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Bidirectional associations linking parent autonomy support and child anxiety symptoms were investigated longitudinally across elementary school. A sample of 733 mothers, fathers, and teachers reported on child anxiety symptoms. Parent-child dyads participated in structured interaction tasks when children were 54 months, Grade 1, Grade 3, and Grade 5, which were later coded for parental autonomy support behaviors. Latent change score models were used to assess change in child anxiety symptoms and parent autonomy support from 54 months to Grade 1 and from Grade 3 to Grade 5, and to test whether initial level of each construct predicted change in the other construct during these periods, controlling for child depression symptoms and parent anxiety symptoms. Multigroup analysis was used to examine whether associations differed for girls and boys. Results indicated that relationship patterns for parental autonomy support and child anxiety symptoms differed between early and late elementary school and by parent gender. In early elementary school, mother autonomy support and child anxiety symptoms were correlated at 54 months, but father autonomy support was unrelated to child anxiety symptoms. During middle to late elementary school, child anxiety symptoms predicted change in mother autonomy support such that children with high anxiety in Grade 3 had mothers with lower-than-average increases in autonomy support. Father autonomy support predicted change in child anxiety symptoms such that highly autonomy-supportive fathers at Grade 3 had children with higher-than-average decreases in anxiety symptoms. Multigroup analyses indicated no statistically significant differences on key parameters by child gender. This study advances conclusions about the role that parental autonomy support plays in changing child anxiety symptoms for mothers and fathers during different periods in elementary school. Findings also have implications to aid development of targeted family-based intervention strategies to treat and prevent child anxiety symptoms during middle childhood.

RELATIONS BETWEEN PARENTAL AUTONOMY SUPPORT AND CHILD ANXIETY

SYMPTOMS ACROSS ELEMENTARY SCHOOL IN TWO-PARENT FAMILIES

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Amy Leigh McCurdy

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Dr. Anne C. Fletcher

Committee Chair

APPROVAL PAGE

This dissertation written by Amy Leigh McCurdy has been approved by the following committee of the Faculty of The Graduate School at The University of North Carolina at Greensboro.

Committee Chair   <u>Dr. Anne C. Fletcher</u>

Committee Members   <u>Dr. Jennifer Coffman</u>

<u>Dr. Esther Leerkes</u>

<u>Dr. Andrew Supple</u>

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CHAPTER I: INTRODUCTION

Anxiety disorders are some of the most common psychological problems facing children during middle childhood, with 6.6% of 6 – 11-year-olds diagnosed with an anxiety disorder in the United States (Ghandor et al., 2019). Of this number, only 54.9% reported having received mental health treatment in the previous year, increasing the risk of persistent, long-term consequences. Elevated anxiety symptoms (the focus of the current study) are presumably even more widespread and can similarly lead to detrimental outcomes. Heightened anxiety symptoms during middle childhood put children at risk for social, emotional, and academic difficulties in the short-term (de Lijster et al., 2019), in addition to subsequent emotion and mood disorders in the long-term (Feng et al., 2008). Therefore, intervention and prevention efforts to reduce child anxiety symptoms can significantly improve the quality of children's lives in several consequential domains.

Problematic anxiety symptoms show relative stability from early childhood through adolescence and adulthood, suggesting that the roots of anxiety problems in adulthood are likely found in childhood (Bayer et al., 2019). Change and continuity in anxiety problems during middle childhood is predicted to be impacted by environmental factors, especially within parent-child relationships (Ginsburg et al., 2004). Parenting practices create important contexts that predict whether anxiety symptoms will develop or persist in children, and it is predicted that child anxiety likewise directly influences parenting practices. One notable parenting practice implicated in relation to child anxiety is parental autonomy support, which has been found to uniquely predict the most variance in fewer child anxiety symptoms compared with other parenting practices (McLeod et al., 2007). Parental autonomy support describes parenting practices that foster autonomous self-regulation through alignment of belief and action, which may include providing rationales and explanations, recognizing the unique emotions and perspectives of the child, offering choices when possible, and avoiding controlling techniques (Joussemet et al., 2008). Parental autonomy support is associated with a range of beneficial child outcomes, including: fewer externalizing (Hauser Kunz & Grych, 2013) and internalizing

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problems (Inguglia et al., 2015), greater agency (Bradley et al., 2015), higher self-esteem, stronger ego development (Allen et al., 1994), and greater school performance and success (Grolnick et al., 2007). Thus, understanding predictors of parental autonomy support is relevant to a range of child outcomes, even beyond child anxiety.

Linking Child Anxiety Symptoms and Parental Autonomy Support

Bayer and colleagues (2019) note that "the most likely relationship between parent factors and inhibited children's anxiety…is a cyclical one" (p. 1167), wherein child anxiety elicits overprotective, less autonomy-supportive parenting practices, which in turn facilitates an increase or continuity in child anxiety symptoms. However, parenting researchers have tended to apply a unidirectional framework within their work, in which socialization is presumed to flow from parents to children, rather than investigating how child characteristics or behaviors may influence parenting practices. Bell (1968) critiqued this framework, stating, "The model of a unidirectional effect from parent to child is overdrawn, a fiction of convenience rather than belief" (p. 82). Indeed, the theoretical bidirectional links connecting child anxiety and parental autonomy support are often mentioned but seldom tested. However, there is evidence that parental autonomy support predicts child anxiety symptoms concurrently (Verhoeven et al., 2012) and longitudinally (Bayer et al., 2019; Hudson & Dodd, 2012; Parrigon & Kerns, 2016), and that child anxiety symptoms predict parent autonomy support concurrently (Moore et al., 2004). Although several studies have measured child anxiety symptoms using longitudinal research designs to permit consideration of change over time, longitudinal measurement of autonomy-supportive parenting practices is scarce. Therefore, investigating the longitudinal, bidirectional links between parental autonomy support and child anxiety can yield information about the direction of effects over the course of middle childhood.

Limitations of Extant Literature

One primary limitation of the extant literature is the reliance on almost entirely cross-sectional research designs to investigate parental autonomy support. This severely limits the inferences

that can be made about change in this construct over time. Whereas behavioral autonomy, defined as control over personal decision-making, has been found to steadily increase over the course of middle childhood and adolescence (Wray-Lake et al., 2010), no comparable inquiry has been made for psychological autonomy support. Without this essential information, it is difficult to predict how certain variables may conditionalize autonomy support levels across middle childhood, or which variables predict changes in autonomy support over time. It is possible that parental autonomy support increases along with support for behavioral autonomy – as parents allow children more decision-making opportunities, they may also begin to view their children as having unique perspectives and avoid controlling these expressions. Alternatively, parental autonomy support could represent a stable way of responding to children – although specific autonomy-supportive behaviors may change to be consistent with the developmental period, the level of autonomy support may remain steady over time. A by-product of this specific gap is the lack of research addressing directionality between parental autonomy support and child anxiety. Parental autonomy support is seldom assessed at more than one time point, making it unclear whether child anxiety plays a causal role in this parenting practice, or vice-versa.

A second limitation involves the inclusion of fathers in parenting research. Both the parental autonomy support and child anxiety literature have focused on the experiences of mothers (for exceptions, see Bögels & Brechman-Toussaint, 2006; Bögels & Phares, 2008). As other authors have pointed out, behaviors assessed exclusively in mothers cannot accurately be referred to as "parenting" without also assessing fathers' behaviors (Adamsons & Buehler, 2007). Many families in the United States with a child under the age of 18 include both mothers and fathers (Vespa et al., 2013), emphasizing the relevance of studying mothers' and fathers' parenting practices. Stolz et al. (2005) argue that parenting theories must be tested for mothers and fathers together in a way that takes the contributions of both parents into account. Studies of parenting practices in general (not autonomy support specifically) show that differences in mothers' and fathers' parenting practices cannot entirely be attributed to measurement error (Adamsons & Buehler, 2007) and that mothers' and fathers' parenting is differentially associated with child outcomes (Stolz et al., 2005). In other words, actual differences in parenting practices have been

found for mothers and fathers, both in the average expression of parenting practices and functionally in predicting child outcomes.

Strengths of Proposed Study

The current study clarifies and builds upon previous research through consideration of change in mothers' and fathers' autonomy support and child anxiety symptoms over time. The purpose of this study is to examine the bidirectional associations between parental autonomy support and child anxiety, and the unique contributions of mothers and fathers, across the elementary school years. The proposed study in innovative in two primary ways. First, the proposed study considers the influence of both mothers and fathers. Investigating mothers and fathers within the same study is a priority in the parenting literature, as studying each in isolation does not allow researchers to draw conclusions about "parenting" as a whole.

Second, the proposed study utilizes a longitudinal research design, spanning 54 months to Grade 5, with multiple assessments of parental autonomy support and child anxiety over this period. The use of a longitudinal design is particularly important for research on this topic in order to understand the direction of effects between parental autonomy support and child anxiety at discrete points during elementary school. The proposed study will test whether parental autonomy support precedes and predicts changes in child anxiety symptoms and whether child anxiety symptoms precede and predicts changes in parental autonomy support, controlling for previous levels of these constructs. This provides a time-ordered sequencing to make better directional inferences, while controlling for previous and concurrent associations between parental autonomy support and child anxiety symptoms. Use of a longitudinal design can also inform intervention efforts by suggesting when to best address family issues to prevent pathological anxiety symptoms in children.

The proposed study uses a 4-wave, longitudinal design in order to examine: 1) individual differences in change in children's anxiety symptoms and parental autonomy support from 54 months to Grade 5, and 2) bidirectional associations between child anxiety symptoms and parental autonomy support from 54 months to Grade 1 and from Grade 3 to Grade 5. This study

also examines the influence of fathers' and mothers' autonomy support and differences in associations by child gender. Specifically, mother autonomy support and father autonomy support with the target child are examined in separate models, which permit comparison of overall similarity and differences in the relationship between parental autonomy support and child anxiety symptoms for mother-child and father-child dyads. Child gender is included as a potential moderator of associations within both models.

<u>Conceptual Model</u>

The hypothesized models (presented in Figure 1; indicators, mean structure, and residuals are not shown), examines how child anxiety symptoms and parental autonomy support (from 54 months through Grade 5) may each be associated with change in the other construct via bidirectional coupling links. Specifically, the current study utilizes two bivariate latent change score models (LCS; Model 1 and Model 2) that yield information about the direction of effects and change in each construct from one time interval to the next, which is especially useful when the amount of change in each construct differs across the span of the study. In the LCS model, change scores are modeled as latent variables, providing the approach with an important advantage of removing measurement error. This model is particularly useful when investigating constructs that are expected to change from one interval to the next, since change is modeled on this scale (Selig & Preacher, 2009).

Using these models, the current study explores how child anxiety symptoms and parental autonomy support systematically change over the course of elementary school and proposes that individual children's anxiety symptoms significantly predict subsequent change in parental autonomy support, and vice-versa. Two models, the first measuring change from 54 months to Grade 1 and the second from Grade 3 to Grade 5, were estimated due to changes in the measurement approach of parental autonomy support between Grade 1 and 3. Mother-child and father-child dyads were examined in separate models. Child gender was examined as a moderator using a multiple-group analysis to investigate whether there are different amounts of variability in the change of anxiety symptoms or autonomy support for boys and girls.

The current study offers several methodological strengths. Use of a multiple-wave, longitudinal design will provide stronger conclusions regarding the direction of effects. Latent variables constructed through reports from multiple informants reduces measurement error and provide more accurate measurement of child anxiety symptoms. Finally, parental autonomy support is assessed via observation, which may provide a more objective assessment of this construct than parent self-report and has been found to be more strongly linked to child anxiety symptoms (McLeod et al., 2007).
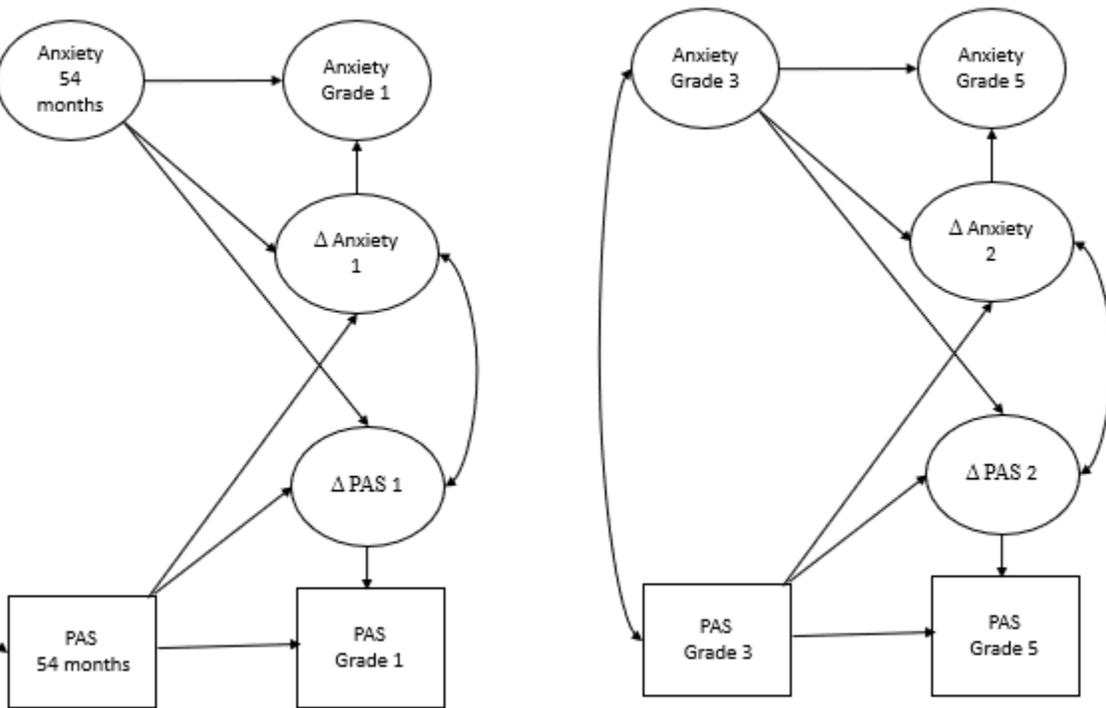
Figure 1. Bivariate latent change score path model diagrams for Model 1 (54 months – Grade 1) and Model 2 (Grade 3 – Grade 5)

Note. "PAS" = parental autonomy support

CHAPTER II: THEORETICAL FRAMEWORKS

Historically, several influential models (Belsky's process model of the determinants of parenting; Patterson's transactional model of the determinants of antisocial behavior; Abidin's path model predicting the determinants of parenting behavior) have been used to frame and guide empirical investigation regarding factors that predict parenting practices. One factor of interest involves the impact of child characteristics on parenting. Despite much research suggesting that parenting predicts child outcomes in a unidirectional fashion, Bell (1968) called researchers to consider the alternative; that child characteristics may motivate or elicit certain parenting behaviors. In subsequent decades, models that were introduced to predict parenting behaviors answered this call by incorporating child characteristics as predictors. For example, Belsky (1984) presented a particularly influential process model of the determinants of parenting which included three key factors: parent characteristics, child characteristics, and social context. Belsky's model assumes that parenting is multiply determined, that social contexts may affect parenting directly or indirectly via psychological well-being, and that the influence of these three factors on parenting is not equivalent. The effect of child characteristics on parenting practices was predicted to be limited, and Belsky noted that perhaps this effect could be explained entirely by the goodness-of-fit between parent and child. Abidin (1992) later presented a revised model in which parenting-relevant stressors affect parenting behaviors via parent cognitions and beliefs. In this model, child characteristics influence parents' appraisal of situations and experiences of stress, which then directly predict behavior. Although both of these models acknowledge the influence that child characteristics have in predicting parenting behaviors and represent improvements in researcher's ability to account for the multiple determinants of parenting practices, neither addresses potential transactions between parent-child dyads.

