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Kindergarten teacher-child relationships have been identified as important and salient contributors to child school success across multiple domains. However, less attention has focused on what early factors impact the development of a positive teacher-child relationship in kindergarten. This study presents a developmental cascade model that examines how the interaction of early maternal warmth and emotion regulation impacts the development of kindergarten-teacher child relationships, which in turn, impacts later academic performance. It was hypothesized that high levels of maternal warmth and adaptive emotion regulation at the transition to school (age 5) would each directly predict positive teacher-child relationships in kindergarten which in turn would predict academic performance concurrently and two years later. A series of structural equation models (SEM) were examined to test these hypotheses in a sample of children who participated in the ongoing longitudinal RIGHT Track project at ages 2, 4, 5, and 7 years. Results indicated that neither maternal warmth nor emotion regulation at 5 years predicted kindergarten teacher-child relationships. Four year adaptive emotion regulation; however, significantly predicted positive kindergarten teacher-child relationships. In addition, the kindergarten teacher-child relationship was associated with concurrent academic performance and had a significant indirect effect to second grade academic performance. Exploratory analyses indicated that maternal hostility at 5 years negatively predicted the kindergarten teacher-child relationship. Future research should

consider additional child and parenting behaviors that may predict the development of kindergarten teacher-child relationships.

A DEVELOPMENTAL CASCADE OF EARLY TEACHER-CHILD
RELATIONSHIPS: IMPLICATIONS FOR
ACADEMIC PERFORMANCE

by

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To my family, friends, and especially Jen for your continued love, support, and encouragement through this long and challenging process. You made it possible for me to earn this degree.

APPROVAL PAGE

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TABLE OF CONTENTS

	Page
LIST OF TABLES	vi
LIST OF FIGURES	vii
CHAPTER	
I. INTRODUCTION	1
II. METHODS	25
III. RESULTS	35
IV. DISCUSSION	46
REFERENCES	67
APPENDIX A. TABLES AND FIGURES	81
APPENDIX B. QUESTIONNAIRES	104

LIST OF TABLES

	Page
Table 1. Descriptive Statistics for Demographic Measures.....	81
Table 2. Descriptive Statistics for Study Variables	82
Table 3. Gender Differences for Study Variables.....	83
Table 4. Correlations Among Study Variables	84
Table 5. Regression Coefficients for Control Variables by Model	85
Table 6. Model Fit and Comparison Indices for Maternal Warmth Models	86
Table 7. Model Fit and Comparison Indices for Maternal Hostility Models.....	87

LIST OF FIGURES

	Page
Figure 1. Theoretical model of the impact of maternal warmth and emotion regulation on kindergarten teacher-child relationships and academic performance	88
Figure 2. Stability model used to assess the stability/continuity of maternal warmth, emotion regulation, and academic performance from 2 years to second grade	89
Figure 3. No direct effects model to assess the cross-lagged and longitudinal paths between study variables.....	90
Figure 4. Maternal warmth direct effect model	91
Figure 5. Emotion regulation direct effect model	92
Figure 6. Maternal warmth and emotion regulation direct effect model	93
Figure 7. Path diagram for continuity model.....	94
Figure 8. Path diagram for no direct effects model	95
Figure 9. Path diagram for maternal warmth direct effect model.....	96
Figure 10. Path diagram for emotion regulation direct effect model.....	97
Figure 11. Path diagram for maternal warmth and emotion regulation direct effects model	98
Figure 12. Path diagram for hostility continuity model.....	99
Figure 13. Path diagram for no direct effects model	100
Figure 14. Path diagram for maternal hostility direct effect model	101
Figure 15. Path diagram for emotion regulation (exploratory analysis) direct effect model.....	102

Figure 16. Path diagram for maternal hostility and emotion regulation
direct effects model103

