

MCCURDY, AMY L., M.S. Autonomy-Relevant Maternal Parenting in Early Childhood as a Predictor of Anxiety Symptoms in Preadolescence. (2018)  
Directed by Drs. W. Roger Mills-Koonce and Anne C. Fletcher. 80 pp.

Autonomy-relevant parenting practices have been associated with anxiety symptoms later in life, although this finding has most commonly been studied in adolescent populations using self-report measures. The current study used a sample of mother-child dyads living in rural areas under conditions of poverty to understand how psychologically controlling and autonomy-supportive parenting at 58 months predicts anxiety symptoms at 12 years. Infant distress to novelty at 6 months and child gender were investigated as a potential moderators of these associations. Autonomy-relevant parenting measures were assessed via observational coding methods, whereas child anxiety and infant distress to novelty were measured through mother's self-reports. Results indicated that for girls only, a significant association between the psychological control/autonomy-support measure and child anxiety emerged such that higher autonomy-support predicted greater anxiety symptoms. For girls only, distress to novelty moderated this association – infants who were high in distress to novelty showed a stronger association between autonomy-supportive parenting and later anxiety symptoms than infants who were low in distress to novelty. Findings from the current study provoke further questions regarding bidirectional associations between child anxiety symptoms and parenting practices, and indicate avenues for future interventions to ameliorate anxiety symptoms in preadolescent girls.

AUTONOMY-RELEVANT MATERNAL PARENTING IN EARLY CHILDHOOD AS  
A PREDICTOR OF ANXIETY SYMPTOMS IN PREADOLESCENCE

by

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A Thesis Submitted to  
the Faculty of The Graduate School at  
The University of North Carolina at Greensboro  
in Partial Fulfillment  
of the Requirements for the Degree  
Master of Science

Greensboro  
2018

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## CHAPTER I

### INTRODUCTION

Anxiety disorders are the most common types of pathology diagnosed during childhood and preadolescence (Beesdo, Knappe, & Pine, 2009; Lepine, 2002). Childhood is a particularly risky period for the development of heightened anxiety symptoms, as such symptoms carry serious implications for social, emotional, and academic development (Langley, Bergman, McCracken, & Piacentini, 2004). Heightened anxiety symptoms are pervasive in childhood, and often persist or increase as children mature into adolescence. According to Child Trends, anxiety symptoms affect 32 percent of adolescents aged 13- to 18-years (Terizan, Hamilton, & Ericson, 2011). The significance of anxiety problems during childhood should not be underestimated; Terizan, Hamilton, and Ericson (2011) cited evidence that half of all lifetime mental disorders emerge by age 14. Therefore, determining the factors that precede and sustain anxiety problems in childhood is an important task for researchers to undertake.

The dynamic developmental systems model is a useful framework through which to examine the development of heightened anxiety symptoms in children. This model proposes that individual characteristics interact with contextual features that together predict the development of psychopathology. Both child temperament (especially distress to novelty) and autonomy-relevant parenting practices (including psychological control and psychological autonomy-support) have been studied independently in relation to

child anxiety, and both have been found to predict anxiety symptoms in children (Barber, Bean, & Ericson, 2001; Bosquet & Egeland, 2006; Brenning, Soenens, Braet, & Bal, 2011; Lansford et al., 2014; Silk, Morris, Kanaya, & Steinberg, 2003; Verhoeven, Bögels, & van der Bruggen, 2012). The literature on parental psychological control generally indicates a positive association between high parental control and high child anxiety symptoms (Barber, 1996; Barber, Bean, & Ericson, 2001; Lansford et al., 2014; Silk et al., 2003; Verhoeven, Bögels, & van der Bruggen, 2012), but the nature of the relationship between parental autonomy-support and child anxiety is less clear. This signals the need for additional research to clarify whether high parental autonomy-support is associated with child anxiety symptoms in a positive manner, negative manner, or whether the two are unrelated. Furthermore, empirical work suggests that understanding the way in which autonomy-relevant parenting is linked to anxiety can be enhanced by investigating parenting within the context of infant distress to novelty temperament. This integrative research can advance our understanding of child anxiety symptoms by investigating how parental autonomy-support is associated with anxiety and how infant distress to novelty temperament interacts with the effects of early caregiving experiences.

### **Separation-Individuation Theory**

As articulated by Margaret Mahler (Mahler, Pine, & Bergman, 1975), separation-individuation was initially conceptualized as a stage theory of child development wherein infants progress from total absorption – oneness with their parents – to being able to differentiate themselves as separate from their parents. Recent use of separation-

individuation theory has implicated parental autonomy-support during adolescence as a parenting behavior that promotes the development of independence (Silk et al., 2003). Soenens, Vansteenkiste, and Sierens (2009) posited that parental promotion of independence emphasizes individual expression, and parents high on this dimension typically encourage children to make decisions for themselves.

The basic premise of separation-individuation theory is that separation and individuation are linked processes; an increase in one corresponds to an increase in the other. Therefore, proponents of this theory maintain that adolescents require some amount of psychological autonomy from their parents to develop independence and to make decisions on their own. Separation-individuation theory has been primarily articulated developmentally since its introduction (Mahler, Pine, & Bergman, 1975). Psychological differentiation becomes more developmentally salient as children mature into adolescents; therefore, parents can effectively support their children's development in this area by gradually increasing choices, responsibilities, and freedoms in an age-appropriate manner. At an interpersonal level, parents can also promote psychological autonomy by encouraging the expression of opinions and validating children's right to hold these perspectives, even if different from those of the parent.

The implications of high psychological autonomy-supportive parenting behaviors have also been investigated through the framework of separation-individuation theory. Within the field of developmental psychology (Soenens, Vansteenkiste, & Sierens, 2009), findings have indicated that psychological autonomy is especially important for children's identity formation (Meeus, Iedema, Maassen, & Engels, 2005) and emotional

independence (Hoffman, 1984). The literature on autonomy could be enhanced by considering the extent to which autonomy-relevant parenting practices impact child internalizing outcomes within a framework of separation-individuation theory. Specifically, children whose parents provide reassurance, scaffolding, and validation for their perspectives within interpersonal interactions may be more confident in themselves and their decisions. Thus, the extent to which parents respect and validate their children's perspectives will theoretically correspond to the children's confidence in themselves as autonomous individuals.

### **Dynamic Developmental Systems Model**

A dynamic developmental systems model considers how interactive processes across multiple levels of analysis together predict vulnerability to depression, anxiety, and internalizing disorders (Cicchetti & Natsuaki, 2014; Windle, 2010). Children's differential responding to a range of environmental contexts can interact with characteristics of children to lead to adaptive or maladaptive functioning (Ingram & Luxton, 2005). In the context of the proposed study, children's distress to novelty temperament functions as an individual characteristic, whereas parenting practices serve as a potential environmental stressor. This perspective could help explain why researchers have observed variation in anxiety outcomes (both heightened and decreased) related to parental autonomy-supportive practices; consideration of child temperament could illuminate for which children the association between parental autonomy-support and anxiety exists. For instance, Ingram and Luxton (2005) argued that stress alone does

not predict psychopathy; examining individual characteristics as potentially interacting with stress exposure often yields a more refined description of various disorders.

Under a dynamic developmental systems model, researchers must consider the developmental nature of psychopathology. In the proposed study, this pertains specifically to the use of categorical versus continuous measures of anxiety; categorical anxiety measures seek to delineate whether an individual meets a specific diagnostic criteria, whereas continuous measures of anxiety consider gradation of symptoms (McLeod, Weisz, & Wood, 2007). Considering that anxiety symptoms can fluctuate over time and gradually increase to clinical levels as risk factors accumulate, this perspective favors the use of a continuous measure of anxiety symptoms, to allow for potential change over development.

### **Anxiety Symptoms in Preadolescence**

Of particular interest for the proposed study is how autonomy-relevant parenting is associated with psychosocial well-being and mental health outcomes. An important indicator of well-being in childhood and adolescence is the presence of internalizing problems, which have been defined as emotion and mood dysregulation resulting from negative emotions (Graber, 2004). Anxiety is a response to stressful situations, wherein signals are sent to the brain that action is necessary to cope with environmental danger (Vasey, Bosmans, & Ollendick, 2014). Although anxiety has an adaptive function when it facilitates danger avoidance, symptoms can begin interfering with quality of life if they are severe or persistent (Beesdo, Knappe, & Pine, 2009). Dysregulation can lead to problems such as withdrawn behavior, excessive worrying, low self-esteem, negative

self-talk, and social anxiety (Terzian, Hamilton, & Ericson, 2011). Spielberger, Gorsuch, and Lushene (1970) are generally credited with introducing two important conceptual distinctions within the concept of anxiety. The first of these concepts is state anxiety, which refers to psychological and physiological responses that occur in challenging situations. The second concept is trait anxiety, which is a relatively stable personality trait that describes individuals' tendency to have state anxiety (Vagg, Spielberger, & O'Hearn, 1980). Further work on this distinction has questioned Spielberger et al.'s (1970) conception of anxiety as a unidimensional, versus multidimensional construct (Endler & Parker, 1991; Vagg et al., 1980), and some recent evidence suggests that the correlation between trait anxiety and state anxiety differs based on the type of threat encountered (i.e., interpersonal versus physical; Leal, Goes, Ferreira da Silva, & Teixeira-Silva, 2017). This study will conceptualize anxiety symptoms as stable trait features to represent anxiety as a consistent manner of responding to adverse or novel situations.

Anxiety symptoms in middle childhood can include timidity, extreme shyness in the context of unfamiliar places or people, and feelings of shame (Muris, Merckelbach, Mayer, & Meesters, 1998). Furthermore, a recent meta-analysis concluded that the prevalence of anxiety disorders in elementary-school children is 12.3% (Costello, Egger, Copeland, Erkanli, & Angold, 2011). The prolonged trajectory of anxiety disorders has been confirmed in numerous studies; a majority of adult anxiety disorders cases are first diagnosed in childhood and early adolescence (Cohen et al., 1993; Newman et al., 1996). Early onset of anxiety symptoms have implications for children's future health and well-

being, and early experience with heightened anxiety has the potential to initiate developmental cascades which predict later adjustment difficulties.

An important consequence of anxiety problems is the ways in which anxiety issues affect other areas of children's lives and health. Researchers at Child Trends have found that anxiety problems in children and adolescents are associated with unsatisfactory school performance and difficulties forming close relationships with peers (Terizan, Hamilton, & Ericson, 2011). Tu, Erath, and El-Sheikh (2015) found that young adolescents with high anxiety symptoms were more likely to experience peer victimization. Other research has indicated associations between internalizing symptoms and antisocial behaviors (Sheidow et al., 2008), increased substance use in adolescent girls (Wu et al., 2010), delinquent behaviors, and mental illnesses (Byrd, Loeber, & Pardini, 2012). Heightened anxiety symptoms in children often go unreported. Tandon, Cardeli, and Luby (2009) found that caregivers and teachers often inadvertently overlook shy or withdrawn behaviors in children, which may indicate anxiety symptoms, because these behaviors are not actively disruptive. The potential development of long-term mental health concerns is a serious consequence of this underreporting.