Parents and children are part of dynamic systems, and the relationships they form are created over time through the contributions of both members. Parents and children develop mutual expectations about how the other partner will behave based on an accumulation of previous interactions such that past interactions influence present interactions (Hinde, 1979). Lollis and

Kuczynski (1997) write that bidirectionality is implied in all developmental perspectives, and there are a variety of frameworks used to conceptualize and model this bidirectionality. One such framework involves the development of transactional models, which represent an important bridge linking behaviorist-based models with parent-child relationship theories (Altman & Rogoff, 1987). Transactional models emphasize how parents and children change as they interact over time; the actions of each partner are transformed over time as each partner responds to changes in the characteristics or actions of the other (Kuczynski, 2003). Transactions occur when one member of the dyad changes the action of the other member of the dyad or elicits a new response (Sameroff & Mackenzie, 2003). A relevant example of a transactional model used to predict a particular type of parenting behaviors is exemplified in Patterson et al.'s (1990) transactional model of the determinants of antisocial behavior. This model demonstrates how child misbehavior can elicit inappropriate discipline by parents, which may escalate the child's misbehavior over the course of an interaction. In this model, both parent and child behaviors contribute to a child outcome in a way that becomes predictable over time. However, for questions centering around the prediction of parental autonomy support, additional theories that are specific to these topics might also be needed to generate questions and hypotheses.

Self-determination theory (SDT) is frequently used to guide research on the prediction and role of parental autonomy support in the lives of elementary school-aged children (Grolnick et al., 2002; Grolnick et al., 2007). Because SDT is embedded within the larger organismic framework, key assumptions include that active growth progresses in a direction that represents synthesis, organization, or unity for all individuals (i.e., it is universal). Deci and Ryan (2002) write that SDT also bridges between developmental organismic theories and behavioral or cognitive theories that emphasize contextual factors. Although SDT embraces the organismic assumption that individuals have innate tendencies to develop a unified self, it also includes the perspective that social-contextual factors can support or hinder these tendencies (Deci & Ryan). Therefore, autonomy-relevant parenting contexts are important determinants of child psychological well-being.

SDT posits that three basic psychological needs – for autonomy, competence, and relatedness – facilitate development and that environments can be categorized by the extent to which they support these needs. As such, the individual and context both contribute to autonomy development. According to Ryan (1995; cited by Joussemet et al., 2008), children have an innate propensity to internalize societal norms, including the values, attitudes, and behaviors of those around them. Autonomous environments are those that support people's autonomy, rather than controlling their behavior. In this context, autonomy refers to "the experience of freedom in initiating or endorsing behaviors, that is, to authentically concur with the internal or external forces that influence behavior" (Joussemet et al.; p. 194). In other words, autonomous behavior involves a match between beliefs and action such that "behavior is an expression of the self" (Deci & Ryan, 2002; p. 8). Because autonomy is a basic psychological need, social contexts that infringe upon or do not fulfill this need can harm psychological well-being. SDT has been applied to parenting as an influential social context wherein autonomy support predicts optimal child development. Parental autonomy support consists of providing rationales for requests, recognizing the unique contributions and perspectives of the child, offering choices when possible, and minimizing psychologically controlling techniques (Joussemet et al.). Joussemet et al. (2008) maintain that parental autonomy support should not be confounded with permissiveness, neglect, structure, or promotion of independence.

Research on parental autonomy-support has demonstrated that situational factors, socio-political contexts, and parent beliefs about the child's development impact the extent to which parents will endorse and use autonomy-supportive practices. There is also evidence to suggest that certain child characteristics may create environments in which parent's active support of children's autonomy varies (Grolnick et al., 2007). Variation in specific child characteristics could elicit differing amounts of control and autonomy support from parents, whose behavior, in turn, either helps or hinders children's development of autonomy, relatedness, and competence. In fact, Joussemet, Landry, and Koestner (2008) conclude that examining reciprocal relations between parents and children to investigate determinants of parental control versus parental autonomy support is an important future direction, indicating that consideration of child

characteristics as an influential social-contextual factor opens a new door for exploring parent—child bidirectionality in the context of SDT.

Variation in parental autonomy support may be shaped by child characteristics through children's behavior. For example, SDT posits that parental autonomy support is most needed during unpleasant or challenging tasks, when the task lacks inherent enjoyableness (Joussemet et al., 2008). Child behaviors during these challenging tasks may influence parents' autonomy support such that temperamentally inhibited and anxious children may view certain challenges as threatening and withdraw from the task or show signs of distress. These child behavioral responses, and parent's subsequent use of autonomy support or control, could form transactional patterns over time that affect the success with which parents internalize social regulation and attitudes while remaining emotionally close with their children.

CHAPTER III: REVIEW OF LITERATURE

Child Anxiety Symptoms

Anxiety symptoms represent an individual's response to perceived threat or danger. Symptoms can range from mild to severe and are present from early infancy (Beesdo, Knappe, & Pine, 2009). Common fears during middle childhood includes the fear of specific objects (such as animals or monsters), fear of natural disasters and traumatic events, and school or performance-related anxiety; it is considered typical for children to experience these fears (Beesdo, Knappe, & Pine). Although anxiety is inherently an adaptive response which facilitates harm avoidance, pathological anxiety can occur if symptoms are severe and persist over time in the absence of true threat. The consequences of elevated anxiety symptoms during middle childhood include low peer relationship quality, self-esteem, and school performance (de Lijster et al., 2019), making identification of the predictors of such symptoms an important research goal.

Anxiety that may indicate pathology in middle childhood includes cognitive, affective, and behavioral components. Regarding cognitions, clinically anxious children tend to perceive ambiguous situations as more dangerous, view themselves as less influential and competent in these situations, and make more underestimations of their abilities to cope with danger than children without anxiety disorders (Bögels & Zigterman, 2000). Children with heightened anxiety symptoms are also likely to report cognitive styles that are high in anxiety sensitivity, intolerance of uncertainty, and fear of negative evaluations (Hong et al., 2017). Emotional awareness, management, and coping are also implicated in pathological anxiety; children who have high anxiety symptoms have also been found to have difficultly identifying negative emotional states, inhibiting anger, and inappropriately expressing anger and sadness (Zeman, Shipman, & Suveg, 2002). Finally, behavioral indicators of anxiety symptoms in middle childhood include withdrawal/avoidance, agitation (hand-wringing, sucking fingers), difficulty transitioning between settings, security-seeking/clinginess to trusted adults, and perfectionism (Beesdo, Knappe, & Pine, 2009; Headley & Campbell, 2013). In this way, anxiety symptoms

during middle childhood consist of both internal experiences and external behaviors that provide cues of distress.

Anxiety symptoms that meet certain diagnostic criteria, which typically include symptoms that are excessive and persistent, are classified as anxiety disorders (American Psychiatric Association, 2013). Prevalence rates of anxiety disorders in children fall between 5.7 and 17.7% in the United States (Zahn-Waxler, Klimes-Dougan, & Slattery, 2000), indicating that anxiety disorders are relatively common during childhood. Research indicates that the prevalence of anxiety disorders steadily increases with age, such that 1.3% of children ages 3 – 5 years have severe levels of anxiety symptoms, whereas 6.6% of children ages 6 – 11 years and 10.5% of children ages 12 – 17 years are affected (Ghandour et al., 2019). Although specific symptoms may differ by diagnosis type, many anxiety disorders share common features and there is diversity in symptoms even within diagnostic categorizations (Beesdo, Knappe, & Pine, 2009). It may be informative to study anxiety symptoms generally rather than specific diagnoses when investigating anxiety over the course of childhood, because this is a time of rapid growth and development during which fluctuations in anxiety symptoms are likely. Anxiety diagnoses are likely to change from early to middle childhood, which may be missed by research focusing on only a particular diagnosis (Hudson & Dodd, 2012). There is also evidence that even elevated levels of anxiety symptoms within community samples are associated with adverse social, emotional, and academic outcomes for children (de Lijster et al., 2019). Therefore, the current study considers anxiety symptoms on a continuum, rather than using a categorial clinical cut-off, to better capture variability in symptoms over the course of middle childhood with the understanding that even subclinical levels of anxiety might still present challenges to children and their families.

An examination of changes and continuities in anxiety symptoms over the course of middle childhood reveals that symptoms follow different change trajectories for different children, which offers some information about potential predictors and sequelae of these trajectories. Kerns, Siener, and Brumariu (2011) utilized latent growth curves to model change in child anxiety symptoms from kindergarten to 6th grade and found that although anxiety symptom

levels did not significantly change across elementary school, significant variance around the slope indicated that individual children within the sample did experience increases or decreases in anxiety symptoms during this period. These individual differences in change trajectories have been investigated further using group-based mixture modeling to illuminate whether there are groupings of children whose anxiety symptoms change in similar ways. De Lijster and colleagues (2019) charted anxiety symptoms in a cohort of children from age 1.5 years to 10 years. Results indicated the presence of 4 trajectories: 82.4% of children in the sample had low anxiety symptoms at all time points, 6% had gradually decreasing anxiety symptoms over this period, 4.2% had high, preschool-limited anxiety which began decreasing at age 6, and 7.4% of children in the sample had steadily increasing anxiety symptoms. These findings were preceded by a smaller longitudinal study by Feng, Shaw, and Silk (2008) which indicated that among boys ages 2 – 10 years, 50.8% of the sample had consistently low anxiety, 32.5% had initially high anxiety followed by a decrease, 8.8% had gradually increasing anxiety symptoms, and 7.9% had persistently high anxiety symptoms for the duration of the study.

Taken together, these findings illustrate a nuanced picture of anxiety symptoms during middle childhood; although a majority of children never have anxiety problems from early to middle childhood, a significant portion of children do experience elevated anxiety symptoms at some point for either a limited or persistent duration. The long-term impact of anxiety symptoms is evident in findings from Feng, Shaw, and Silk (2008) which indicate that children who experience elevated anxiety symptoms at any point during early and middle childhood have a greater likelihood of being diagnosed with a mood disorder at age 10 than those with persistently low symptoms. The variation in anxiety trajectories also indicates the importance of understanding when particular risk factors are most salient in predicting anxiety symptoms during development.

Parental Autonomy Support

Parental autonomy support is recognized as a key predictor of child well-being. Autonomy-supportive parenting is notable for its role in facilitating autonomous motivation, perceived

competence, perceived control, and academic achievement (Karavasilis et al., 2003; Vasquez et al., 2016) and for supporting child social and cognitive development during middle childhood (van der Kaap-Deeder et al., 2015). Much of the literature on parental autonomy support has focused on the beneficial role it serves in promoting child academic success (Grolnick et al., 2002; Grolnick et al., 2007), but a recent meta-analysis indicated that it is most strongly associated with child psychosocial health (Vasquez et al., 2016).

One of the earliest conceptualizations of parental autonomy support was Shaefer's (1965) introduction of "psychological autonomy granting," a construct predicted to lie opposite from "psychological control" on a continuum. Both constructs have undergone significant revision since that time, with the concept of parental psychological control now distinguished from "behavioral control" (Barber, 1996), and the construct of psychological autonomy granting split into "promotion of independence" and "promotion of volitional functioning" (Soenens et al., 2007). These conceptual changes have been justified quantitatively by factor analyses, correlations among constructs, and differential associations with child outcomes. One important result of the decades of work refining the parental autonomy support construct is its relationship with parental control. Although autonomy support was initially hypothesized to be the conceptual opposite of psychological control, this assumption was challenged by several authors (Barber et al., 2002; Silk et al., 2003) who argued that the two were best conceptualized as related but independent constructs (Hauser Kunz & Grych, 2013). Recent analyses suggest that the linchpin lies in how each construct is defined; although parental promotion of independence may coexist somewhat independently from psychological control, promotion of volitional functioning is fundamentally incompatible with psychological control (Soenens et al., 2009).

These two conceptualizations of parental autonomy support stem from different theoretical frameworks. The specific theory guiding conceptualization of parental autonomy support guides operationalization of the construct and therefore its relationship with parental psychological control. Separation-individuation theory (Blos, 1979) guides the conceptualization of promotion of independence, a process by which children distance themselves emotionally and psychologically from parents, therefore becoming autonomous through non-dependence on

parents. Parents who promote independence behave in ways that encourage individual expression, decision-making, and thinking (Silk et al., 2003). SDT (Deci & Ryan, 2000) guides the conceptualization of promotion of volitional functioning and posits that autonomy depends upon alignment between beliefs and actions and can only be realized when individuals are free from externally controlling environments. Parental promotion volitional functioning includes four "ingredients:" 1) acknowledging children's perspectives, 2) providing explanations, especially when choices are not possible, 3) avoiding control, and 4) offering children choices when possible (Joussemet et al., 2005). The current study aligns with the SDT perspective on parental promotion of volitional functioning, as research shows that this type of autonomy support is a better predictor of child well-being than promotion of independence (Soenens et al., 2007), and is particularly relevant to culturally and ethnically diverse families (Benito-Gomez, Washington, McCurdy, & Fletcher, 2020). Hereafter, parental promotion of volitional functioning will be referred to as "parental autonomy support" for the sake of parsimony and to be consistent with the majority of literature on this topic (Grolnick & Ryan, 1989; Grolnick et al., 2002; Grolnick et al., 2007).

Indicators of parental autonomy support may appear different depending on the age of the child. In general, autonomy support at all ages involves the parent's ability to "adopt and accept the frame of reference of their children" (p. 1591, van der Kaap-Deeder et al., 2015), although specific autonomy-supportive behaviors may differ. Parents of children in middle childhood can provide autonomy support by acknowledging children's perspectives, providing choices, and offering rationales (Joussemet, Koestner, Lekes, & Landry, 2005). During homework tasks, parents might provide autonomy support by allowing children to work independently, providing solicited advice and checking, and helping children develop problem-solving strategies of their own (Fei-Yin Ng, Kenney-Benson, & Pomerantz, 2004). There is scant information about change and stability of parental autonomy support behaviors across middle childhood, although there is evidence that context and personality influence the amount of autonomy support that parents provide. Studies that have investigated the antecedents of maternal autonomy support indicate that mothers are less likely to use autonomy-supportive behaviors during ego-involved and high-pressure tasks (Grolnick, Gurland, DeCourcey, & Jacob, 2002), when they believe they

will be evaluated, and when they are high in contingent self-worth (Grolnick, Price, Beiswenger, & Sauck, 2007). These findings demonstrate that maternal autonomy support is somewhat contingent upon the immediate circumstances, but also has a stable aspect that reflects a consistent way of responding to the child. It is also possible that change in the child's behavior influences parental autonomy support. As child competencies and maturity increase over middle childhood, it is expected that parental autonomy support will similarly increase, though this supposition lacks empirical confirmation. The current study attempts to fill this gap by investigating both mothers' and fathers' use of autonomy support longitudinally over the course of middle childhood.

Association Between Child Anxiety and Parental Autonomy Support

Several methods have been used to examine the links between parental autonomy support and child anxiety symptoms; however, most previous studies on this topic have used cross-sectional designs to test main effects of parenting behaviors on child outcomes. These practices are inconsistent with understanding of the way in which autonomy support and anxiety symptoms are linked over time, the direction of effects, and whether one is a stronger predictor of the other. McLeod et al. (2007) note the multiple ways that parental autonomy support might be related to child anxiety. These include autonomy support as a direct cause of anxiety, a response to the child's existing anxiety, or as an expression of the parent's existing anxiety. Although many studies acknowledge that the relationship between parental autonomy support and child anxiety symptoms is probably cyclical (Bayer et al., 2019), as change in one partner affects the behavior of the other, only one study has examined these bidirectional links longitudinally (Rubin et al., 1999). Results of this study indicated that observed child shyness at age 2 predicted lack of encouragement of independence at age 4, but not the other way around. These findings establish the connection between parental autonomy support and child anxiety and demonstrate the utility of longitudinal designs in this topic of inquiry. Stronger designs, utilizing more than 2 waves of data collection and an expanded age range that allows time for these transactional processes to unfold, represent crucial next steps for this body of work.

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Much of the extant literature examines whether parental autonomy support directly predicts child anxiety. Some of the literature reviewed here assesses parental psychological control or overprotection rather than parental autonomy support, which have been shown to lie on opposite ends of the same continuum (Soenens et al., 2009). Although most studies continue to use cross-sectional designs, some researchers have devised longitudinal designs to make stronger causal inferences. Results generally support the prediction that less parental autonomy support (or high parental psychological control) is associated with greater child anxiety symptoms, perhaps by undermining children's self-confidence, shielding children from experiences that might allow them to develop coping mechanisms, exacerbating children's existing anxious tendencies, or perhaps by modeling parents' own anxiety through restrictive parenting.