CHAPTER I

INTRODUCTION

Teacher-child relationships have long been identified as important and salient contributors to a child's school success throughout elementary school (e.g., Alexander & Entwisle, 1988; Graziano, Keane, & Calkins, 2010; Graziano, Reavis, Keane, & Calkins, 2007; Hamre & Pianta, 2001; Pianta & Stuhlman, 2004). Early influences on school success are of particular importance as they contribute to later development such as graduation rates (Cairns & Cairns, 1994; Garnier, Stein, & Jacobs, 1997), being accepted to a four year institution, and the number of potential career opportunities (Arbona, 2000). Further, it has been proposed that few experiences after third grade are powerful enough to alter a child's long-term academic achievement (Alexander & Entwisle, 1988). Thus, the early school period is a critical period for establishing positive experiences at school, especially with teachers. While previous research has examined multiple outcomes of the teacher-child relationship, less research has examined the pre-school factors that impact its development. Thus, the primary goal of the current study is to examine pre-school factors that impact the development of the kindergarten teacher-child relationship and subsequent academic performance. This goal will be accomplished by first identifying outcomes of the teacher-child relationship as well as its definition and measurement. Second, two important pre-school variables, child emotion regulation and parenting behaviors, will be discussed as early contributors to this relationship. Third, a

contemporary theoretical model will be proposed. Finally, based on the contemporary theoretical model, four testable, competing models will be examined and discussed.

Outcomes of the Teacher-Child Relationship

Teacher-child relationships have been identified as important contributors to several child outcomes, including academic performance. For example, conflicted and dependent kindergarten teacher-child relationships are associated with negative concurrent outcomes including learning problems, lower academic competence, and less effective work habits whereas close teacher-child relationships are associated with concurrent positive outcomes in these areas (Pianta & Steinberg, 1992). More recent research has indicated that kindergarten teacher-child relationships are longitudinally predictive of children's elementary school report card grades and standardized achievement scores from first through eighth grades (Hamre & Pianta, 2001). Specifically, conflict in the kindergarten teacher-child relationship was negatively related to standardized test scores and Math and Language Arts grades from kindergarten through eighth grade (Hamre & Pianta, 2001). Conversely, children with closer kindergarten teacher-child relationships had higher grades and performed better on standardized assessments in first grade. This same pattern of results was evident for teacher-reported measures of academic success (Pianta & Stuhlman, 2004). Further, the saliency of the kindergarten teacher-child relationship has been demonstrated, as these associations are evident even when statistically controlling for demographic variables (e.g., gender, ethnicity), kindergarten behavior problems, and kindergarten verbal intelligence (e.g., Hamre & Pianta, 2001; Pianta & Stuhlman, 2004). Other research on

the teacher-child relationship has repeatedly demonstrated similar relations among the teacher-child relationship and standardized achievement assessments, grades, and teacher-reported academics both concurrently and throughout elementary school (e.g., Birch & Ladd, 1997; Graziano et al., 2007; Jerome, Hamre, & Pianta, 2009; Maldonado-Carreño & Votruba-Drzal, 2011; Pianta & Stuhlman, 2004; White, 2013).

A possible interpretation for these findings is that children who possess closer teacher-child relationships may benefit from the support and warmth provided by this relationship, which increases academic performance. For example, a child with a close teacher-child relationship may be more likely to ask for help and receive more support during challenging learning experiences. These same benefits may not be as readily available for children with a more conflicted teacher-child relationship. In addition to these child-initiated behaviors, teachers may offer additional help or guidance to children with whom they have a close relationship. Teachers may be more likely to provide additional instruction or activities to bolster skills to a child with whom they have a positive relationship. Thus, children who have positive teacher-child relationships may gain access to additional resources provided by teachers that may not be as readily accessible to children with more negative teacher-child relationships.

Taken together, previous literature indicates that the teacher-child relationship is a consistent contributor to child academic success both concurrently and throughout elementary school. In general, children who have closer and less conflicted and dependent relationships tend to demonstrate the highest level of academic achievement independent of other child factors such as gender, ethnicity, behavior problems, and

intelligence (Hamre & Pianta, 2001; Pianta & Stuhlman, 2004). Further, these results highlight the developmental importance of the early teacher-child relationship, as early academic performance is highly associated with later academic performance (Alexander & Entwisle, 1988). This is likely because elementary school is an important time for children to develop academic skills, habits, and competencies, which serve as a foundation for later school success. Although these studies have identified outcomes associated with teacher-child relationships, the same studies failed to identify factors that impact the development of the kindergarten teacher-child relationship. To best identify these pre-school factors, we must first discuss the theories as to how teacher-child relationship develops.