Empirical evidence suggests that mental health disorders in adulthood can be predicted by the presence of adverse environments in childhood. For example, McLaughlin and colleagues (2010) demonstrated that individuals who experience greater environmental stressors in middle childhood are more physiologically reactive to stressors in adulthood than those who experienced fewer stressors in childhood. Heightened stress reactivity was found to correspond to a higher risk of developing mood

and anxiety disorders. Thus, use of parenting practices that are perceived as stressful to children (i.e., psychological control) could influence stress physiology over time and perpetuate or initiate serious internalizing disorders later in adulthood. In contrast, other researchers have proposed cognitive models in which autonomy-relevant parenting impacts anxiety symptoms. Wood, McLeod, Sigman, Hwang, and Chu (2003) found evidence that parental autonomy-support engenders feelings of mastery and competence in children, which ameliorates anxiety symptoms in novel situations. Chorpita and Barlow (1998) posited that high parental psychological control early in children's lives create certain cognitive styles that lead children to interpret novel situations as beyond their control. This cognitive experience of losing control can become a vulnerability factor regarding anxiety symptoms.

Previous work has suggested that middle childhood is a developmental period during which signs of anxiety begin to emerge, but are not yet clinically diagnosed (Costello et al., 2011). Thus, middle childhood is a critical period for early intervention and prevention. Although evidence suggests that most cases of childhood anxiety do not persist into adulthood, chronic cases of anxiety have been recorded for a subgroup of children (Costello et al., 2011; Kessler et al., 2005), signifying the need to identify the environment conditions which predict the development of anxiety symptoms.

### **Conceptualizing Autonomy-Relevant Parenting**

The literature regarding autonomy-relevant aspects of parenting (i.e., autonomy-support, psychological control, and behavioral control) has historically been subject to inconsistencies in conceptualization. A major conceptual flaw regards the frequent

assumption that psychological control and autonomy-support represent opposite ends of a single continuum. This assumption has confounded results from decades of work on autonomy-relevant parenting and continues to afflict research on this topic.

Barber, Bean, and Erickson (2002) and Soenens, Vansteenkiste, and Sierens (2009) trace the origin of conceptual complications to an influential paper published in 1965 by Earl Schaefer. Schaefer performed a factor analysis of 26 parental behaviors indicated in the Child Report of Parental Behavior Inventory (CRPBI; Schaefer, 1965) and found that a subset of behaviors loaded onto a “psychological control” dimension. Although there was little empirical support for the premise, he proposed that “psychological autonomy” was the conceptual opposite of psychological control. Schaefer (1965) wrote that psychologically controlling parents would stunt the development of children’s individuality; thus, the two constructs were suggested to lie on opposite ends of the same continuum. Studies regarding autonomy-relevant parenting operated under this assumption for the following 40 years. Although Barber, Bean, and Erickson (2002) found evidence that some researchers did attempt to measure psychological control and psychological autonomy separately (such as Shulman, Collins, & Dital, 1993), they concluded that many studies have either combined control and autonomy measures or used only control items, reverse-coded to reflect autonomy scores. They posited that disaggregating these parenting dimensions could provide valuable information regarding child outcomes.

During these four decades, most research continued to focus on the impact that parental psychological control had on child outcomes, although the influential work of

Edward Deci and Richard Ryan (1971, 1987) explored psychological autonomy as a key aspect of self-determination theory (SDT). Deci and Ryan (1987) argued that autonomy-support was a critical component for enacting intrinsically motivated behavior, which could be helped or hindered by external events and interpersonal context (i.e., deadlines, surveillance, choices, and positive feedback). Although their work was instrumental in establishing autonomy-support as an influential construct, Deci and Ryan (1987) posited that autonomy-support and control exists on a continuum. The assumption that the two constructs lay on a bipolar continuum persisted, and some authors even chose to operationalize psychological autonomy-support by reverse scoring a measure of psychological control (see Gray & Steinberg, 1999). After an explicit call to reexamine these constructs, as well as preliminary evidence suggesting a low correlation between psychological control and autonomy-support measures (Barber, Bean, & Erickson, 2002), Silk and colleagues conducted a factor analysis on 19 items from Steinberg et al.'s (1992) psychological control and acceptance scales (Silk et al., 2003). The authors found evidence that a two-factor model was the optimal fit for the data; in other words, that autonomy-support and psychological control items were, in fact, loading onto distinct constructs. Similar to Barber, Bean, and Erickson's (2002) preliminary findings, Silk and colleagues demonstrated that the correlation between autonomy-support and psychological control was weak (-.18), and the constructs were differentially associated with indicators of adolescents' well-being. This signals the need for researchers to consider the newly-conceptualized definitions of both autonomy support and psychological control in relation to indicators of child adjustment.

Although they are now recognized as separate constructs, researchers also recognize that there is a degree of relatedness between autonomy-support and psychological control. Realistically, it is unlikely that a parent will score high on both autonomy-support and psychological control measures, but it is possible that parents may score low on both. In other words, disentangling the constructs from one another is important because the absence of one does not necessitate the presence of the other.

The new perspective of autonomy-support and psychological control as separate constructs has already begun to yield results regarding interactive and additive effects. For instance, recent work by Kunz and Grych (2013) indicated that psychological control and autonomy-support interact with one another to predict a range of child outcomes (e.g., externalizing, depression/anxiety, and aggression) such that high psychological control was associated with less adaptive outcomes when parents were low in autonomy support. Psychological control was unrelated to negative child outcomes in the context of high parental autonomy-support. Thus, consideration of both constructs within the same study is useful, because aggregation of these scores may mask important effects. As Kunz and Grych (2013) wrote, further study is needed to determine whether these effects are additive, independent, or interactive.

Given the confused history regarding the conceptualization of autonomy-relevant parenting practices, studies which claim to investigate these constructs must be carefully evaluated. Another concern regards operationalization. Measures of autonomy-support and psychological control are almost always operationalized through the use of self-report questionnaires or surveys to capture parental behaviors (see Brenning, Soenens,

Braet, & Bal, 2012; Seiffge-Krenke & Pakalniskiene, 2011; Sher-Censor, Parke, & Coltrane, 2011; Silk et al., 2003; Soenens & Vansteenkiste, 2009; Verhoeven, Bögels, & van der Bruggen, 2012). However, McLeod, Weisz, and Wood (2007) found that associations between observational measures of parental behavior and indicators of child adjustment often yield significantly higher effect sizes than either interview or questionnaire measures. Furthermore, observations of parental behaviors avoid many serious concerns which limit self-reported data, such as social desirability bias. This said, the disaggregation of autonomy-granting and psychological control is still relatively new and there are currently no observational coding systems that yield separate scores for each of the two constructs. This is a problem for researchers who prefer to use observational methods, who must adapt existing observational scales (such as the Psychological Control Scale-Observer Rating Scale; Barber, 1996) that contain elements of both autonomy support and psychological control to yield separate scores for each (for an example, see Kunz & Grych, 2013). Further attempts could be made to determine whether existing observational coding measures, although they aggregate autonomy-granting and psychological control, could still prove useful within this new framework of separation.

**Parental Autonomy-Support.** Measurement issues concerning autonomy-support have limited researchers' abilities to understand this construct outside of the context of psychological control. Thus, there is less scholarship defining "autonomy-support" when compared to the enormous body of work on psychological control. One exception is the well-known work of Edward Deci and Richard Ryan, who argued that

individuals can enact choice as an expression of autonomy and intentionality (1987). At the level of parent-child dyads, Silk and colleagues (2003) posited that parents who are high in autonomy-support will attempt to understand their children's perspective, encourage the children's individuality, and respect different opinions through validation. It is also important to distinguish between parents who actively *support* autonomy and parents who passively *allow* autonomy. Parents who support autonomy encourage self-expression and decision-making to engender independence (Barber, Bean, & Erickson, 2001; Goodman & Gotlib, 1999), whereas those low in autonomy-support may not engage in these behaviors. Recent work indicates that autonomy-support can be further separated into two similar but distinct concepts: promotion of independence and promotion of volitional functioning (Soenens, Vansteenkiste, & Sierens, 2009).

Soenens and colleagues (2009) retrospectively termed Silk et al.'s (2003) description of autonomy-support as "promotion of independent expression and decision making" (p. 188 – 189). This type of autonomy-support is based on theories suggesting that children must have the opportunity to psychologically distance themselves from parents in order to make independent decisions. From this perspective, parents can grant autonomy by encouraging children to rely on themselves, rather than parents, to solve problems or make decisions. However, Soenens et al. (2009) pointed out that parents who promote independence cannot be sure that their children are acting in an authentic way. For instance, children may perform independent actions because of external pressure from parents, rather than of their own will. Termed "promotion of volitional functioning," this second type of autonomy emphasizes alignment between thoughts and

actions; independent behaviors are enacted because they are fully endorsed and controlled by the individual. Parents who promote volitional functioning display empathy and provide reasons to support their position, as a means of encouraging and modeling the same growth in their children.

**Parental Psychological Control.** In contrast to autonomy-support, the literature on psychological control is considerable. Findings typically indicate that, in one way or another, psychologically controlling parenting is associated with negative outcomes for children. Psychological control is manifested in interpersonal interactions that are passive-aggressive or use of intrusive tactics which often contain an element of hostility. Barber (1996) elaborated that parents high in psychological control often display these intrusive behaviors through interruptions, undermining comments, or dismissiveness. Parents who are psychologically controlling may use coercion to invalidate children's perspectives, undermine their individuality, and deny children's independence by pressuring them to think and behave in certain ways that are consistent with their own views (Soenens & Vansteenkiste, 2010).

The impact that psychologically controlling tactics have on children has been well-documented over decades of research. Parental psychological control has been found to negatively impact several areas of children's emotional well-being. Specifically, numerous studies indicated positive associations between parental psychological control and negative self-concept (Silk et al., 2003), internalizing problems (Barber, 1996; Gray & Steinberg, 1999), and depressive symptoms in children and adolescents (Sher-Censor, Parke, & Coltrane, 2011). Because controlling strategies often contain elements of

undermining or denying selfhood, it is particularly important to consider this construct as it relates to children's internal emotional experiences – specifically, anxiety symptoms.

### **Autonomy-Support, Psychological Control, and Anxiety**

In Western cultures, youth are encouraged to develop psychological autonomy, which includes cultivation of ideas, thoughts, and feelings independent of their parents (Sher-Censor, Parke, & Coltrane, 2011). This task can be either helped or hindered by parenting behaviors. For example, parents high in autonomy-support may promote independence by instilling self-confidence and positive self-concepts, whereas parents high in psychological control may stunt independence through invalidation and undermining. Each parenting dimension has a unique relationship with childhood anxiety symptoms, which are in turn impacted by children's ages and the developmental appropriateness of autonomy-granting.

**Main Effects of Psychological Control on Anxiety Symptoms.** Evidence for the association between high parental psychological control and children's anxiety symptoms has been consistently replicated. Simply put, parental intrusive control has been found to be positively associated with anxiety and other internalizing symptoms in children and young adolescents (Barber, 1996; Barber, Bean, & Ericson, 2001; Lansford et al., 2014; Silk et al., 2003; Verhoeven, Bögels, & van der Bruggen, 2012). Evidence indicates that this finding is consistent across diverse race and ethnicities (Kincaid, Jones, Cuellar, & Gonzalez, 2011).

