn reduce the lifetime burden of impairment and suffering on individuals, and provide some reprieve to an over-burdened treatment system which cannot currently meet the demand for empirically supported treatments for anxiety (Khanna, Kerns, & Carper, 2014; Rapee, 2002).

Prevalence and Course

As noted above, most current estimates of cumulative prevalence of anxiety disorders from childhood through adolescence converge around 15-20 percent. Our current understanding is that anxiety disorders tend to be fairly chronic and persistent in nature (Beesdo et al., 2009; Degnan et al., 2010; Grills-Taquechel & Ollendick, 2007). However, it is worth noting that

evidence for their protracted course stems primarily from retrospective studies in adults (only a minority of whom ever seek or receive treatment; Rapee, 2002). It may be the case that anxiety detected and treated earlier in development is much more malleable, and thus may come to be considered a less enduring syndrome. A prospective, follow-back cohort study of 11- to 32-year-olds with anxiety disorders at 32 found that over half of them had been first diagnosed with an anxiety disorder before the age of 18 (Gregory et al., 2007). Few studies have prospectively followed children through adolescence and into adulthood, but epidemiological data from the Great Smoky Mountains Study indicate that the presence of any anxiety disorder across the 9- to 16-year-old waves doubled the likelihood of having an anxiety disorder at any subsequent wave (95 percent confidence interval = 1.2-3.4; Costello, Mustillo, Erkanli, Keeler, & Angold, 2003). In another long-term prospective population study, anxious and withdrawn behaviors at age 8 predicted internalizing disorders, both anxiety and depression, into early adulthood (Goodwin, Fergusson, & Horwood, 2004). These studies, among others, support the notion that anxious patterns of responding to the world tend to endure for many individuals when left unaddressed.

Familial Transmission of Anxiety

A large number of studies have demonstrated the clustering of anxiety disorders within families, such that children with one or more parents with an anxiety disorder are more likely to develop anxiety themselves. Studies suggest that non-shared environmental influence (that is, environmental factors unique to individuals) accounts for a substantial portion of the remaining variance in anxiety outcomes after accounting for genetic heritability and shared environmental factors (McLeod, Wood, & Weisz, 2007). This may include parenting specific to a particular child, or non-genetic biological influences that affect one sibling differentially from others, though gaps in the literature leave significant room for better identifying specific environmental

influences on the etiology of anxiety, particularly as they interact with child characteristics such as temperament.

The Role of Temperament

In their foundational book, Chess and Thomas proposed that some children were rendered more vulnerable to problems with fear and anxiety as a result of the temperament with which they were born (1977). Preeminent researchers in this area have since conceptualized temperament as a biologically based set of individual tendencies to respond to the environment (particularly novelty), that emerge early, are fairly stable across time and situation, and yet are shaped by experience (Kagan & Fox, 2006; Rothbart & Bates, 2007). Though measured and conceptualized in various ways across studies, temperament is considered a major factor in the etiology of psychopathology. Specifically, a particular constellation of traits comprising a *behaviorally inhibited* (BI) temperament, evident as early as infancy, has been well-established as conferring increased risk for internalizing disorders, and anxiety in particular, later in childhood and adolescence and into adulthood (Biederman et al., 1993, 2001; Chronis-Tuscano et al., 2009; Degnan & Fox, 2007; Essex, Klein, Slattery, Goldsmith, & Kalin, 2010; Hudson, Dodd, Lyneham, & Bovopoulous, 2011; Kagan & Snidman, 1999; Muris, Brakel, Arntz, & Schouten, 2010; Prior, Smart, Sanson, & Oberklaid, 2000; Rapee, 2014). This BI framework predominates the literature in characterizing a temperamental profile of high fear reactivity predisposed to later anxiety: it comprises a negative response to novelty as early as infancy, which may lead to socially inhibited and withdrawn behaviors in toddlerhood continuing into childhood. While behavioral inhibition is one of the most extensively documented temperamental profiles, no known studies have examined whether related temperament constructs such as fearfulness, infant negative reactivity, and shyness, significantly differ from

BI in their predictive validity for later anxiety. For the purposes of this review, studies examining fearful temperament, broadly construed, were included.

These trait-like behavioral tendencies are thought to be mediated by differences in physiological and neurobiological responding that are genetically predisposed. Specifically, systems underlying the processing of fear may be hyper-responsive or sensitive in these individuals, beginning with initial brain responses to novelty or threat and cascading through other systems including autonomic nervous system responses, attentional biases to threat, and behavioral responses from startle to avoidance (Pérez-Edgar et al., 2010; Pérez-Edgar & Fox, 2005; Schmidt & Fox, 1998; Schmidt, Fox, Schulkin, & Gold, 1999). Heightened amygdala reactivity to novel or potentially threatening stimuli as well as differences in functional connectivity between the amygdala and other brain regions including striatum and prefrontal cortex have been demonstrated in adolescents and adults with BI (Pérez-Edgar et al., 2007; Roy et al., 2014; Schwartz, Wright, Shin, Kagan, & Rauch, 2003). These neural responses mirror those observed in individuals with anxiety disorders (McClure et al., 2007), leading the field toward an endophenotypes approach that may help to explicate the link between temperament and disorder through such biomarkers (Goldsmith & Lemery, 2000). Repeated behavioral avoidance of stimuli and situations that elicit fear may calm this reactivity in the short term, but tends to generalize over time, and in the long-term serves to reinforce anxiety (Degnan et al., 2010). Stability estimates for temperamental fearfulness range markedly depending on the developmental stages spanned but tend to be moderate, and diverge further when considering how many children with this early temperament go on to develop anxiety disorders per se (Degnan & Fox, 2007). Given that only a proportion of children displaying early inhibition or fear show stability in this trait or go on to develop problematic anxiety (e.g., Hirshfeld et al.,

1992; Prior et al., 2000), is it critical that we better understand how interactions between temperament and key environmental influences, such as parenting, may increase or decrease this risk.

Parenting

Beyond the genetic or trait-related risk factors for the development of anxiety in children, aspects of the social context also contribute to children's anxiety. These include broader elements of household chaos, adverse or traumatic early experiences (Chorpita & Barlow, 1998), as well as vicarious learning that may take place when parents or others model fearful responses repeatedly over time in front of children (e.g., Aktar, Majdandžić, de Vente, & Bögels, 2014; de Rosnay, Cooper, Tsigaras, & Murray, 2006; Dubi, Rapee, Emerton, & Schniering, 2008; Gerull & Rapee, 2002). The latter mechanism has been tested in experimental paradigms but is more challenging to assess in a naturalistic study design.

Of particular interest to the current study, specific parenting-related behaviors also have a significant influence on children's anxiety; however, estimates of the magnitude of this impact vary substantially. Several recent meta-analyses have found small to medium effect sizes of the effects of parenting overall on the development of children's anxiety disorders (McLeod, Wood, et al., 2007; Möller, Nikolić, Majdandžić, & Bögels, 2016; Van Der Bruggen, Stams, & Bögels, 2008). However, as these reviews show, particular parenting behaviors or dimensions vary significantly in their impact and directly observed parenting behaviors tend to show a larger effect than those assessed by parent or child rating (McLeod, Wood, et al., 2007). Because specific parenting behaviors will have differential impact on children based on child temperament, main effects analyses that essentially average across parents and children may occlude the effective impact of a parenting behavior on a *particular* child or set of children.

Despite the varying conceptualizations of parenting throughout the literature, several key factors have been examined with regard to children's anxiety. Studies in this area have generally focused on dimensions that can be organized into two theoretically orthogonal continua, as described by Maccoby and Martin (1983) and supported by subsequent factor- and meta-analytic studies (McLeod, Wood, et al., 2007). One is an **affective** continuum ranging from parental warmth and acceptance at one end to rejection at the other. The other is a parental **control** continuum, ranging from autonomy-granting at one end to over-control, intrusiveness or overprotection at the other.

Across this body of literature, elements of the affective dimension variously include withdrawal or a lack of interaction or involvement with the child; outright rejection, criticism or disapproval of the child and their expressed emotions; emotional negativity or hostility toward the child; warmth; positive regard; sensitivity; interactiveness and engagement. This heterogeneity makes it challenging to compare results across studies, as even constructs such as rejection and warmth do not necessarily line up as opposite ends of the same pole: for example, an absence of warmth does not equal the presence of criticism or rejection, and a lack of rejection does not connote the presence of warmth. These behaviors are posited to influence children's development of anxiety in several ways. First, rejection and criticism may convey in a general sense to children that the world is hostile and induce a negative sense of self, leading to internalizing symptoms (Möller et al., 2016). Parental acceptance, on the other hand, may support children's development of emotion regulation skills and their tolerance for negative emotions, without which they may be more vulnerable to developing anxiety (Wood, McLeod, Sigman, Hwang, & Chu, 2003).

Within the control dimension are elements of psychological and behavioral control that can either facilitate or interfere with children's developing self-regulation, sense of autonomy and confidence. Psychological control includes protective and over-protective behaviors intended to shield a child from danger (which may or may not be present); intrusiveness in which parents forcibly direct the child's behavior; over-involvement in which parents needlessly help, direct or interfere with the child; and other behaviors in which parents attempt to manage or regulate children's emotional experience or actions. At the other end of that spectrum are autonomy-granting and encouragement to approach novelty, which provide guidance and scaffolding to children in challenging situations and are theorized to communicate to children that they can cope. "Challenging" parenting is a newer construct in this realm, initially coined to capture the important and potentially unique contribution of fathers, which is characterized by gently pushing children to approach and overcome their limits, teasing, and rough-and-tumble types of play (Majdandžić, de Vente, & Bögels, 2016; Majdandžić, Möller, Vente, Bögels, & Boom, 2014).

Less frequently studied in relation to internalizing (as opposed to externalizing) outcomes, but also relevant, are dimensions of behavioral control such as limit-setting, clear instructions, and structured parenting (Natsuaki et al., 2013). When parents are over-controlling or intrusive, they limit children's exposure to challenging situations that could help promote a sense of mastery and confidence, and this is thought to undermine the child's willingness to approach novel or unfamiliar situations for fear that they will not be able to handle them successfully (Rapee, 1997, 2001; Van Der Bruggen et al., 2008). This over-protection also promotes and/or reinforces children's beliefs that the world is unpredictable and dangerous, a hallmark of anxiety (Chorpita & Barlow, 1998). On the contrary, when parents provide clear and

reasonable expectations about behavior and enforce these limits consistently, such structure may create a predictable environment that reduces children's worries and anxiety, particularly regarding parents' reactions to behavior.

It is important to note that attempts to distinguish and independently assess the contributions of these parenting behaviors to anxiety are hampered both by inconsistencies in definition and measurement across studies, and by individual differences in the functional impact of behaviors. For example, for an inhibited child, excessive warmth may function as overprotectiveness and solicitousness that reinforce anxious tendencies. Constructs like sensitivity and responsiveness also pose a challenge given that they are necessarily dependent on the child's temperament; a sensitive response to an inhibited child might be very different from that to a disinhibited child. Likewise being highly responsive, while generally considered a positive parenting behavior, may serve to reinforce fearfulness in children who tend to respond to the world that way. Considering these complexities, the current review is relatively agnostic as to whether particular parenting behaviors are inherently "good" or "bad" and will instead examine their functional significance in maintaining or increasing children's anxious tendencies. This is in line with the notion of "goodness-of-fit" in parenting: that what is effective for a particular child will depend on their temperamental needs (Thomas & Chess, 1977).

Evidence for Temperament – Parenting Interactions

A significant challenge in parsing apart of the effects of parenting and temperament on child psychopathology are the multidirectional processes that occur between mothers, fathers and their children across development. In considering how these processes may play out in the development of child anxiety, it is plausible that there are parenting behaviors that directly cause anxiety in children; for example, over-involvement and over-protective behaviors may

communicate to children generally that the world is dangerous or that they are unable to handle the challenges they may face. The messages communicated by such behaviors may be particularly salient for children who are temperamentally more inhibited or fearful; that is, particular temperaments may render children more sensitive to these forms of parenting. It is also likely that children's fearful behaviors, borne out of genetic or temperamental predisposition, may trigger parents' own anxiety or concern and elicit further protective parental responses, reinforcing and perpetuating the child's fearfulness. Recognizing that transactional processes of mediation are also important, the proposed study focuses on the role of temperament as a *moderator* of the relation between parenting and child anxiety.

The interaction between temperament and parenting can be sliced in two directions, each addressing a different question (though the statistical analyses are identical, and thus only the frame of the study distinguishes the difference). The majority of studies look at moderation by parenting, asking how the presence of particular parenting behaviors impacts the relation between early fearful temperament and anxiety. Other studies, including the current one, frame the question in terms of moderation by temperament, to understand for whom particular parenting behaviors may be harmful or helpful in the development of anxiety. In other words, this type of analysis helps to identify parenting behaviors that may either increase or buffer risk for anxiety differentially for a temperamentally vulnerable subset of children.

Parent Affective Behaviors

In terms of main effects, existing reviews and meta-analyses have found mixed results or evidence for a small effect of parenting behaviors that can be categorized as primarily affective (warmth, acceptance, negativity, rejection, etc.) on child anxiety among the general population (i.e., community, rather than at-risk or clinical, samples). In their 2003 review, Wood and

colleagues concluded that there was mixed evidence for these behaviors, with the suggestion that acceptance might be related indirectly to child anxiety via maternal anxiety, while outright criticism appeared to be more directly related to child anxiety (Wood et al., 2003). A 2007 meta-analysis found an average of a small effect size of $r = .20$ for parental rejection; within that, however, components ranged widely in their average effects (warmth = .06, withdrawal = .22, aversiveness = .23; McLeod, Wood, et al., 2007). This does suggest that it may not be appropriate to combine these aspects of "affective" parenting behaviors into an overall positive or negative affective behavior construct, because doing so may obscure the specificity of effects. However, the currently limited number of interaction studies and the lack of concordance in constructs across them render it necessary to some degree in order to glean general patterns. Studies subsequent to these meta-analyses have continued to yield mixed findings regarding affective parenting and child anxiety (Barnett & Scaramella, 2015; Bayer, Sanson, & Hemphill, 2006; Bögels, van Oosten, Muris, & Smulders, 2001; Degnan et al., 2015; Degnan, Henderson, Fox, & Rubin, 2008; Edwards, Rapee, & Kennedy, 2010; Ginsburg, Grover, & Ialongo, 2005; Karreman, de Haas, van Tuijl, van Aken, & Deković, 2010; Knappe, Beesdo-Baum, Fehm, Lieb, & Wittchen, 2012; Luebbe, Kiel, & Buss, 2011; Pereira, Barros, Mendonça, & Muris, 2014; van Gastel, Legerstee, & Ferdinand, 2009; Wei & Kendall, 2014), bolstering the conclusion that the inconsistent relations among these variables are likely related to moderating factors. Yet, there remain relatively few studies examining the interactions among temperament and parenting behaviors, and only some yield evidence for moderation.