Teacher-Child Relationships

Theories of how and why the teacher-child relationship is important in child development are rooted in the parent-child attachment literature (Birch & Ladd, 1997; Howes & Hamilton, 1992; Howes & Matheson, 1992). Attachment research indicates that all infants are predisposed to form attachments with adults around them, the most typical attachment figure being the child's primary caretaker (e.g., Bowlby, 1980). The primary caretaker serves a unique function in the attachment relationship. Specifically, beginning in infancy, caretakers serve as a "base" for their children to explore new environments (Bowlby, 1980). Caregiver sensitivity and responsiveness are key influences on parent-child attachment (Bowlby, 1980). Sensitivity is defined as an awareness of child cues and the correct interpretation of cues (Goldsmith & Alansky, 1987). Thus, a caregiver who is highly sensitive is able to quickly identify the nature of

their child's distress and quickly and effectively alleviate the distress. Caregiver responsivity is intertwined in sensitivity, which allows the caregiver to efficiently act to alleviate child distress once the cause of the distress is identified. Caregivers who are highly sensitive and responsive teach their children that they can be trusted and will relieve distress in a timely manner. Over time, the child becomes more autonomous and relies less on the caregiver to alleviate distress, but is aware of the caregiver's sensitivity to help in cases where help is needed (Goldsmith & Alansky, 1987). High levels of sensitivity and responsivity foster secure attachment relationships (Goldsmith & Alansky, 1987).

Parent-child attachments serve as a "base" for future attachment relationships. Parent-child attachments develop over time, particularly during the first year of life, but are not fully developed until the child has established object permanence with his or her caregiver, understanding that the caregiver still exists even when the caregiver is not present (Bowlby, 1980). Through the development of object permanence and a history of interactions with the child's primary caregiver, the child develops an internal working model of attachment relationships (Bowlby, 1980). This internal working model establishes the child's expectations for future relationships with other individuals. Theoretically, it is through this mechanism that parent-child attachments impact secondary or alternative attachment relationships, including those with teachers (Verschueren & Koomen, 2012).

The "teacher perception view" of teacher-child relationships blends attachment research and research on the importance of early school experiences while highlighting

perceptions of the teacher. Specifically, this view is based on two foundational principles (Pianta & Steinberg, 1992). First, the child's relationship with his or her teacher is an important component of the school experience, is related to the child's school adjustment and success, and is a common for teachers, parents, and children. Second, a myriad of literature including parent-child attachment, social development, and teaching and learning research indicates that adult-child relationships are an important context for child development (Pianta & Steinberg, 1992; Sabol & Pianta, 2012). Based on these two principles, research has focused on the kindergarten teacher-child relationship as a secondary attachment relationship that is critical for a child's school success.

Pianta and Steinberg (1992) indicate that the teacher-child relationship is rooted in attachment theory, but is more than an extension of this relationship. They suggest that a child's attachment pattern with his or her primary caregiver is associated with how the child navigates the social and academic demands of school (Erickson & Pianta, 1989). The early attachment relationship impacts the child's behavior, which in turn impacts how the teacher perceives the child in the classroom and then dictates how they themselves behave with the child. For example, anxious-avoidant children tend to provoke teacher anger whereas their teachers tolerated anxious-resistant children (Sroufe, 1983; Sroufe, 1988). Further, securely attached children received warm and highly communicative responses from their teachers, which promoted a sense of trust that the child would comply with teacher requests (Sroufe, 1983; Sroufe, 1988). These elicited teacher behaviors then impact the development of the teacher-child relationship by impacting particular qualities of the relationship.

Measurement and Definition of Teacher-Child Relationship Constructs

The teacher's perception view of teacher-child relationships prompted the development of measurement tools designed to assess qualities of the teacher-child relationship. These measurement tools are rooted in attachment theory and have facilitated further refinement in the definition of the teacher-child relationship. Pianta and Nimetz (1991) created the Student-Teacher Relationship Scale (STRS) which identifies unique qualities of the relationship based the Attachment Q-Set questionnaire (Waters, Noyes, Vaughn, & Ricks, 1985) and literature describing teacher-child interactions (Pianta & Nimetz, 1991). Specifically, the STRS was designed to examine a teacher's representational model of their relationship with a particular student. This involved the teacher's feelings and beliefs toward the student and the teacher's beliefs and feelings about the student's behavior directed toward the teacher