The mechanisms connecting psychological control and anxiety are not as well-established, but some evidence indicates that parents high in psychological control

contribute to the development of low self-efficacy in children, leaving them vulnerable to heightened anxiety (Wood, 2006). Anxiety symptoms may also result from loss of control, which could occur when parents frequently limit children's expressions of independent thoughts and opinions. Overall, the consistency of findings are convincing evidence for a positive association between high psychologically controlling parenting and children's anxiety symptoms.

**Main Effects of Autonomy-Support on Anxiety Symptoms.** Although evidence for the positive association between parental psychological control and children's anxiety symptoms has been consistently replicated, the evidence for a link between high psychological autonomy-support and anxiety is more complex, and a range of conclusions have been empirically supported. Seiffge-Krenke and Pakalniskiene (2011) found that familial promotion of autonomy-support was associated with children's use of adaptive coping skills, whereas for Silk and colleagues (2003), the association between parental autonomy-support and internalizing symptoms (including both anxiety and depression symptoms) was not significant. Results from some studies indicate that parents high in autonomy-support have, on average, children with fewer anxiety symptoms (Brenning, Soenens, Braet, & Bal, 2011), but other studies indicated that high levels of parental autonomy-support were associated with heightened children's anxiety symptoms (Verhoeven, Bögels, van der Bruggen, 2012). The range of conclusions that have been empirically supported signals the need for additional research to clarify whether the nature of the association between parental autonomy-support is positive, negative, or whether the two are unassociated.

Disentangling these seemingly contradictory findings necessitates consideration of a developmental perspective. Support for autonomy can provide benefits for children's burgeoning independence, but too much autonomy at a young age may indicate a lack of parental monitoring or supervision. Therefore, greater consideration of what constitutes an age-appropriate level of autonomy-granting is necessary when measuring this construct. The age of participants also appears to matter. Although the incidence of anxiety symptoms increases as children reach adolescence (Petersen et al., 1993), evidence also suggests that parenting has stronger ties to anxiety in childhood, rather than in adolescence (Verhoeven, Bögels, & van der Bruggen). Because the influence of parenting may be less for adolescents as compared to children, research examining associations between autonomy-support and anxiety symptoms in childhood is especially necessary.

Despite the need for research considering links between autonomy-relevant parenting and child outcomes, a majority of studies only consider autonomy-relevant parenting for adolescents, for whom independence from parents is an important developmental task (Boykin McElhaney & Allen, 2001). However, patterns of parent-child interactions develop over time, and the features which are valued at one developmental period – such as independent thoughts and actions – are not simply tokens that are granted at the appropriate age. They evolve over time. Thus, there is value in evaluating how parents enact developmentally appropriate levels of autonomy-support for their children, because this can set the stage for interaction patterns later in adolescence.

The next step is to consider the relative importance of parenting practices in the development of anxiety symptoms in children. If parenting does contribute to anxiety, how much do autonomy-granting and psychological control specifically contribute to child anxiety relative to other dimensions of parenting, such as warmth or hostility? A meta-analysis of the parenting-child anxiety literature suggests that parenting accounts for about 4% of the total variance in childhood anxiety, and that parental control explained significantly more of this variance than did parental rejection (McLeod, Weisz, & Wood, 2007). Consideration of a range of parenting dimensions (e.g., warmth, withdrawal, averseness) indicated that autonomy-granting was the single best predictor of child anxiety, accounting for 18% of the total variance (McLeod, Weisz, & Wood, 2007). Besides emphasizing the importance of parental control and autonomy-support in relation to other parenting dimensions, these findings also indicate the need to consider parenting in conjunction with other empirically substantiated predictors of child anxiety symptoms, such as child temperament. Here, the dynamic developmental systems model is especially useful in understanding the incidence and maintenance of psychopathology.

**Moderating Effects of Child Temperament.** Within the autonomy-relevant parenting literature, there is an abundance of research that considers how a wide variety of variables may moderate associations between parenting practices and child outcomes (often internalizing behaviors). Moderating variables provide information as to the conditions under which the association between parenting and anxiety symptoms exist. Consistent with a dynamic developmental systems perspective, previous research has found evidence that certain combinations of parenting practices and individual

characteristics interact to produce children's tendency to develop anxiety symptoms (Davis, Votruba-Drzal, & Silk, 2014). Consideration of these variables contributes understanding of developmental pathways above and beyond simple documentation of associations between parenting practice and child outcomes.

Although specific conceptualizations of temperament differ by theoretical approach (see Goldsmith et al., 1987), Rothbart and Derryberry's (1988) model is most useful in the context of this study due to their view of temperament as a stable, biologically-based differences in children's reactivity and self-regulatory capacity (Goldsmith et al., 1987). Temperament has been measured in infancy using variables that include activity level, smiling and laughter, fear/distress to novelty, distress to limitations, soothability, and duration of orienting. Distress to novelty in particular has been studied most often with respect to anxiety, and is defined as the extent and length of emotional arousal to novel stimuli. In infancy, distress to novelty ranges from stoic lack of reaction to out-of-control tantrums (Goldsmith et al., 1987). Empirical evidence shows that distress to novelty is positively associated with anxiety symptoms via children's ability to manage intense emotions (Brumariu & Kerns, 2013). Longitudinal studies have confirmed that infant distress to novelty is associated with anxious behaviors in toddlers, who are in turn more likely to experience heightened anxiety symptoms in middle and late childhood (Bosquet & Egeland, 2006; Crockenberg & Leerkes, 2006).

Early caregiving experiences do not always strongly predict outcomes in preadolescence. Findings in the literature regarding autonomy-granting parenting contain several inconsistencies; for instance, Silk et al. (2003) found that parental autonomy-

support was not associated with adolescent's internalizing symptoms, whereas other studies have reported significant associations. In addition to the aforementioned conceptualization concerns, the discrepancies in these findings may also be due to the presence of moderators. Specifically, consideration of early caregiving experiences in conjunction with temperament may yield better predictions of the incidence of anxiety symptoms during preadolescence. The interaction between temperament and parenting behaviors may produce different outcomes for different groups of children, which has been empirically demonstrated in several studies, although few have addressed autonomy-granting parenting practices exclusively in related to distress to novelty. One important exception is in the work of Morris and colleagues (2002), who demonstrated that negative outcomes of parental psychological control among children were contingent upon child negative reactivity temperament.

Other studies have indicated the importance of parenting in the context of infant distress to novelty temperament specifically. For instance, Crockenberg and Leerkes (2006) found that infants high in distress to novelty were likely to have heightened anxiety symptoms in childhood when their mothers demonstrated less engaged and less sensitive parenting. Similarly, Affrunti, Geronimi, and Woodruff-Borden (2014) found that nurturing parenting practices interacted with infant distress to novelty to predict anxiety symptoms in childhood. These findings confirm that the developmental trajectory for anxiety symptoms is not always associated with parenting practices in straightforward ways; individual characteristics, such as temperament, play a role in relation to this relationship.

In the context of the proposed study, this means that infant distress to novelty may interact with parenting practices to predict preadolescents' anxiety symptoms. This interaction is worth investigating because it helps to understand how environmental and individual qualities together predict the development of anxiety symptoms more broadly. Therefore, the developmental systems model, in which genetic components interact with parenting practices to produce physiological and behavioral responses, is particularly well-suited to the proposed study.

**Moderating Effects of Child Gender.** Child gender may also moderate the association between autonomy-relevant parenting practices and anxiety. A majority of research concurs that lifetime prevalence for internalizing symptoms has shown to differ by gender, with girls reporting significantly more anxiety problems than boys (Terizan, Hamilton, & Ericson, 2011; Gray & Steinberg, 1999; Telzer & Fuligni, 2013; Paxton, Valois, Watkins, Huebner, & Drane, 2007). Girls are also more likely to experience anxiety disorders than boys in childhood (Weiss & Last, 2001). The prevalence of anxiety symptoms in children may influence parenting practices or be influenced by different parenting practices. Weiss and Last (2001) posit that because girls are likely to exhibit more symptoms of anxiety than boys, parents of girls may react by demonstrating overprotective parenting practices. These overprotective practices have the possibility of either exacerbating or ameliorating child anxiety symptoms. Anxiety outcomes in children may also be influenced by the parenting practices that are employed in ways that differ between girls and boys. For instance, Telzer and Fuligni (2013) uncovered that positive interactions between parents and children were found to significantly reduce

anxiety symptoms for girls to an extent greater than that of boys. McLean and Anderson (2009) posit that parental gender role socialization may account for the variation in parenting practices between girls and boys – whereas boys are socialized to exhibit brave and fearless behaviors, girls are allowed to exhibit behaviors consistent with anxiety, such as dependent or avoidant behaviors. Similarly, Zahn-Waxler, Klimes-Dougan, and Slattery (2000) suggest that parents tend to reinforce behavior that is consistent with gender roles for girls and boys, which could contribute to the more prevalent internalizing symptoms exhibited in adolescent girls.

A majority of research on autonomy-relevant parenting practices and anxiety symptoms in children has not uncovered moderation effects of child gender (McLeod, Weisz, & Wood, 2007; Verhoeven, Bögels, & van der Bruggen, 2012). However, this has been contested by evidence that the association between autonomy-relevant parenting and heightened anxiety symptoms is more likely to be found for girls, rather than boys. For example, van der Bruggen and colleagues (2008) found that the association between parental control and anxiety symptoms was stronger for girls than it was for boys. Given the strong evidence of child gender differences in prevalence rates of anxiety symptoms, many researchers continue to include child gender as a moderator due to the possibility of gender differences. Further investigation of this topic should continue to consider the influence of child gender on the association between autonomy-relevant parenting and anxiety symptoms, given the possibility that this association may be stronger for girls than for boys.

## **Current Study**

Unique features of the sample for the proposed study will allow me to fill in missing information about associations between autonomy-relevant parenting and childhood anxiety. Most research on autonomy development has involved adolescent participants. Few studies have investigated how parents promote autonomy for their children, despite McLeod, Weisz, and Wood's (2007) compelling finding that parental autonomy-granting accounted for more variance in child anxiety symptoms than any other dimension of parenting. Furthermore, a developmental perspective demands investigation of this construct across different periods of the lifespan, which can help researchers understand how specific parenting dimensions influence individuals at each period of life, as well as predict adjustment at subsequent ages.

An additional strength of the proposed study is the method of data collection. The majority of research on autonomy-relevant parenting has relied heavily on self-report questionnaires (for exceptions, see Boykin McElhaney & Allen, 2001; Kunz & Grych, 2013). Furthermore, many of these studies have relied on data from only a single reporter, typically a parent. Multi-method data collection strategies reduce common method variance and therefore ensure greater confidence in the validity of results. Additionally, the use of data collected via direct observations could provide a perspective on parenting behaviors that may have been overlooked by using self-report measures. According to Shanley and Niec (2011), research that uses observational methods may provide better quality assessments of parent-child functioning, because they involve direct observation of dyadic relationships in real-time contexts. When specifically applied

to autonomy-relevant parenting practices, the observational measures employed in the current study could provide rich, useful data that will extend findings from previous research.