Several factors support an investigation of parental autonomy support as a predictor of child anxiety symptoms. First, research comparing the impact of parental autonomy support and psychological control on anxiety symptoms with other parenting behaviors shows that autonomy support and anxiety are uniquely and strongly associated with anxiety symptoms. McLeod et al. (2007) conducted a meta-analysis examining the links between parenting and child anxiety to provide information about the overall strength of this association. Of the parenting dimensions investigated, parental autonomy support predicted the greatest proportion of variance in childhood anxiety symptoms and had a significantly larger effect size than other parenting dimensions.

Second, parental autonomy support and psychological control are significant predictors of increases in child anxiety over time. For example, Hudson and Dodd (2012) reported that maternal overinvolvement at age 4 predicted child anxiety disorders at age 9, controlling for anxiety at age 4. Therefore, maternal overinvolvement might be a risk factor of subsequent child anxiety. Parrigon and Kerns (2016) examined parent autonomy support as a mechanism that mediates associations between parental anxiety and child anxiety. Although findings did not support this mediational model, low maternal autonomy support in 5th grade predicted greater child anxiety symptoms at 15 years, controlling for previous anxiety symptoms.

Finally, parenting behaviors have been shown to increase the likelihood that children with existing vulnerabilities will develop anxiety disorders during middle childhood. Bayer and colleagues (2019) examined child anxiety and parenting behaviors longitudinally in a sample of inhibited preschoolers. Among parenting variables, overprotective parenting behavior emerged as the strongest predictor of inhibited toddlers developing an anxiety disorder by age 6. However, lack of an uninhibited control group limits the generalizability of these results, and it is possible that overprotective parenting is elicited in reaction to child temperamental inhibition. The extant literature provides considerable documentation regarding the predictive value of parental autonomy support and psychological control with respect to child anxiety symptoms. Studies that utilize longitudinal designs indicate that parental autonomy support and control can predict increases in child anxiety symptoms. Unfortunately, many of these studies are informed by theories or assumptions that reinforce a unidirectional model of parenting on child outcomes, without directly testing how child behaviors or characteristics influence parenting.

MAIN EFFECTS OF CHILD ANXIETY ON PARENTAL AUTONOMY SUPPORT

A smaller body of literature that investigates the impact of child characteristics on parent's use of autonomy support. Similar to the literature describing main effects of parental autonomy support on child anxiety, some studies describe how child anxiety informs parental psychological control, rather than parental autonomy support. The conclusions drawn from these studies are discussed here, as parental autonomy support is fundamentally incompatible with psychological control, but the need for research assessing parental autonomy support specifically is clear.

There are three ways in which child anxiety could influence parental autonomy support: 1) parents perceive their anxious children as more difficult and as needing more intervention, 2) child anxiety activates parents' own fears, leading to restricted autonomy support, and 3) child anxiety behaviors elicit more protective and less autonomy-supportive parenting. Evidence for the first mechanism comes from research that assesses parent perceptions of their child and actions during an interaction task. Neitzel and Stright (2004) investigated the role of mother's perceived child temperament and use of autonomy-supportive behaviors during a problem-

solving interaction task with kindergarten-aged children. During the task, mothers who viewed their child's temperament as difficult were more likely to restrict autonomy by giving the child answers, directing the child's actions, or simply taking over the task for the child entirely. Evidence for the second mechanism comes from Coplan and colleagues' (2009) investigation into the interactions between child temperament, maternal personality, and parenting practices among children in kindergarten through 2nd grade. Child shyness interacted with maternal neuroticism to predict overprotection such that mothers with high neuroticism and shy children were higher in overprotection compared to neurotic mothers with less shy children. The authors note that shy children's display of social fear may exacerbate neurotic mothers' tendency to overestimate threat and danger in the environment and to increase overprotective behaviors.

However, other studies have found evidence that parents of anxious children systematically differ in their use of autonomy-supportive practices, regardless of parent anxiety and perceptions of their child. During a challenging interaction task, Hudson and Rapee (2001) found that mothers of clinically anxious children used more psychologically controlling behaviors compared to mothers of non-anxious children. The authors posit that this type of parenting involvement may be a reaction to child pathology or may play a role in maintaining child anxiety. Similarly, Moore and colleagues (2004) reported a main effect of child anxiety diagnosis on maternal autonomy support such that mothers of anxious children were less autonomy-supportive compared to mothers of non-anxious children. There were no main or interaction effects of mother anxiety diagnosis on autonomy support. These findings suggest that child anxiety is connected to maternal autonomy support regardless of the mother's own anxiety diagnosis, which challenges the notion that maternal anxiety is the primary precursor to less autonomy support.

There are several limitations of this small literature, notably the lack of longitudinal research and lack of paternal involvement. Only one study has investigated this subject longitudinally: Rubin and colleagues (1999) examined parental perceptions of child behavior at age 2 and parenting behaviors at age 4. Results indicated that observed child shyness at age 2 was inversely associated with parental encouragement of independence at age 4, though lack of encouragement

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of independence at age 2 did not predict child shyness at age 4. More research designs focused on middle childhood would provide stronger evidence about the direction of effects. The almost exclusive reliance on mothers, and not fathers, for understanding parenting behaviors limit the generalizability of these results substantially. Finally, this literature also appears to highlight the role of parent perceptions of child anxiety in shaping parenting practices, rather than systematically investigating how child anxious *behaviors* may directly evoke more parental control or less autonomy support.

Covariates

PARENT GENDER

Parental gender roles influence parenting behaviors and possibly the ways in which parenting impacts child anxiety symptoms. Research shows that mothers and fathers continue to divide childrearing tasks along traditional gender roles, with mothers responsible for daily caregiving and fathers engaging in play and providing financial support for the family – even in families when mothers earn more money than fathers (Helms-Erikson et al., 2000). Children in middle childhood also perceive parents as serving complementary, gendered parenting roles wherein mothers are more involved in caregiving, socialization, communication, and educational activities with children while fathers are more involved in physical play and exploration activities (Newland et al., 2013). These gendered roles may contribute to actual differences in parenting practices, which cannot entirely be explained by differences due to measurement error (Adamsons & Buehler, 2007).

Lack of parenting research that involves fathers has limited the conclusions that can be drawn about the effect of parenting on child anxiety (Bögels & Phares, 2008). There is also mixed evidence about whether mothers and fathers differ in their use of autonomy support, with some studies finding significant mean level differences, while others do not. Newland and colleagues (2013) found that children between the ages of 8 and 11 reported receiving significantly higher levels of autonomy support from mothers than from fathers. Notably, this study investigated

child perceptions of parenting practices, which could be influenced by the child's socialized gender norms about which "functions" mothers and fathers should perform. On the other hand, Teetsel and colleagues (2014) investigated how anxiety disorders among mothers and fathers might differentially impact observed parenting practices during a challenging interaction with children aged 6 to 12. Results indicated no significant parental gender differences in use of observed autonomy support. However, other parenting practices – including observed overcontrol and self-reported reinforcing dependence – did significantly vary by parent gender, with anxious fathers displaying more overinvolved behaviors and less reinforcing dependence than anxious mothers. Without a non-anxious control group, it is unclear whether these differences are due to general parenting differences or are in some way dependent on anxiety disorder.

A related question is whether mothers' and fathers' autonomy-supportive practices have similar associations on child anxiety. Verhoeven et al. (2012) investigated whether parent gender moderated associations between self-reported parental autonomy support and child anxiety symptoms. Results indicated that both mother and father autonomy support were associated with greater anxiety symptoms for children under the age of 10. Neither mean autonomy support nor the association between autonomy support and child anxiety differed by parent gender; however, more evidence is needed beyond this single study before definitive conclusions can be drawn, especially given that other research (e.g., Stolz et al., 2005) has indicated that the strength of associations between parenting behaviors and child outcomes differ for mothers versus fathers. These findings suggest that autonomy-supportive parenting practices and their impact may differ systematically for mothers and fathers and demonstrate the importance of examining potential gender-of-parent differences in the impact of parental autonomy support on child anxiety symptoms.

PARENT ANXIETY SYMPTOMS

Parents of anxious children are more likely to have high levels of anxiety symptoms themselves, confounding the proposed relationship between parental autonomy support and child anxiety.

The connection between parent anxiety and child anxiety has been demonstrated in numerous studies and indicates that parental anxiety is strongly associated with child anxiety symptoms in cross-sectional (Parrigon & Kerns, 2016) and longitudinal work (de Lijster et al., 2019; Hudson & Dodd, 2012) for both fathers and mothers. There are three mechanisms typically proposed to explain the relationship between parent and child anxiety symptoms: 1) Predisposition to anxiety may be passed biologically from parent to child via genetic transmission (consistent with biological models), 2) anxious parents may use different parenting practices that increase child anxiety compared to non-anxious parents (consistent with psychoanalytic or relational theories), and 3) anxious parents may inadvertently model fear and avoidance by expressing their own anxiety symptoms in the child's presence (consistent with behavioral and cognitive learning theories). There is some evidence to support each of these transmission mechanisms, underscoring the importance of accounting for parental anxiety symptoms when studying child anxiety.

Although research shows that a significant portion of variance in child anxiety symptoms can be attributed to genetic influences, genes seem to have a more general impact on stability in anxiety symptoms, whereas changes in symptoms are largely the result of novel environmental influences (Trzaskowski et al., 2012). This suggests that environmental influences are important predictors of change in anxiety symptoms over time. Anxiety might also manifest by influencing parenting practices which in turn increase child anxiety. Mothers' separation anxiety in particular has been identified as an important predictor of observed autonomy support. Wuyts and colleagues (2017) found that mothers with high separation anxiety provided less choice about the conversation topic, used less reflective listening, displayed less authentic interest, and asked fewer experience-related questions during an interaction task with their children. These findings support the conclusion that highly anxious mothers might be more vulnerable to using lower levels of autonomy support. Anxious parenting might also model anxiety symptoms for children, though this finding might be specific to parent's self-report measures. When Drake and Ginsburg (2011) compared the parenting behaviors of anxious and non-anxious mothers, results indicated that maternal anxiety predicted higher *self-reported* anxious modeling, but not child report or observer ratings of anxious modeling. Therefore, it is possible that elevated anxiety symptoms

cause mothers to feel as though their anxiety is "on display" in a way that children and observers do not perceive. Given that parent anxiety appears to be strongly associated with both autonomy-supportive parenting and child anxiety through several different mechanisms, it is important to account for the effect of this variable.

CHILD GENDER

There are no clear differences in anxiety disorders by child gender during early childhood (ages 4 – 5 years), but by middle and late childhood (starting at around age 10), girls have significantly higher prevalence of anxiety disorders and symptoms than boys, which persists throughout adolescence (Zahn-Waxler et al., 2000; Browne et al., 2010). Several explanations have been offered to account for the elevated anxiety symptoms among girls during this period. Researchers note that at young ages, girls are slightly more likely than boys to be shy and inhibited. During middle childhood, a broader range of circumstances may elicit anxiety for girls but not for boys, such as relational or interpersonal problems. It is also more likely that girls will be socialized in ways that interfere with self-actualization, reinforce shyness, overlook success, and do not tolerate physical aggression (Zahn-Waxler et al., 2000). There is also some evidence that anxiety symptom trajectories differ for girls and boys. De Lijster and colleagues (2019) found differences in the percentage of girls versus boys within trajectory classes, with a higher percentage of boys in the persistent low and preschool-limited trajectories and a higher percentage of girls in the increasing and decreasing anxiety symptom trajectories. Girls were therefore more likely than boys to have had experienced elevated anxiety symptoms at some point during early and middle childhood.

Child gender has also been tested as a moderator of associations between parenting practices and child anxiety. Although there is no unifying consensus about how child gender moderates this association, one guiding theory that has been put forward involves the "theory of gender stereotyped misbehavior" (Kim et al., 2005), which posits that stereotype *congruent* misbehavior (i.e., internalizing problems in girls and externalizing problems in boys) is associated with parental permissive responses, whereas stereotype *incongruent* misbehavior (i.e., externalizing

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problems in girls and internalizing problems in boys) is associated with parental hostility. Therefore, it might be expected that child anxiety symptoms elicit lower autonomy support from parents of boys and higher autonomy support from parents of girls as a means of socializing the expression of anxiety symptoms in gender stereotyped ways. However, the evidence for child gender as a moderator has received mixed confirmation. Whereas Browne and colleagues (2010) found that gender did moderate associations predicting child anxiety such that parenting consistency and positive interactions were more strongly associated with less anxiety symptoms for boys compared to girls, McLeod, Wood, and Weisz's (2007) meta-analysis indicated no significant moderation effects of parenting on child anxiety. This finding might be illuminated by examining the potential impact of gender as a moderator over time, because prevalence of anxiety symptoms over time is known to differ by gender.

CHILD DEPRESSION

Child anxiety and depression symptoms both represent a "disturbance in intropunitive emotions and moods" (p. 443, Zahn-Waxler et al., 2000). As such, they are often investigated side-by-side or in combination under the construct "internalizing symptoms." Research consistently finds high comorbidity of anxiety and depressive disorders and symptoms (20 – 50% but as high as 70%; Zahn-Waxler et al.), and there is evidence that a core cognitive factor, or a general factor of "negative affectivity," renders children vulnerable to both anxiety and depressive symptoms. Evidence of a generalized psychological vulnerability to both anxiety and depressive disorders was reported by Hong and colleagues (2017), who found that cognitive commonalities in anxiety and depression loaded onto a common core factor for children in middle childhood. However, differences have been found in research using longitudinal designs. Feng and colleagues (2008) found that anxiety symptoms preceded and predicted depressive symptoms in a sample of boys in middle childhood, a finding that has been replicated in other studies (Zahn-Waxler et al.). Given the high comorbidity between these constructs, examinations of child anxiety symptoms must consider the impact of child depression symptoms as a potential confound.

Research Aims and Hypotheses

1. Evaluate change in child anxiety symptoms and parental autonomy-supportive behavior across middle childhood. It is hypothesized that:
   a. The variability of change in anxiety symptom scores will be significant, indicating the presence of individual differences in anxiety symptom changes from 54 months to Grade 1 and from Grade 3 to Grade 5.
   b. The variability of change in parental autonomy support will be significant, indicating the presence of individual differences in parental autonomy support changes from 54 months to Grade 1 and from Grade 3 to Grade 5.
2. Examine the bidirectional associations between parental autonomy support and child anxiety symptoms across middle childhood. Four possible relationships between child anxiety symptoms and parental autonomy support will be tested:
   a. Child anxiety symptoms and parental autonomy support are correlated at 54 months and at Grade 3.
      i. Initial child anxiety symptoms and parental autonomy support will be inversely related, such that high child anxiety is associated with low parental autonomy support.
   b. Child anxiety symptoms at 54 months and at Grade 3 predict change in parental autonomy support from 54 months to Grade 1 and from Grade 3 to Grade 5.
      i. Greater child anxiety symptoms will be associated with decreases in parental autonomy support.
   c. Parental autonomy support at 54 months and at Grade 3 predict change in child anxiety symptoms from 54 months to Grade 1 and from Grade 3 to Grade 5.
      i. Greater parental autonomy support will be associated with decreases in child anxiety symptoms.
   d. Change in child anxiety symptoms from 54 months to Grade 1 and from Grade 3 to Grade 5 predicts change in parental autonomy support from 54 months to Grade 1 and from Grade 3 to Grade 5.
      i. No specific hypothesis is formulated.

3. Examine the moderating effect of child gender on the bidirectional associations between parental autonomy support and child anxiety symptoms. It is hypothesized that:
   a. The proposed effects of greater child anxiety symptoms predicting over-time decreases in parental autonomy support will be stronger for boys than for girls.
   b. No specific hypothesis is provided for the effect of greater parental autonomy support on over-time decreases in child anxiety symptoms.

CHAPTER IV: METHOD

Sample Selection

The current study utilizes a sample drawn from a four-phase longitudinal study, the
NICHD Study of Early Child Care and Youth Development (SECCYD), conducted to examine
how variations in caregiving and context relate to children's developmental outcomes (Griffin,
2010). The study involved 10 data collection sites across the United States. Families with a
newborn child were recruited from hospitals in proximity to data collection sites in 1991.
Eligible mothers were age 18 or older, sufficiently conversant in English, did not have plans to
relocate within 3 years, had a single (not multiple) birth, and the target child had not been
hospitalized for more than 7 days after birth (Griffin, 2010). A conditionally random sampling
plan was implemented to ensure that 1) the sample represented the demographic diversity of the
recruitment site and 2) the sample included specific percentages of mothers who planned to work
full-time (60%), part-time (20%), and stay at home (20%) during the target child's first year of
life. Of the 8,986 mothers who received study information in target hospitals, a total of 1,364
families met eligibility criteria and were selected to participate (NICHD SECCYD User Guide,
n.d.). Phase I of the study began in 1991, included 1,364 families, and lasted from child age one
month to three years. 1,220 of these families were retained in Phase II, starting in 1995, which
continued until the target child finished first grade. Phase III began in 2000 and included 1,100
families who were followed from child enrollment in second to sixth grades.