Of studies that have examined *positive affective parenting behaviors* such as warmth, support, engagement and responsiveness, three found no significant interactions with temperament in prediction of internalizing symptoms (Karreman et al., 2010; Kiff, Lengua, &

Bush, 2011; Zarra-Nezhad et al., 2014), while another found that shyness was more strongly linked to internalizing problems in the context of low levels of maternal warmth and supportive behavior (Coplan, Arbeau, & Armer, 2007). Infant negative reactivity was associated with higher anxiety at 2.5 years for mothers below the median in engagement (Crockenberg & Leerkes, 2006).

Interactions between fearful or inhibited temperament and maternal sensitivity appear to be particularly complex: of four extant studies, each found significant but different patterns. This may be consistent with theory, in that for highly inhibited children, overly sensitive parenting may serve to inadvertently reinforce anxiety and remove opportunities for corrective learning, while insensitive parenting would also be ineffective in helping children to learn self-regulation strategies that would reduce anxiety. The conceptualization and measurement of sensitivity varied and at times included both affective and control elements, and the studies spanned different developmental periods, which may account for inconsistent findings. Crockenberg and Leerkes found that infant negative reactivity along with poor regulation (measured as withdrawal and poor attentional control) was associated with higher anxiety at 2.5 years only for children whose mothers were below the median for sensitivity (2006). This represents a 3-way interaction between two aspects of temperament (reactivity, regulation) and parenting; it is notable that no other studies incorporated measures of self-regulation, which is critical as it may significantly affect the expression of fear reactivity. Another study of 2.5 year olds found that maternal sensitivity showed a curvilinear interaction with temperament, such that for highly inhibited children, both low and high levels of maternal sensitivity were associated with increased risk for anxiety (Mount, Crockenberg, Jó, & Wagar, 2010). A prospective study showed that for children with more “difficult” temperaments at 1 and 6 months, more sensitive mothering was associated

with greater decreases in child anxiety/depressive symptoms overall at age 2, but only for boys at age 3 (Warren & Simmens, 2005). Meanwhile, another infant study found that for high-avoidant infants, maternal sensitivity at 9 months was positively associated with the odds of membership in a high-stable social reticence trajectory at 5 years (Degnan et al., 2015), which has been associated with high levels of BI and internalizing problems (Degnan et al., 2014).

Negative affective parenting behaviors, including rejection or criticism toward the child, have also been inconsistently associated with later problems for temperamentally fearful children. Several studies spanning infancy to middle childhood found no significant interactions (Hudson & Dodd, 2012; Hudson, Dodd, & Bovopoulos, 2011; Hudson, Dodd, Lyneham, et al., 2011; Kiff et al., 2011; Lengua, 2008). Inhibited temperament at age 2 was linked to higher social reticence (a behavioral construct characterized by social wariness and reluctance to engage with unfamiliar peers) at age 4 only for children whose mothers were higher in derisiveness, making disparaging comments to or about their child (Rubin, Burgess, & Hastings, 2002). However, neither inhibited temperament nor parenting in that study predicted internalizing symptoms (via mom's CBCL report) at age 4.

Two other studies did find that maternal negativity was associated with increased adjustment problems or social wariness for more fearful or reactive children, however, these must be interpreted with caution as they defined the affective parenting constructs in problematic ways, either confounding them with control behaviors (Barnett & Scaramella, 2015) or taking a maternal personality approach to negativity that did not focus on specific, measurable parenting behaviors (Degnan et al., 2008).

Across this limited body of work, it appears that affective parenting behaviors may account for some variance in the continuity of inhibited temperament, and in related outcome

constructs like social reticence and social wariness that do not themselves constitute clinical levels of anxiety. However, there is not strong evidence for a specific risk for the development of anxiety disorders *per se* through either main effects of these parenting behaviors, or through their interactions with inhibited temperament, while several studies support the notion that parental rejection and negativity may confer risk for psychopathology more generally.

In comparing the remaining studies that did versus those that did not find evidence for moderation, no particular parenting behaviors within this affective cluster emerged as differentiating or particularly salient in relation to temperament and anxiety. This is in contrast to prior findings that the presence of aversive behaviors like withdrawal or rejection had a larger effect than the absence of positive behaviors such as warmth (McLeod, Wood, et al., 2007). One factor that may account for this is that very few studies measured multiple, separable parenting behaviors using direct observation (cf. Rubin et al., 2002). Self-report and composite measures assessing constructs such as "negativity" on a single continuum may not parse parenting behaviors specifically enough to identify nuanced effects on child anxiety. Differences in findings also did not appear to be systematically related to other individual or methodological moderators such as child age, parent gender, observed vs. reported temperament or parenting, or community vs. selected samples. Our understanding of the conditions under which parents' negative or positive affective behaviors contribute to or buffer against anxiety requires further refinement.

Parent Control Behaviors

Regarding main effects of parents' control behaviors, two meta-analyses have found that parents' controlling behavior has a moderate effect, larger than that of rejection/acceptance, on child anxiety outcomes (McLeod, Wood, et al., 2007; Van Der Bruggen et al., 2008). Breaking

down the components of control (r = .25 overall), McLeod and colleagues found a larger effect size for autonomy-granting (r = .42) than over-involvement (r = .23), which concurs with Van Der Bruggen's analyses of the effect sizes for studies examining control (d = .56) versus control plus autonomy-granting (d = .63). As was the case for affective parenting behaviors, studies conducted since these meta-analyses were inconsistent in terms of main effects of parent over-control, overprotective or challenging (gently encouraging children to approach their limits) behaviors on child anxiety-related outcomes (Bayer et al., 2006; Borelli, Margolin, & Rasmussen, 2014; Cooper-Vince, Pincus, & Comer, 2014; Edwards et al., 2010; Gere, Villabø, Torgersen, & Kendall, 2012; Knappe et al., 2012; Majdandžić et al., 2014, 2014; Möller, Majdandžić, & Bögels, 2014; Muris et al., 2010; Pereira et al., 2014; van Gastel et al., 2009; Wei & Kendall, 2014). In middle childhood and adolescence, overprotection and intrusiveness were in some cases significantly associated with anxiety outcomes for fearful children but also with clinical problems more generally (Wei & Kendall, 2014). The finding that over-control was related to lesser decreases in anxiety over the transition to adolescence (Borelli et al., 2014) suggests that this parenting behavior may interfere with normative developmental trajectories in which anxiety tends to decline during that period. The majority of these studies have considered parent psychological control: with the exception of those examining challenging parenting (Majdandžić et al., 2014; Möller et al., 2014), none have examined the role of positive parent behavioral control. Thus, again, in light of mixed findings, it is likely that moderating factors such as child temperament and developmental stage are playing a role.

A number of studies examining moderation have found no supporting evidence for interactions between temperament and elements of *psychologically controlling parenting*; notably these were the only studies that assessed strictly anxiety diagnosis outcomes (Hudson &

Dodd, 2012; Hudson, Dodd, & Bovopoulos, 2011; Hudson, Dodd, Lyneham, et al., 2011; Muris et al., 2010). A larger number have found that in the presence of over-protective, over-controlling or intrusive behaviors, there is a stronger link between early inhibition/fearfulness and internalizing symptoms or social wariness (Coplan et al., 2007; Degnan et al., 2008; Karreman et al., 2010; Kiel, Premo, & Buss, 2016; Lewis-Morrarty et al., 2012; Rubin et al., 2002; van Brakel, Muris, Bögels, & Thomassen, 2006; Zarra-Nezhad et al., 2014), but many are qualified in some way as described below.

It is notable that only 2 studies have examined the "positive" end of this spectrum, which is conceptualized as parenting that encourages autonomy and is not intrusive or overly controlling. One finding includes a curvilinear effect of encouragement to approach novelty, which captures a very specific parenting behavior that may be particularly relevant to temperamental fear (Kiel et al., 2016). At moderate levels, parents were neither overly protective nor intrusive and this was associated with lower anxiety, suggesting they provided guidance that was "just right" for their child's temperament. Autonomy granting was not significantly related to anxiety symptoms generally, nor for fearful children (Kiff et al., 2011). Challenging parenting, which may tap into similar notions of scaffolding reluctant children in situations that elicit anxiety, or pushing them just a bit past their limits without becoming insensitive, has not yet been tested as a moderator of the fearful temperament-anxiety relation.

Summarizing the effects of the six studies identified that examined *behavioral control or structured parenting*, three found that low levels of structure (i.e. permissive or inconsistent discipline) related to higher internalizing outcomes for temperamentally at-risk children (Degnan et al., 2015; Williams et al., 2009; Zarra-Nezhad et al., 2014), one found the opposite (Lengua,

2008) and two found no relation between structured parenting and internalizing (Karreman et al., 2010) or anxiety outcomes (Kiff et al., 2011).

The overall suggestion of this literature is that stability of fear or inhibition, or general internalizing symptoms, may be greater in the presence of over-control, but few studies measured actual anxiety symptoms or diagnoses; those that did found no effect. Several studies that found significant interaction effects looked at concurrent fear and internalizing symptoms (Coplan et al., 2007; Karreman et al., 2010), as opposed to using prospective designs, which leaves questions as to directionality and developmental sequence. Several results must be interpreted with caution as they included imprecise measurements of controlling parenting, muddied by affective elements or lack of behavioral specificity (Degnan et al., 2008), or were qualified by other moderators like attachment status (van Brakel et al., 2006) or gender (Lengua, 2008). While negative or psychological controlling behaviors are not likely to *help* fearful children overcome their temperamental tendencies, the extent to which these types of parenting behaviors contribute to a cascade of increasing anxiety likely depends on other factors yet to be clearly delineated. Likewise, the field would benefit from better understanding the conditions under which parents can positively impact fearful children's trajectories away from future anxiety problems by scaffolding and supporting their autonomy.

Parenting context

The studies reviewed above vary widely in their measurement of parenting behaviors. Many rely on parent report or less commonly, child report, instead of laboratory observation and may capture specific, behavioral constructs or more global style descriptors. Where parent ratings are used to measure both parenting and child temperament and/or anxiety, issues of shared method variance may elevate estimates, and child or parental anxiety may bias reports on

parenting from either reporter. However, parent ratings are likely to capture a sense of a child's behaviors across a range of situations and stimuli. Laboratory tasks provide the opportunity for independent coding of specific, observable parent behaviors, which may be more limited in their ecological validity due to demand characteristics and task specificity, but provide a means by which to measure actual behaviors rather than parenting beliefs or attitudes that may or may not reflect a parent's actual practices. Further, in most studies of behavioral inhibition and parenting, parenting is observed in unstructured (e.g., free-play) or structured (e.g., game with rules) parent-child interaction tasks. These capture how parents direct their children and how they respond to children's behaviors in a general, neutral (though potentially somewhat novel) context and are thought to be representative of frequent, day-to-day parent-child interactions. Notably fewer studies assess parenting within an intentionally uncertain or unpredictable context such as the appearance of a clown, spider or unpredictable toy (e.g., Kiel et al., 2016; Mount et al., 2010), which provides a sample of parenting behavior in situations that could be interpreted by the parent and/or child as scary, and thus may elicit a different range of parenting behaviors. This may be of particular relevance to the development or maintenance of anxiety as it captures the degree to which parents help to reinforce versus extinguish fearful responses. No known studies have taken both types of settings into account to build a more complete understanding of the relative contributions of parenting behaviors across contexts.

This Study

This study aims to clarify and expand upon the existing literature on the role of parenting behaviors in the development of child anxiety and how these relations may be moderated by child temperament. The study takes advantage of a rich existing data set from a larger longitudinal study of 306 mothers and their children across the preschool period (3-5.5 years of

age). The extant body of work examining these associations is characterized by inconsistent findings. This is likely due, at least in part, to differences in the operationalization and measurement of parenting constructs and, despite evidence that effect sizes differ across and within domains of parenting (i.e., affective vs. control behaviors), the limited number of studies that include behaviors across multiple specific domains, particularly while controlling for others. As reviewed above, the presence of parental warmth (e.g., engagement, positive affect) may encourage a fearful child, while negative affect (e.g., rejection or criticism) might instead reinforce their fear. Whereas parents' over-control (e.g., intrusiveness, discouragement of autonomy, over-protection) may communicate to an already fearful child that the world is dangerous or scary and that they will be unable to cope with challenges that arise, appropriate behavioral control (e.g., scaffolding, setting consistent expectation, encouraging autonomy) may create an environment in which children are able to build mastery and approach challenges. Thus, it is important to capture behaviors at both ends of these spectra.

This study therefore helps to clarify and extend the existing literature by examining how temperament moderates the relation between affective parenting behaviors (warmth, negative affect), negative psychological control (intrusiveness) and positive behavioral control (scaffolding) and child anxiety. We will examine the associations among these parenting behaviors, fearful temperament and anxiety across both general and novel/uncertain contexts to gain better specificity in understanding when, and for which children, particular parenting behaviors contribute to continuities or discontinuities in child anxiety. No known studies have compared parenting across contexts in this way as it relates to the development of anxiety in children.

Further, many prior studies have examined internalizing outcomes, yet it reasonable to expect that particular parenting behaviors might contribute differentially to anxious versus depressive symptoms in children. Because our hypotheses pertained specifically to pathways for anxiety, we separated out the anxiety and depression items from a broader internalizing scale and primarily examined the anxiety outcome measure. We then tested parallel models predicting depression strictly for comparison, to address empirically whether different parenting behaviors contribute uniquely to separable aspects of internalizing problems. This study tested the following:

Hypothesis 1: Temperamental fear will moderate the relations between parenting in a general context and anxiety. **1A:** Higher parental negative affect will predict higher anxiety more strongly for children who are more fearful, whereas parental warmth will not relate to child anxiety. **1B:** Higher parental intrusive control will predict higher anxiety more strongly for fearful children compared to those who are not fearful. **1C:** Scaffolding will relate to lower anxiety for fearful children and will be unrelated to anxiety for children who are not temperamentally fearful.

Hypothesis 2: Parenting in a novel/uncertain context will predict anxiety for children who are temperamentally fearful over and above the effects of parenting in a general context. In other words, parenting in this type of context may be particularly informative for understanding how parenting behaviors contribute to anxiety over time for children who are temperamentally fearful. **2A:** Higher parental negative affect will predict higher anxiety more strongly for children who are fearful. **2B:** For temperamentally fearful children, intrusive control in the novel context will be associated with higher levels of child anxiety. **2C:** For temperamentally fearful children,

scaffolding in the novel context will be associated with lower levels of child anxiety, over and above the effects of other parenting.

Hypothesis 3: Parenting will be related to expressions of fear in a context of novelty/uncertainty (i.e., during the stranger task). Because this task was conducted only at T1, we cannot look at changes over time that might point to directionality, but exploratory analyses examining the concurrent associations will be informative. It is expected that parents' warmth and scaffolding will be negatively associated with displays of fear. Negative affect and intrusive control in this context will be associated with higher levels of expressed child fear.

Methods

Participants

The proposed study is part of a larger study conducted by Dr. Liliana Lengua (NICHD #5RO1 HD54465-01) that examined parenting, family adversity and low income in relation to child temperament and adjustment in preschoolers. Participants are a community-based sample of 306 children and their mothers who were assessed across 4 waves of data. Time 1 assessments began when children were approximately 3 years old, with Time 2 – 4 assessments following at 9-month intervals. The proposed study will make use of parenting and temperament data collected at Time 1 (36-40 months old), and outcome data collected at Time 4 (63-67 months old).