Previous research has identified parental psychological control, autonomy-supportive practices, and child temperament independently as predictors of child anxiety symptoms. The literature on parental psychological control uniformly suggests that high control is associated with child anxiety. However, additional research is needed to determine how parental autonomy-support is associated with child anxiety, given that previous work has supported a range of findings (positive association, no association, and negative association). Although the autonomy-relevant parenting instrument used in the proposed study measures autonomy-support and psychological control as opposite ends of a single scale, the analytic procedure this study will use is sensitive to potential differences. Because this is a widely-used dataset, it is important to understand the nature of the relationship between psychological control/psychological autonomy-support and anxiety symptoms with the consideration that these may be independent, but related, constructs. Using a developmental systems perspective, this study builds on existing research and considers ways in which interactions between individual and dyadic characteristics can predict the levels of anxiety symptoms over time.

At low levels on the maternal psychological control/autonomy-support scale, it is predicted that the association between psychological control/autonomy-support will be linear. However, previous research has yielded different findings for high levels of the psychological control/autonomy-support scale, suggesting that further is needed to test

this association. Therefore, I will test three alternative hypotheses to determine the nature of the association between psychological control/autonomy-support and child anxiety symptoms.

**Hypothesis 1.** Maternal psychological control/autonomy-support at 58 months will be associated with child anxiety symptoms at 12 years. The association will be tested for significant linear, squared, and cubic relationships. Examples of the three potential trends are presented in Figures 1, 2, and 3. Additionally, I will test whether these associations between maternal psychological control/autonomy-support and child anxiety symptoms will vary by child gender, given the possibility that girls may show increased anxiety symptoms in the context of certain parenting practices.

**Hypothesis 1a.** There will be a significant negative, linear association between psychologically controlling/autonomy-support<sup>1</sup> parenting at 58 months and child anxiety symptoms at 12 years. Low scores on the psychological control/autonomy-support measure will be associated with high levels of child anxiety symptoms, whereas high scores on this measure will be associated with low levels of child anxiety symptoms. This result will support the conclusion of a inverse association between parental autonomy-support and child anxiety symptoms.

**Hypothesis 1b.** This hypothesis tests whether there will be significant linear and squared terms for the association between psychological control/autonomy-support parenting at 58 months and child anxiety symptoms at 12 years. It is predicted that low scores on the

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<sup>1</sup> This is a measure in which autonomy-support and psychological control are considered to be two dimensions on a single scale and for which higher scores indicate high autonomy-support.

psychological control/autonomy-support measure will be associated with high levels of child anxiety symptoms, whereas high scores on this measure will not be significantly associated with child anxiety symptoms. If significant, this result will support the conclusion that there is no association between autonomy-support and child anxiety symptoms.

**Hypothesis 1c.** This hypothesis tests whether there will be a significant linear, squared, and cubic association between psychological control/autonomy-support parenting at 58 months and child anxiety symptoms at 12 years. If significant, this result will support the conclusion that there is a positive association between autonomy-support and anxiety symptoms.

Next, each of these potential associations will be tested using distress to novelty temperament as a moderator. Tests for moderation using the linear and squared terms (hypothesis 2b) and the linear, squared, and cubic terms (hypothesis 2c) are exploratory in nature. I will also test whether this interaction effect varies for girls and boys, given the possibility that the association between autonomy-relevant parenting and child anxiety symptoms also differs by gender.

**Hypothesis 2.** Infant distress to novelty temperament will moderate the association between psychologically controlling/autonomy-supportive parenting at 58 months and child anxiety symptoms at 12 years. An example of this trend can be viewed in Figure 4.

**Hypothesis 2a.** The predicted negative, linear association between psychologically controlling/autonomy-supportive parenting and child anxiety will be stronger for children who are high in distress to novelty than for children low in distress to novelty.

**Hypothesis 2b.** The potential linear and squared associations between psychologically controlling/autonomy-supportive parenting at 58 months and child anxiety symptoms at 12 years will significantly differ by child distress to novelty temperament. However, no specific hypotheses will be provided as to the nature of these differences.

**Hypothesis 2c.** The potential linear, squared, and cubic associations between psychologically controlling/autonomy-supportive parenting at 58 months and child anxiety symptoms at 12 years will differ based on levels of child distress to novelty. However, no specific hypotheses will be provided as to the nature of these differences.

## CHAPTER II

### METHODS

#### **Participants**

Data used in the proposed study were collected as part of the Family Life Project, a longitudinal study funded by the National Institute of Child Health and Development (NICHD). Participants included 1,292 families who were recruited for the study at the time of the target child's birth. Families were recruited from hospitals, as well as through phone contact via birth records, in six different rural, poor counties across central Pennsylvania and eastern North Carolina. Study recruiters screened mothers for eligibility in each selected hospital every day over a 1-year period of time. Potential participants were eligible for the study if they reported speaking English as a primary language and did not intend to move out of the target county within the next 3 years. Overall, 68% of eligible families were willing to participate, and 58% of these families were selected to enroll in the study using a stratified sampling approach. Specifically, participants were recruited using a sampling method that oversampled low-income families (in both Pennsylvania and North Carolina) and African American families (in North Carolina).

## **Procedure**

Home visits occurred regularly after the birth of the target children, beginning when children were 2 months old. At each home visit, mothers and children completed questionnaires, assessment tests, and observational tasks. In the proposed study, the data regarding temperament were collected when the children were 6 months old through questionnaires completed by parents. An observational task was completed when children were 58 months old to assess parenting practices. Finally, data regarding anxiety symptoms were collected when children were 12 years old. During each home visit, informed consent was provided by parents and assent was provided by children beginning at the age of 7.

Mothers and children were observed during a videotaped interaction task when children were 58 months old. This mother-child interaction involved a tower building task in which the dyad was instructed to replicate a tower that the researcher built using blocks of different sizes and shapes. The mother was instructed that the task was for the child to complete but that she could assist the child in any way she thought necessary. The second portion of the interaction involved a card game in which the mother and child were competing to collect the most cards in a “slap-jack” game. The two interactions lasted a total of 15 minutes. The videotapes were then reviewed and independently coded by two observers using the Qualitative Caregiving Ratings scale developed for use with the Family Life Project data (Zvara et al., 2014). Coders underwent training to ensure reliability, and 20% of cases were coded by both coders and discussed to minimize coder drift.

## Measures

**Maternal Psychological Control/Autonomy-Support.** At the 58-month home visit, parenting behaviors were assessed by trained coders for autonomy-support and psychological control as two ends of a single continuum. Mother's autonomy-relevant parenting behaviors were assessed using the Promoting Autonomy/Respect for Autonomy scale of the Qualitative Caregiver Ratings observational coding method. Psychological autonomy-support was defined as the degree to which parents recognize and encourage the child's individuality, perspectives, and opinions. Parents who score high on autonomy-support acknowledge children's intentions, ask questions to understand children's perspectives, and validate children's contributions. Psychological control was defined as the extent to which parents dismissed or denied children's individual expressions. Parents who score high on psychological control interrupt their children frequently, disregard children's input, and dismiss or invalidate children's perspectives. Scores were assigned holistically on a 7-point scale and ranged from 1 (*“not at all characteristic”*), to 7 (*“highly characteristic”*). Because the scores were assigned holistically, scores of 1 through 3 were assigned to mothers who predominantly displayed psychological control during the 10-minute interaction task, above and beyond any autonomy-support that was displayed. A score of 4 was given to mothers who did not demonstrate any controlling behaviors, but were not actively promoting autonomy. For example, mothers who allowed children to provide their perspectives but did not validate, encourage, or promote these contributions received a score of 4. Finally, scores of 5 through 7 were assigned to parents who predominantly displayed autonomy-supportive

behaviors. Intraclass correlations were calculated to determine interrater reliability.

Intraclass correlations were greater than .80 across all pairs of coders.

**Child Anxiety.** Children's anxiety at 12 years was assessed using the Diagnostic Interview Schedule for Children (DISC; Shaffer et al., 2000). The DISC is a standardized assessment based on parents' report of a variety of common childhood disorders, and includes scales for anxiety, mood, disruptive, substance use, and other miscellaneous disorders. The DISC also provides a tally of endorsed symptoms. For the purposes of the proposed study, only the 30 items pertaining to child general anxiety disorders will be included. At the 12-year home visit, mothers were asked to rate their child's behavior during the past year (12-month period). An example item is: "In the last year, did he/she often seem very worried before going to play a sport or game or do some other activity?" Responses are limited to "yes" or "no." Scores on these items will be summed for each participant to create an anxiety symptoms index. Previous reported internal consistency on this scale for parent's report on children aged 6 – 17 shows an acceptable  $\kappa$  statistic of .56 using a community sample (Shaffer et al., 1996).

**Child Temperament.** Child temperament was assessed using the Infant Behavior Questionnaire (IBQ; Rothbart, 1981), which was completed by parents when their children were 6 months old. The IBQ is a measure of child temperament based on a validated psychobiological theory of temperament (Derryberry & Rothbart, 1988). During a home visit, parents were asked to rate the frequency with which certain child behaviors occurred over the previous one or two weeks using an 7-point Likert-style response format which ranged from 1 ("Never") to 7 ("Always"). The full measure

includes 60 items on which parents are asked to respond on the scales of Approach, Fear/Distress to Novelty, Distress to Limitations, Duration of Orienting, and Recovery from Distress. For the purposes of the proposed study, only the 16 items pertaining to the Fear/Distress to Novelty scale will be included. A sample item is “How often during the last week did the baby startle (jump in surprise) to a sudden or loud noise?” Previous reported internal consistency on this scale for infants age 9 – 12 months was  $\alpha = .87$  (Rothbart, 1986).

**Covariates.** In addition to autonomy-relevant parenting and child temperament, several variables which may potentially influence the associations between the variables of interest will be entered as covariates. These will include mothers’ warm parenting behaviors, mothers’ anxiety symptoms, children’s conduct behavior problems, child gender, and demographic variables (race, state, and maternal income level). Mothers’ warm parenting behaviors were assessed using the Warmth/Positive Regard/Valuing scale of the Qualitative Caregiver Ratings observational coding method during the 58-month home visit. The scale was designed to assess the quality and quantity of caregivers’ positive feelings toward their children during an interaction task. Scores were assigned holistically on a 7-point scale and ranged from 1 (“*not at all characteristic*”), to 7 (“*highly characteristic*”). Mothers’ anxiety symptoms were assessed using the anxiety subscale of the Brief Symptom Inventory (BSI; Derogatis, 2001) during the 58-month home visit. Children’s conduct behavior problems were assessed by parental self-report at 12 years. Mothers completed 43 items on the DISC pertaining to conduct disorder problems that children had experienced in the previous year. Scores were summed for

each participant to create an conduct disorder symptoms index. The demographic variables child gender, child race, state, and income level were all assessed via primary caregiver self-report. Information about child gender, race, and state were provided by mothers at the initial hospital visit. Income level was measured during multiple home visits when the target child was 6, 15, 24, 36, 48, 58, and 90 months of age, and an average score was calculated for each family.