The development of the STRS has expanded the definition of the teacher-child relationship with regard to the qualities of the relationship (Birch & Ladd, 1997). Over time, three relationship qualities of the teacher-child relationship have been identified: closeness, conflict, and dependency. In addition, Birch and Ladd (1997) examined the associations between each of these distinct qualities of the teacher-child relationship and measures of school success. The first quality they identified is closeness, which is comparable to a secure parent-child attachment. Closeness is the degree of open communication and warmth between a child and his or her teacher (Birch & Ladd, 1997). A child who has open communication with his or her teacher may be more likely to be engaged or involved in the school and classroom. This is likely because the teacher

functions as a “secure base” for a child who has a close teacher-child relationship, thus allowing the child to explore the new school environment. This in turn fosters positive affect about school and may increase the child’s adjustment and performance at school (Birch & Ladd, 1997).

Conflict in the teacher-child relationship is characterized by a lack of rapport and frequent, discordant interactions between the teacher and a particular child (Birch & Ladd, 1997). Conflict in the teacher-child relationship may act as a stressor at school and impede overall school success. A conflicted teacher-child relationship may promote anger and anxiety in the child at school because they are unable to use their teacher as a “secure base” with which to explore their new environment. This in turn may cause children to withdraw at school and exhibit feelings of loneliness and negative affect about school, thus impeding a successful school transition. The withdrawal exhibited by children is comparable to the anxious-avoidant parent-child attachment style as children with this attachment style tend to avoid interactions with their primary caregiver (Erickson & Pianta, 1989). It differs, however, in that a conflicted teacher-child relationship suggests that children initially interact with their teacher, but the conflict that exists may cause the child to withdraw from future interactions.

Relationships can also be described as high on dependency. Dependency is comparable to an anxious-resistant parent-child attachment as it is defined as the overreliance of a child on their teacher (Birch & Ladd, 1997). The teacher perceives a child who is possessive and “clingy” to be highly dependent. Similar to children with highly conflicted relationships, children who are highly dependent on their teachers may

also exhibit feelings of loneliness and negative feelings and attitudes toward school. In addition, children who are highly dependent on their teachers are more hesitant in their exploration of the new school environment and relationships at school. Dependent relationships may be viewed as lying on a continuum between close and conflicted relationships; however, dependency is viewed as a separate negative quality of the teacher-child relationship (e.g., Birch & Ladd, 1997; Bowlby, 1980).

These qualities of the teacher-child relationship are to be viewed as separate and distinct constructs or dimensions of the teacher-child relationship (e.g., Birch & Ladd, 1997; Pianta & Steinberg, 1992). In addition, these qualitative descriptors exist, to varying degrees, in all teacher-child relationships and thus are located on mutually exclusive continuums. For example, a teacher may indicate a relationship with a child characterized by high degrees of conflict and low degrees of closeness and dependency or a relationship with high degrees of closeness and dependency and low conflict. Of note, closeness is viewed as a positive indicator of the teacher-child relationship whereas conflict and dependency are negative indicators of this relationship (Birch & Ladd, 1997). Each quality of the relationship should be considered when assessing the teacher-child relationship as opposed to generic, overall indicators of a positive or negative teacher-child relationship as this approach allows for the most comprehensive description of the teacher-child relationship for an individual student.

Despite initial research suggesting no gender differences between the qualities of the teacher-child relationship (Pianta & Nimetz, 1991), more recent studies have consistently demonstrated gender specific patterns (Ewing & Taylor, 2009). Boys tend to

have teacher-child relationships characterized by more conflict whereas girls tend to have closer teacher-child relationships (Birch & Ladd, 1997; Ewing & Taylor, 2009; Hamre & Pianta, 2001). Research has suggested that gender role socialization accounts for these gender differences as teachers have different expectations for children based on the child's gender (Fagot, 1977; Maccoby, 1998). For example, teachers expect girls to be more nurturing and caring at school whereas they expect boys to be more "rough and tumble". These expectations result in differential treatment by teachers and send messages about behavioral expectations for a child's behavior (Koch, 2003): girls are expected to have close relationships with teachers and it is acceptable for boys to have more conflict in their relationships. Thus, girls and boys may benefit from teacher styles that fit the behavioral expectations (i.e., nurturing for girls and "rough and tumble" for boys) of a particular gender (Ewing & Taylor, 2009). Further, because of the behavioral expectations, girls may be more impacted by the degree of closeness in their relationship with their teacher whereas boys may not be as impacted by a conflicted teacher-child relationship as these types of interactions are considered appropriate for boys (Maccoby, 1998). Dependency has received less attention in regard to gender differences, but it has been suggested that this type of teacher-child relationship would be less appropriate for boys as dependency in general is viewed as less acceptable for boys (Basow, 2004).