Families were recruited from the university hospital birth register, preschools, co-ops, and daycares. Only one child in the target age range per family was permitted to participate. Children with developmental disabilities and families not fluent in English were excluded from the study to ensure adequate comprehension of the procedures. A female primary caregiver was required to participate. The sample represents the demographic characteristics of the urban area

surrounding the university in the Pacific Northwest. At Time 1, the sample consisted of 50% female children. Nine percent identified as African American, 3% Asian American, 2% Native American, 10% Latino or Hispanic, 64% European American, and 12% with other or multiple backgrounds. The sample over-represented families in poverty and low income, making this an economically diverse sample, with 29% of the sample at or near poverty (at or below 150% of the federal poverty threshold), 28% low income (below the local median income of $58K), 25% middle income (above the median income to $100K), and 18% upper income (above $100K). Mothers' educational attainment included 3% with less than a high school degree, 6% high school graduates, 35% with some college experience, 30% college graduates, and 36% with some or completed graduate degree. Families consisting of two-parent households made up 81% of the sample. Attrition was low with approximately 95% of participants remaining at Time 2-4 and 93% at Time 5.

Procedures

At all time points, mothers and children came to the university for 2-hour sessions to complete all questionnaire measures and observational assessments. Children were administered a fear-eliciting task and other tasks as part of the larger study, while mothers completed questionnaire measures pertaining to family demographics, children's temperament and adjustment in another room. Then mothers and children were brought back together to complete several parent-child interaction tasks. Families were compensated at each visit for their time.

Measures

Income. At Time 1, mothers reported on household income from all sources on a 14-point scale that provided a fine-grained breakdown of income, facilitating identification of families at the federal poverty cutoff (e.g., 1 = $14,570 or less, 2 = $14,571–$18,310, 3 =

$18,311–$22,050, and so on). The 14-point variable representing the full range of income will be used in this study. The mean income was 8.75 (*SD* = 3.93, *range* = 1.00–14.00).

Fear reactivity. Temperamental fear was assessed at Time 1 by observed fear expressions and behaviors to two scary situations (spider, stranger with clown mask). In the spider task, children were prompted to touch a toy spider triggered to jump when the child approached it. This task took place when children were alone with the experimenter. Then, when mother and child were reunited in the same room at the end of the research visit, an experimenter unfamiliar to the participants entered the room holding a clown mask, and prompted the child to try on the mask several times, waiting for a set latency after each prompt to allow the child time to approach. Finally, if the child had not yet approached, the experimenter offered the mask to the mother to try on and allowed another minute to lapse before the task was ended.

Behaviors in each task were coded for intensity of a fear response, ranging from 0 (no observed response) to 2 (obvious, strong response). Coded behaviors included body motions (e.g., jumping/withdrawing, shaking/fluttering), facial expressions (e.g., widened eyes, tensing face), and vocalizations (e.g., non-language noises, verbal refusals). An overall fear score for each prompt was assigned based on the number of behaviors coded. In addition, latency to touch the spider or mask after the prompt was given was assessed, with potential latencies ranging from 0 to 5 seconds. Total scores were the average overall rated fear across three prompts and also took into account the latency for the child to touch the spider or mask. The internal consistency of the fear scale as measured by Cronbach's alpha was .89 for the spider task, .93 for the stranger task. The inter-rater reliability for the fear coding was measured with intraclass correlation coefficients (ICCs), based on double coding of 20% of cases; ICCs were .97 for the spider task and .96 for the stranger task. Because mothers' presence during the stranger task may

have influenced expression of child fear, the fear scores from the spider task were used as the measure of temperamental fear for Hypotheses 1-2. The stranger fear scores were used in testing Hypothesis 3 only, which was specific to the expression of fear in that task.

Parent-child interaction. To assess parenting in a general context, mothers and children engaged in 4 activities together (7 minutes restricted play, 7 minutes free play, 7 minutes instructional activity, 3 minutes clean-up; Kerig & Lindahl, 2001). In restricted play, mothers were instructed to allow the child to play with toys in the room except those in a specified place, a freely accessible shelf of highly desirable toys. This was followed by free play in which mothers and children were informed that they could now play with the previously restricted toys. Next, mothers were instructed to help children build a challenging Lego figure. Finally, mothers were to obtain children's assistance in cleaning up. As a measure of parenting in a context of uncertainty, mothers' behaviors during the stranger task (as described above) were coded intended to elicit a range of responses from the children, including fear.

In the larger study, eight coded behaviors were selected based on existing literature on the relation between parenting and adjustment: positive affect, interactiveness, negative affect, responsiveness, guidance/structuring, limit-setting (coded in the general context only), autonomy-granting, and intrusive control. Parenting was coded from videotapes by advanced undergraduates using a coding system that was adapted from established coding systems: System for Coding Interactions and Family Functioning (SCIFF: Lindahl & Malik, 2000), Parenting Style Ratings Manual (Cowan & Cowan, 1992), and Parental Warmth and Control Scale—Revised (Rubin & Cheah, 2000) and used previously by this research team (Lengua, Honorado, & Bush, 2007). Several scales were adapted to be unidirectional so that the presence of a

behavior could be coded independently from the absence of its opposite. All behaviors were rated on 6-point scales (0 = absent/lowest, 5 = highest).

Each behavior was independently coded in 1-minute epochs for all segments within a task, and then averaged across epochs. However, based on limited evidence for responsiveness as defined in this study in the existing literature relating to anxiety outcomes, and the lack of limit-setting in the stranger task context, we decided *a priori* to exclude those two variables from the current study. Based on preliminary correlations, and in order to reduce the number of predictors, some of the remaining indicators were combined to create composites. Importantly however, these were constructed to maintain their behavioral specificity, to avoid some of the problems in the extant literature with muddled parenting constructs. *Warmth* was coded as the mean of positive affect and interactiveness, and captured the frequency and level of behavioral and verbal expressions of positive affect, happiness, comfort, connection, and the parent's engagement with the child. *Negative affect* assessed the negative tone or tension expressed by the mother and included verbal and non-verbal expressions of irritation or frustration with the child that were critical, rejecting or invalidating. *Scaffolding* was coded as a mean of parent's autonomy-granting and guidance/structuring, and captured the balance between stepping in to guide and structure the child's activities as needed, and stepping back and allowing the child to take the lead as appropriate, thus supporting the child's autonomy. This was conceptualized as a positive, non-intrusive form of structured parenting. *Intrusive control* was characterized by intrusive or controlling behaviors in which the mother unnecessarily directed the child. The general context task segments (unstructured play, structured play, instructional activity, clean-up) were averaged together, while the novel stranger context was kept separate. This yielded one general context score and one stranger context score for each of the 4 parenting behaviors. Inter-rater reliability

was assessed by independent recoding of 20% of the interactions separately for the general and novel contexts. The ICCs for parenting constructs in the general context were: .81 (warmth), .75 (negative affect), .79 (scaffolding) and .81 (intrusive control), and in the stranger task context were .72 (warmth), .39 (negative affect), .66 (scaffolding) and .56 (intrusive control).

The reliability estimates for the stranger task coding are notably lower than those for the general parenting context, and in the case of negative affect and intrusive control, are below typically accepted norms (>.60) for these types of coded behavioral data (Cicchetti, 1994). Typically, analyses using these two variables would not proceed as this raises concerns about the reliability of the coding scores. However in this case, in order to proceed in conducting the analyses proposed, we included these variables with caution, recognizing that findings related to these constructs must be interpreted with those caveats in mind.

Upon further inspection, there appeared to be several possible reasons that might account for the lower reliability estimates for these constructs. First, negative affect and intrusive control were low frequency behaviors in the stranger task context: non-zero scores occurred in just 26.5% and 46.7% of the sample for these behaviors, respectively. This reflects that the length and context of the stranger task simply did not tend to elicit from mothers the same frequency of intrusive control and negative affect behaviors as the general context tasks. Second, composite scores for the stranger task parenting codes comprised averages of scores across 3 1-minute epochs, whereas the general parenting task comprised averages of scores across 24 1-minute epochs. Thus, the effect of even minor differences across coders was much more likely to be significant when averaging so few scores to create the composites. Again, we retained these variables in the models to be consistent with the proposed analyses but recognize that the

inclusion of unreliable variables in multivariate analyses may lead to over- or under-estimation of coefficients in the model (Osborne & Waters, 2002).

Adjustment Outcomes. Mothers reported on children's adjustment at Time 1 via the Child Behavior Checklist (CBCL, 4-18 years; Achenbach, 1991b), which utilizes a 3-point scale (0 = *not true* to 2 = *very/often true*). A subscale score for T1 anxiety was the sum of maternal responses to 7 anxiety-related items.

At Time 4, teachers reported on children's internalizing symptoms via the Anxious/Depressed subscale of the Teacher Report Form (TRF: Achenbach, 1991a). An anxiety subscale with good internal consistency (α = .79) was constructed using the sum of 9 anxiety-related items, and a depression subscale score was the sum of 6 depression symptom scores (α = .74). As teachers did not report on the anxiety/depression scale at T1, the mother-rated anxiety score for T1 was included as a covariate to control for prior adjustment in the analyses, such that the T4 anxiety outcome represented change or growth in anxiety over the study period.

Results

Analytic Plan

Analyses were conducted to examine whether temperament moderated the relations of specific parenting behaviors with children's anxiety symptoms. Hierarchical linear regression models were used to test the direct effects of covariates (child gender, family income, T1 anxiety), fearful temperament, and parenting (warmth, negative affect, scaffolding, intrusive control) as well as the interactive effects of fear and parenting, on child anxiety symptoms (T4 anxiety). As a comparison to better understand the specificity of the results with regard to anxiety outcomes, parallel models were constructed to predict children's depression. First, we entered child gender and family income as covariates, and the general context parenting

variables. Next, parenting in the stranger context was entered to assess for its added contribution in predicting anxiety outcomes. Moderation of the parenting–anxiety relation by temperament was then tested by entering interaction terms as predictors of anxiety. Fear and the parenting variables (from both the general and stranger contexts) were mean-centered before being multiplied to reduce multicollinearity among the interaction terms. All four parenting variables (warmth, negative affect, scaffolding, intrusive control) were included in each model so that the effect of each parenting variable on child anxiety was uniquely estimated over and above the effects of the others.

In order to interpret significant interaction effects, simple slopes and regions of significance were calculated to examine at what levels of the predictors there was evidence for moderation. Regions of significance (also known as marginal effects) analyses and plots are a helpful adjunct to simple slopes in characterizing the nature of interactions, as they identify and visually depict the simple slope of the predictor variable plus its 95% confidence interval (for further discussion, see McCabe, Kim, & King, in press). Rather than identifying arbitrary levels of the moderator such as the mean +/- 1-2 SDs, which may or may not be meaningful and may extend beyond the range of the observed data points, these analyses examine the full continuous range of the moderator. This helps to demonstrate over what range the slope is significant and what proportion of the observed data lie within the significant region for that slope.

Missing Data Analyses

Attrition from T1 to T4 was quite modest, with approximately 95% of the sample remaining enrolled in the study. All participants ($N = 306$) had complete family income and child gender data, with missing data on the remaining variables ranging from a low of 5% on child spider task fear to a high of 23% on T4 teacher-rated child anxiety and depression (see Table 1).

Based on suggested best practices for handling missing data (Schlomer, Bauman, & Card, 2010), missing value analysis was first conducted to ascertain the most appropriate method based on the pattern of missingness. Results suggested that the pattern of missingness did not deviate significantly from missing completely at random, based on Little's MCAR test: χ^2 (193) = 204.81, p = .267. This, coupled with the overall low level of missing data (i.e., <25% on key variables), suggested that the dataset would be robust to the assumptions of full information maximum likelihood estimation (FIMLE) to generate unbiased parameter estimates (Enders & Bandalos, 2001). Regression analyses were therefore conducted using FIMLE in Mplus 8.0 (Muthen & Muthen, 2017) and included all 306 families. Regions of significance analyses for significant interaction effects were conducted using the web-based interActive application (McCabe, Kim, & King, in press).

Descriptive statistics and correlations

Prior to hypothesis testing, descriptive data and correlations for all study variables were evaluated, as reported in Tables 1 and 2. Child gender and family income were retained as covariates for the regression models, given their significant relations to predictor and outcome variables. Because the presence of a parent during the stranger task may have influenced children's expressions of fear during that task, child fear during the spider task was retained as the measure of temperamental fear in the regression analyses for main effects and in the interaction terms examining temperament x parenting interactions. Notably, the fear scores from the two tasks were uncorrelated (r = .04, *ns*). The 4 parenting variables (warmth, negative affect, scaffolding, intrusive control) were correlated significantly but modestly across the two contexts (r's = .20-.25), suggesting only moderate continuity in mothers' behaviors across contexts, and allowing for the possibility of differential relations of parenting across contexts with the other

study variables. With the exception of general context maternal warmth, the parenting behaviors were uncorrelated with the teacher-rated T4 child anxiety outcome measure. General context maternal negative affect was related to T4 child depression. This was not necessarily unexpected, as we did not predict main effects of parenting on anxiety but rather that temperamental fear would condition the effects of parenting on anxiety.

Regression models

Hierarchical multiple regression models predicting T4 child anxiety were built in steps beginning with covariates child gender, family income, and T1 anxiety, and predictors child fear, and general context parenting (Model 1), next adding stranger context parenting (Model 2), interaction terms between general parenting and child fear (Model 3), and finally interactions between stranger context parenting and fear (Model 4). This allowed us to parse apart the variance accounted for by each parenting main effect and each temperament x parenting interaction term, while controlling for the effects of the other parenting behaviors in the model. The final, full model provided estimates of additional variance accounted for by parenting in the stranger context over and above the effects of the general context parenting. An identical comparison model was built predicting T4 child depression, in order to assess the specificity of temperament x parenting effects to anxiety versus depression outcomes that cannot be gleaned from a more general internalizing outcome measure. For the sake of comprehensiveness, results for the same regressions predicting internalizing symptoms (combining anxiety and depression) are reported in Appendix 1.

Main effects of temperament and parenting on child anxiety. There were no significant main effects of fearful temperament or any general context parenting variable other than warmth (see Models 1 and 2, Table 3), which had a statistically significant, negative effect

in the model examining main effects of all parenting (t = -2.04, p =.042), suggesting that higher levels of maternal warmth were associated with lower levels of later anxiety. There were no main effects of parenting in the stranger context. The model including main effects of all parenting from both contexts (Model 2, Table 3) did account for a small but significant portion of the variance in child anxiety overall (R^2 = .072, p = 0.035). Family income, included as a covariate, also had a significant negative effect in this model (t = -2.01, p = .044), such that lower family income predicted higher levels of anxiety.