### **Analytic Strategy**

The analysis for this proposed study will be conducted in three stages. In the first stage, descriptive statistics and bivariate correlations will be calculated for each of the key variables. A scatterplot will be created to visually examine associations between mothers' psychological control/autonomy-support and anxiety for nonlinearity and the presence of possible outliers. Outliers will then be identified using the Outlier Labeling Rule, in which the interquartile range of normally distributed data are multiplied by a factor of 2.2, as Hoaglin and Iglewicz (1987) recommend. Values which exceed these markers will be dropped from further analyses. After removal of outliers, parent psychological control/autonomy-support and the distress to novelty temperament measures will be mean centered to produce a normal distribution and reduce nonessential multicollinearity, as recommended by Cohen, Cohen, West, and Aiken (2003). Next, higher-order terms (squared and cubic) for psychological control/autonomy-support will be calculated by squaring and cubing mother's scores on the psychological control/autonomy-support measure of parenting.

In the second stage of analysis, a multiple regression analysis will be performed in AMOS to determine whether the association between mother's psychological control/autonomy-support and child anxiety is best described as a linear, squared, or cubic effect. The outcome variable will be child anxiety at 12 years old. Covariates will include mother's warmth, mother's anxiety symptoms, child conduct disorder symptoms, child gender, and stratified variables (race, state, and income level). Predictor variables will include the linear, squared, and cubic parent psychological control/autonomy-support variables. Missing data will be handled using the Full Information Maximum Likelihood (FIML) function in AMOS.

In the third stage, multiple regression analysis in AMOS will be used to consider the moderating effect of child distress to novelty on the association between mother's psychological control/autonomy-support and child anxiety. The outcome variable will be child anxiety symptoms at 12 years. Covariates will again include mother's warmth, mother's anxiety symptoms, child's conduct disorder symptoms, child gender, and stratified variables (race, state, and income level). Predictors will be the linear, squared, and cubic psychological control/autonomy-support parenting terms as well as two-way interaction terms: controlling/autonomy parenting (linear term) x distress to novelty, controlling/autonomy parenting (squared term) x distress to novelty, and controlling/autonomy parenting (cubic term) x distress to novelty. All orders of the predictor variable (linear, squared, and cubic) will be included in the regression because the relationship between psychological control/autonomy-support and child anxiety could change with the inclusion of child temperament.

If any of the three interaction terms are significant at  $p < .05$ , the interaction will be probed using test of simple slopes using the procedures recommended by Aiken and West (1991). The test of simple slopes will clarify how the associations between psychologically controlling/autonomy-supportive parenting and child anxiety differs at different levels of distress to novelty. In the event of a significant interaction effect, a Johnson-Neyman regions of significance test will also be conducted to determine a more precise account of the moderation effect.

## CHAPTER III

### RESULTS

#### **Preliminary Analyses**

First, a regression analysis was performed using all potential covariates as predictors of child anxiety symptoms to determine controls needed in subsequent analyses. Potential control variables were entered in this regression as predictors of child anxiety symptoms alongside the main independent variable (mother's psychological control/autonomy-support) and moderator (infant distress to novelty). All together, infant distress to novelty, mother's psychological control/autonomy-support, household income, race, child conduct problems, mother's positive regard, and mother's anxiety symptoms were entered as predictors of child anxiety symptoms. Of the potential control variables, only mother's anxiety symptoms was significantly associated with child's anxiety symptoms. Mother's anxiety symptoms was included in all subsequent analyses as a control variable.

#### **Intercorrelations and Gender Differences among Model Variables**

Descriptive statistics and bivariate correlation coefficients for all model variables are presented in Table 1, separated by child gender. Among girls, two variables were positively correlated with child anxiety symptoms; higher maternal anxiety symptoms were associated with higher child anxiety symptoms,  $r(160) = .33, p < .001$ , and higher scores on the psychological control/autonomy-support scale (representing greater

autonomy-support) were associated with higher child anxiety symptoms,  $r(149) = .25, p < .01$ . For both girls and boys, infant distress to novelty temperament was inversely correlated with mother's psychological control/autonomy-support such that higher distress to novelty was associated with lower scores on the psychological control/autonomy-support measure (representing greater psychological control),  $r(119) = -.31, p < .001$  for girls and  $r(452) = -.28, p < .001$  for boys. For girls only, infant distress to novelty was also positively associated with maternal anxiety symptoms such that higher scores on infant distress to novelty were correlated with higher maternal anxiety symptoms,  $r(496) = .08, p < .05$ .

Next, t-tests were conducted to examine differences in mean levels of all key variables by child gender. Only one significant difference emerged. On average, girls had higher scores on infant distress to novelty than did boys,  $t(3.93) = 5.26, p < .001$ .

### **Gender as a Potential Moderator of Associations between Psychological Control/Autonomy-Support and Child Anxiety**

IBM SPSS Amos 25 was used to conduct regression analyses testing whether mother's psychological control/autonomy-support parenting behaviors (mean centered), child gender, and the interaction between mother's psychological control/autonomy-support and child gender were associated with children's anxiety symptoms, controlling for mother's anxiety symptoms. Three separate models were estimated. The first model included maternal anxiety symptoms, the linear psychological control/autonomy-support term, child gender, and interaction between the linear term and child gender. The second model included all of the variables as the previous model, with the addition of the

squared psychological control/autonomy-support term and interaction between the squared term and child gender. Finally, the third model consisted of all variables in the first and second models with the addition of the cubic psychological control/autonomy-support term and interaction between the cubic term and child gender. Results are presented in Table 2.

Analyses showed that child gender was not significantly associated with child anxiety symptoms in any of the three models containing the linear, squared, or cubic terms of psychological control/autonomy-supportive parenting,  $\beta = -.04, p = .36$ ;  $\beta = .02, p = .59$ , and  $\beta = .02, p < .53$ , respectively. However, mother's psychological control/autonomy-support significantly interacted with child gender to predict child anxiety symptoms. Specifically, the linear, squared, and cubic psychological control/autonomy-support terms all significantly interacted with child gender to predict child anxiety symptoms at  $p < .01$ . Accordingly, the sample was split by gender, and all subsequent analyses were conducted running separate models for girls and boys.

### **Main Effects of Psychological Control/Autonomy-Support**

The first set of tests were intended to establish the presence of significant associations between maternal psychological control/autonomy-support and child anxiety symptoms. Specifically, regression analyses were conducted testing linear, squared, and cubic terms of psychological control/autonomy-support as predictors of child anxiety symptoms to determine the nature of the relationship between psychological control/autonomy-support and child anxiety symptoms. Four models were tested. In the first model, maternal anxiety symptoms and infant distress to novelty were entered as

predictors of child anxiety symptoms. In the second model, the linear psychological control/autonomy-support term was entered as a predictor of child anxiety, controlling for maternal anxiety symptoms and infant distress to novelty. The third and fourth models included the squared and cubic psychological control/autonomy-support terms, respectively, in addition to the variables entered in all previous steps. Results for girls are displayed in Table 3 and results for boys are displayed in Table 4.

For girls, the linear psychological control/autonomy-support term was significantly associated with child anxiety such that higher maternal psychological control/autonomy-support scores (reflecting higher levels of autonomy-support) were associated with higher child anxiety symptoms,  $\beta = .285, p < .001$ . The squared and cubic psychological control/autonomy-support terms also indicated significant, positive associations with child anxiety symptoms for girls,  $\beta = .167, p < .05$  and  $\beta = .213, p < .01$ , respectively. The shape of the association between the cubic psychological control/autonomy-support term and anxiety symptoms is shown in Figure 5.

No significant associations between mother's psychological control/autonomy-support and child anxiety symptoms were found for boys.

### **Distress to Novelty as a Moderator**

The second set of tests was intended to establish the presence of a significant moderation effect of infant distress to novelty. Regression analyses were conducted to test whether infant distress to novelty temperament (centered), maternal psychological control/autonomy-support (centered; linear, squared, and cubed terms), and the interaction between them significantly predicts child anxiety symptoms, controlling for

maternal anxiety symptoms. Three models were tested separately for girls and boys. The first model included maternal anxiety symptoms, distress to novelty, the linear psychological control/autonomy-support term, and the interaction between the linear term and distress to novelty. The second model included all variables in the previous model, with the addition of the squared psychological control/autonomy-support term and the interaction between the squared term and distress to novelty. The third model included all variables in the first and second models, with the addition of the cubic psychological control/autonomy-support term and the interaction between the cubic term and distress to novelty. Results for girls are displayed in Table 5 and for boys in Table 6.

For girls, results indicated that higher scores on the linear and squared terms for maternal psychological control/autonomy-support were significantly associated with more child anxiety symptoms,  $\beta = .338, p < .001$  and  $\beta = .188, p < .01$ . However, the cubic term of the maternal psychological control/autonomy-support score did not show a significant main effect on child anxiety symptoms, indicating that the squared term best represented the association between psychological control/autonomy-support and child anxiety symptoms. The shape of the association between the squared psychological control/autonomy-support term and anxiety symptoms is shown in Figure 2. The shape of the squared association appears to show that low scores on the parenting measure (indicating high psychological control) are unassociated with child anxiety, which gradually becomes a positive association between high scores on the parenting measure (indicating high autonomy-support) and child anxiety. Higher infant distress to novelty was also significantly associated with increased child anxiety symptoms in all three

models,  $\beta = .13, p < .05$ . For girls, the interaction between the linear psychological control/autonomy-supportive parenting term and infant distress to novelty was significant,  $\beta = .036, p = .05$ . None of the other interactions were found to be significant.

For boys, there were no significant main effects of infant distress to novelty on child anxiety symptoms. Similarly, there were no significant main effects of the linear, squared, and cubic psychological control/autonomy-support parenting terms on child anxiety. None of the interaction effects between the psychological control/autonomy-support parenting terms and infant distress to novelty were significant at  $p < .05$ .

Next, the significant interaction effect between the linear psychological control/autonomy-support parenting term and infant distress to novelty for girls was probed using test of simple slopes, recommended by Aiken and West (1991). Figure 3 shows the results from this test. Infant distress to novelty was graphed one standard deviation above and below the mean. For girls with low infant distress to novelty scores, levels of psychological control/autonomy-supportive parenting were unassociated with child anxiety symptoms,  $\beta = .134, p = .284$ . For girls with high infant distress to novelty scores, high scores on psychological control/autonomy-supportive parenting (representing high autonomy-support) were associated with more anxiety symptoms,  $\beta = .489, p < .001$ . These findings indicate that girls with highly autonomy-supportive mothers were more likely to have increased anxiety symptoms at 12 years when they had high distress to novelty scores in infancy.

To further understand this moderation effect, regions of significance were estimated using the Johnson-Neyman technique. Results of this analysis are displayed in

Figure 4. Confidence bands represent the association between levels of infant distress to novelty and the strength of the association between psychological control/autonomy-supportive parenting and child anxiety symptoms. This test indicated that a significant association between psychological control/autonomy-support and child anxiety symptoms was present for girls who scored above  $-.9333$  on infant distress to novelty (mean centered). The significant region represented the top 90% of girls' distress to novelty scores in the sample.