In addition to gender, child ethnicity has also been associated with different characteristics of the teacher-child relationship in recent research (Ewing & Taylor, 2009). While initial studies using the STRS did not report relationship differences that were dependent on ethnicity (Pianta & Steinberg, 1992), recent research consistently

notes that African American children tend to have less positive teacher-child relationships, particularly in regard to conflict and dependency, compared to White or Latino children (Hamre & Pianta, 2001; Saft & Pianta, 2001). This may also be due to ethnic socialization and the match or mismatch between child and teacher ethnicity; however, ethnicity does not moderate the association between teacher-child relationships and behavioral adjustment (Ewing & Taylor, 2009), suggesting that child ethnicity is not the link between teacher-child relationships and child outcomes. Therefore, similar to child gender, ethnicity is an important demographic factor that may differentially impact the qualities of the teacher-child relationship.

Overall, previous research suggests that the teachers' perception of their relationship with a particular student is conceptually similar to the parent-child attachment relationship. Moreover, this work indicates that the teacher-child relationship is related to academic functioning, and that representations of the teacher's internal working models are a useful framework for understanding children's adjustment to school (Pianta & Steinberg, 1992). Since the establishment of this framework and the development of an effective assessment tool, an abundance of research examining the teacher-child relationship has adopted this approach for assessing child outcomes of early teacher-child relationships (e.g., Arbeau, Coplan, & Weeks, 2010; Graziano et al., 2007; Griggs, Gagnon, Huelsman, Kiddler-Ashley, & Ballard, 2009; Hamre & Pianta, 2001; Hamre, Pianta, Downer, & Mashburn, 2008; Jerome et al., 2009; Saft & Pianta, 2001; Webb & Neuharth-Pritchett, 2011; Zhang & Sun, 2011). Although previous research has established the effect of early teacher-child relationships on school outcomes,

significantly less research has examined pre-school factors that contribute to the development of the kindergarten teacher-child relationship.

Early Contributors to the Teacher-Child Relationship

As noted above, the examination of teacher-child relationships are based on parent-child attachment research. This may suggest that the parent-child attachment would be the most salient predictor of the teacher-child relationship; however, research has indicated that the mother-child attachment relationship is not fully concordant with the teacher-child relationship (e.g., Howes & Hamilton, 1992). This suggests that other parent and child factors may contribute to the development of the teacher-child relationship upon the transition to school. Two such factors that may impact the development of the teacher-child relationship are emotion regulation and parenting behaviors. The independent impact of parenting behavior and child emotion regulation as well as the interplay of these factors may better explain the development of the teacher-child relationship given the lack of concordance between parent-child attachments and kindergarten teacher-child relationships.

Child Emotion Regulation

Emotion regulation develops through early parent-child interactions and impacts future parent-child interactions (Kopp, 1982). Emotion regulation has been defined as the intrinsic and extrinsic strategies that an individual uses to enhance or inhibit the expression of emotions (Calkins & Hill, 2007; Thompson, 1994). An individual's emotion regulation strategies help to monitor, evaluate and provide feedback, and change emotional responses to arousing stimuli and can function at a conscious or unconscious

level (Calkins & Hill, 2007; Thompson, 1994). Based on this definition, two general patterns of emotion regulation can be exhibited by an individual, emotion regulation or dysregulation. Regulation would suggest a pattern of emotion regulation strategies that, when employed, allow an individual to inhibit maladaptive emotional responses whereas dysregulation would not allow for the inhibition of this same emotional arousal resulting in a dysregulated emotional expression (Cicchetti, Ganiban, & Barnett, 1991). Moreover, these two patterns of responding are derived from two components of emotion regulation: emotional regulation and reactivity (Calkins, Gill, Johnson, & Smith, 1999; Cole, Martin, & Dennis, 2004). Emotion regulation has been conceptualized as the degree to which an individual is able to control his or her emotions when aroused (Cole et al., 2004).