Tests of temperamental fear as a moderator of parenting on child anxiety. Next, the interactions among general parenting variables and fear were examined (Model 3, Table 3). In this model, there was a trend-level interaction between general context intrusive control and temperamental fear (t = 1.68, p = .09). When the stranger context interaction terms were added in Model 4, this became significant (t = 1.98, p = .05). Simple slopes and regions of significance analyses were examined to identify the nature of the interaction, and revealed that for children lower in fear, greater intrusive control in the general context was associated with later lower anxiety (Figure 1). As seen in the marginal effects plot (Figure 2), the simple slope of intrusive control (G) on anxiety is significant and negative when child fear is 1.05 standard deviations below from the mean or more (15.36% of the observations fall within this region). This full model overall accounted for a small but significant proportion of the variance in child anxiety symptoms (R^2 = .12, p = 0.004). There were no significant interaction effects for negative affect, scaffolding, or warmth in the general context, and no significant interactions with any of the stranger context parenting variables.

Main effects of temperament and parenting on child depression. In the models assessing main effects of parenting on child depression outcomes (Models 1 and 2, Table 4),

only maternal negative affect in the general parenting context was a significant predictor (t = 1.99, p = .046). Higher levels of maternal negative affect predicted higher levels of child depression. Notably, family income was also a significant predictor here, such that lower income predicted higher levels of depression (t = -2.18, p = .029). There were no significant main effects of stranger context parenting on child depression.

Tests of temperamental fear as a moderator of parenting on child depression. Examining the full model (Model 4, Table 4) with interaction terms from both the general and stranger contexts included, there were significant effects for maternal warmth in the general (G) context (t = -2.39, p = .017) and for negative affect in the stranger (S) context (t = 2.28, p = .022). Probing the warmth (G) x fear interaction, simple slopes showed that this effect was significant and positive for children below the mean in fear (Figure 3). The marginal effects analysis showed that the region of significance for this effect was at 1.1 SDs below the mean, which represented 11.76% of the data (Figure 4). So, for this small proportion of children lowest in fear, higher warmth in the general context predicted higher later depression symptoms.

For negative affect (S) x fear, the simple slope of negative affect on child depression was significant and positive for children 0.5 SDs or more above the mean of child fear, which captured 36.27% of the observed data points (Figures 5, 6). For these children with above average levels of fear, higher maternal negative affect in the stranger context predicted higher levels of depression.

Parenting and concurrent expressions of fear

To address the third hypothesis regarding how expressions of fear in the stranger task related to parent behaviors in that context, we first ran a regression including child gender and income, and the 4 parenting variables predicting child fear in the task (Table 5). This provided a

test of the unique concurrent relations of each parenting variable to child fear during the stranger task, controlling for the effects of the other parenting constructs. Family income, negative affect, intrusive control and scaffolding were each positively, significantly related to child fear within the stranger task. Given that child temperament and parenting influence one another bidirectionally, we also ran multivariate regression models predicting each of the 4 parenting behaviors from child fear (controlling for income and child gender), displayed in Table 6. Higher child fear predicted higher levels of each of the 4 parenting behaviors.

Regression models for internalizing outcome

Hierarchical linear regression models were also used to predict the teacher reported T4 internalizing scale (anxiety and depression combined). These results are reported in Appendix 1. Overall, the pattern of these results is a fairly representative combination of the separate depression and anxiety results, suggesting that the contributions of parenting and temperament to internalizing outcomes are driven by their relations to both anxiety and depression symptoms. However, in the final model including main and interaction effects for both general and stranger context parenting with temperamental fear, the only significant interaction was between stranger negative affect and fear, which more closely resembles the results for the depression outcome model.

Discussion

The current study adds to the existing literature by clarifying for whom and in what contexts particular parenting behaviors may be associated with anxiety outcomes in children. Using a longitudinal dataset that included assessments of temperament, parenting, and internalizing outcomes from 306 mothers and their children over the 3- to 5.5-year-old period, we examined how fearful temperament moderates the relations among parenting and child

anxiety. We were able to compare and contrast these results to those obtained in parallel models predicting depression, to identify which aspects of parenting are particularly relevant to anxiety specifically. Results partially supported the general hypotheses that fearful temperament would moderate the effects of specific parenting behaviors on child anxiety outcomes, and that parenting in a more novel, uncertain context would confer additional information beyond parenting assessed in a general context. However, the direction and specificity of these effects were not always consistent with hypotheses. As noted above, few studies examine behaviorally specific dimensions across both the affective and control dimensions of parenting, so there are few consistent findings in the literature within which to contextualize the results.

First, there was a significant main effect of warmth predicting child anxiety, such that higher levels of maternal warmth in the general contexts at age 3 predicted lower levels of child anxiety at age 5.5. This effect had a standardized beta coefficient of approximately ~0.17 across models. As reported in a meta-analysis of the association of parenting variables with child anxiety, the effect of warmth varied significantly across studies (McLeod, Wood, et al., 2007). That warmth emerged as a significant predictor among those examined at first appears unexpected, given that in meta-analyses and prevailing theory, parental control is considered more relevant than parent affect to anxiety outcomes. However, as noted by McLeod and colleagues, this depends on the sample, as that finding is specific to studies comparing referred to non-referred samples (2007). Given that this study assessed a community sample with a continuous but relatively low range of anxiety symptoms, rather than comparing children diagnosed with anxiety disorders versus those without, this finding is not inconsistent with the overall literature.

It is also interesting to note that maternal negativity in the general context interactions predicted higher child depression symptoms, whereas warmth predicted lower anxiety symptoms. This pattern lends support to our suggestions that: a) it is important to capture multiple parenting behaviors simultaneously with unidirectional, separable codes; and b) it may be valuable to investigate the development of anxiety and depression separately, rather than a combined internalizing outcome, even in very young children. In this sample, anxiety and depression ratings were correlated at r = .55, so they were not so highly correlated as to preclude differential relations with temperament and parenting. And, given the divergent patterns when examining depression versus anxiety outcomes, our findings suggest that internalizing scales may represent too general an outcome measure to detect differential influences of specific parenting behaviors.

Of greater interest to the present study was the question of how fearful temperament moderates the effects of parenting. There was one significant interaction, between maternal intrusive control and fearful temperament; however, it was in a somewhat unexpected pattern, given the hypothesis that intrusive control would lead to higher anxiety for more fearful children. For children higher in fearfulness, maternal intrusive control was positively related to anxiety, though the association was not significant. For children more than 1.05 standard deviations *below* average in fear, higher levels of maternal intrusive control were related to lower levels of anxiety. It is important to note that given the observed range of child fear scores, this significant region of the simple slope of intrusive control on child anxiety represented only about 15% of the sample. Nonetheless, this may reflect that directive forms of parent control may actually be helpful for children's later adjustment when they are temperamentally low in fear, perhaps by creating a more predictable and contained environment for a child who might be less naturally

attuned to cues for danger or boundaries. As described in theoretical models (though not supported by our results), for a more fearful child this type of parenting could reinforce that their instincts about being unable to cope in an unpredictable world are accurate. The lack of a significant interaction at this end of the spectrum *is* consistent with several studies that examined these relations in the context of anxiety disorder outcomes (Hudson & Dodd, 2012; Hudson, Dodd, & Bovopoulos, 2011; Hudson, Dodd, Lyneham, et al., 2011; Muris et al., 2010), and in contrast to other longitudinal studies across this age range that used other proxy outcomes such as internalizing symptoms or social reticence (Degnan et al., 2008; Rubin et al., 2002; Zarra-Nezhad et al., 2014).

Meanwhile, as suggested by these data, for a more fear*less* child who has lower levels of temperamental inhibition, parental over-involvement or intrusiveness may provide a helpful form of external control. Interpreting this finding in the context of prior studies is challenging, as most do not report the regions of significance or simple slopes for significant interaction effects, interpret only the effects for "high" fear children (often determined by a median or tertile split, or by arbitrary cutoffs such as +/- 1 SD), and rely on many different outcome measures. For example, in two papers the patterns of low fear x higher intrusive control relating to fewer concurrent internalizing problems (Karreman et al., 2010), and of low BI x over-control leading to less child-reported anxiety (Lewis-Morrarty et al., 2012) are graphed, but significance tests for the slopes are not reported.

The other hypotheses regarding interaction effects of maternal negative affect and scaffolding in the general context were not supported, nor was the overall hypothesis that parenting in the context of uncertainty (stranger task) would explain variance in anxiety over and above the effects of parenting in the general task contexts. Possible reasons for this are further

explored among the limitations of the study below, however, prior studies have yielded inconsistent findings so this is not altogether surprising. Various methodological differences, including outcome measure, and conceptualization and measurement of parenting, likely account for the lack of consistent relations among fear, anxiety and parenting. In addition, while not a primary aim of the study, we found evidence for the unique contributions of particular parenting behaviors to anxiety symptoms in particular, by using depression as a comparison. As noted, few if any prior studies have simultaneously examined multiple outcomes in order to speak to the specificity of parenting behaviors to particular child outcomes, and indeed many of our dimensional questionnaire measures of symptomatology do not even distinguish between depression and anxiety symptoms in this age range, instead looking at internalizing symptoms collectively (e.g., CBCL anxious/depression or anxious/withdrawn syndrome scales).

For depression outcomes, the key parenting behaviors that emerged were interactions between fearful temperament and maternal warmth in the general context, and maternal negative affect in the novel/uncertain context of the stranger task. The finding with maternal warmth is somewhat puzzling in that for the children lowest in temperamental fear, higher warmth in the general contexts predicted higher later depression scores. It is possible that there is another unmeasured aspect of temperament or parenting that is driving the association seen in this small proportion of children (~11%). For maternal negative affect, for children higher in fear, higher negative affect in the stranger task predicted higher later depression. However, because of the low reliability of the ratings of this parenting dimension in this task, this finding will need to be replicated. In addition, overall there were very low mean levels of depression and limited variance in the outcome variables for this sample, so it is unclear whether parenting effects of this magnitude translate into ecologically meaningful differences in depression outcomes.

Nonetheless, it is intriguing to see the possibility that different aspects of parenting might confer risk differentially for anxiety versus depressive outcomes.

The general pattern of affective parenting behaviors accounting for more variance in depressive symptoms and control-related parenting components predicting anxiety symptoms is in line with theory and existing meta-analyses that look at the contributions of parenting in each outcome (McLeod, Weisz, & Wood, 2007; McLeod, Wood, et al., 2007). Based on these meta-analyses, we expected the role of parenting to account for a relatively small proportion of the variance in anxiety and internalizing outcomes more broadly and this was indeed the case; when including all parenting main effects and interactions, the complete regression models accounted for about 12-15% of the variance in anxiety and depression, respectively.

It is also important to acknowledge the statistically significant or trend effect of income throughout these models. Income was included as a covariate because of its significant relation to the majority of the parenting variables and to both anxiety and depression outcomes. While there are large bodies of work across several theoretical models suggesting higher rates of psychopathology for children experiencing low income and/or the associated burden of cumulative environmental risk factors that go along with experiences of poverty, few if any studies examining parenting and temperament risk for anxiety have also taken family income into account. In the current data set, the zero-order correlations demonstrate clear patterns in which conventionally "positive" parenting behaviors (warmth, scaffolding) are positively associated with income while "negative" behaviors (negative affect, intrusive control) are negatively associated with income. So, while we simply controlled for income in the regression analyses to examine what role each parenting behavior plays over and above income effects, there is reason to believe there may be more complex interactions going on in which parenting

behaviors confer different risks across environments, as has been demonstrated for other child adjustment outcomes (Ruberry, Klein, Kiff, Thompson, & Lengua, 2017). The current study was underpowered to examine 3-way interactions with income, parenting and temperament, but future studies should explore this possibility.

Because the stranger task was conducted at only one timepoint, we were able to examine only the concurrent associations between expressed child fear and the four parenting behaviors in the task, and thus cannot speak to causality (which would require repeated timepoints from which to run cross-lagged panel models). In contrast to our hypotheses, that mothers' warmth and scaffolding would be negatively associated, and negative affect and intrusive control positively associated, with children's displays of fear, it instead appeared that higher levels of fear were associated with higher levels of all parenting. Looking at how parenting predicted fear, negative affect, intrusive control and scaffolding were all positively associated with child fear. In the converse, child fear positively predicted all four parenting behaviors. Again, from these data alone we cannot discern whose behaviors are driving these associations and there are very likely bidirectional influences occurring. It appears that overall higher levels of child fear were linked to simply more overall parenting behaviors, suggesting that for children who appeared less fearful, their parents were also "doing less" in the task. It could be that in the presence of higher child fear, parents attempt several different strategies to try to manage their child's emotional response, and/or that parents' use of ineffective strategies is actually driving greater child fear expression. Longitudinal data or experimental designs are needed to parse out the contributions of each to the interaction, and to address how these instances contribute to the longer-term development of child anxiety that may stem from repeated reinforcing interactions.

Strengths and Limitations

This study is strengthened by its use of a longitudinal design in which measures of parenting, temperament and anxiety were repeated at multiple waves. This allowed us to control for prior levels of anxiety and examine the unique predictive variance of earlier parenting on growth or change in anxiety symptoms. We observed and coded several different parenting behaviors in the laboratory to get a broad sample of how parents interacted with their children, rather than relying on parents' self-report. Further, the parenting behaviors of interest are not mutually exclusive, yet when they are assessed on bidirectional scales (e.g., from protectiveness to intrusiveness, as in Kiel et al., 2016), it is not possible to independently measure the presence/absence and magnitude of each relevant behavior. Thus, we measured each parenting behavior separately on a unidirectional scale where a low score represents the absence of a behavior and high score represents a frequent or higher-intensity behavior. These behaviors were captured in multiple contexts, allowing us to examine potential differential effects evoked by a more novel and uncertain situation, which was hypothesized to be of particular relevance to our question of emerging anxiety. This approach represents a significant contribution to the literature due to the lack of agreement across extant studies in the operationalization and measurement of parenting constructs, and due to the limited contexts in which parenting is typically measured (if it is observed at all versus self-reported). The majority of studies have examined parenting along the dimensions of affect and control; however, among those examining parent control behaviors, nearly all look at negative psychological control to the exclusion of positive behavioral control or scaffolding (cf. Natsuaki et al., 2013), which we have argued may play a very different role, though those relations were not borne out in the current study.

Because we used observed rather than parent-reported measures of parenting and temperament, we did not have significant concerns about shared method variance inflating

estimates as likely occurs in many other studies (McLeod, Weisz, et al., 2007), but we did wish to avoid bias in parents' perceptions of their children that may stem from their own anxiety. Thus, we elected to use teachers' report of child adjustment outcomes, as they are able to provide a perspective on child anxiety that takes into account a wide range of child behaviors they have experienced. The use of a community sample, over-sampled at the low end of the income distribution, increases our ability to generalize findings to the larger population.

Interpretation of our findings must also take into account several limitations of the study design. First, poor inter-rater reliability was gleaned for two of the parenting behaviors (negative affect, intrusive control) in the stranger task. This is likely due in part to the relative infrequence of these behaviors in our sample during that task, and the fact that the task was very brief and yielded only 3 epoch scores, but will need to be addressed before accurate inferences can be made from models including those data. Next, while teacher report offers some strengths, it may capture an incomplete picture of anxiety behaviors that occur more at home, and may not account well for more internalized aspects of anxiety such as physiological symptoms. Anxiety was measured using a dimensional, continuous count of related behaviors and symptoms and we did not assess for clinical levels with diagnostic interviews. As this study was conducted with a community sample within a relatively early developmental period, we observed a fairly low and restricted range of scores in the anxiety outcome measure. Thus, the relations among temperament and parenting found here may be quite different from those obtained in a clinical sample or an older sample with a wider range or higher frequency of anxiety problems.