## CHAPTER IV

### DISCUSSION

The purpose of the current study was to extend research focused on autonomy-relevant parenting practices in early childhood as predictors of anxiety symptoms in preadolescents. Furthermore, this study also examined the moderating effect of temperament (specifically infant distress to novelty) in relation to the association between autonomy-relevant parenting and child anxiety. The results indicated differences in these associations by child gender; the association between autonomy-relevant parenting and child anxiety symptoms was significant for girls, but not for boys. Findings indicated that, for girls, the nature of the association between maternal psychological control/autonomy-support and child anxiety symptoms is best conceptualized by a positive squared, rather than linear or cubic, relationship. Results from this study also indicated a significant moderation effect of infant distress to novelty. For girls with high distress to novelty, higher scores on the psychological control/autonomy-support measure (indicating greater maternal use of autonomy-support) was associated with heightened anxiety symptoms. For girls with low distress to novelty scores, scores on the psychological control/autonomy-support measure were unassociated with child anxiety symptoms. The regions of significance analysis revealed that distress to novelty was a significant moderator for about 90% of girls in the sample – only those falling in the bottom 10% on distress to novelty scores exhibited no association between psychological

control/autonomy-support and child anxiety. Thus, specifically for girls above the 10<sup>th</sup> percentile of temperamental distress to novelty there was an association between psychological control/autonomy-supportive parenting and child anxiety, but not in the direction as hypothesized. Although these patterns of finding were not present across all children, the current study revealed important differences between parenting practices and child outcomes by gender, although the direction of this effect, or the bidirectionality of the effect, cannot be determined by the current analyses.

### **Associations Between Psychological Control/Autonomy-Support and Child Anxiety Symptoms**

Caregiving experiences early in children's lives impact their wellbeing as they progress through childhood and early adolescence. Specific parenting practices, such as psychological control and autonomy-support, have been shown to influence the development of anxiety symptoms (McLeod, Weisz, & Wood, 2007). However, most of the research to date on these constructs involves the influence of autonomy and control on adolescents, for whom identity formation is a critical developmental goal. Using a developmental perspective, this study sought to extend this research literature by measuring how autonomy-relevant parenting practices in early childhood may influence anxiety symptoms in preadolescence.

Partially consistent with Hypothesis 1, autonomy-relevant parenting in early childhood was associated with child anxiety symptoms for girls only during preadolescence, but in the opposite direction as predicted. Results indicated that the nature of association between the psychological control/autonomy-support measure and

child anxiety symptoms for girls was best conceptualized as a cubic, rather than squared or linear, function. When graphed, the cubic shape appeared to show a weak, positive association between psychological control/autonomy-support and anxiety symptoms when scores were low on the parenting measure (representing higher psychological control), followed by a flat association at average levels of psychological control/autonomy-support scores, and then a strong, positive association between high psychological control/autonomy-support scores (representing high levels of autonomy-support) and child anxiety symptoms.

This pattern of associations was not as hypothesized – high parental psychological control has typically been linked with greater child anxiety symptoms, and this result has been consistently replicated (Barber, 1996; Barber, Bean, & Ericson, 2002; Lansford et al., 2014; Silk et al., 2003; Verhoeven, Bögels, & van der Bruggen, 2012). Perhaps this unexpected finding could be due to limitations of the psychological control measurement instrument; specifically, the qualitative scale included behavioral control aspects alongside psychological control elements. Behavioral control has been linked more strongly with externalizing problem behaviors, rather than internalizing behaviors, which were the object of this study (Gray & Steinberg, 1999).

Surprisingly, I found that high scores on the psychological control/autonomy-support measure (representing high autonomy-support) were positively associated with increased child anxiety symptoms. Although inconsistent with the majority of research on this topic, the finding that higher autonomy-support was associated with increased anxiety symptoms is not without precedent. Verhoeven, Bögels, and van der Bruggen

(2012) also discovered the remarkable finding that parental psychological autonomy-support was linked with heightened child anxiety for children 10 years or younger. These authors suggest several different explanations for this finding.

First, the issue could be related to the way in which autonomy-support was measured or the age of the sample. Few studies have measured autonomy-relevant parenting practices using observational methods, and those using observational assessments also investigated adolescents rather than younger children. Thus, autonomy-support may be differently associated with child anxiety by the measurement type or age of the child. Alternatively, this finding could represent the bidirectional influence of mother's adaptation to their child's needs. For instance, perhaps mothers with highly anxious daughters try to help their children by providing more psychological autonomy-support, whereas parents of less anxious daughters engage in more psychologically controlling parenting to protect their young children. This surprising finding could benefit from further investigation to establish whether the type of measurement, age of child, or a bidirectional effect between parenting and child anxiety contribute to this unexpected association.

### **Associations Between Psychological Control/Autonomy-Support, Distress to Novelty, and Anxiety Differ by Child Gender**

Consistent with my predictions, the main effect of autonomy-relevant parenting and moderation effects of infant distress to novelty on child anxiety symptoms differed by child gender. The finding that associations between autonomy-relevant parenting practices and anxiety symptoms vary by child gender is consistent with previous research

documenting this variability (Bögels & Perotti, 2010; Van der Bruggen et al., 2008). For instance, van der Bruggen et al. (2008) discovered that maternal psychological control had a stronger effect on girls' anxiety symptoms than it did on boys' symptoms. Findings from this study extend the literature to suggest that maternal autonomy-support predicts child anxiety for girls more strongly than for boys.

However, some studies have found that the association between autonomy-relevant parenting practices and child anxiety symptoms is not moderated by child gender – neither McLeod, Weisz, and Wood (2007) nor Verhoeven, Bögels, and van der Bruggen (2012) found significant differences in the association between autonomy-relevant parenting practices and child anxiety symptoms by child gender. Verhoeven, Bögels, and van der Bruggen (2012) suggest that these inconsistent findings may be due to the use of different measurement instruments when operationalizing autonomy-relevant parenting. Because the majority of literature on this topic uses self-report questionnaires to describe perceived autonomy-relevant parenting, further investigation using observational methods is needed to clarify the role of child gender in the association between parenting practice and anxiety symptoms.

A secondary goal of this study was explore how infant distress to novelty interacts with parenting practices in early childhood to predict anxiety symptoms in preadolescence. This purpose aligns with the observation that associations between autonomy-relevant parenting practices and child anxiety outcomes vary based on child characteristics. According to the dynamic developmental systems approach, parenting practices might interact with individual child characteristics to predict which children

develop elevated anxiety symptoms and which children do not. The current study found that for girls only, the association between maternal psychological control/autonomy-support and child anxiety symptoms was moderated by infant distress to novelty. This moderation effect was present only for the linear psychological control/autonomy-support term, rather than the squared or cubic terms. For girls with average or above average distress to novelty scores, higher psychological control/autonomy-support scores (indicating greater autonomy-support) was associated with heightened anxiety symptoms. For girls with low distress to novelty scores, no significant association between psychological control/autonomy-support and anxiety symptoms was found. There were no significant interactions found for boys.

This significant moderation effect suggests that there are a combination of contextual factors which increase girls' risk of developing heightened anxiety symptoms. Higher psychological control/autonomy-support parenting practices at 58 months and heightened distress to novelty as an infant both independently predicted higher anxiety symptoms for girls. Furthermore, the interaction of these variables suggests that biological predisposition (i.e., infant temperament) influences the way in which parenting practices (i.e., mother's autonomy-relevant parenting) are associated with anxiety symptoms at the end of childhood. Additional probing of this moderation effect revealed that a majority of the sample did have a significant association between autonomy-relevant parenting and anxiety symptoms- it was only for girls in the bottom 10% of distress to novelty that the association between psychological control/autonomy-support and anxiety symptoms was insignificant.

This finding is consistent with previous work which found significant interactions between parenting practices and distress to novelty temperament in predicting anxiety symptoms later in childhood (Crockenberg & Leerkes, 2006; Affrunti, Geronimi, & Woodruff-Borden, 2013), and also with the dynamic developmental systems model of psychopathology. Whereas heightened distress to novelty does appear to act as a vulnerability factor for later anxiety symptoms, my findings also suggest that even average levels of distress to novelty interact with autonomy-relevant parenting to predict risk, but only for girls. Alternatively, this finding may also be interpreted to suggest that it is not necessarily the case that heightened distress functions as a vulnerability factor, but rather very low levels of distress to novelty is a highly atypical temperamental phenotype that attenuates the normative association between parenting experiences and child anxiety symptoms.

### **Strengths and Limitations**

Several strengths allowed the current study to contribute in unique ways to the literature on autonomy-relevant parenting. One strength of the current study was the use of observational methods to assess autonomy-relevant parenting. Whereas a majority of research on this topic has relied on child or parent self-report of parenting practices, Shanley and Niec (2011) posit that observational data collection could provide better real-time assessment of parent-child functioning. Furthermore, the use of a longitudinal design provided a more comprehensive understanding about how the constructs of autonomy-relevant parenting, infant distress to novelty, and child anxiety symptoms relate to one another over time. Finally, the current study utilized analytic tools that were

sensitive to the possibility of psychological control and psychological autonomy-support as separate constructs, although I was not able to test this hypothesis directly.

However, the current study also included a number of limitations which should be considered when interpreting the results. One limitation of the current study is that the sample only included data from mothers and not from fathers. Previous work has suggested that consideration of both mothers and fathers can facilitate better understanding about the association between autonomy-relevant parenting and child anxiety symptoms (Seiffge-Krenke & Pakalniskiene, 2011). Although most of the research that involves both mothers and fathers has found that the effect size of the association between parental psychological control and child anxiety were stronger than studies that only involved mothers, there is also some evidence that parent gender might moderate the association between autonomy-relevant parenting and child anxiety (Hudson & Rapee, 2002). Thus, it will be important for future studies to consider how parent gender influences the strength and direction of the association between autonomy-relevant parenting and child anxiety symptoms.

A second limitation of the current study was my use of a single scale to measure both psychological control and psychological autonomy-support, although current work on this topic advocates the use of two distinct scales. This prevented me from investigating the interactive effects between autonomy-support and psychological control - specifically, I was unable to examine how parenting practices that are low on both autonomy-relevant measures may influence children's anxiety symptoms. Furthermore, the autonomy-relevant parenting measure in the current study included elements of both

behavioral control and psychological control, which may limit my ability to compare these results to studies that use a true measure of psychological control. It is also possible that an exclusive measure of psychological control may have yielded different associations than the ones reported in this study.

Finally, the current study lacked the data to investigate changes in anxiety symptoms and autonomy-relevant parenting over time. Notably, it would have been particularly important to control for children's anxiety symptoms at 58 months, at the time when the parenting data was available. Inclusion of this data may have provided stronger rationale for the surprising finding that high maternal autonomy-support at 58 months was associated with increased anxiety symptoms at 12 years. This limitation provokes interesting questions regarding the bidirectional effect of child anxiety and autonomy-relevant parenting practices for future research on this topic to investigate.

## **Conclusion**

Findings from the current study demonstrate the potential importance of early caregiving experiences and infant temperament on the development of heightened anxiety symptoms in preadolescents and offers three main contributions to the literature. First, the finding that high maternal autonomy-support was associated with greater anxiety symptoms for girls challenges previous findings that high parental autonomy-support in early childhood is uniformly associated with positive outcomes. Although I had expected to find a linear, inverse association between the autonomy-relevant parenting measure and child anxiety symptoms, my findings indicated a non-linear, positive association. This suggests the need to investigate bidirectional associations between autonomy-

relevant parenting practices and child anxiety symptoms over time to better untangle the causal nature of this association. Second, results of the current study suggest that girls high in distress to novelty may be at heightened risk of developing anxiety symptoms in the presence of high maternal autonomy-supportive parenting; however, given the regions of significance for this effect it may be better conceptualized as girls very low in distress to novelty are buffered from the association between maternal autonomy-supportive parenting and later anxiety symptoms. This is an important distinction as it calls into question what is considered “normative” and “non-normative” with respect to child temperament and its role as a moderator of environment effects on children’s development. Regardless of this distinction, the overall finding is consistent with previous research noting that individual characteristics of infants interact with parenting practices in the prediction of later psychopathology. Furthermore, given that this association was limited to girls underscores the need to better understand child gender differences when documenting associations between parenting practices and child psychopathology.