The current study utilizes data from 733 families who participated in both Phase II and III of the
SECCYD, had data from both mothers and fathers, and had complete data on at least one parent-
child observation task. Participating children were about 4.5 years old at the start of Phase II
(which began in 1995) and 9 years old at the start of Phase III (which began in 2000), and 49.8%
of the children were girls. Mothers identified their child's ethnicity as European American
(89.1%), African American (5.5%), Asian American (1.8%), Native American (.3%), or as
another ethnicity (3.4%). During the 1-month visit, 20.6% of mothers reported attaining a high
school diploma/GED or less, 30.3% had an associate degree, 29.1% had a bachelor's degree, and

20.1% had a graduate degree (Master's, law degree, or doctoral degree). 20.4% of fathers had attained a high school diploma/GED or less, 29.5% had an associate degree, 27% had a bachelor's degree, and 22.8% had a graduate degree. The median household income at the start of Phase II was $54,000 per year, which was higher than the national median income ($34,076) for American households in 1995 (Weinberg, 1996).

<u>Data Collection Procedures</u>

Data were collected from target children, their families, and their teachers via questionnaires and observational assessments. Home visits and laboratory visits were conducted at 54 months and during Grade 1, 3, and 5. During these visits, mothers, fathers, and children completed questionnaires independently. Mother-child and father-child dyads participated in videotaped interaction tasks. Experimenters also conducted school and/or childcare visits at 54 months, Grade 1, 3, and 5, during which teachers completed questionnaires and the target child was observed in the classroom and in the lunchroom. Phone contact was initiated with each household every 4 months during Phase II (54 months – Grade 1) and every 6 – 12 months during Phase III (Grade 2 – 6) to collect additional information from mothers.

Observational data utilized in the proposed study were collected during mother-child and father-child interaction tasks. The tasks were adjusted to be developmentally appropriate for the child's age and differed by parent gender. Tasks at 54 months included a combination of challenging and play activities. For mother-child dyads at 54 months, dyads first completed an Etch-A-Sketch maze together, with each partner controlling a separate knob. In the second task, dyads built a tower from various-shaped blocks. In the third task, dyads were given puppets and instructed to play together. For father-child dyads at 54 months, dyads were instructed to engage in two tasks: the first task consisted of a challenging building task using a marble maze toy. In the second task, dyads were given animal toys and props and were instructed to play together (Owen, 2010).

At the Grade 1 visit, mother-child dyads were asked to draw a house and a tree using an Etch-A-Sketch together, while father-child dyads were asked to draw a sailboat using the Etch-A-Sketch.

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Both sets of dyads engaged in a challenging task, with mother-child dyads fitting blocks into a parquet pattern and father-child dyads building block structures using Color Cube Task Cards. Finally, both sets of dyads played a competitive card game – mother-child dyads played one-up/one-down and father-child dyads played slap jack. At the Grade 3 and Grade 5 visits, both mother-child and father-child dyads engaged in a discussion task about household rules and a problem-solving activity (NICHD SECCYD Manuals of Operation, n.d.).

Measures

DEMOGRAPHICS

Mothers reported on key demographic information. Total household income (including family income and government assistance) was reported by mothers at 54 months, Grade 1, 3, and 5 using the "Family Employment and Income" questionnaire developed for use by the SECCYD. Income-to-needs ratios were calculated by dividing total household income by poverty thresholds for the number of individuals (adults and children) in each household. Ratios ranged from <1.0 (*Below poverty index*) to > 5.0 (*Relatively affluent*) with average ratios of 4.20, 4.59, 5.11, and 5.27 at 54 months, Grade 1, 3, and 5, respectively. Mothers reported on child gender and ethnicity when children were 1 month old. Child gender was coded dichotomously (0 = boy, 1 = girl).

CHILD ANXIETY SYMPTOMS

Child anxiety symptoms are represented by a latent variable with three latent variable indicators – mother report, father report, and teacher report – which were estimated by 6 manifest indicators each. Anxiety symptoms were measured at each time point using the Child Behavior Checklist (CBCL for Ages 4 - 18; Achenbach, 1991) questionnaire for parents. At 54 months, early childhood educators reported on child anxiety symptoms using the Caregiver-Teacher Report Form (C-TRF for Ages 2 – 5; Achenbach, 1991) and at Grades 1, 3, and 5, elementary school educators reported on child anxiety symptoms using the Teacher Report Form (TRF).

Respondents were asked to rate their agreement with a set of items about child emotional problems during the past 6 months. Responses for the scale range from 0 (*Not true*) to 2 (*Very true* or *often true*). Examination of the raw data revealed that although the possible response range for anxiety item indicators included 3 categories (0 = *Not true*, 1 = *Somewhat true*, 2 = *Often true*), the actual responses were far more likely to fall into a binary, "0" or "1" pattern. Response category "2" was very seldom endorsed. In addition to the estimation problems that such a skewed distribution of responses would cause, this was a community sample of children, and not a clinically-referred or diagnosed sample, for whom binary representation of anxiety symptoms may be appropriate. The "2" category responses were combined with the "1" responses to yield a dichotomous indicator of the presence (1) or absence (0) of anxiety symptoms.

As part of the original data collection, the CBCL "anxious/depressed" scale (CBCL-A/D) was used, which does not distinguish between anxiety and depression symptoms. For the purposes of the proposed study, I implement Achenbach and colleagues' (2003) method of selecting specific items on the CBCL-A/D scale which are indicative of DSM-IV anxiety diagnosis symptoms. This yields a 6-item "Anxiety Problems" scale (CBCL-AP), which includes symptoms of generalized anxiety disorder, specific phobia, and separation anxiety disorder. Specifically, these 6 items measured child dependency, fear, fear of school, nervousness, fearfulness, and worry. An identical procedure was implemented to create an anxiety-specific scale for teacher's report in grades 1, 3, and 5 (TRF-AP). For early childhood educator report at 54 months, 7 items on the C-TRF were used to create the "Anxiety Problems" scale (C-TRF-AP), all of which had been identified as such by Achenbach and colleagues (2003). The CBCL-AP has been demonstrated to better discriminate between anxious and affective problems than the CBCL-A/D (Kendall et al., 2007).

PARENTAL AUTONOMY SUPPORT

Mother and father autonomy support will be examined in separate models and measured using observer rating. Mother-child and father-child dyads participated in a series of interaction tasks

at 54 months, and at Grades 1, 3, and 5. The interactions from all tasks were videotaped and later coded for specific parenting behaviors. Observations of mother and father autonomy support were scored using the "Respect for Child Autonomy" subscale of the Parent Rating Scale, which was developed for use by the SECCYD. Autonomy support reflects parental recognition and respect for the child's individuality, motives, and perspectives. Two trained coders rated parental behavior on a 7-point Likert scale (1 = *Very Low* to 7 = *Very High*), using the same operational definitions of constructs at each time point. Consistent with SDT, scores at the low end of the autonomy support scale indicated a degree of intrusion and control, whereas scores at the high end of the scale indicated acknowledgement and encouragement of the child's perspectives. Interrater reliability estimates were calculated at each data collection period using Winer's (1971) "anchor point" approach to intraclass correlation (ICC) for estimating the reliability of a single rating. Ratings of mother autonomy support indicated acceptable reliability at all four data collection periods (ICCs of 0.78, 0.81, 0.73, 0.78). Ratings of father autonomy support also indicated acceptable reliability at all four periods (ICCs of 0.78, 0.79, 0.70, 0.80).

COVARIATES

Parent anxiety symptoms

Symptoms were assessed via parent self-report at Grades 1, 3, and 5. Parents completed the "My Feelings II" questionnaire, a measure created specifically for the SECCYD study, which includes 10 of the 20-item subscale assessing state anxiety from the State-Trait Anxiety Inventory (STAI Form Y; Spielberger et al., 1983). This measure assesses the strength of individuals' anxiety (fear, nerves, and discomfort) during situations that are perceived as threatening or dangerous. Parents were asked to rate their agreement with statements such as "I am tense; I am worried" and "I feel calm; I feel secure" (reverse-scored) on a 4-point scale (1 = *Almost Never* to 4 = *Almost Always*). Scores on all items are summed and the score was imputed by proportional weighting to create a single score for each parent at each time point. Possible scores ranged from 10 to 40, with higher scores indicative of greater anxiety symptoms. Cronbach's alpha values

indicated high internal reliability, which ranged from 0.86, 0.87 to 0.87 for mothers at Grades 1, 3, and 5, respectively, and from 0.86, 0.84 to 0.86 for fathers at these same time intervals.

Child depression symptoms

Child depression symptoms are represented by a latent variable with three latent variable indicators: mother report, father report, and early childhood educator report. Symptoms were assessed at 54 months using report on the CBCL and C-TRF and at Grade 3 using the CBCL and TRF. Parents and educators were asked to rate their agreement with a set of items about child affective problems during the past 6 months. Responses range from 0 (*Not true*) to 2 (*Very true or Often true*). Similar to the child anxiety symptom scale, response category "2" was very seldom endorsed. Therefore, the "2" category responses were combined with the "1" responses to yield a dichotomous indicator of the presence (1) or absence (0) of depressive symptoms.

In order to distinguish the affective from the anxious symptoms on the CBCL-A/D subscale, Achenbach and colleagues' (2003) method of constructing a new subscale from specific items on the CBCL-A/D scale that tap specific DSM-IV mood diagnosis symptoms was implemented. For parents' reports, this yields a 12-item "Affective Problems" scale (CBCL-AFF; Kushner et al., 2012) that includes symptoms of dysthymia and major depression. These 12 items assess child crying, eating habits, feeling worthless or guilty, tiredness, apathy, sleep disturbances or problems, and sadness. Two items on this scale, *Talks suicide* and *Harms self*, were seldom endorsed, indicating that these items may not be good indicators of the presence or absence of depressive symptoms with this community sample. These items were dropped from the scale, leaving a 10-item measure.

For early childhood educator report, an identical procedure was implemented to create a depression-specific scale using 7 items at 54 months (C-TRF-AFF) and 8 items at Grade 3 (TRF-AFF). The two items, *Talks suicide* and *Harms self*, were seldom endorsed and subsequently dropped from the scale, leaving 6 items in the Grade 3 measure.

<u>Plan of Analysis</u>

Preliminary analyses will include examination of intercorrelations among and the range of score distributions for key study variables. Hypotheses will be tested using structural equation modeling (SEM) in R using the lavaan package (Rosseel, 2012). Analyses will be conducted using a robust weighted least squares estimator – WLSMV – to handle non-normal categorical variables. At the time of writing, lavaan does not support the full information maximum likelihood (FIML) approach to missing data for WLS estimation, as this is a property of ML estimation. Therefore, missing data were handled using pairwise availability to allow cases to be included when there were some data available, rather than dropping the case entirely (as is the case in listwise deletion). The following analyses were run separately for mothers and fathers.

These tests were also conducted separately by time period – the period from 54 months to Grade 1 is referred to as "Model 1," and the period from Grade 3 to Grade 5 is referred to as "Model 2." This split was necessary because the coding conventions for parental autonomy support changed between Phase II and Phase III of data collection – whereas parents received a single, holistic score of parental autonomy support over the course of three different interaction tasks during Phase II, the interactions tasks were scored separately in Phase III data collection. Therefore, analyses were conducted separately by parent gender and by time period, yielding a total of four models.

Since the task used to assess parental autonomy support was slightly altered over time in order to remain developmentally appropriate and novel, it was necessary to adjust for this change instead of assuming equivalence. One proposed way to handle change in the measurement of constructs over the course of development is through the use of factor scores, which are "estimates of the unobserved scores theorized to underlie latent variables" (Wirth, 2008; p. 25). Factor scores implement characteristics of both longitudinal confirmatory factor analysis (CFA), in that factor scores implement differentially weighted items which are appropriate to the item/construct relationship. Use of factor scores is an improvement over mean scores because factor scores account for non-invariance in the measurement structure and can provide more accurate estimates of true change over time. To estimate factor scores, regression-based factor scores (rF)

were calculated for the assessment of parental autonomy support in Model 2 (Grade 3 to Grade 5), for which parental autonomy scores were available for two tasks. rF was introduced by Thomson (1939; expanded by Lawley and Maxwell, 1963) and utilized by Wirth (2008). Studies by Curran et al. (2007) and Ram et al. (2005) have successfully used rF score estimates in models of growth to study constructs that manifest differently over time.

To ensure that measurement properties of latent variables are stable over time, tests of longitudinal measurement invariance were conducted with anxiety symptom items. Meredith's (1993) sequence of testing factorial invariance was utilized with the configural invariance model as a point of comparison, which proposes testing configural factorial invariance (whether the factor structure is the same across time points) first, followed by weak invariance (whether corresponding factor loadings are the same across time), and then strong invariance (whether the corresponding factor loadings and intercepts/thresholds are the same across time). Strict invariance (whether the corresponding factor loadings, intercepts/thresholds, and residuals are the same across time) is typically needed to establish validity in constructs that are theorized to manifest in a stable manner over time; in this instance, strict invariance was not consistent with hypotheses and was not tested. At a minimum, strong factorial invariance must be supported in order to fit change models to ensure that the measurement of the construct holds across time (Grimm et al., 2016).

Likelihood ratio tests (LRTs; i.e., chi-square difference test) were used to compare the nested models. A chi-square difference test yielding a significant result at $p < .05$ will be interpreted to mean that the parameters constrained to equality are noninvariant (they have a different structure/meaning across different time points). However, because chi-square LRTs are quite sensitive to sample size, it is possible that small changes in magnitude will be statistically significant but not necessarily practically important. To limit this possibility, additional fit indices were considered. Chen (2007) concluded that changes in Comparative Fit Index (CFI) and root mean square error of approximation (RMSEA) could successfully be used to test for measurement invariance, and recommended cut-off points of $\Delta CFI \leq -.010$ and $\Delta RMSEA \leq .015$. If the test fails according to these estimates (i.e., a model fits significantly worse than the

configural invariance model), modification indices will be consulted to find noninvariant parameters. Noninvariant parameters, indicated by the modification indices, will be freed until the model fit is not significantly worse than the configural model and further testing will be conducted using partially invariant models.

A latent change score model (LCS; specifically, the bivariate latent change model) was selected to test focal hypotheses. The bivariate LCS model includes autoregressive and cross-lag parameters in order to test whether change in one process, from one measurement occasion to the next, is predicted by the previous state of a second process (Grimm et al., 2012). Unlike autoregressive latent trajectory (ALT) models, bivariate LCS models the initial time point rather than treating initial points as determined. This aspect of LCS models is preferred over the ALT method of handling initial time points since anxiety symptoms are likely to change from preschool to elementary school for a significant portion of the population (i.e., the "preschool-limited" trajectory of anxiety symptoms; de Lijster et al., 2019; Feng et al., 2008).

The bivariate LCS will be estimated by building up from simple specifications to more complex specifications. Following the example of Barker and colleagues (2014) to "build up" to the LCS, univariate change models and bivariate change models will be fit for each process, which will yield information about how latent change scores are predicted by the same latent variable at the previous time point. Estimations will be evaluated using the three indices of global fit mentioned previously (i.e., RMSEA, CFI, and chi-square test of model fit). Good model fit will be indicated by a comparative fit index (CFI) value of above 0.95 and acceptable model fit will be indicated by a CFI value between 0.90 and 0.95 (Byrne, 2001; Hu & Bentler, 1999). Good model fit will be indicated by root-mean-square error of approximation (RMSEA) values less than 0.05 and acceptable model fit will be indicated by RMSEA values between 0.06 and 0.08 (Browne & Cudeck, 1993; Byrne, 2001).

A multi-group analysis using the bivariate LCS model was then run to determine whether the "coupling" effects (i.e., the regression of change in one variable on the initial level of the other variable) differ in significance for boys and girls. Likelihood ratio tests were used to compare the models wherein key coupling parameters were freely estimated versus constrained for boys and

girls. A chi-square difference test yielding a significant result at $p < .05$ will be interpreted to mean that the parameters constrained to equality significantly differ for boys and girls.