Another potential limitation pertains to the validity of the measurement of temperamental fear. Observed fear in the spider task and stranger tasks was highly reliably rated by trained coders, supporting that at least relative levels of expressed fear across children within the sample

were accurately captured in the scores for each task. However, these scores were not correlated with one another, which could reflect the methodological differences between the tasks (social vs. non-social, parent present vs. child alone with experimenter). As an additional exploration of the data, correlations of the observed fear scores with mother-rated child fear at T1 were examined; neither of the laboratory task fear scores was correlated with these ratings. Interestingly, other studies reviewed that utilize a behavioral battery to yield a temperament score for fear (e.g., Kiel et al., 2016; Rubin et al., 2002) did not report the internal consistencies for those composite scores, so it is difficult to say how typical this intra-individual variability is. Couched in the wide variation of temperament measures also found in the literature, this leaves questions as to the most appropriate way to measure temperament with either single or multiple measures, particularly considering that creating a composite score from uncorrelated measures would further complicate interpretation of results. Nonetheless, assessing and summing child fear across a wider range of situations and tasks could yield a continuous score that may capture the range of this temperament dimension, with children showing more consistent or extreme fear reactions scoring highest.

Implications and Future Directions

This study is in line with recent calls for further research into protective factors and the interaction among etiological factors in the emergence of childhood anxiety (Wong & Rapee, 2016). Next steps in this specific line of research include examining longer-term anxiety outcome measures. Ongoing data collection in this sample with a collaborator includes children's self-reported anxiety ratings using the SCARED, and semi-structured clinical interviews (K-SADs), which will yield more comprehensive assessment of anxiety at ages 11-13. It would be

interesting to examine trajectories of anxiety across this span, as by this developmental stage, there may be a wider distribution in anxiety scores across the sample.

Future studies ought to continue to measure parenting along behaviorally specific dimensions and to include parenting behaviors across the affective and control spectra, because the estimation of the effects of a particular behavior while controlling for others rather than in isolation yields a more accurate picture of how parenting operates in the real world. Along those lines, another novel approach would be to create profiles that represent different constellations of parenting behaviors using latent profile analysis (e.g. high warmth + low scaffolding, high negativity + high intrusive control) to understand how these interact with child temperament to contribute to anxiety development. Another future direction for this research includes capturing a multi-dimensional assessment of temperament, as we have demonstrated that child fear may vary across contexts.

Ultimately, it is important to better understand how parents influence the development of anxiety to be able to leverage parents' crucial role as coaches in their children's lives well before impairing anxiety develops. In addition to identifying parenting behaviors that exacerbate risk, it is also critical to identify whether specific parenting behaviors, like warmth, encouragement to approach novelty or autonomy-granting, could also buffer risk. This is particularly important for children at higher initial risk for anxiety due to inhibited or highly fearful temperament, as such traits may represent a somewhat less tractable, biologically based risk factor. A primary goal for examining these interactions is that we may be better able to design or modify parenting programs to promote these skills, incorporating families more effectively and before anxiety risk becomes reality. Currently, parents may be incorporated into evidence-based cognitive behavioral treatments for anxiety disorders in children, with goals ranging from supporting their

children's practice of skills and strategies, to directly decreasing parents' own anxiety-maintaining behaviors. However, while commonly held as clinical best practice, the evidence to date is mixed as to whether or not this parent involvement is helpful or necessary, and needs to be further evaluated (Fisak, Richard, & Mann, 2011). In addition, an emerging base of evidence suggests that children at higher risk for developing anxiety disorders due to inhibited or fearful early temperament may benefit from targeted early prevention efforts that include a parenting component (e.g., Chronis-Tuscano et al., 2009; Kennedy, Rapee, & Edwards, 2009; Rapee, 2013; Rapee, Kennedy, Ingram, Edwards, & Sweeney, 2005), yet it is unknown upon which risk factors they have an effect, as no such studies to date have measured observed changes in parenting behaviors. Recognizing the large burden that anxiety disorders present across the lifespan, we ought to devote research and resources to increasing the evidence base for these targeted prevention programs, and then work to increase their availability to the children and families who will benefit from them.

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Table 1. *Descriptive statistics for study variables*

	N	Mean	SD	Min	Max	% Missing
Family Income	306	8.75	3.93	0.50	14.00	0.00
T1 Child Anxiety	304	1.53	1.51	0.00	8.00	0.65
T1 Parenting - General Context						
Mom Warmth	288	3.75	0.44	2.22	4.83	5.88
Mom Negative Affect	288	0.36	0.38	0.00	2.42	5.88
Mom Scaffolding	288	3.19	0.49	1.51	4.40	5.88
Mom Intrusive Control	288	0.97	0.79	0.00	3.38	5.88
T1 Parenting - Stranger Context						
Mom Warmth	274	3.68	0.74	0.50	5.00	10.46
Mom Negative Affect	272	0.24	0.48	0.00	3.00	11.11
Mom Scaffolding	274	3.06	0.84	1.50	5.00	10.46
Mom Intrusive Control	274	0.63	0.86	0.00	3.50	10.46
T1 Child Fear Spider Task	290	0.36	0.29	0.00	0.93	5.23
T1 Child Fear Stranger Task	278	0.64	0.28	0.00	1.00	9.15
T4 Child Anxiety	236	2.70	2.89	0.00	13.00	22.88
T4 Child Depression	237	0.84	1.49	0.00	8.00	22.55

Table 2. *Zero-order correlations for study variables*

	2	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
1. Child Gender	-.05	-.04	-.02	.03	-.05	.17**	.09	.03	.05	.17**	-.11	.03	.00	-.02
2. Family Income	–	.02	.23**	-.26**	.41**	-.30**	.09	-.19**	.16*	-.07	-.03	.13*	-.13	-.17*
3. T1 Child Anxiety		–	-.03	-.09	.03	.00	-.07	.01	-.01	-.01	.06	.13*	.03	.01
General Context Parenting														
4. Warmth			–	-.24**	.54**	-.36**	.20**	-.16**	.26**	.03	.00	.08	-.14*	-.01
5. Negative Affect				–	-.45**	.48**	-.07	.21**	-.07	.22**	-.01	-.11	-.02	.15*
6. Scaffolding					–	-.68**	.15*	-.21**	.24**	-.16**	.05	.08	-.04	-.05
7. Intrusive Control						–	.01	.16**	-.10	.25**	-.06	-.05	-.02	.05
Stranger Context Parenting														
8. Warmth							–	-.11	.71**	.13*	.02	.17**	.01	-.02
9. Negative Affect								–	-.12	.21**	-.09	.12*	-.05	.12
10. Scaffolding									–	.07	.03	.22**	.06	.03
11. Intrusive Control										–	.00	.24**	-.11	-.06
12. Child Fear - Spider											–	.04	.08	.09
13. Child Fear - Stranger												–	-.04	-.07
14. T4 Child Anxiety													–	.55**
15. T4 Child Depression														–

* $p < .05$; ** $p < .01$
Gender was coded 0 = girl, 1 = boy

Table 3. *Hierarchical multiple regression predicting T4 Child Anxiety*

	Model 1				Model 2				Model 3				Model 4			
Predictor	B	SE	β	*p*	B	SE	β	*p*	B	SE	β	*p*	B	SE	β	*p*
Gender	0.08	0.38	0.01	.84	0.13	0.38	0.02	.74	0.17	0.38	0.03	.65	0.13	0.38	0.02	.73
Family Income	-0.09	0.05	-0.13	.08	**-0.11**	**0.05**	**-0.14**	**.05**	**-0.10**	**0.05**	**-0.14**	**.05**	-0.09	0.05	-0.12	.10
T1 Anxiety	0.05	0.12	0.02	.70	0.05	0.12	0.03	.65	0.06	0.12	0.03	.64	0.05	0.12	0.03	.67
Child Fear	0.62	0.68	0.06	.36	0.64	0.68	0.06	.35	0.73	0.67	0.07	.28	0.66	0.67	0.07	.33
Mom Negative Affect (G)	-0.20	0.59	-0.03	.74	-0.02	0.60	0.00	.97	-0.16	0.61	-0.02	.79	-0.20	0.61	-0.03	.74
Mom Intrusive Control (G)	-0.26	0.35	-0.07	.46	-0.21	0.35	-0.06	.56	-0.08	0.35	-0.02	.83	-0.05	0.36	-0.01	.90
Mom Scaffolding (G)	0.13	0.66	0.02	.85	-0.08	0.66	-0.01	.90	0.10	0.67	0.02	.88	-0.01	0.67	0.00	.99
Mom Warmth (G)	**-1.07**	**0.53**	**-0.16**	**.04**	**-1.10**	**0.55**	**-0.17**	**.04**	**-1.25**	**0.56**	**-0.19**	**.03**	-1.06	0.57	-0.16	.06
Mom Negative Affect (S)					-0.36	0.46	-0.06	.43	-0.44	0.46	-0.07	.34	-0.42	0.47	-0.07	.38
Mom Intrusive Control (S)					-0.32	0.25	-0.10	.20	-0.34	0.25	-0.10	.17	-0.41	0.25	-0.12	.11
Mom Scaffolding (S)					0.50	0.33	0.15	.12	0.50	0.33	0.14	.13	0.40	0.33	0.12	.23
Mom Warmth (S)					-0.14	0.39	-0.04	.71	-0.15	0.39	-0.04	.70	-0.01	0.39	0.00	.98
Negative Affect (G) x Fear									-2.52	2.08	-0.10	.22	-2.77	2.15	-0.11	.20
Intrusive Control (G) x Fear									2.08	1.25	0.16	.09	**2.52**	**1.29**	**0.20**	**.05**
Scaffolding (G) x Fear									2.14	2.28	0.11	.35	2.89	2.33	0.14	.21
Warmth (G) x Fear									-2.62	1.96	-0.11	.18	-1.55	2.05	-0.07	.45
Negative Affect (S) x Fear													2.35	1.64	0.12	.15
Intrusive Control (S) x Fear													-1.12	0.87	-0.10	.20
Scaffolding (S) x Fear													-0.21	1.24	-0.02	.87
Warmth (S) x Fear													-0.65	1.35	-0.05	.63
	R^2 = .04, p = .100				R^2 = .07, p = .035				R^2 = .10, p = .011				R^2 = .12, p = .004			

(G) = general context; (S) = stranger context

Table 4. *Hierarchical multiple regression predicting T4 Child Depression*

	Model 1				Model 2				Model 3				Model 4			
Predictor	B	SE	β	*p*	B	SE	β	*p*	B	SE	β	*p*	B	SE	β	*p*
Gender	-0.10	0.20	-0.03	.61	0.01	0.20	0.00	.96	0.02	0.19	0.01	.93	-0.02	0.19	-0.01	.92
Family Income	**-0.06**	**0.03**	**-0.15**	**.04**	**-0.06**	**0.03**	**-0.16**	**.03**	**-0.06**	**0.03**	**-0.15**	**.03**	**-0.05**	**0.03**	**-0.14**	**.05**
T1 Anxiety	0.04	0.06	0.04	.58	0.01	0.06	0.01	.85	0.01	0.06	0.01	.91	0.00	0.06	0.00	.00
Child Fear	0.40	0.35	0.27	.25	0.45	0.35	0.09	.19	0.45	0.34	0.09	.18	0.39	0.34	0.08	.25
Mom Negative Affect (G)	**0.60**	**0.30**	**0.15**	**.05**	**0.60**	**0.31**	**0.15**	**.05**	**0.60**	**0.31**	**0.15**	**.05**	**0.62**	**0.31**	**0.16**	**.05**
Mom Intrusive Control (G)	-0.02	0.18	-0.01	.89	0.02	0.18	0.01	.91	0.04	0.18	0.02	.82	0.03	0.18	0.02	.86
Mom Scaffolding (G)	0.16	0.34	0.05	.63	0.16	0.34	0.05	.64	0.31	0.34	0.10	.35	0.27	0.34	0.09	.43
Mom Warmth (G)	0.08	0.28	0.02	.78	0.12	0.28	0.04	.67	-0.07	0.29	-0.02	.81	0.01	0.29	0.00	.97
Mom Negative Affect (S)					0.32	0.23	0.10	.16	0.27	0.22	0.09	.22	0.37	0.23	0.12	.11
Mom Intrusive Control (S)					-0.21	0.13	-0.12	.10	-0.17	0.13	-0.10	.19	-0.19	0.13	-0.11	.14
Mom Scaffolding (S)					0.17	0.17	0.09	.32	0.14	0.17	0.08	.39	0.09	0.17	0.05	.60
Mom Warmth (S)					-0.05	0.20	-0.03	.79	-0.02	0.20	-0.01	.90	0.07	0.20	0.04	.72
Negative Affect (G) x Fear									-0.89	1.05	-0.07	.40	-0.94	1.08	-0.07	.39
Intrusive Control (G) x Fear									0.20	0.63	0.03	.76	0.33	0.65	0.05	.62
Scaffolding (G) x Fear									0.64	1.15	0.06	.58	1.05	1.16	0.10	.37
Warmth (G) x Fear									**-3.02**	**0.99**	**-0.26**	**.002**	**-2.44**	**1.03**	**-0.21**	**.02**
Negative Affect (S) x Fear													**1.80**	**0.79**	**0.18**	**.02**
Intrusive Control (S) x Fear													-0.52	0.44	-0.09	.24
Scaffolding (S) x Fear													-0.23	0.62	-0.04	.71
Warmth (S) x Fear													0.07	0.67	0.01	.92
	$R^2 = .05, p = .068$				$R^2 = .08, p = .027$				$R^2 = .12, p = .003$				$R^2 = .15, p = .001$			

(G) = general context; (S) = stranger context

Table 5. Regression analysis predicting child fear in the stranger task

Predictor	B	SE	β	*p*
Child Gender	-0.01	0.03	-0.01	.80
Family Income	**0.01**	**0.00**	**0.14**	**.02**
Mom Negative Affect (S)	**0.07**	**0.03**	**0.13**	**.03**
Mom Intrusive Control (S)	**0.07**	**0.02**	**0.21**	**.00**
Mom Scaffolding (S)	**0.06**	**0.03**	**0.19**	**.02**
Mom Warmth (S)	0.00	0.03	0.01	.89

Table 6. Regression analyses predicting parenting in the stranger task

	Mom Negative Affect				Mom Intrusive Control				Mom Scaffolding				Mom Warmth			
	B	SE	β	*p*	B	SE	β	*p*	B	SE	β	*p*	B	SE	β	*p*
Child Gender	0.02	0.06	0.02	0.78	**0.27**	**0.10**	**0.16**	**0.01**	0.09	0.10	0.06	0.34	0.14	0.09	0.09	0.12
Family Income	**-0.03**	**0.01**	**-0.21**	**0.00**	-0.02	0.01	-0.10	0.10	**0.03**	**0.01**	**0.13**	**0.02**	0.01	0.01	0.08	0.21
Child Fear	**0.26**	**0.10**	**0.15**	**0.01**	**0.78**	**0.18**	**0.25**	**0.00**	**0.61**	**0.18**	**0.20**	**0.00**	**0.42**	**0.16**	**0.16**	**0.01**
	R^2 = .06, p = .037				R^2 = .09, p = .006				R^2 = .07, p = .021				R^2 = .04, p = .078			