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APPENDIX A  
DATA TABLES

*Table 1*

*Descriptive Statistics and Bivariate Correlations among Model Variables*

	1	2	3	4
1. Mother's anxiety symptoms	-	0.12	.04	.074
2. Infant distress to novelty	.08*	-	-.28***	.083
3. Psychological control/ Autonomy-support	-.06	-.32***	-	.11
4. Child anxiety symptoms	.33***	.09	.25**	-
Mean: Girls	.32	2.92	3.25	2.14
Boys	.28	2.69	3.20	1.87
SD: Girls	.53	1.03	1.42	2.06
Boys	.47	.95	1.48	2.14
N: Girls	530	565	474	164
Boys	540	577	488	156

Note: Correlations for girls are below the diagonal; correlations for boys are above the diagonal.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

Table 2

Regression Analysis for Main Effects of Psychological Control/Autonomy-Support (Linear, Squared, and Cubic), Main Effects of Child Gender, and Interaction Effects on Child Anxiety Symptoms

	Model 1			Model 2			Model 3		
	$\beta$	<i>SE</i>	<i>p</i>	$\beta$	<i>SE</i>	<i>p</i>	$\beta$	<i>SE</i>	<i>p</i>
Mother's anxiety symptoms	.199	.224	.000	.192	.222	.000	.194	.222	.000
Child gender	-.046	.225	.365	.025	.224	.594	.025	.223	.605
Psychological control/Autonomy-support (linear)	.351	.080	.000	.252	.079	.000	.134	.079	.006
PC/AS (linear) x Child gender	-.182	.050	.000	-.090	.049	.066	-.030	.049	.537
Psychological control/Autonomy-support (squared)				.296	.045	.000	.262	.045	.000
PC/AS (squared) x Child gender				-.319	.026	.000	-.306	.026	.000
Psychological control/Autonomy-support (cubic)							.226	.013	.000
PC/AS (cubic) x Child gender							-.144	.008	.003
$R^2$			.198			.299			.291

Table 3

Regression Analysis for Main Effects of Psychological Control/Autonomy-Support (Linear, Squared, and Cubic) on Child Anxiety Symptoms for Girls Only

	Model 1			Model 2			Model 3			Model 4		
	$\beta$	<i>SE</i>	<i>p</i>									
Mother's anxiety symptoms	.331	.284	.000	.347	.267	.000	.355	.264	.000	.360	.264	.000
Distress to novelty	.085	.151	.263	.193	.142	.005	.179	.140	.010	.178	.140	.012
Psychological control/Autonomy-support (linear)				.349	.103	.000	.312	.102	.000	.201	.103	.005
Psychological control/Autonomy-support (squared)							.137	.062	.049	.106	.062	.138
Psychological control/Autonomy-support (cubic)										.160	.018	.025
$R^2$			.117			.280			.274			.238
$R^2$ change			.131***			.113***			.014			.003

\*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$

Table 4

Regression Analysis for Main Effects of Psychological Control/Autonomy-Support (Linear, Squared, and Cubic) on Child Anxiety Symptoms for Boys Only

	Model 1			Model 2			Model 3			Model 4		
	$\beta$	<i>SE</i>	<i>p</i>									
Mother's anxiety symptoms	.069	.361	.390	.068	.358	.391	.069	.356	.378	.069	.356	.379
Distress to novelty	.075	.186	.369	.113	.184	.168	.107	.184	.186	.107	.184	.186
Psychological control/Autonomy-support (linear)				.153	.118	.059	.184	.117	.022	.179	.117	.026
Psychological control/Autonomy-support (squared)							-.111	.064	.169	-.114	.064	.158
Psychological control/Autonomy-support (cubic)										.010	.018	.905
$R^2$			.010			.041			.063			.061
$R^2$ change			.009			.010			.006			.001

\*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$

Table 5

Regression Analysis for Interaction Effects of Psychological Control/Autonomy-Support (Linear, Squared, and Cubic) and Distress to Novelty on Child Anxiety Symptoms for Girls Only

	Model 1			Model 2			Model 3		
	$\beta$	<i>SE</i>	<i>p</i>	$\beta$	<i>SE</i>	<i>p</i>	$\beta$	<i>SE</i>	<i>p</i>
Mother's anxiety symptoms	.339	.264	.000	.337	.259	.000	.341	.259	.000
Distress to novelty	.238	.140	.000	.271	.137	.000	.266	.137	.000
Psychological control/Autonomy-support (linear)	.338	.102	.000	.266	.100	.000	.235	.101	.000
PC/AS (linear) x Distress to novelty	.136	.110	.055	.172	.108	.013	.141	.108	.045
Psychological control/Autonomy-support (squared)				.188	.061	.005	.184	.061	.007
PC/AS (squared) x Distress to novelty				-.067	.050	.339	-.068	.050	.337
Psychological control/Autonomy-support (cubic)							.047	.018	.498
PC/AS (cubic) x Distress to novelty							.036	.021	.615
$R^2$			.304			.327			.304
$R^2$ change			.266***			.028			.000

\*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$

Table 6

Regression Analysis for Interaction Effects of Psychological Control/Autonomy-Support (Linear, Squared, and Cubic) and Distress to Novelty on Child Anxiety Symptoms for Boys Only

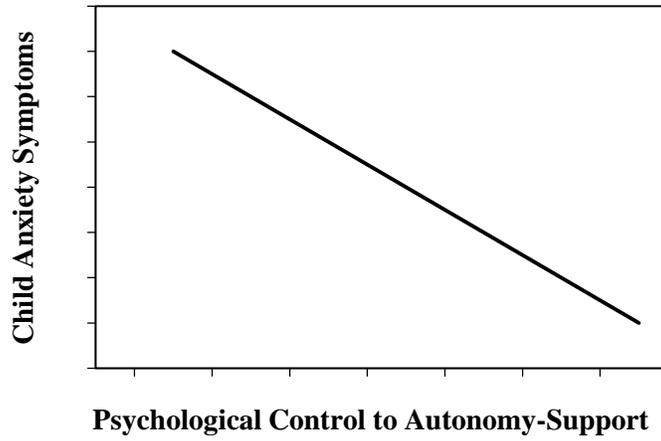
	Model 1			Model 2			Model 3		
	$\beta$	<i>SE</i>	<i>p</i>	$\beta$	<i>SE</i>	<i>p</i>	$\beta$	<i>SE</i>	<i>p</i>
Mother's anxiety symptoms	.070	.357	.379	.070	.354	.365	.071	.354	.360
Distress to novelty	.102	.184	.213	.025	.183	.755	.012	.182	.880
Psychological control /Autonomy-support (linear)	.136	.118	.095	.186	.117	.020	.118	.117	.137
PC/AS (linear) x Distress to novelty	-.042	.130	.624	-.092	.129	.267	-.097	.129	.241
Psychological control/Autonomy-support (squared)				-.088	.064	.270	-.108	.064	.176
PC/AS (squared) x Distress to novelty				.147	.052	.076	.173	.052	.037
Psychological control/Autonomy-support (cubic)							.119	.018	.134
PC/AS (cubic) x Distress to novelty							.015	.018	.854
$R^2$			.036			.078			.084
$R^2$ change			.022			.021			.006

\*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$

APPENDIX B

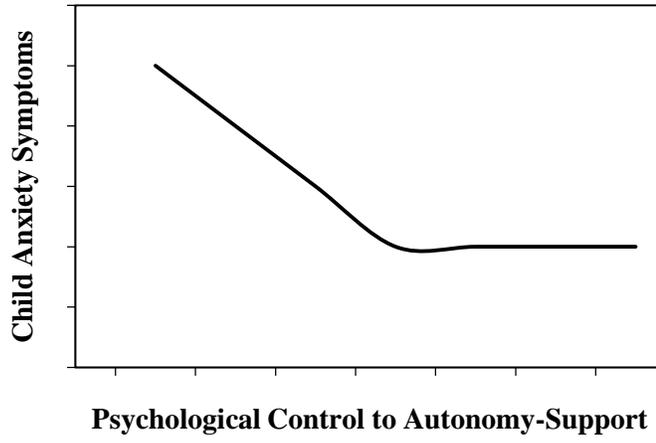
FIGURES

**Predicted Result Described in Hypothesis 1a**

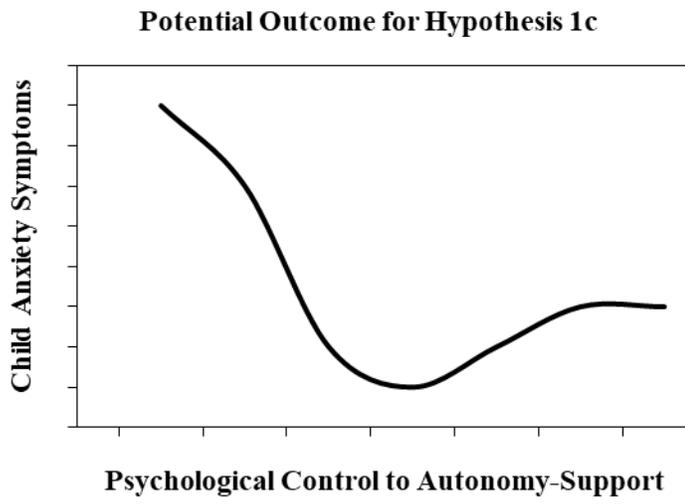


*Figure 1. Potential Result Described in Hypothesis 1a*

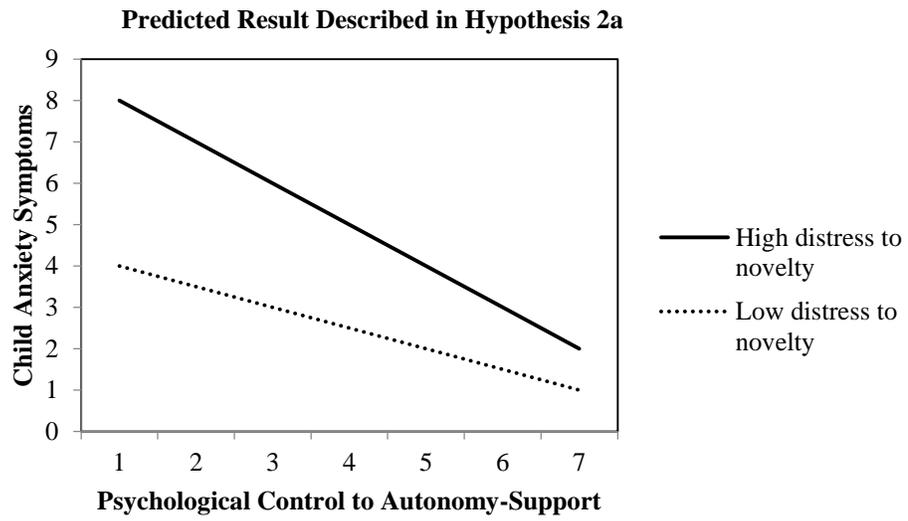
**Potential Result Described in Hypothesis 1b**