CHAPTER V: RESULTS

<u>Descriptive Statistics and Correlations</u>

Descriptive statistics for manifest variables are presented in Table 1. Since all analyses were conducted separately for mothers and fathers, these tables are also presented by parent gender.

Variables	1	2	3	4	5	6	7	8
1. OB PAS 54 mo	0.15^c	0.39^c	0.27^c	0.23^c	-0.06	-0.11^b	-0.06	0.02
2. OB PAS G1	0.33^c	0.23^c	0.30^c	0.26^c	-0.06	-0.07	-0.03	0.06
3. OB PAS (rF) G3	0.24^c	0.32^c	0.50^c	0.33^c	-0.04	-0.11^b	-0.08^a	0.16^c
4. OB PAS (rF) G5	0.24^c	0.22^c	0.32^c	0.31^c	-0.02	-0.05	-0.01	0.02
5. PR anx G1	-0.09^b	-0.04	-0.05	-0.07^a	0.18^c	0.53^c	0.50^c	0.08^a
6. PR anx G3	-0.06	-0.06	-0.08^a	-0.09^a	0.49^c	0.13^c	0.48^c	0.01
7. PR anx G5	-0.06	-0.09^a	-0.07^a	-0.09^b	0.48^c	0.51^c	0.16^c	0.02
8. Child gender	0.05	0.06	0.17^c	0.11^b	0.02	0.02	0.03	1
N	681	678	689	692	685	703	698	733
	623	615	689	692	618	616	597	733
M	5.38	5.46	0	0	17.1	16.8	17.1	0.49
	5.52	5.23	0	0	16.7	16.8	16.5	0.49
SD	1.04	1.03	0.53	0.95	5.08	4.94	5.18	0.50
	1.01	1.05	0.71	0.87	4.83	4.95	5.03	0.50
Min	1	2	-2.12	-3.14	10.0	10.0	10.0	0
	2	1	-3.41	-3.72	10.0	10.0	10.0	0
Max	7	7	1.10	1.69	38.0	37.0	38.0	1
	7	7	1.42	1.79	36.0	39.0	37.0	1

^{a}p < .05, ^{b}p < .01, ^{c}p < .001

Note. Correlations for the mother-child model are displayed below the diagonal. Correlations for the father-child model are displayed above the diagonal (highlighted in light grey). Correlations along the diagonal are correlations between mothers and fathers (highlighted in dark grey). Descriptives for mothers are located in the first row; descriptives for fathers are in second row. PR = Parent report. OB = Observed. PAS = parental autonomy support. rF = regression-based factor score. anx = anxiety symptoms. 54 mo = 54 months, G1 = 1st grade, G3 = 3rd grade, G5 = 5th grade.

Table 1. Descriptives and correlations of manifest variables

FACTORIAL INVARIANCE

Longitudinal measurement invariance tests were conducted for the measure of child anxiety symptoms for the purpose of testing whether the measurement of child anxiety symptoms was equal over time (see Figure 2, Tables 2 and 3).

Configural factorial invariance tests whether general patterns of factor loadings are consistent over time. Configural invariance models were fit with unconstrained latent variable variances, factor loadings, threshold estimates, and corresponding correlated item residuals. Model fit indices indicated acceptable fit for Model 1 (CFI = 0.958, RMSEA = 0.018) and for Model 2 (CFI = 0.97, RMSEA = 0.018). Fit of these configural models were compared against more constrained models. Weak invariance models were fit with factor loadings constrained to equality in order to test whether corresponding factor loadings were equal across time. LRTs indicated that weak invariance models fit no worse than the configural model for both Model 1 ($\Delta\chi^2$ = 15.89, Δdf = 17, p = 0.53, ΔCFI = .004, ΔRMSEA = -.001) and Model 2 ($\Delta\chi^2$ = 20.34, Δdf = 17, p = 0.25, ΔCFI = .003, ΔRMSEA = -.001).

Strong factorial invariance models were fit with constraints on indicator threshold estimates and intercepts of first-order factors. Thresholds are useful for categorical and ordinal variables, which often violate assumptions of normality, and specify boundaries between response categories or levels. The thresholds of responses to each item were constrained to equality by reporter (e.g., the threshold between response category *Not true* (0) and *True* (1) on Item 2 was constrained for mothers at Time 1 and Time 2). LRTs indicated that the differences between the weak and strong invariant models were not significant for Model 2 ($\Delta\chi^2$ = 50.57, Δdf = 15, p < .001, ΔCFI = -.005, ΔRMSEA = .001), but were significant for Model 1 ($\Delta\chi^2$ = 296.93, Δdf = 15, p < .001, ΔCFI = -.050, ΔRMSEA = .008), indicating that the strong invariant model fit significantly worse. Modification indices were consulted to find possible sources of poor fit. This showed that several items, including *Clings to adults or too dependent* (for all reporters), *Worries* (for fathers), and *Fears certain animals/situations/places* (for mothers and teachers), were found to

have non-invariant thresholds from 54 months to Grade 1. When the thresholds for these items were allowed to be estimated freely, the difference in CFI and RMSEA suggested acceptable change in fit ($\Delta\chi^2 = 59.55$, $\Delta df = 9$, $p < .001$, ΔCFI = -.010, ΔRMSEA = .001). Subsequent testing was conducted using the fully invariant model for Model 2 and the partially invariant model for Model 1.
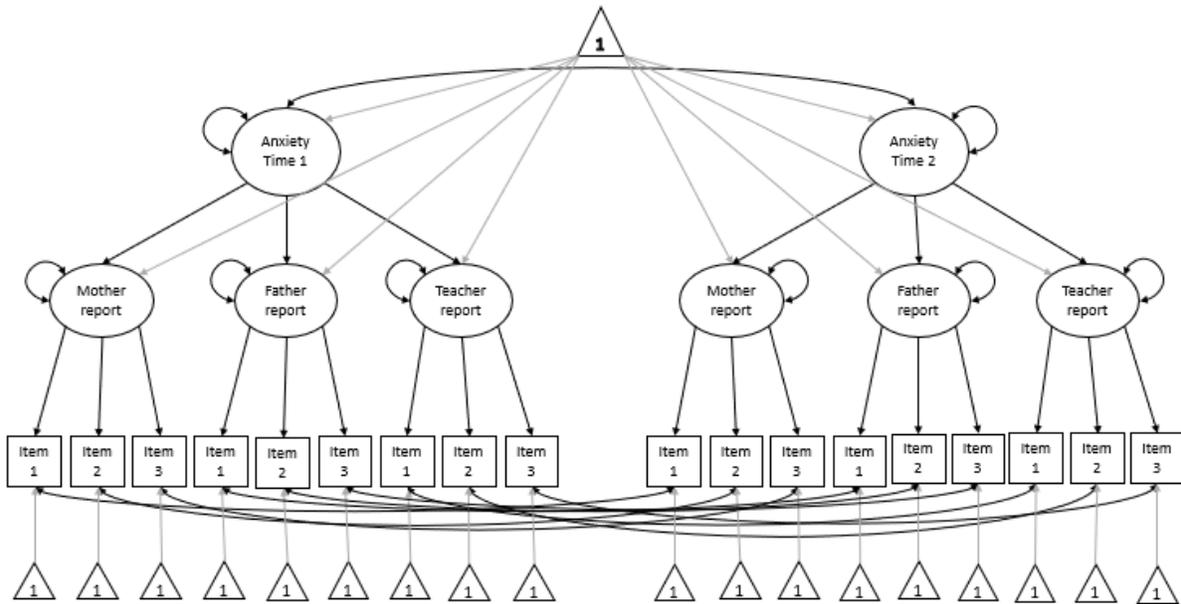
Note. Only three of the total six items are displayed for each reporter for ease of viewing.

Figure 2. Measurement invariance testing for child anxiety symptoms

Invariance model	χ^2	df	$\Delta\chi^2$	Δdf	ΔCFI	ΔRMSEA
1. Configural	690.57	564	--	--	--	--
2. Weak	693.96	581	15.89	17	.004	-.001
3. Strong	731.78	590	59.55	9	-.010	.001

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

Note. Robust test statistics are provided

Table 2. Chi-square values and difference tests for invariance models, 54 months – Grade 1

Invariance model	χ^2	df	$\Delta\chi^2$	Δdf	ΔCFI	ΔRMSEA
1. Configural	694.98	565	--	--	--	--
2. Weak	707.36	582	20.34	17	.003	-.001
3. Strong	739.63	597	50.37***	15	-.005	.001

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

Note. Robust test statistics are provided

Table 3. Chi-square values and difference tests for invariance models, Grade 3 – Grade 5

UNIVARIATE LATENT CHANGE SCORE MODELS

A series of univariate LCS models were fit as the first step to building a bivariate LCS and to test hypothesis 1 (Figures 3 – 4). Single indicators of the observed scores (Model 1; 54 months and Grade 1) and factor scores (Model 2; Grade 3 and Grade 5) were used for parental autonomy support, whereas multiple indicators from mothers, fathers, and teachers were used in both models for child anxiety symptoms. The covariance between initial parental autonomy support and change in parental autonomy support was estimated, rather than the regression, to allow a test of the significance of the average change in parental autonomy support (Coman et al., 2013) across time points. The univariate LCS models for parental autonomy support included single indicator measures, making the model just identified; therefore, model fit indices could not be estimated for these models. The univariate LCS models for child anxiety symptoms were found to have acceptable model fit (see Table 5), and factor loadings for the child anxiety symptoms items were acceptable (Table 4).
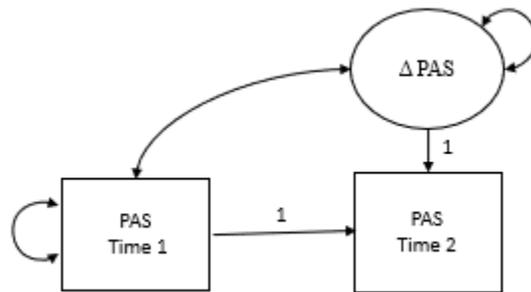
Note. This model was run separately for mothers and fathers.

Figure 3. Univariate, single-indicator latent change score parental autonomy support model
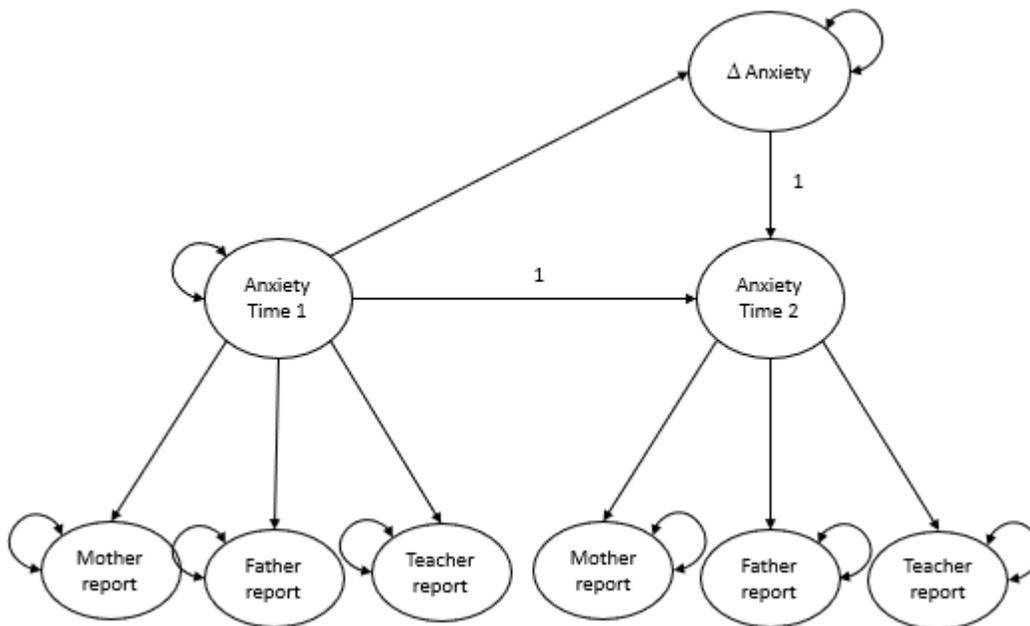
Figure 4. Univariate, multiple-indicator latent change score child anxiety symptom model

| Latent variables	Factor Loadings	
	Univariate LCS model – Time 1	**Univariate LCS model – Time 2**
Model 1 (54 m – G1)	**MR/FR/TR**	**MR/FR/TR**
Child anxiety item loadings		
Clings to adults or too dependent	.60/.59/.59	.59/.60/.61
Fears certain animals/situations/places	.55/.43/.66	.54/.44/.69
Fears going to school	.59/.69/.85	.57/.70/.86
Nervous, high-strung, or tense	.67/.73/.59	.65/.74/.62
Too fearful or anxious	.85/.82/.88	.84/.82/.89
Worries	.63/.67/.75	.62/.68/.78
Child anxiety reporter loadings		
Mother, father, teacher report	.77/.69/.36	.74/.63/.31
Model 2 (G3 – G5)		
Child anxiety item loadings		
Clings to adults or too dependent	.51/.59/.54	.57/.63/.57
Fears certain animals/situations/places	.56/.51/.65	.63/.55/.67
Fears going to school	.57/.55/.82	.63/.59/.83
Nervous, high-strung, or tense	.72/.72/.64	.77/.76/.66
Too fearful or anxious	.89/.86/.91	.92/.88/.92
Worries	.69/.81/.68	.75/.84/.70
Child anxiety reporter loadings		
Mother, father, teacher report	.83/.77/.27	.83/.81/.30

Note. Factor loadings are standardized values. MR = mother report. FR = father report. TR = teacher report.

Table 4. Univariate latent change score factor loadings for child anxiety symptoms

Model	CFI	RMSEA
Model 1 (54 months – Grade 1)	0.953	0.018 [90% CI: 0.014 0.023]
Model 2 (Grade 3 – Grade 5)	0.968	0.018 [90% CI: 0.013 0.022]

Note. Robust estimates are provided

Table 5. Model fit of univariate latent change score for child anxiety symptoms

These univariate LCS models provide three pieces of information regarding change over time. First, the intercept of change in PAS and child anxiety signifies average change across the two periods. Results indicated that mean PAS scores significantly decreased for fathers from 54 months to Grade 1 (Table 6). Child anxiety symptoms did not change on average from 54 months to Grade 1 or from Grade 3 to Grade 5 (Table 7).

Second, variance of the change in PAS and child anxiety indicates whether individuals significantly differ in their change over time. This information was used to test study hypothesis 1 regarding variability of the change in child anxiety symptoms and parental autonomy support. Contrary to hypothesis 1a, the variance of change in child anxiety symptoms was non-significant in both models. In addition to being non-significant, the variance of change in child anxiety symptoms was also negative, an improper solution which can occur when the variance is already close to 0 (Barker et al., 2014). These variances were constrained to 0, implying that there was no individual variability in anxiety symptom changes from Time 1 to Time 2. Consistent with hypothesis 1b, the variance of change scores shows significant individual differences in the extent to which parental autonomy support changed for both mothers and fathers in Model 1 and Model 2.

Finally, the regression parameter of the change factor on the initial score denotes whether change is proportional to the initial value (i.e., whether change depends on the starting point). The covariance between initial parental autonomy support and change in autonomy support was significant for both mothers and fathers and in both models, indicating that the mean change in parental autonomy support was inversely correlated with its starting point. Proportional change was not significant for either of the child anxiety symptom models, suggesting that the rate of change in anxiety symptoms did not depend on initial anxiety symptoms.