Figure 1. Simple slopes for the interaction between intrusive control in the general context x child fear predicting child anxiety

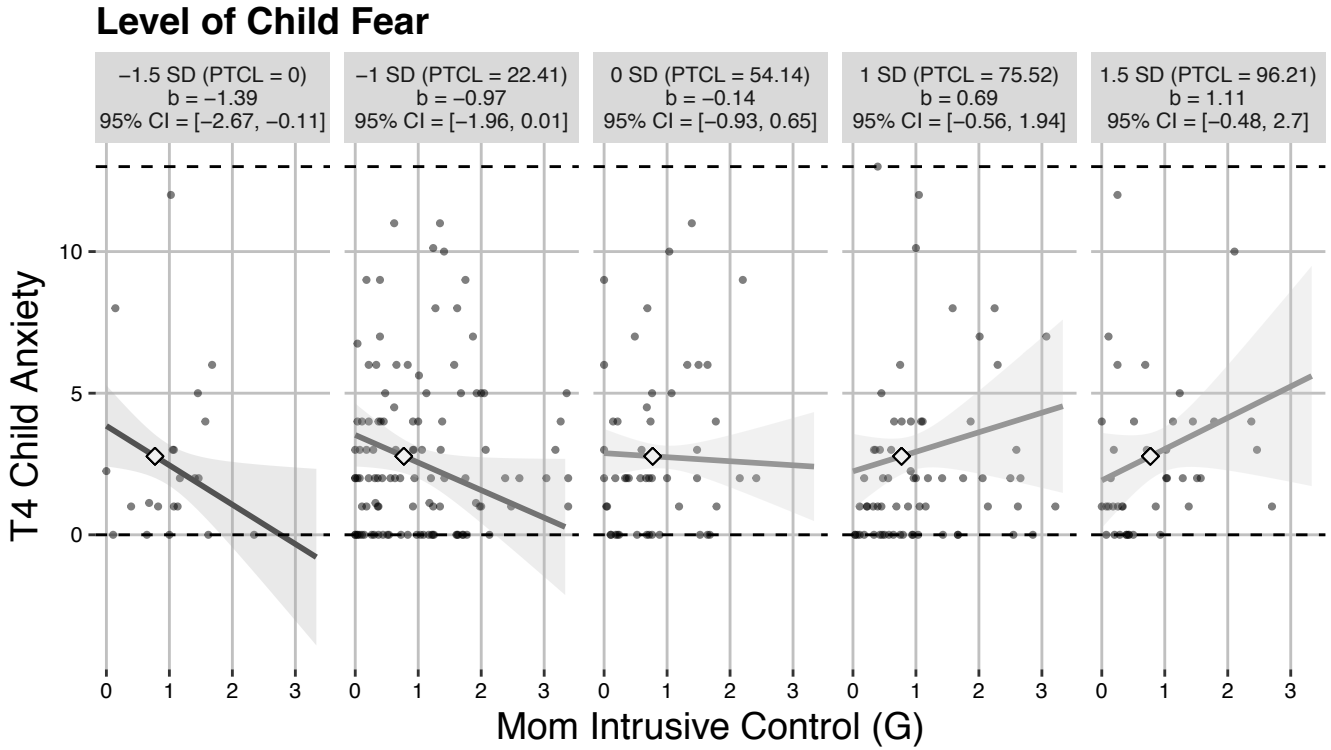


Figure 2. Region of significance for the intrusive control (G) x fear interaction predicting child anxiety. The gray area indicates the 95% confidence interval. The dotted lines represent the cutoff values of child fear outside which the simple slopes are significantly different from 0. The "rug" or hashmarks across the bottom represent observed values of child fear to guide interpretation of the simple slopes in relation to the range of the actual data.

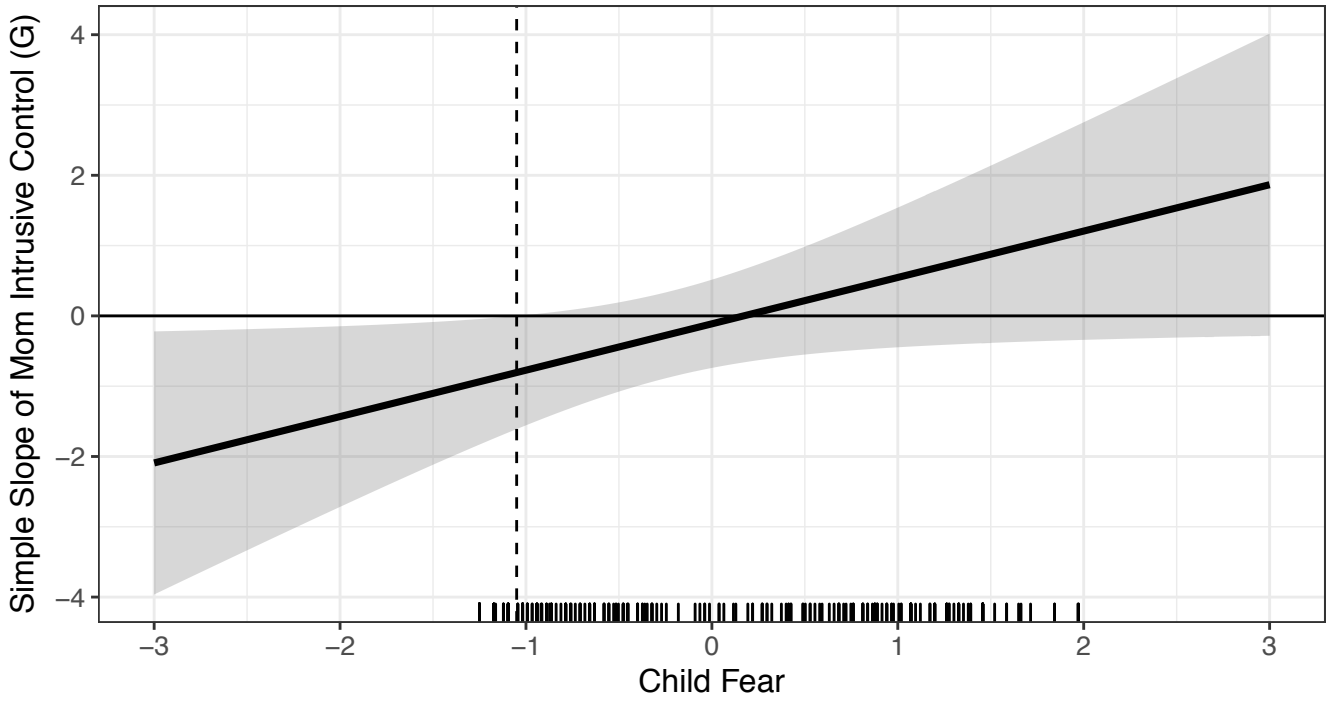


Figure 3. Simple slopes for the interaction between maternal warmth (G) and child fear predicting child depression

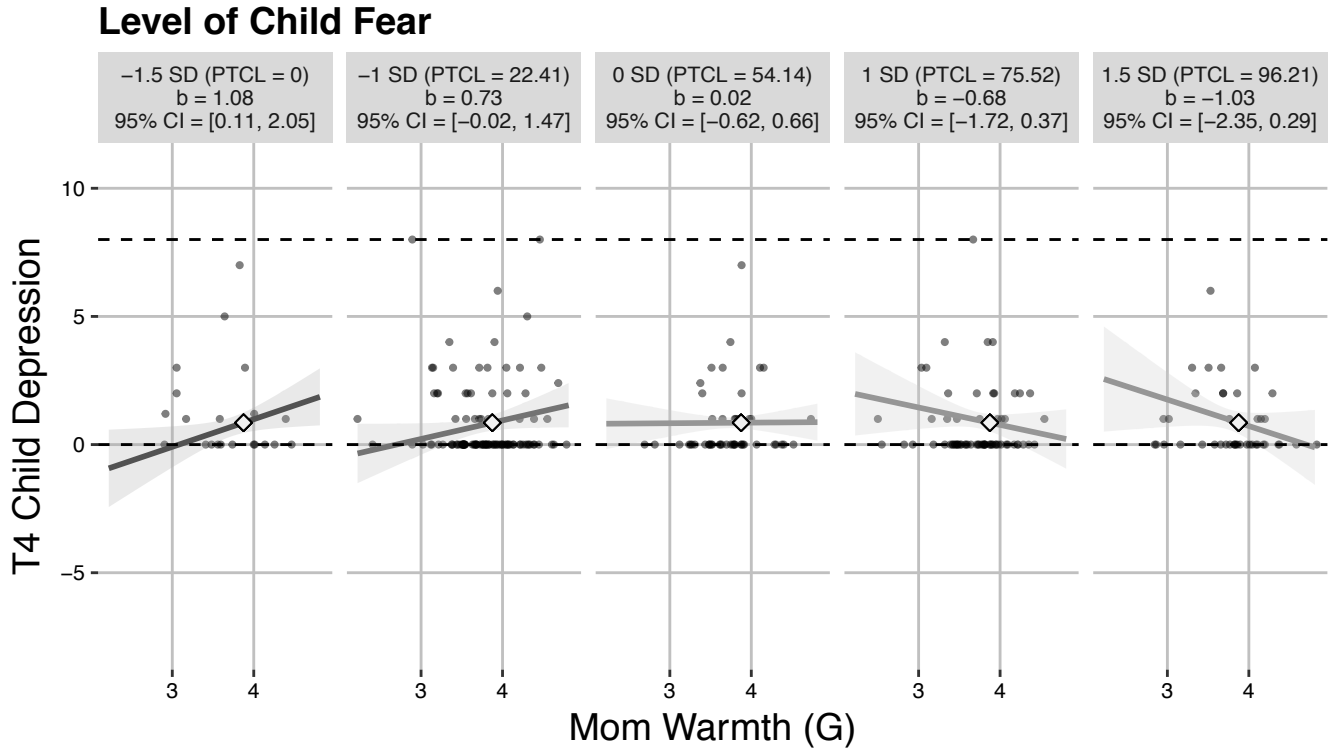


Figure 4. Region of significance for the warmth (G) x fear interaction predicting child depression.

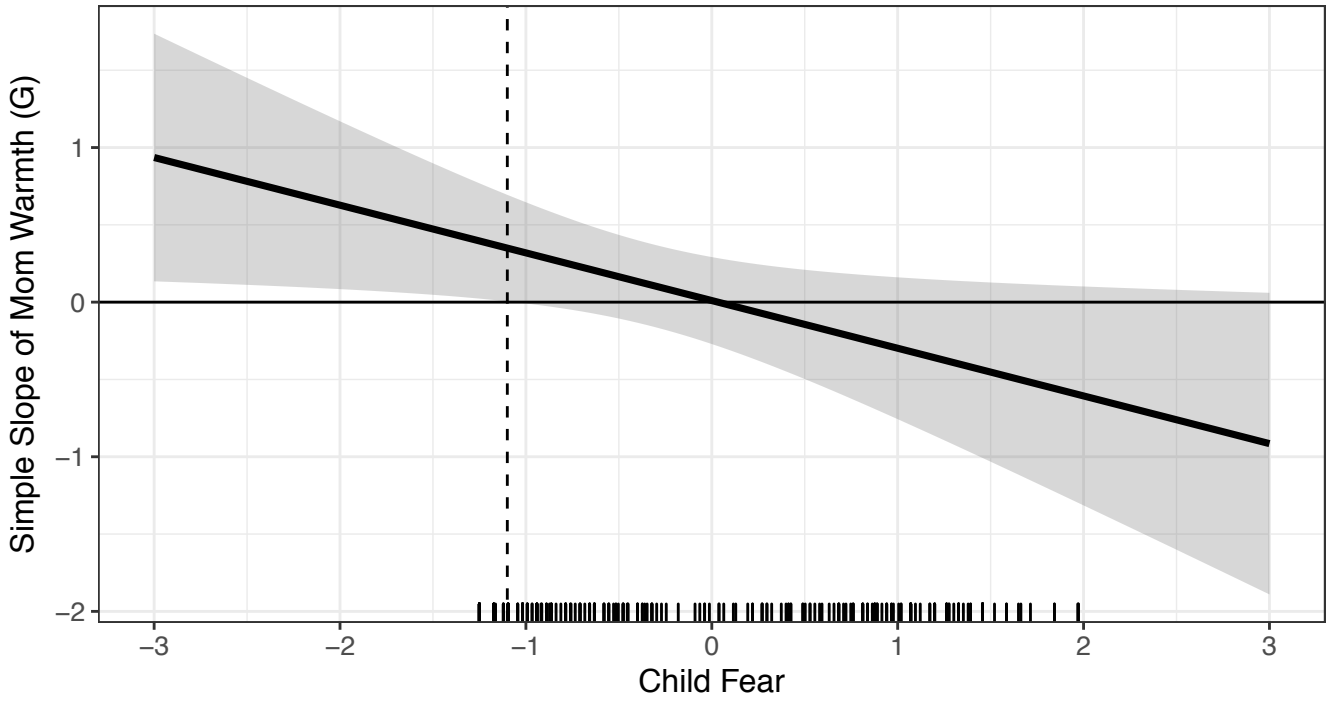


Figure 5. Simple slopes for the interaction between maternal negative affect (S) and child fear predicting child depression