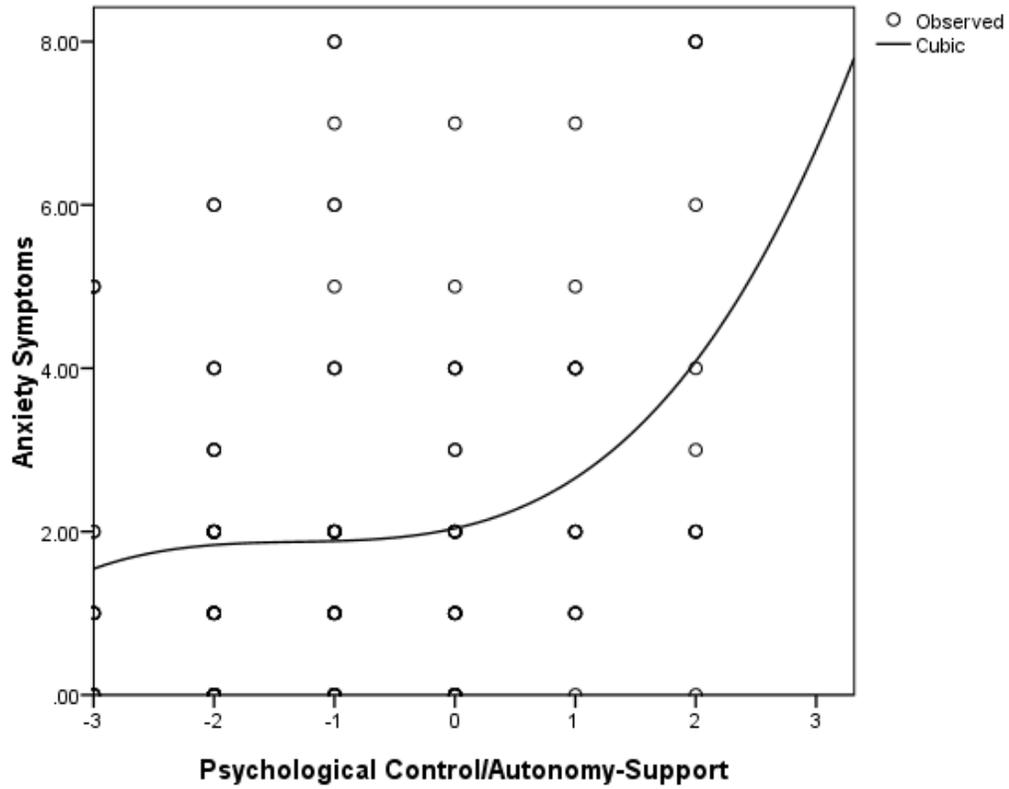
*Figure 2. Potential Result Described in Hypothesis 1b.*



*Figure 3. Potential Result Described in Hypothesis 1*



*Figure 4. Predicted Result Described in Hypothesis 2a.*



*Figure 5. Cubic Relationship Between Psychological Control/Autonomy-Support and Child Anxiety for Girls Only.*

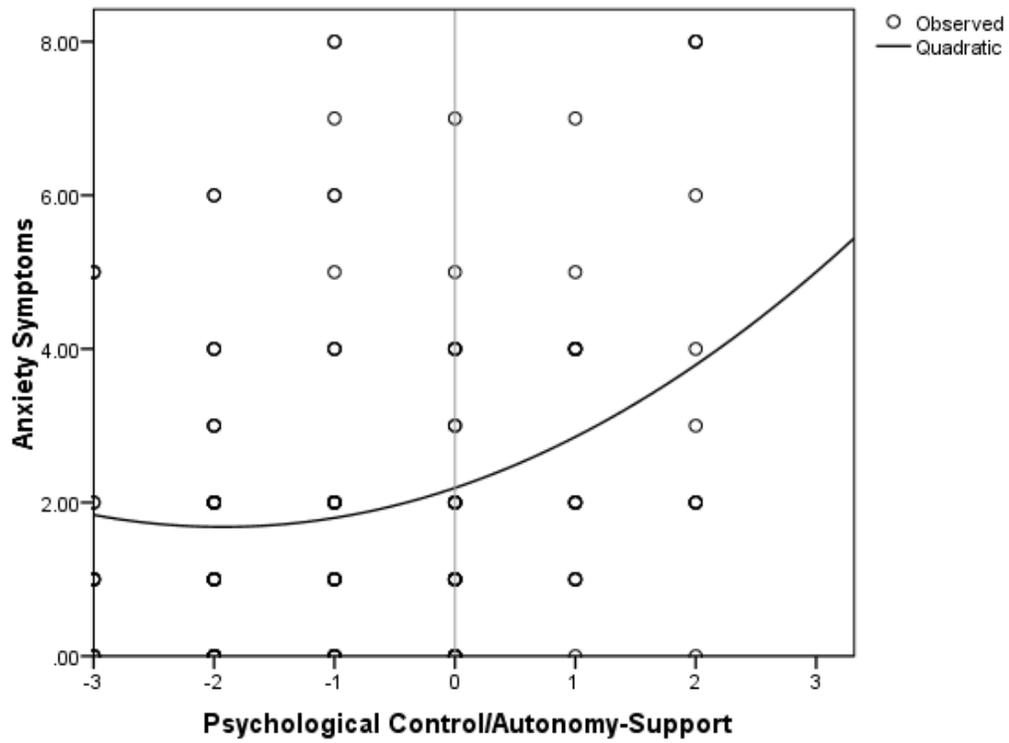
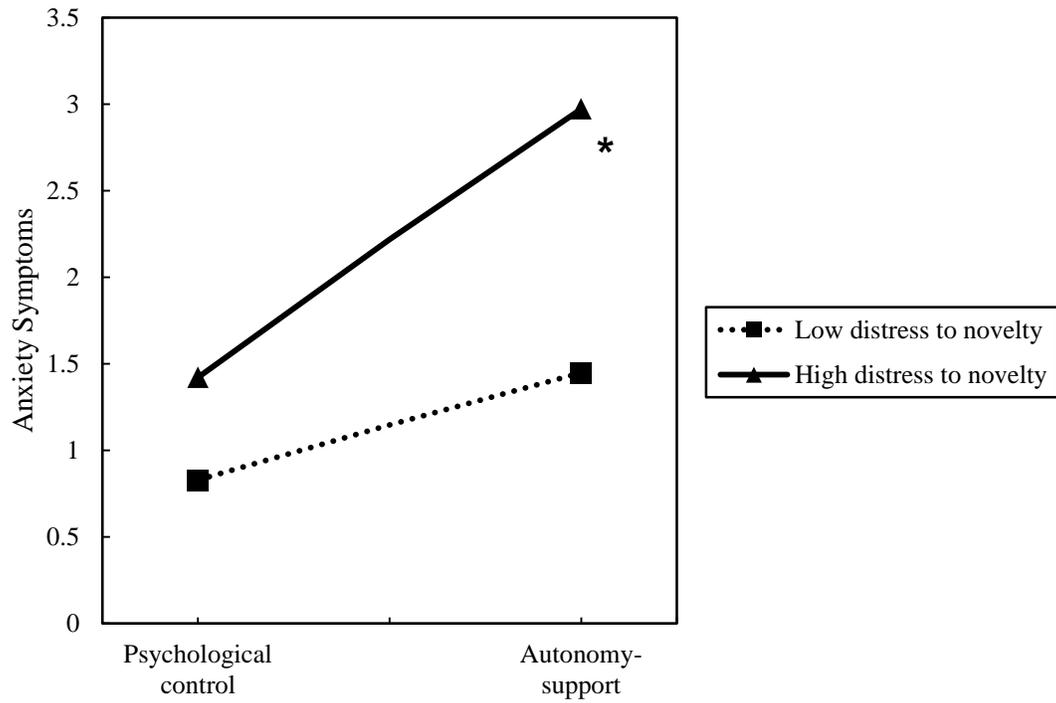
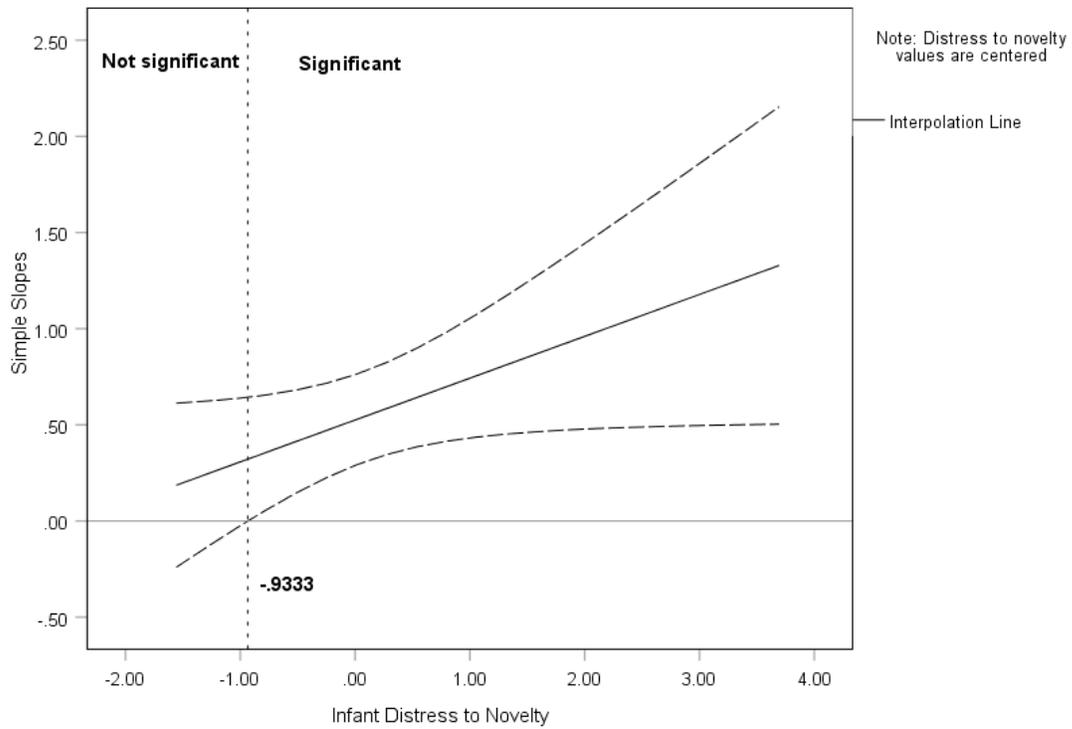


Figure 6. Squared Relationship Between Psychological Control/Autonomy-Support and Child Anxiety for Girls Only



*Figure 7. Associations Between Psychological Control/Autonomy-Support and Girls' Anxiety Symptoms by Distress to Novelty.*  
 \*slope significantly different from 0;  $p \leq .0$



*Figure 8. Confidence Bands for the Moderation Effect of Distress to Novelty on the Association Between Psychological Control/Autonomy-Support and Anxiety Symptoms*