Model	Parent	Intercept ΔPAS	Variance ΔPAS	Covariance of initial PAS & ΔPAS
Model 1 (54 months – Grade 1)	Mother	0.08(0.05)	1.45(0.09)***	-0.74(0.07)***
	Father	-0.29(0.05)***	1.27(0.08)***	-0.59(0.05)***
Model 2 (Grade 3 – Grade 5)	Mother	-0.002(0.04)	0.86(0.05)***	-0.12(0.02)***
	Father	0.004(0.04)	0.85(0.05)***	-0.29(0.03)***

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

Note. Estimates are shown outside of parenthesis; standard errors are in parentheticals

Table 6. Univariate latent change score key parameters for parental autonomy support

Model	Intercept ΔAnx	Variance ΔAnx	ΔAnx on initial Anx
Model 1 (54 months – Grade 1)	-0.02(0.04)	0	-0.07(0.09)
Model 2 (Grade 3 – Grade 5)	-0.10(0.06)	0	0.17(0.10)

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

Note. Estimates are shown outside of parenthesis; standard errors are in parentheticals

Table 7. Univariate latent change score key parameters for child anxiety symptoms

BIVARIATE LATENT CHANGE SCORE MODELS

Four possible relationships between PAS and child anxiety symptoms were tested, all within the bivariate LCS model. The first relationship was the covariance between parental autonomy support and child anxiety symptoms, which tests whether autonomy support at Time 1 is correlated with anxiety symptoms at Time 1. The second relationship was the regression estimate (i.e., "coupling parameter") of change in child anxiety symptoms on parental autonomy support at Time 1, testing whether differences in parental autonomy support at Time 1 impacted the change in child anxiety symptoms. Conversely, the third relationship was the coupling parameter for the regression of change in parental autonomy support on child anxiety symptoms at Time 1, which examined whether child anxiety symptom scores at Time 1 predicted change in parental autonomy support. Finally, the fourth relationship was the covariance between change scores, testing whether the degree of change in parental autonomy support was correlated with the

degree of change in child anxiety symptoms over the same period of time. These four relationships were tested in the bivariate LCS model, in separate models for mothers and fathers at the two time points.

Fit indices for the bivariate LCS model were acceptable for both parents in Model 1 (fathers, CFI = 0.952, RMSEA = 0.018 [90% CI: 0.013 0.022] and mothers, CFI = 0.953, RMSEA = 0.018 [90% CI: 0.013 0.022]) and in Model 2 (fathers, CFI = 0.964, RMSEA = 0.018 [90% CI: 0.013 0.022] and mothers, CFI = 0.963, RMSEA = 0.018 [90% CI: 0.014 0.022]), indicating that the bivariate LCS models fit the data well.

COVARIATES

Once the bivariate LCS models were specified, two covariates – parent anxiety symptoms and child depression symptoms – were added. Two second-order CFA models were fit for child depression symptoms at 54 months and Grade 3, such that CBCL items were entered as indicators of mother, father, and teacher reports, which were themselves indicators of a depressive symptom latent variable. One item, *Doesn't eat well*, was dropped due to poor factor loading (<0.40) for mothers and fathers in both models. Items with factor loadings below .40 indicate low quality of measurement and have been linked to worse model fit in CFI, TLI, and RMSEA (Shi, Lee, & Maydeu-Olivares, 2019). Fit for the child depression CFA models were acceptable (at 54 months, CFI = 0.946, RMSEA = 0.022 [90% CI: 0.015 0.028] and at Grade 3, CFI = 0.951, RMSEA = 0.019 [90% CI: 0.011 0.025]). Parent anxiety symptoms were reported separately by parent and included as manifest variables in different models.

In Model 1, the child depression symptom variable at 54 months was entered into the bivariate LCS model as a predictor of child anxiety symptoms at 54 months, and the parent anxiety symptom variable at Grade 1 was entered as a predictor of child anxiety symptoms at Grade 1 and parental autonomy support at Grade 1. Model 2 followed the same pattern (child depressive symptoms at Grade 3 predicting child anxiety symptoms at Grade 3), with the addition of parent anxiety symptoms at both Grade 3 and Grade 5 predicting child anxiety symptoms and parental autonomy support at their respective times.

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BIVARIATE LCS MODELS WITH COVARIATES

To test the second study hypothesis, the bivariate LCS Model 1 and Model 2 were run for both mothers and fathers to test the four relationships after controlling for child depression symptom and parent anxiety symptoms. Fit indices for these models indicated mixed conclusions; as CFI indicated poor fit for Model 1 (fathers = .859, mothers = .856) and Model 2 (fathers = 0.878, mothers = 0.865), while RMSEA was within an adequate range for both Model 1 (fathers = 0.021 [0.018 0.023], mothers = 0.021 [0.019 0.023]) and Model 2 (fathers = 0.022 [0.019 0.024], mothers = 0.023 [0.021 0.025]). CFI estimates have been shown to decline with increasing number of indicators (Kenny & McCoach, 2003), which may help account for the drop in CFI once the covariates were added to the model.

Estimates of the four parameters of interest – the covariance between initial parental autonomy support and initial anxiety symptoms, the covariance between change in parental autonomy support and change in child anxiety symptoms, and the two coupling parameters – are displayed in Table 8 and in Figures 5 - 8. Intercepts and variances of the two latent change scores (parental autonomy support and child anxiety symptoms) are provided in Table 9, as these are useful for interpreting coupling parameters and covariances for change scores.

Model	Parent	Covariance: Initial PAS ↔ initial Anx	Covariance: ΔPAS ↔ ΔAnx	Regression: Initial PAS → ΔAnx	Regression: Initial Anx → ΔPAS
Model 1	Mother	-0.18(0.06)**	0.08(0.06)	-0.04(0.05)	-0.02(0.04)
54 m – Grade 1	Father	-0.09(0.06)	0.003(0.05)	-0.005(0.05)	-0.02(0.05)
Model 2	Mother	-0.01(0.02)	0.08(0.04)*	-0.05(0.08)	-0.13(0.05)**
Grade 3 – 5	Father	-0.001(0.02)	0.01(0.03)	-0.13(0.05)**	-0.03(0.05)

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

Note. Estimates are shown outside of parenthesis; standard errors are in parentheticals

Table 8. Bivariate latent change score key parameters with covariates

Model	Parent	Intercept of ΔPAS	Intercept of ΔAnx	Variance of ΔPAS	Variance of ΔAnx
Model 1	Mother	3.88(0.22)***	-0.96(0.26)***	0.95(0.05)***	0
54 m – Grade 1	Father	3.15(0.26)***	-0.97(0.26)***	0.92(0.05)***	0
Model 2 Grade 3 – 5	Mother	0.264(0.13)*	-1.15(0.13)***	0.79(0.04)***	0
	Father	0.01(0.11)	-1.02(0.13)***	0.68(0.03)***	0

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

Note. Estimates are shown outside of parenthesis; standard errors are in parentheticals

Table 9. Intercepts and variances for latent change scores in bivariate LCS model with covariates

Results for Model 1 (54 months to Grade 1) indicated a significant, negative covariance between anxiety symptoms at 54 months and autonomy support at 54 months for mothers. This supports hypothesis 2a, which proposes a significant correlation between initial child anxiety symptoms and parental autonomy support. This result suggests that the relationship between child anxiety symptoms and maternal autonomy support from 54 months to Grade 1 can be conceptualized as related at 54 months but is not predictive of changes in either construct over time. Results for the fathers' Model 1 showed no statistically significant relationships in the parameters of interest; in other words, there was no link between child anxiety symptoms and paternal autonomy support from 54 months to Grade 1.
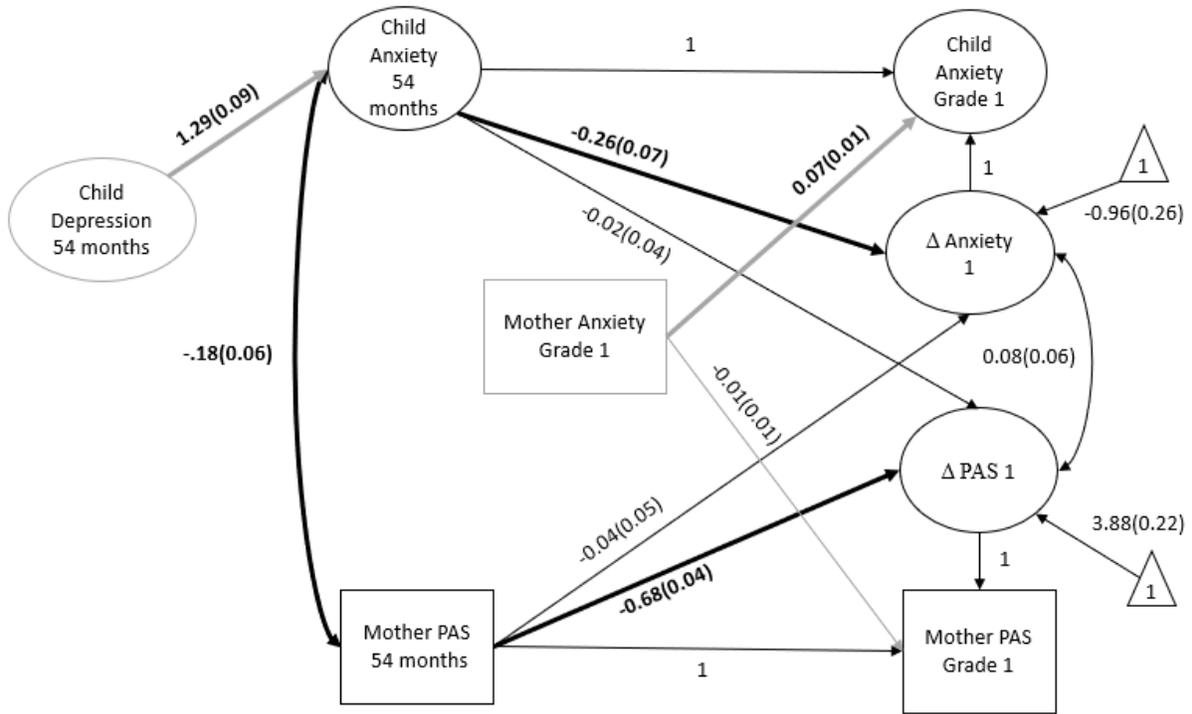
Note. Bolded paths and labels are significant at p < .05. Covariates outlined in gray.

Figure 5. Model 1 (54 months – Grade 1), bidirectional associations between child anxiety and mother autonomy support, controlling for child depression and mother anxiety symptoms
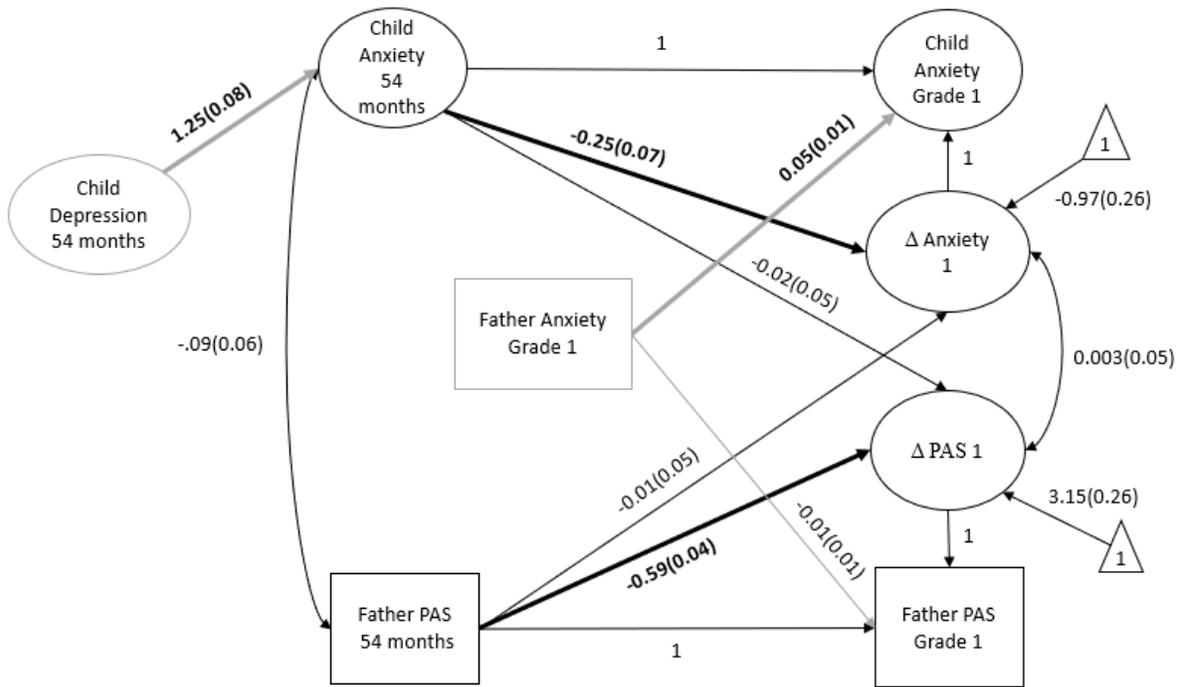
Note. Bolded paths and labels are significant at p < .05. Covariates outlined in gray.

Figure 6. Model 1 (54 months – Grade 1), bidirectional associations between child anxiety and father autonomy support, controlling for child depression and father anxiety symptoms

Results from Model 2 (Grade 3 to Grade 5) for mothers indicated two significant parameters. First, the covariance between the anxiety symptoms change score and the maternal autonomy support change score was significant correlated ($b = 0.08$, $se = 0.04$, $p = 0.04$), showing that greater change in autonomy support was linked to greater change in child anxiety symptoms. Second, the regression of change in maternal autonomy support on child anxiety at Grade 3 was significant and negative ($b = -0.13$, $se = 0.05$, $p = 0.009$). This result supports hypothesis 2b, proposing a significant coupling relationship between initial child anxiety symptoms and change in parental autonomy support. The direction of this relationship indicated that greater child anxiety symptoms at Grade 3 predicted lower change scores in maternal autonomy support from Grade 3 to Grade 5. The intercept of the mother autonomy support change score ($b = 0.264$, $se = 0.13$, $p = 0.04$) suggests that mother autonomy support increased on average from Grade 3 to Grade 5. In this context, the significant coupling relationship could mean that mothers of

children with high anxiety symptoms at Grade 3 did not increase on autonomy support as much as the average.
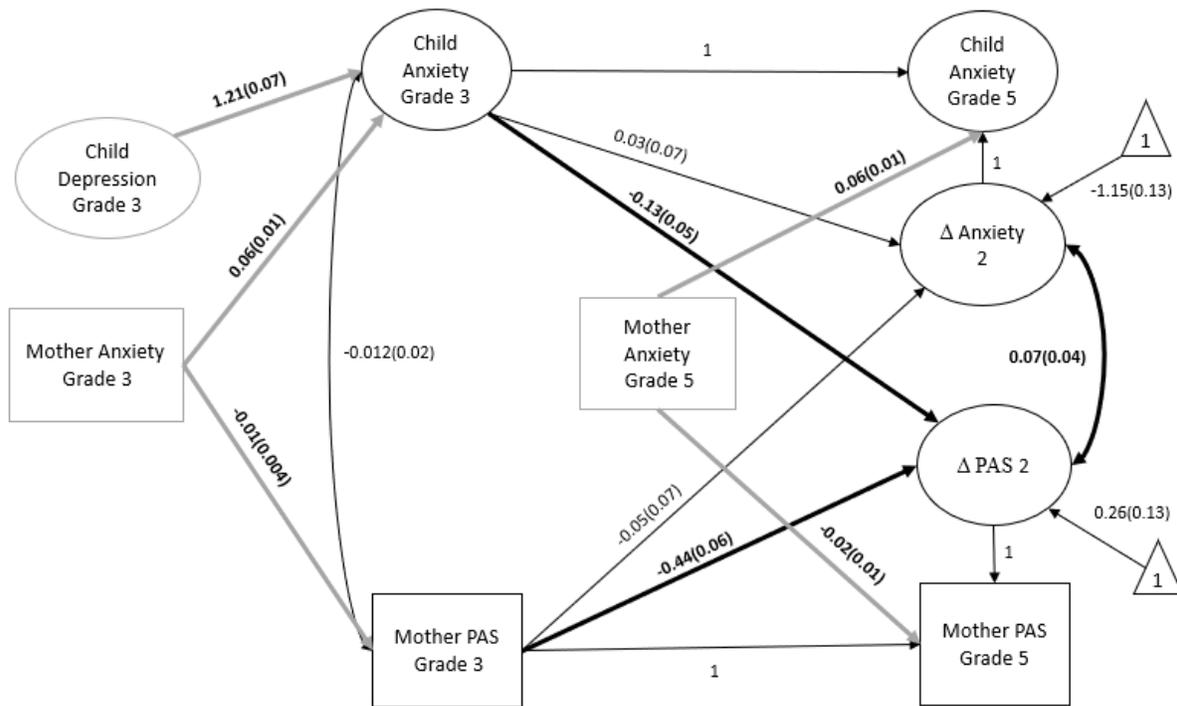
Note. Bolded paths and labels are significant at p < .05. Covariates outlined in gray.