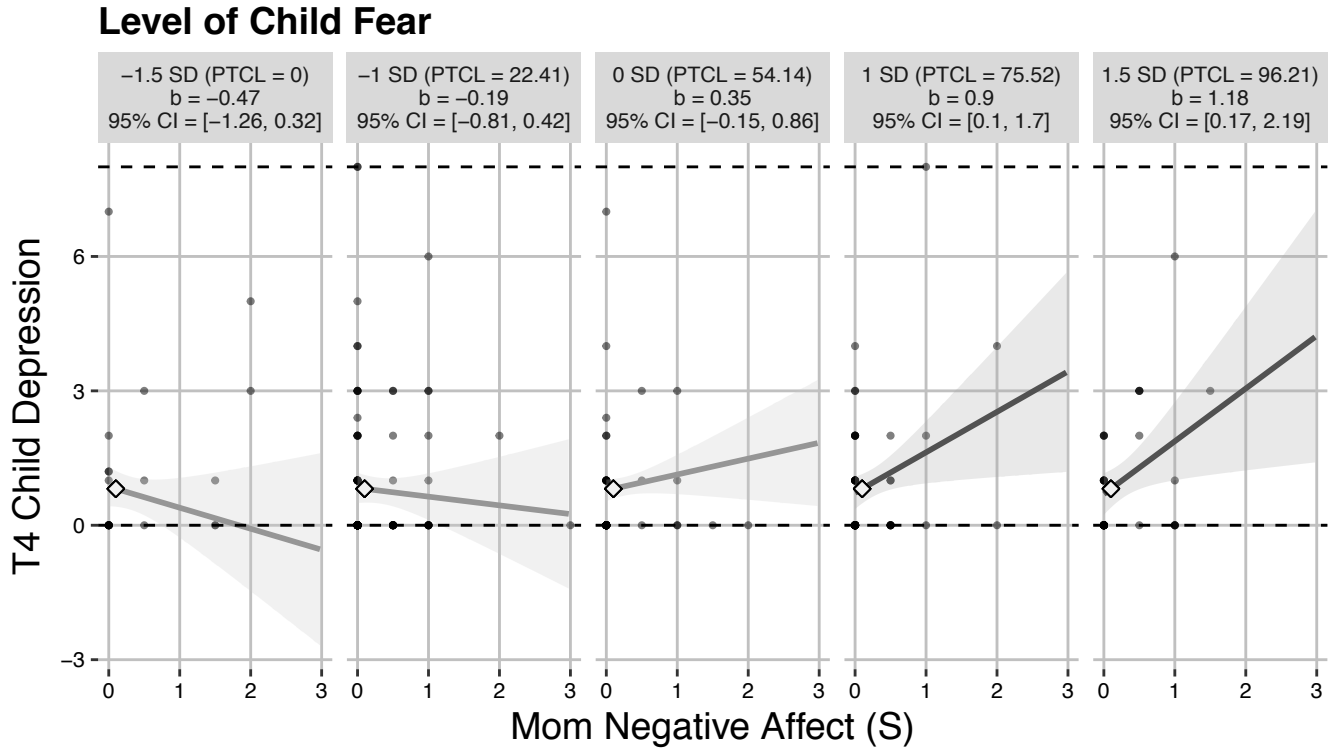
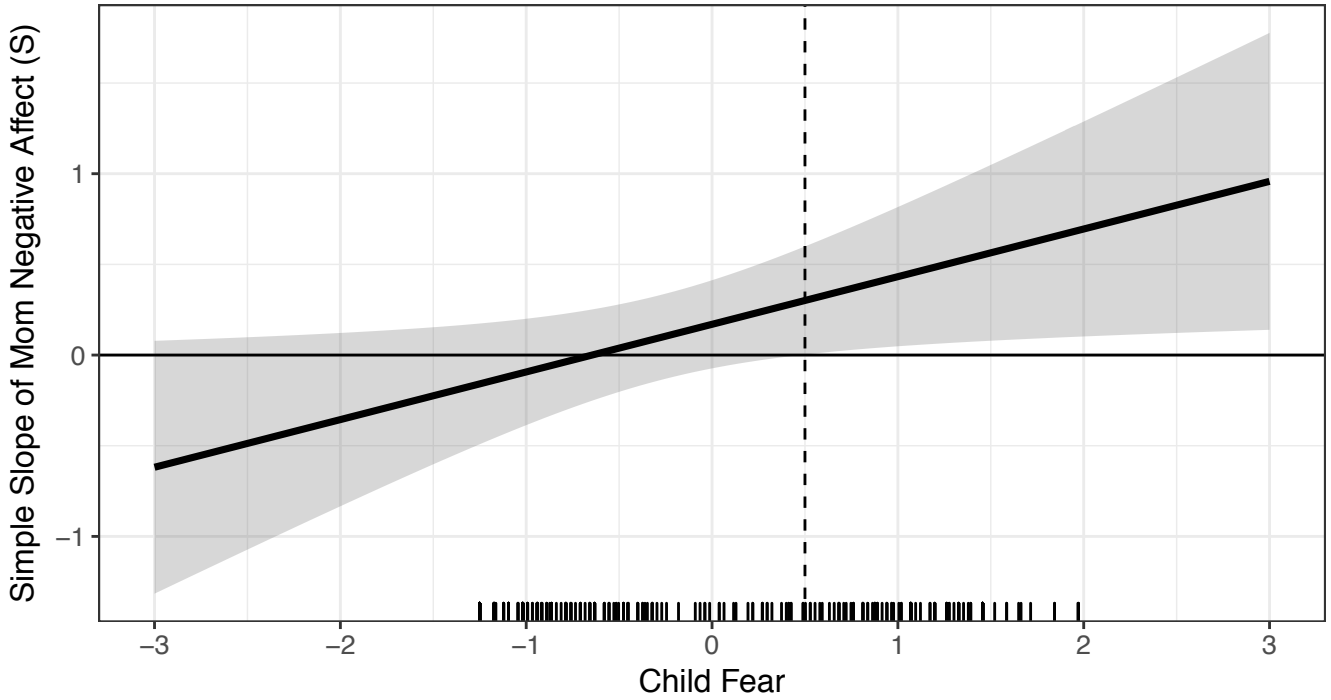


Figure 6. Region of significance for the negative affect (S) x fear interaction predicting child depression



Appendix 1. Results for internalizing (combined anxiety/depression) outcome.

Main effects of temperament and parenting on internalizing

Regression models including child gender, family income, fear, general context parenting and stranger context parenting (first separately then together) were tested. There were no significant main effects of fearful temperament or any parenting variable, and the general parenting alone did not account for significant variance overall in child internalizing (see Table A1). The model including all parenting from both contexts (Table A2) did account for a small but significant portion of the variance in child internalizing (R^2 = .065, p = 0.045). Family income was the sole significant predictor across all 3 of these models.

Tests of temperamental fear as a moderator of parenting on child internalizing

First, the interactions among general parenting variables and fear were examined (Table A3). In this model, there was a significant interaction between general context warmth and temperamental fear (B = -0.20, t = -2.50, p = .01). Simple slopes and regions of significance analyses were examined to identify the nature of the interaction (see Figures A1 and A2), and revealed that for children higher in fear, greater warmth in the general context was associated with later lower internalizing. As seen in the marginal effects plot (Figure A2), the simple slope of warmth on anxiety is significant and negative when child fear is 0.25 standard deviations away from the mean or more (40.85% of the observations fall within this region). This model overall accounted for a small but significant proportion of the variance in child internalizing symptoms (R^2 = .079, p = 0.024).

Next, the interactions among parenting in the stranger context alone and fear were tested (Table A4). In this model, one statistically significant and one trend level association emerged. There was a significant interaction between mom negative affect and child fear (B = 0.18, t =

2.39, p = .02). Probing this effect, the slope of negative affect on child internalizing was significant in the positive direction when fear was 1.55+ SDs from the mean or more, which accounted for 3.27% of the sample (Figures A3, A4). So, for this small proportion of children higher in fear, greater maternal negative affect predicted higher later internalizing.

The relation of maternal intrusive control in the stranger context to later internalizing was also moderated by child fear at a trend level (B = -0.12, t = -1.79, p = .07). This interaction occurred in the presence of a trend-level main effect of negative control on internalizing B = -0.12, t = -1.74, p = .08). The simple slope of intrusive control on later child internalizing was significant and negative when fear was .05+ SDs from the mean, which captures 42.81% of the data. This suggested that for children slightly above average in fear and higher, higher maternal intrusive control in the stranger context predicted lower later internalizing.

When all parenting variables from both contexts were entered simultaneously along with their interactions with temperament, only the trend level main effect of intrusive control and the interaction between negative affect and fear remained, suggesting multicollinearity or shared variance among the predictors (see Table A5). This model accounted for the most overall variance in the child internalizing outcome measure (R^2 = .13, p = 0.002).

Table A1. Standardized regression coefficients for model examining main effects of general parenting on internalizing

	Estimate	S.E.	Est./S.E.	P-Value
Gender	0.00	0.07	-0.02	0.99
Family Income	**-0.14**	**0.07**	**-1.97**	**0.05**
General Context Neg. Affect	0.04	0.08	0.51	0.61
General Neg. Control	-0.04	0.10	-0.41	0.68
General Context Scaffolding	0.04	0.11	0.36	0.72
General Context Warmth	-0.11	0.08	-1.36	0.17
Child Fear	0.08	0.07	1.25	0.21

R^2 = .04, p = 0.12

Table A2. Standardized regression coefficients for model examining main effects of all parenting variables together on internalizing

	Estimate	S.E.	Est./S.E.	P-Value
Gender	0.01	0.07	0.18	0.86
Family Income	**-0.15**	**0.07**	**-2.14**	**0.03**
General Context Neg. Affect	0.05	0.08	0.69	0.49
General Neg. Control	-0.02	0.10	-0.23	0.82
General Context Scaffolding	0.01	0.11	0.12	0.90
General Context Warmth	-0.11	0.08	-1.32	0.19
Stranger Context Neg. Affect	0.01	0.08	0.15	0.88
Stranger Context Neg. Control	-0.12	0.07	-1.61	0.11
Stranger Context Scaffolding	0.14	0.09	1.46	0.15
Stranger Context Warmth	-0.03	0.10	-0.34	0.73
Child Fear	0.09	0.07	1.33	0.18

$R^2 = .065$, $p = 0.045$

Table A3. Standardized regression coefficients for model examining interaction effects of general context parenting and fearful temperament on internalizing

	Estimate	S.E.	Est./S.E.	P-Value
Gender	0.01	0.07	0.09	0.93
Family Income	**-0.13**	**0.07**	**-1.90**	**0.06**
General Context Neg. Affect	0.03	0.08	0.38	0.71
General Neg. Control	-0.02	0.09	-0.17	0.87
General Context Scaffolding	0.09	0.11	0.77	0.44
General Context Warmth	**-0.15**	**0.08**	**-1.86**	**0.06**
General Neg Affect x Fear	-0.08	0.08	-1.06	0.29
Gen. Neg Control x Fear	0.10	0.10	1.02	0.31
Gen Scaffolding x Fear	0.10	0.11	0.87	0.39
General Warmth x Fear	**-0.20**	**0.08**	**-2.50**	**0.01**
Child Fear	0.09	0.07	1.36	0.17

$R^2 = .079$, $p = 0.024$

Table A4. Standardized regression coefficients for model examining interaction effects of stranger context parenting and fearful temperament on internalizing

	Estimate	S.E.	Est./S.E.	P-Value
Gender	0.00	0.07	-0.02	0.98
Family Income	**-0.16**	**0.07**	**-2.32**	**0.02**
Stranger Context Neg. Affect	0.06	0.08	0.77	0.44
Stranger Context Neg. Control	**-0.12**	**0.07**	**-1.74**	**0.08**
Stranger Context Scaffolding	0.10	0.09	1.02	0.31
Stranger Context Warmth	0.00	0.10	0.01	0.99
Stranger Neg Affect x Child Fear	**0.18**	**0.08**	**2.39**	**0.02**
Stranger Neg Control x Child Fear	**-0.12**	**0.07**	**-1.79**	**0.07**
Stranger Scaffolding x Fear	-0.04	0.09	-0.41	0.68
Stranger Warmth x Fear	0.01	0.10	0.05	0.96
Child Fear	0.07	0.07	1.12	0.26

R^2 = .091, p = 0.014

Table A5. Standardized regression coefficients for model examining interaction effects of combined general and Stranger context parenting and fearful temperament on internalizing

	Estimate	S.E.	Est./S.E.	P-Value
Gender	0.01	0.06	0.14	0.89
Family Income	**-0.13**	**0.07**	**-1.78**	**0.08**
Stranger Context Neg. Affect	0.01	0.08	0.15	0.88
Stranger Context Neg. Control	**-0.13**	**0.07**	**-1.79**	**0.07**
Stranger Context Scaffolding	0.10	0.10	1.06	0.29
Stranger Context Warmth	0.02	0.10	0.17	0.87
General Context Neg. Affect	0.04	0.08	0.54	0.59
General Neg. Control	0.01	0.10	0.07	0.94
General Context Scaffolding	0.03	0.11	0.23	0.82
General Context Warmth	-0.11	0.08	-1.33	0.18
Stranger Neg Affect x Child Fear	**0.17**	**0.08**	**2.10**	**0.04**
Stranger Neg Control x Child Fear	-0.11	0.07	-1.45	0.15
Stranger Scaffolding x Fear	-0.02	0.10	-0.17	0.87
Stranger Warmth x Fear	-0.04	0.10	-0.36	0.72
General Neg Affect x Fear	-0.10	0.08	-1.20	0.23
Gen. Neg Control x Fear	0.15	0.10	1.57	0.12
Gen Scaffolding x Fear	0.13	0.11	1.18	0.24
General Warmth x Fear	-0.13	0.09	-1.47	0.14
Child Fear	0.09	0.07	1.33	0.18

R^2 = .13, p = 0.002

Figure A1. Simple slopes for the interaction between general parenting warmth and child fear

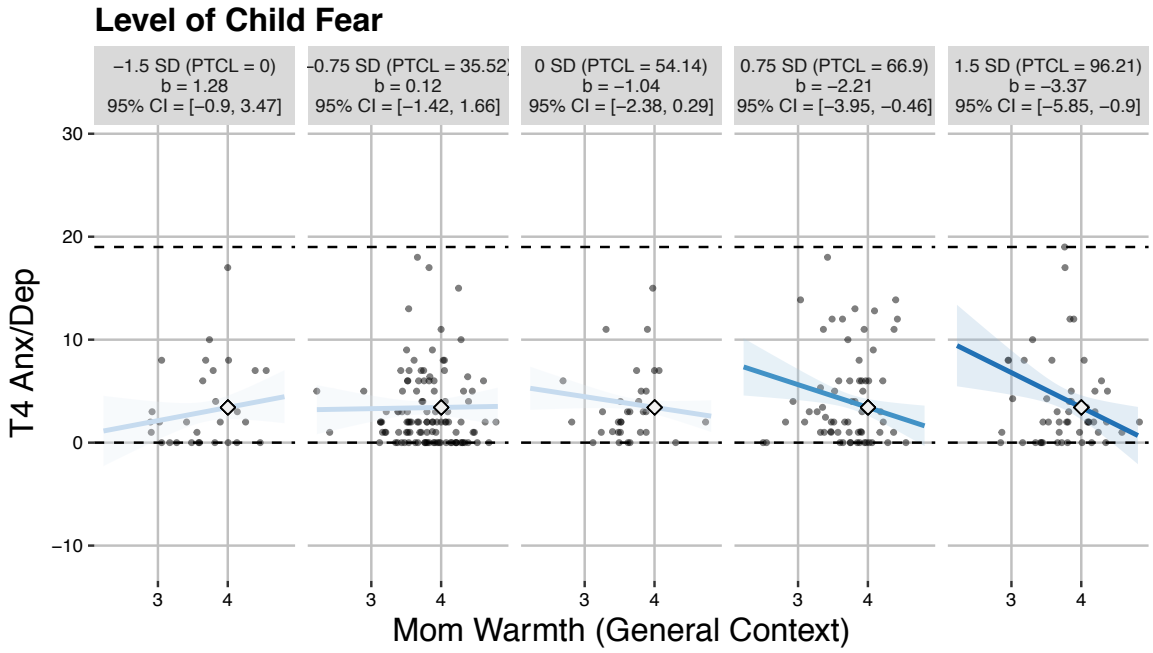


Figure A2. Region of significance for the warmth x fear interaction. The gray area indicates the 95% confidence interval. The dotted lines represent the cutoff values of child fear outside which the simple slopes are significantly different from 0. The "rug" or hashmarks across the bottom represent observed values of child fear to guide interpretation of the simple slopes in relation to the range of the actual data.

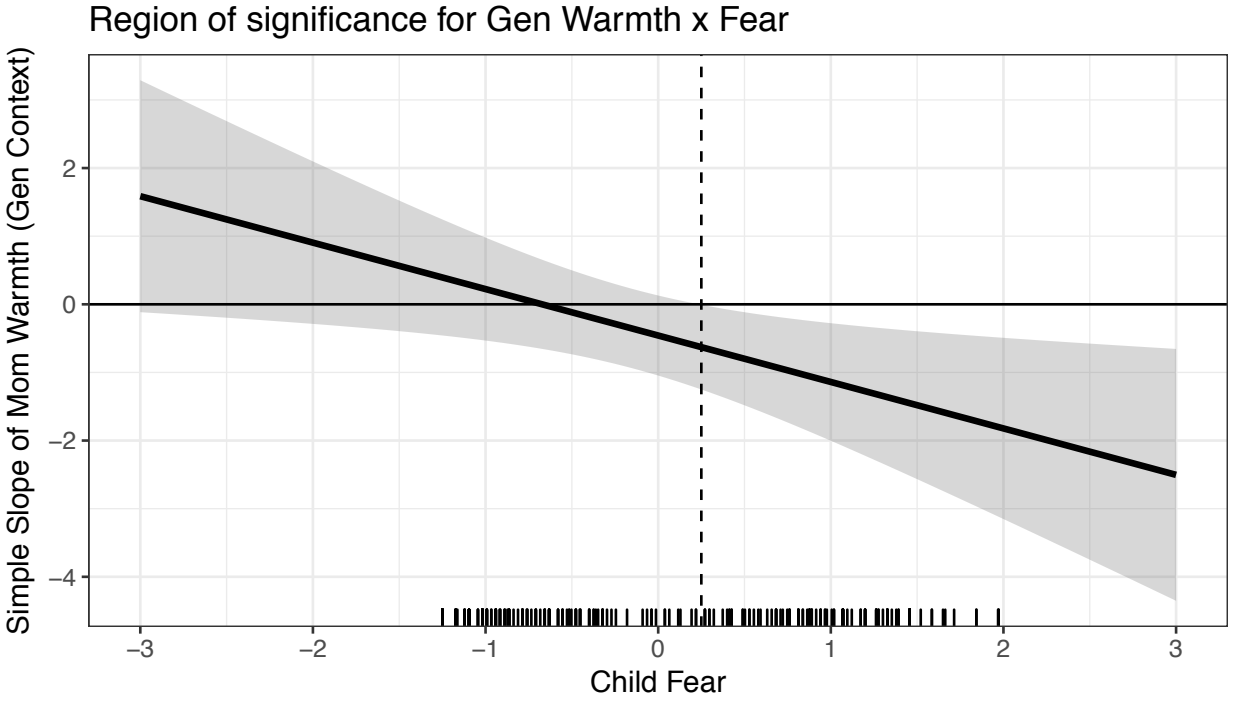


Figure A3. Simple slopes for the interaction between maternal negative affect and child fear

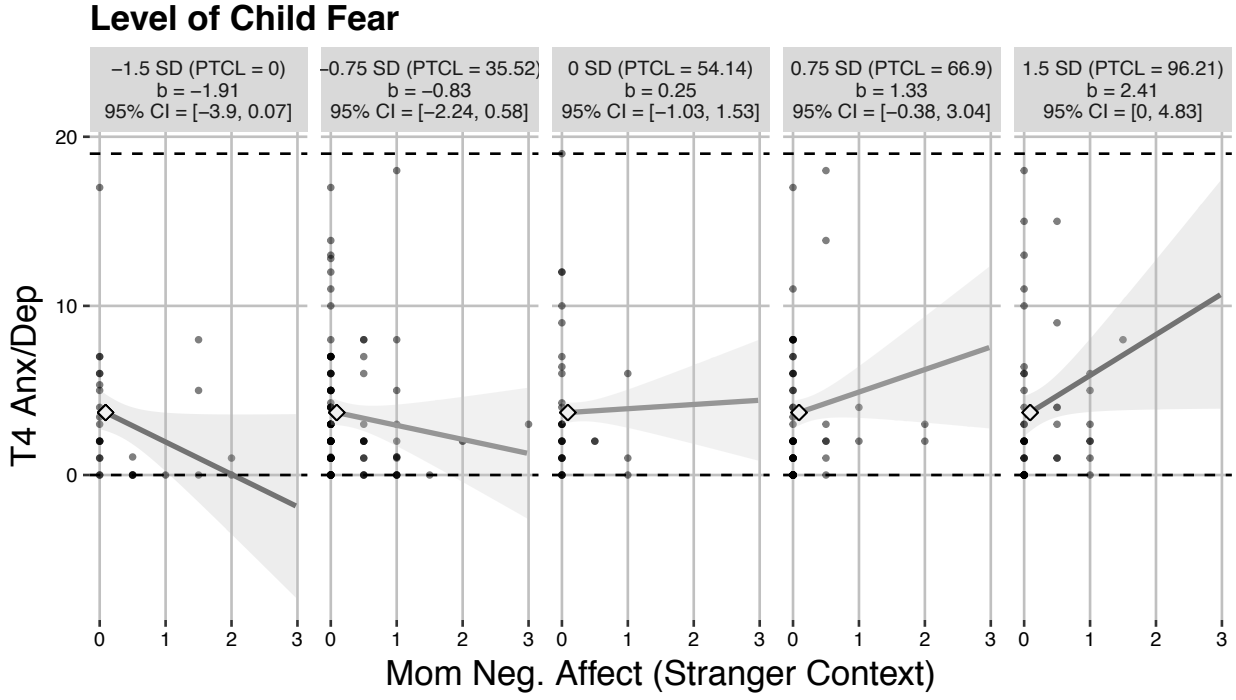


Figure A4. Region of significance for the negative affect x fear interaction.

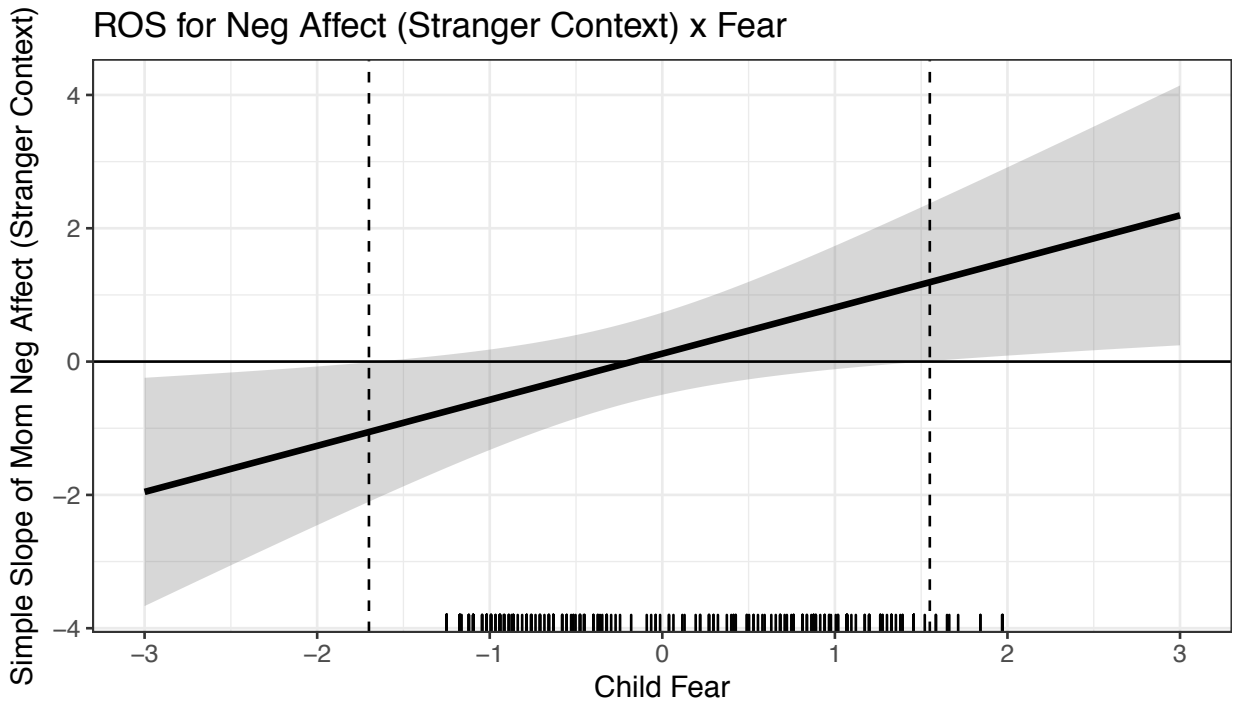


Figure A5. Simple slopes for the interaction between maternal intrusive control and child fear

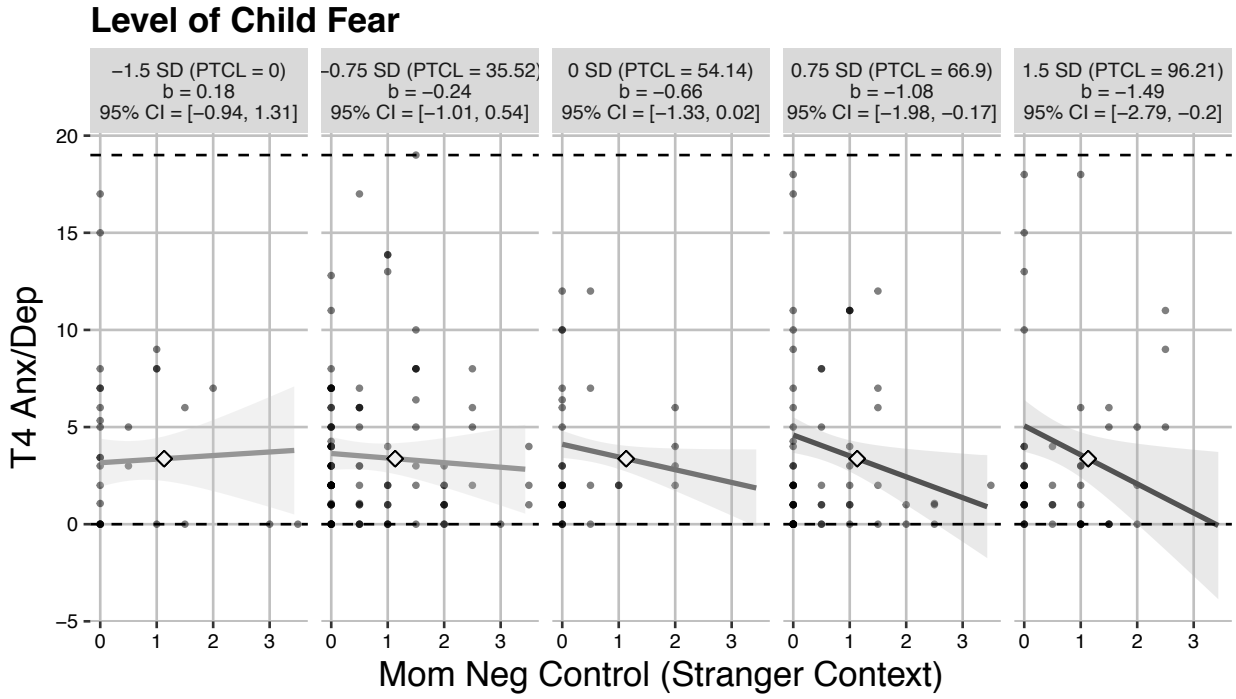
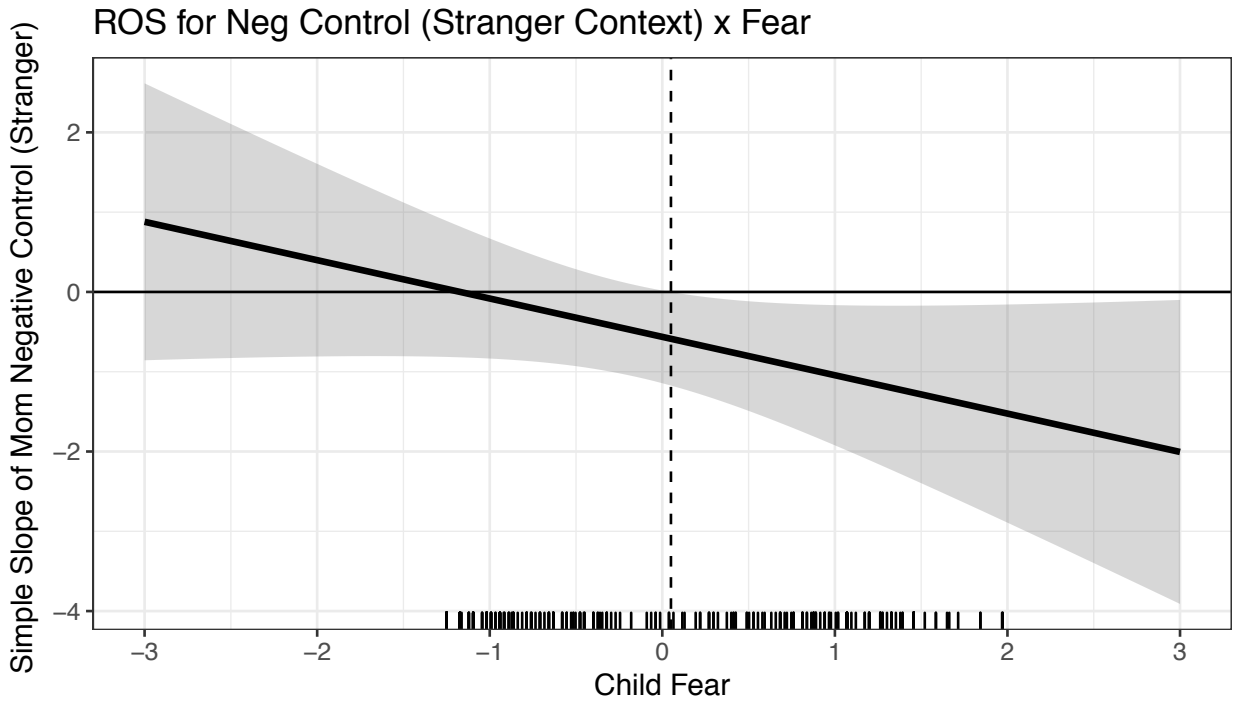


Figure A6. Region of significance for the warmth x fear interaction



Appendix B. Anxiety (A) and depression (D) items from the Teacher Report Form (Achenbach) internalizing scale completed at T4

1.	Clings to adults or too dependent	A
2.	Fears going to school	A
3.	Feels he/she has to be perfect	A
4.	Nervous, high strung, or tense	A
5.	Overly anxious to please	A
6.	Too fearful or anxious	A
7.	Is afraid of making mistakes	A
8.	Withdrawn, doesn't get involved with others	A
9.	Worries	A
10.	Complains of loneliness	D
11.	Cries a lot	D
12.	Feels or complains that no one loves him/her	D
13.	Feels worthless or inferior	D
14.	Underactive, slow moving, or lacks energy	D
15.	Unhappy, sad or depressed	D