Figure 7. Model 2 (Grade 3 – Grade 5), bidirectional associations between child anxiety and mother autonomy support, controlling for child depression and mother anxiety symptoms

Results from Model 2 for fathers showed consistency with hypothesis 2c, that the regression of change in child anxiety symptoms on paternal autonomy support at Grade 3 was significant and negative (b = -0.13, se = 0.05, p = 0.014). The direction of the relationship indicated that greater paternal autonomy support at Grade 3 predicted lower change in child anxiety symptoms from Grade 3 to Grade 5. The intercept of the child anxiety symptom change score (b = -1.022, se = 0.13, p < .001) indicated that children's anxiety symptoms decreased on average from Grade 3 to Grade 5. Therefore, the significant coupling relationship suggests that fathers who had higher autonomy support at Grade 3 had children with steeper declines in anxiety symptoms compared to the average amount of decline.

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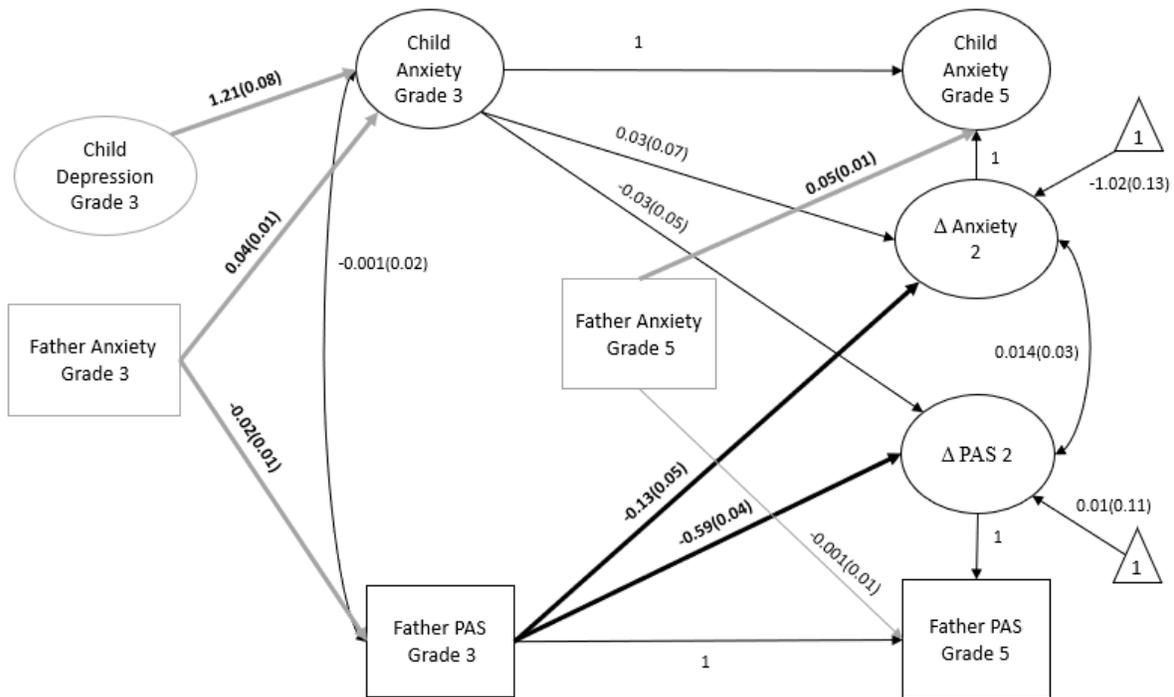
Note. Bolded paths and labels are significant at p < .05. Covariates outlined in gray.

Figure 8. Model 2 (Grade 3 – Grade 5), bidirectional associations between child anxiety and father autonomy support, controlling for child depression and father anxiety symptoms

MULTIGROUP ANALYSIS BY CHILD GENDER

To test the final hypothesis, the bivariate LCS models for mothers and fathers with covariates were run using child gender as the grouping variable (see Tables 10 and 11). First, models were run that constrained the measurement model (factor loadings, residuals, residual covariances) to be equal and all other parameters were freely estimated for girls and boys. Next, models that constrained the coupling regressions individually were run and compared to the freely estimated model. Although it is possible that there are gender differences present in other model parameters (e.g., intercepts, variances, etc.), only the coupling regressions were constrained in order to test the particular study hypotheses about child gender differences in these parameters. The freely estimated and constrained models were compared using chi-square difference tests. If the chi-square difference test is significant at p < .05, this will indicate that the constrained model

fit significantly worse than the freely estimated model; in other words, girls and boys do significantly differ on the constrained coupling regression estimate.

The freely estimated Model 1 for fathers was an adequate fit for the data (CFI = 0.863, RMSEA = 0.019 [0.015 0.022]). Estimates from the freely estimated model indicated that the covariance between change in father autonomy support and change in child anxiety symptoms was significant for both boys and girls (Tables 10 and 11); no other key parameters were statistically significant. Next, constrained models were run to test whether the coupling parameters differed for girls and boys. There were no significant decreases in model fit by constraining the anxiety at 54 months to change in father autonomy support coupling estimate ($\Delta\chi^2 = 0.13$, $\Delta df = 1$, p = .714) or by constraining the father autonomy support at 54 months to change in child anxiety symptoms coupling estimate ($\Delta\chi^2 = 0.24$, $\Delta df = 1$, p = .615). This indicates that the coupling estimates did not significantly differ by child gender within the father model from 54 months to Grade 1 The freely estimated Model 2 for fathers was an adequate fit for the data (CFI = 0.889, RMSEA = 0.018 [0.015 0.021]). Estimates of the freely estimated model indicated that the regression of change in anxiety symptoms on initial father autonomy support was statistically significant for boys only. However, similar to Model 1, there were no statistically significant decreases in fit by constraining the anxiety at Grade 3 to change in father autonomy support coupling estimate ($\Delta\chi^2 = 0.89$, $\Delta df = 1$, p = .344) or by constraining the father autonomy support at Grade 3 to change in child anxiety symptoms coupling estimate ($\Delta\chi^2 = 1.78$, $\Delta df = 1$, p = .181). Although the significant coupling estimate from father autonomy support at Grade 3 to change in child anxiety symptoms was significant only for boys, this difference was not statistically significant according to the chi-square test.

The freely estimated Model 1 for mothers adequately fit the data (CFI = 0.863, RMSEA = 0.019 [0.015 0.022]). Notably, the covariance between initial mother autonomy support and initial child anxiety symptoms, and the covariance between change scores, were both significant for boys only. Neither of the models constraining the coupling estimates were significant, indicating no difference between girls and boys regarding the child anxiety at 54 months to change in mother autonomy support estimate ($\Delta\chi^2 = 0.571$, $\Delta df = 1$, p = .449) or the mother autonomy

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support at 54 months to change in child anxiety symptoms estimate ($\Delta\chi^2 = 0.310$, Δdf = 1, p = .577). The freely estimated Model 2 for mothers was an adequate fit for the data (CFI = 0.878, RMSEA = 0.020 [0.016 0.022]). Estimates from the freely estimated model indicated that the regression of change in mother autonomy support on initial child anxiety symptoms was significant for girls only. However, a chi-square test indicated that there were no statistically significant decreases in fit by constraining the anxiety at Grade 3 to change in mother autonomy support coupling estimate ($\Delta\chi^2 = 0.863$, Δdf = 1, p = .352) or by constraining the mother autonomy support at Grade 3 to change in child anxiety symptoms coupling estimate ($\Delta\chi^2 = 2.41$, Δdf = 1, p = .12). Although the coupling parameter linking initial child anxiety symptoms to change in mother autonomy support was significant only for girls, the chi-square tests indicated that this was not a statistically significant difference. Together, these analyses indicate that the coupling estimates did not significantly differ by child gender within the mother models from 54 months to Grade 1 or from Grade 3 to Grade 5.

Results for both the model and father models were contrary to hypothesis 3a, which predicted that the relationship between child anxiety symptoms at Time 1 and change in parental autonomy support is stronger for boys than girls. Instead, these associations did not statistically differ for boys or girls.

For a condensed summary of hypothesis testing, please refer to Table 12.

Model	Parent	Covariance: Initial PAS ↔ initial Anx	Covariance: ΔPAS ↔ ΔAnx	Regression: Initial PAS → ΔAnx	Regression: Initial Anx → ΔPAS
Model 1 54 m – Grade 1	Mother	-0.13(0.09)	0.002(0.11)	-0.11(0.12)	0.002(0.04)
	Father	-0.12(0.09)	-0.19(0.09)*	0.03(0.05)	0.03(0.09)
Model 2 Grade 3 – 5	Mother	-0.05(0.03)	0.13(0.05)*	0.05(0.10)	-0.18(0.07)*
	Father	-0.002(0.02)	0.02(0.03)	-0.04(0.05)	-0.11(0.12)

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

Note. Estimates are shown outside of parenthesis; standard errors are in parentheticals

Table 10. Multigroup bivariate LCS, key parameters for freely estimated model, girls only

Model	Parent	Covariance: Initial PAS ↔ initial Anx	Covariance: ΔPAS ↔ ΔAnx	Regression: Initial PAS → ΔAnx	Regression: Initial Anx → ΔPAS
Model 1 54 m – Grade 1	Mother	-.34(0.13)**	0.19(0.09)*	-0.04(0.09)	-0.04(0.04)
	Father	-0.11(0.11)	0.18(0.08)*	-0.04(0.08)	-0.04(0.06)
Model 2 Grade 3 – Grade 5	Mother	0.02(0.03)	0.005(0.05)	-0.18(0.11)	-0.08(0.07)
	Father	-0.003(0.02)	-0.006(0.03)	-0.13(0.05)**	0.05(0.11)

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

Note. Estimates are shown outside of parenthesis; standard errors are in parentheticals

Table 11. Multigroup bivariate LCS, key parameters for freely estimated model, boys only

Model	Parent	Hypothesis 1 Variance of LCS		Hypothesis 2 Key parameters				Hypothesis 3 Child gender differences	
		PAS	Anxiety	$Anx_{t1}\leftrightarrow PAS_{t1}$	$Anx_{t1}\rightarrow \Delta PAS$	$PAS_{t1}\rightarrow \Delta Anx$	$\Delta PAS\leftrightarrow \Delta Anx$	$Anx_{t1}\rightarrow \Delta PAS$	$PAS_{t1}\rightarrow \Delta Anx$
1	Mother	✓	x	✓(-)	x	x	x	x	x
	Father	✓	x	x	x	x	x	x	x
2	Mother	✓	x	x	✓(-)	x	✓(+)	x	x
	Father	✓	x	x	x	✓(-)	x	x	x

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

Note. Model 1 (54 months – Grade 1); Model 2 (Grade 3 – Grade 5). PAS = parental autonomy support. Anx = Child anxiety symptoms. t1 = Time 1. ✓ = statistically significant at p < .05. (-) = coefficient is negative; (+) = coefficient is positive.

Table 12. Results of hypothesis testing based on univariate LCS, bivariate LCS, and multigroup analysis

CHAPTER VI: DISCUSSION

The purpose of this study was to explore bidirectional associations between child anxiety symptoms and parental autonomy support during middle childhood to understand how parenting behaviors contribute to changes in child anxiety and how child characteristics may evoke change in parental autonomy support. Bivariate latent change score modeling was used to investigate whether initial levels of one construct predicted change in the other construct. Child anxiety symptoms and parental autonomy support were investigated at four time points –54 months, Grade 1, Grade 3, and Grade 5 – and in two separate models. Specifically, Model 1 (54 months to Grade 1) and Model 2 (Grade 3 to Grade 5) were each tested separately for mothers and fathers. Results indicated unique patterns of relationships between child anxiety symptoms and parental autonomy support across different models, indicating that both child age and parent gender are important considerations in this relationship.

Average Change in Parental Autonomy Support and Child Anxiety Symptoms Over Time

The two constructs of interest, parental autonomy support and child anxiety symptoms, were examined for evidence of change over time. Results from the bivariate LCS models indicated that parental autonomy support significantly increased, on average, for both parents in Model 1 and for mothers only in Model 2, controlling for parent anxiety symptoms. This finding is consistent with findings from a previous longitudinal study of behavioral autonomy and decision-making among European American youth, which concluded that decision-making autonomy gradually increases during middle childhood (Wray-Lake et al., 2010). The current investigation suggests that these gradual increases in decision-making autonomy are accompanied by increases in parental autonomy support demonstrations in an interpersonal context. Fathers in Model 2 did not have significant average change in autonomy support behaviors, though there was significant individual variation in amount of change. This novel finding indicates potential differences in autonomy support by parent gender.

Child anxiety symptoms were found to significantly decrease in both models and for both parents, controlling for child depression symptoms and parent anxiety. This is consistent with the finding from a previous study of developmental trajectories of anxiety symptoms across middle childhood for boys, which found that about 32.5% of the sample showed decreases in anxiety symptoms from age 2 to age 10, while a smaller percentage (17%) followed increasing trajectories (Feng et al., 2008). Similarly, de Lijster et al. (2019) found that about 10% of their sample of Dutch youth were assigned to a decreasing anxiety symptom trajectory, whereas only 7% had an increase in symptoms from ages 1.5 to 10 years. These differences in trajectories might have shown up in the current study as significant average declines in anxiety symptoms, although it is likely that children varied individually in the change in symptoms.

<u>Associations between Parental Autonomy Support and Child Anxiety Symptoms during Early Elementary School</u>

In Model 1, mother's autonomy support at 54 months was inversely associated with child anxiety symptoms at 54 months, but in neither case did 54-month levels of a variable predict change in the other variables over time (i.e., no significant coupling parameters). This suggests that in early elementary school, the relationship between child anxiety symptoms and mother's autonomy support is best conceptualized as associated within the same time period, and not predictive of change from 54 months to Grade 1. Consistent with previous cross-sectional research with mother-child dyads, high child anxiety was correlated with less autonomy support (Laurin et al., 2015; Moore et al., 2004; Whaley et al., 1999). Moore et al. suggested that children with anxious temperaments might evoke less autonomy-supportive behavior because mothers respond to anxious symptoms with more protective behaviors. In contrast, Laurin et al. suggested that less maternal autonomy support conveys to children that the world is threatening and that they lack competency to cope with challenges. Results from the current study do not support either of these suggested processes. Perhaps in early elementary school, transactions between maternal autonomy support and child anxiety symptoms are occurring in moment-to-moment interactions (concurrently), but not in a way that predicts change in either construct over a period of two years. It is also possible that other factors, such as the transition to elementary school, may be

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playing a stronger role in driving the change in maternal autonomy support and child anxiety symptoms during this period.

A different set of findings was observed when Model 1 was applied to fathers. Father's autonomy support and child anxiety symptoms were unrelated in Model 1; neither concurrent correlations nor longitudinal associations were significant. This finding differs from the extant research on the relationship between father's autonomy support and child anxiety symptoms which has generally indicated associations (albeit inconsistent) between these two variables (Bögels & Phares, 2008; Verhoeven et al., 2012). Overall, there has been less research on father autonomy support in relation to child development compared to mother autonomy support. The findings that are available have drawn different conclusions about the impact of father autonomy support in early elementary school, making it difficult to discern how father autonomy support functions in relation to child anxiety. It is possible that father autonomy support impacts children differently at different ages. Verhoeven et al. (2012) reported that mother's use of over control was more strongly related to child anxiety symptoms in middle childhood, whereas father's over control was more strongly related to child anxiety symptoms during adolescence. Such differences may be explained in part by levels of parental involvement at different times within children's lives. Trends in the United States indicate that father involvement, relative to mother involvement, differs by child age, such that fathers are more involved with older than with younger children (Wood & Repetti, 2004; Yeung et al., 2001). A meta-analysis of studies investigating father involvement (including one study using a sample from the SECCYD dataset) found that mothers' mean home-based involvement was significantly higher than fathers' mean home-based involvement (Kim, 2017). In the context of the current study, father involvement might have been lower than mother involvement during early elementary school, and greater parental involvement could have manifested as stronger connections between parental behavior and outcomes. In other words, parental involvement could be the reason parental autonomy support and child anxiety symptoms are correlated for mothers but not for fathers for Model 1.

Associations between Parental Autonomy Support and Child Anxiety Symptoms during Late Elementary School

In Model 2, significant coupling effects emerged in the hypothesized directions. For mothers, the level of child anxiety symptoms in Grade 3 predicted changes in mother's autonomy support from Grade 3 to Grade 5. Mother autonomy support increased on average from Grade 3 to Grade 5, and these increases were greater for children with fewer anxiety symptoms. Children higher in anxiety symptoms at Grade 3 had mothers with below-average increases on autonomy support, after controlling for mother's own anxiety and children's depression symptoms. This is consistent with the notion that child characteristics influence parenting practices, and specifically with findings that mothers of highly anxious children are less autonomy-supportive (Hudson & Rapee, 2000), perhaps using control as a means to alleviate child anxiety symptoms in the short-term. According to Rapee's (2001) model of child anxiety development, anxious children display high reactivity or arousal to distress, prompting mothers to respond with increased involvement and protective behaviors. This response is predicted to increase children's perceptions of threat, decrease their sense of control, and ultimately exacerbate anxiety symptoms. In the context of the current study, Rapee's model suggests that mothers responded to children's anxiety symptoms by increasing autonomy support in lower-than-average amounts. The finding also replicates Rubin et al.'s (1999) finding that greater child social inhibition predicts subsequent lack of autonomy support 2 years later, rather than the other way around.

Interestingly, Model 2 for mothers also indicated that the covariance between change in autonomy support and change in child anxiety symptoms was significant – in other words, that mothers who changed more on autonomy support had children who changed more on child anxiety symptoms. Specifically, mothers with greater increases in autonomy support had, on average, children with greater reductions in anxiety symptoms from Grade 3 to Grade 5. Although change to change covariance was not hypothesized, the direction of the correlation was consistent with what might be expected given cross-sectional work. This finding indicates that mother autonomy support and child anxiety symptoms are dynamic constructs that change over time in ways that parallel one another.

Findings from Model 2 have implications for future research and potential intervention efforts to address child anxiety. This study supported the premise that child characteristics contribute to change in parenting behavior, specifically for mothers. Given the aggregation of child anxiety symptoms within the current study (items that tapped generalized anxiety disorder, specific phobia, and separation anxiety disorder), it was not possible to determine which symptoms specifically evoked changes in mother autonomy support; furthermore, the current study precluded investigation into why mothers increased their autonomy-supportive practices less with highly anxious children than with less anxious children, as well as what the impact of these changes in mother autonomy support might mean for children's future anxiety symptoms. Future research might include measures of mother perceptions of child competency or the perceived need to protect anxious children as explanatory mechanisms; perhaps qualitative investigations of mother autonomy support could yield similar insight into the mechanisms explaining the impact of child anxiety symptoms on maternal autonomy support. Mother emotional regulation might also shed light on this association, since previous work has found that mothers of young children engage in more controlling behaviors when they are experiencing high levels of negative emotions (Aunola et al., 2017), are facing emotionally taxing situations (Robichaud et al., 2019), and are emotionally dysregulated (Brenning et al., 2020).

When Model 2 was tested with fathers, levels of father autonomy support in Grade 3 predicted changes in child anxiety symptoms from Grade 3 to Grade 5. Child anxiety symptoms decreased on average from Grade 3 to Grade 5, and these decreases were greater for children of highly autonomy-supportive fathers. Children of fathers low in autonomy support at Grade 3 experienced lower-than-average decreases in anxiety symptoms from Grade 3 to Grade 5, indicating that autonomy-supportive fathering impacted the rate of decline in anxiety symptoms. This finding is consistent with what might be expected given cross-sectional work indicating that fathers' autonomy support is linked with less anxiety symptoms (Bogels & van Melick, 2004; Mattanah, 2001), although heretofore this had not been demonstrated longitudinally for fathers of elementary school-aged children. This finding suggests that fathers play a role in ameliorating child anxiety through their autonomy-supportive behaviors. According to Bogels and Phares' (2008) model of parent gender roles in the context of child anxiety, fathers serve an important

role during middle childhood in facilitating children's entry into the "larger social world," and encouraging independence and some risk-taking in that environment. Perhaps in their role as facilitators of exposure to the larger social world, father autonomy support demonstrates to children that they are self-efficacious and can cope with challenges faced in the larger world. This is, in turn, is reflected in the steeper-than-average declines in anxiety symptoms seen in children of highly autonomy-supportive fathers.

The current study found support for the impact of parenting practices on change in child anxiety symptoms for fathers specifically. Father's autonomy support has been relatively less studied compared to mother's autonomy support, and this finding offers a strong incentive to future researchers to consider the ways in which father autonomy support helps reduce child anxiety symptoms in late elementary school. Bogels and Phares (2008) note that it is common clinical practice to encourage mothers to be less overprotective and more autonomy supportive in the context of child anxiety – findings from the current study suggest that paternal autonomy support is also an important target of intervention, as it has now been shown to predict the rate of decline in child anxiety symptoms.

Differences in Associations between Parental Autonomy Support and Child Anxiety Symptoms during Early Elementary School versus Late Elementary School

Although Model 1 (54 months – Grade 1) and Model 2 (Grade 3 – Grade 5) tested identical relationships between parental autonomy support and child anxiety symptoms, the results from these models were quite different for both mothers and fathers. These differences were surprising in light of meta-analytic work indicating that child age *does not* moderate associations between autonomy support and child anxiety (McLeod et al., 2007). One possible source of differences might be the change in the parent-child interaction task used to assess parental autonomy support from Grade 1 to Grade 3. At ages 54 months and Grade 1 (Model 1), parent-child dyads were asked to engage in structured and unstructured activity tasks including using an Etch-A-Sketch together, building tasks, and free play with puppets or card games. At Grades 3 and 5 (Model 2), dyads were asked to participate in a discussion task (talking about family rules) and a shared

problem-solving task (either planning a make-believe errand trip or arranging cards to tell a story). Although these tasks were designed to be age-appropriate, they may have involved different competencies or had different meanings for children and parents alike. For example, the interaction activity in Model 1 included a free play task, whereas Model 2 included only potentially challenging relational and cognitive tasks. It is possible that parental autonomy support measured during a free play activity is less relevant for child anxiety symptoms than is parental autonomy support measured during a challenging interpersonal discussion. There might also be differences based on whether the task requires physical, hands-on engagement or relational, verbal engagement. Perhaps the origins and outcomes of physical intrusion differ from those related to verbal intrusions.

Alternatively, it is possible that parental autonomy support and child anxiety symptoms are more closely connected in late versus early elementary school. Although self-determination theory suggests that parental autonomy support should be beneficial for children of all ages, parental autonomy support specifically in relation to anxiety symptoms might differ by age. Such a possibility is supported by a recent meta-analysis conducted by Vasquez et al. (2016), indicating that the cross-sectional association between parental autonomy support and psychosocial outcomes varies by school level. Vasquez et al. examined studies of parental autonomy support and child outcomes for children in elementary school through college and found that the correlation between parental autonomy support and child psychological well-being significantly declined by school level such that the strongest correlation was found for the youngest samples. This conclusion conflicts with McLeod et al.'s (2007) meta-analysis of cross-sectional studies, indicating that child age does not moderate the association between parental autonomy support and child anxiety. McLeod et al. investigated the link between parenting practices and child anxiety in studies of children aged 3 to 16 years and found that child age did not moderate associations between any of the parenting practices considered (warmth, withdrawal, aversiveness, overinvolvement, autonomy-granting) and child anxiety. The current study offers some clarity regarding these conflicting meta-analytic findings through its use of a longitudinal design, which provides the opportunity to analyze changes in the relationships between constructs over time and provides stronger evidence that the relationship between parental

autonomy support and child anxiety does differ as children age. Longitudinal designs are preferable to cross-sectional studies that compare studies with samples of children at different ages or panel studies that compare participants of different ages. Parental autonomy support might still offer benefits to younger children, but perhaps less so in terms of anxiety symptoms.

Comparisons between Model 1 (54 months – Grade 1) and Model 2 (Grade 3 to Grade 5) indicated that whereas parental autonomy support and child anxiety symptoms were relatively unrelated in early elementary school, they were more closely connected in late elementary school for both parents. Although methodological constraints render a statistical comparison of these time points impossible, it is tentatively proposed that changes in child anxiety during early elementary school may be related more strongly to other factors, such as parent psychopathology or adjustment to elementary school (de Lijster et al., 2019). Intervention efforts that aim to include promotion of parental autonomy support as a strategy to ameliorate child anxiety symptoms might be most effective targeting children in mid-to-late elementary school for better chances of success.

Differences by Child Gender

Neither coupling parameter in either the mother or father models significantly differed for girls and boys. Previous research has indicated that girls and boys significantly differ in average levels of anxiety symptoms (Matte- Gagné et al., 2015), and both anxiety symptom trajectories during middle childhood (de Lijster et al., 2019) and theory suggests that gender role stereotyping might influence the extent to which parents are accepting of internalizing behavior problems (Kim et al., 2005). Although this result was not as hypothesized, it is not entirely unsurprising given the lack of significant findings present in previous research focused on gender as a moderator of associations between autonomy-relevant parenting and child anxiety symptoms. For example, Verhoeven et al. (2012) found no significant differences in associations between autonomy-relevant parenting practices (autonomy granting and overcontrol) and child anxiety symptoms based on child gender in a sample of elementary school-aged children. McLeod et al. (2007) also found no evidence that associations between parenting practices and child anxiety were

moderated by child gender. Hypotheses related to child gender as a moderator in the current study were guided by Kim et al.'s (2005) "theory of gender stereotype misbehavior" in which parents are predicted to respond with harshness or hostility to behavior that is incongruent with gender stereotypes (i.e., internalizing in boys and externalizing in girls) and with permissiveness or inconsistency to behavior that is congruent with gender stereotypes (i.e., internalizing in girls and externalizing in boys). Results from the current study did not support the hypothesis generated with this theory – that high anxiety symptoms would predict decreases in parental autonomy support, and that this effect would be stronger for boys than girls. It is possible that the lack of gender differences in the current study are because it is not clear whether low parental autonomy support is not perceived by children as a particularly hostile or harsh behavior. Low parental autonomy support might be perceived by parents as a protective, rather than punitive, response to children's anxiety symptoms. It should also be noted that in this study, child gender was assumed to represent gender socialization experiences, when it would have been more accurate to measure these experiences directly rather than use child gender as a proxy (Browne et al., 2010). It might be that parents differ in their endorsement of gender stereotypes and tailor their parenting behaviors accordingly.

Limitations and Future Directions

The current study contributes to the research on bidirectionality in parent-child relationships over the course of elementary school and adds to this literature by underscoring the importance of investigating change over time. Strengths of this study included: (a) the use of second-order factors to assess child anxiety symptoms, yielding a theoretically error-free measure of this construct (b) a multi-informant, multi-method design, utilizing assessments from observational data, self-reports, and other informant reports, and (c) designing a conservative test of associations between child anxiety and parent autonomy support by controlling for the effect of parent state anxiety and child depression symptoms. However, there are also several limitations to the study that have implications for the conclusions that can be drawn from it and which suggest directions for future research.

First, change in the measurement approach for parental autonomy support from Grade 1 to Grade 3 did not allow for a full bivariate latent change score test spanning the age period from 54 months to Grade 5, which limited the ability to examine change across the entire length of elementary school. Therefore, the current study investigated change in two separate models, one examining change from 54 months to Grade 1 and the other change from Grade 3 to Grade 5. Although dyadic tasks are often altered over the course of a longitudinal study in order to remain developmentally appropriate and novel, factor scores may compensate for such change and provide a useful analytic tool for assessing change over time. However, multiple (manifest) indicators are needed in order to utilize factor scores. For instance, factor scores could not be computed for the measure of parental autonomy support at 54 months and Grade 1, because they relied on a single autonomy support score for each parent. Reliance on a single score does not allow for separation of error and the "true" score and reduces confidence in the accuracy of the measurement. Future studies that use a longitudinal design and study parenting behaviors over dynamic developmental periods might include multiple indicators to create factor scores for use in statistical analysis.

Second, mother and father variables were tested in separate models, although the study represents two-parent households. This was necessary because mothers and fathers completed different tasks with their child during the assessment of parental autonomy support; meaning that methodological effects cannot be ruled out as a source of differences. Child outcomes are the product of parenting from both mothers and fathers together, and the decision to separate mother and father models ignores the impact of joint parenting practices. For example, Kuppens and Ceulemans (2019) used cluster analyses to identify four joint parenting styles comprised of scores on parenting dimensions from both mothers and fathers. Child outcomes were best (i.e., highly prosocial, low internalizing and externalizing) when both parents were high on positive authoritative styles and were worst when both parents were high on authoritarian styles. Regarding autonomy-supportive practices specifically, the additive effects of mother and father autonomy support has been demonstrated to more strongly predict child psychological well-being, compared to the autonomy support of either parent considered independently (Vasquez et

al., 2016). Therefore, consideration of the joint effects of parenting might provide additional insights into the prediction of change in child anxiety symptoms.

Third, demographic characteristics of the sample greatly limits generalizability of study findings. Specifically, the current study included only two-parent, different-sex households, with the majority of parents identifying as European American. Thus, the experiences of parents and children in family structures such as single parent, foster parent, non-parent relative, LGBTQ families, or blended family households are not represented here. To the author's knowledge, there is no research on differences in the relationship between parental autonomy support and child anxiety by family structure. Gibson-Davis (2008) found no differences in parenting behaviors based on marital status or family structure, although limitations in generalizability across diverse family structures and experiences are possible because family transitions can exert an influence on parenting and child anxiety through changes in stress. Alterations in parenting stress or support over time may partially explain changes in parental autonomy support and child anxiety symptoms, a consideration not explored in the current study. Future research might examine how intrafamilial constructs, such as interparental conflict, or even variables outside the family context, including peer victimization, might directly influence or conditionalize the relationships documented in the current study. This would help researchers to understand the determinants of child anxiety symptoms across time and offer recommendations to practitioners about the timing of certain intervention efforts.

Another limitation in generalizability was the reliance on a majority European American sample (89.1%), which limited opportunities to examine whether the relationships between child anxiety symptoms and parental autonomy support differed within families from other racial and ethnic backgrounds. African American, Asian American, Latinx American, and Native American youth have higher average rates of anxiety and fear than European American youth (McLaughlin et al., 2007), and autonomy-relevant parenting (e.g., autonomy support, behavioral/psychological control, restrictiveness) might help explain these differences (Dearing, 2004). Embedded within a social context of racism and discrimination, ethnic minority parents might balance utilizing autonomy-relevant practices that protect their children while also supporting autonomy

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development. Research is needed to understand whether patterns of parental autonomy support and child anxiety symptoms are similar within families from diverse racial and ethnic backgrounds, or if other intrafamilial variables are more influential. For example, experiences of discrimination predict anxiety symptoms in Latinx (Huynh, 2012; Szalacha et al., 2003), Asian American (Huynh, 2012; Lee & Ahn, 2011), and African American (Gibbons et al., 2004) children and adolescents, which may influence and be influenced by parental racial socialization practices (particularly preparation for bias messages) to a greater extent than by general parental autonomy support.

Conclusion

This study advances the literature on the nature of associations between parental autonomy support and anxiety symptoms, particularly through its use of a longitudinal research design and consideration of father autonomy support. The longitudinal design applied in this study permits conclusions about change over time, which are not possible using cross-sectional designs. Latent change score models indicated that parental autonomy support and child anxiety symptoms were relatively less connected in early elementary school than in middle to late elementary school. Patterns emerged in middle to late elementary school indicating that child anxiety symptoms drove change in mother's autonomy support, whereas father autonomy support drove change in child anxiety symptoms. Understanding the development and maintenance of heightened anxiety symptoms in middle childhood is crucial. Findings from the current study suggest that father autonomy support in Grade 3 is an important determinant of decreases in child anxiety symptoms. Child anxiety in Grade 3 predicts change in mother autonomy support, which may ultimately serve to exacerbate anxiety symptoms during middle school. Autonomy-supportive parenting practices can be targeted for intervention in ways that reduce child anxiety symptoms during elementary school with consideration of parent gender and grade level. This study can inform future intervention work to better treat and prevent child anxiety symptoms during middle childhood and establishing parent-child interaction patterns that foster optimal development.

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