Reactivity, on the other hand, has been defined as the degree to which accessible negative emotions are easily aroused and expressed (Calkins et al., 1999). The current study will focus on emotion regulation as the interest is on factors that are theorized to impact the development of adaptive teacher-child relationships.

Emotion regulation is thought to develop through both intrinsic and extrinsic influences. Extrinsic influences of emotion regulation are the focus of this study as these influences highlight the role of dyadic relationships. Specifically, the support and flexibility offered by caregivers is critical to successful emotion regulation during development (Kopp, 1982; Sroufe, 2000). Caregivers, who are able to accurately identify signals from an infant and respond in ways that minimize distress or motivate positive interactions, help diminish their child's distress and socialize emotion regulation or coping strategies. This allows a child to adopt and integrate these experiences into his or

her behavioral repertoire (Sroufe, 1996). Over time, these interactions teach children that a particular strategy may be useful for reducing emotional distress in the context of emotionally arousing situations (Sroufe, 1996).

These infant-caregiver interactions are dependent on the quality of the relationship with the caregiver, but they also depend on qualities of the child themselves. Children who place more demands on their caregiver may tax the caregiver and this in turn can diminish the caregiver's ability to manage the infant's distress and to model effective regulation strategies. Although a child who is easily soothed and has a pleasant disposition may be less demanding on a parent, a child who is fussy, prone to distress, and demands more of the caregiver may impact the parent's ability to effectively regulate their own and their infant's emotions. The above interaction between a parent's responses to infant emotional expression begins to depict the bidirectional association that exists between child emotion regulation and parenting. As caregivers continue to socialize emotion regulation strategies from infancy into early childhood, a caregiver's regulatory behaviors tend to be observed and modeled by their children. These parenting practices directly relate to emotion regulation and the emotional climate of the family (Morris et al., 2002). As children become older and more capable of managing their own emotions, they begin to independently regulate their emotions, typically adopting the strategies learned from their caregiver. This represents a shift in relying on the caregiver to monitor and modulate the child's emotional expression to the child's ability to monitor and modulate his or her own emotional expression as the caregiver shifts to a supportive role (Calkins, 1994). In turn, each child will develop a specific repertoire of regulatory

behaviors, which they can use when confronted with emotionally arousing emotions. In general, a child's emotion regulation skills tend to increase from infancy to preschool (Bronson, 2000) and then become relatively stable from preschool to early childhood through adolescence (Raffaelli, Crockett, & Shen, 2005).

A child's ability to effectively regulate their emotions is related to his or her success in school. Researchers have identified that adaptive emotion regulation is concurrently, positively correlated with an overall positive teacher-child relationship in kindergarten (Graziano et al., 2007). In addition, children who are successful in elementary school tend to have a close or positive teacher-child relationship and are able to appropriately regulate and express their emotions (Alexander & Entwisle, 1988). Children who are poorly regulated tend to exhibit more behavior problems and are more reactive in the classroom leading to more conflicted teacher-child relationships through sixth grade (Jerome et al., 2009). Conversely, children who are better regulated tend to exhibit fewer behavior problems and have closer teacher-child relationships from kindergarten to sixth grade (Jerome et al., 2009). Thus, child emotion regulation directly impacts the quality of the kindergarten teacher-child relationship. Since child emotion regulation develops, in part, through interactions with their primary caretaker, it is also important to consider parent factors in the development of teacher-child relationships.

Parenting Behavior

The quality of parent-child interactions includes the type of parenting behaviors typically used in interactions with the child and the overall style of the parent. Four main parenting styles, authoritative, authoritarian, permissive, and disengaged, have been

identified. Each parenting style is comprised of specific parenting behaviors that lie on a continuum of levels of warmth, hostility, and behavioral control (Baumrind, 1968; Baumrind, Larzelere, & Owens, 2010; McKee, Colletti, Rakow, Jones, & Forehand, 2008). While research often focuses on these different parenting styles, other researchers have examined the impact of the underlying parenting behaviors that comprise these parenting styles (e.g., McKee et al., 2008). As the current study is interested in early factors that are expected to increase the positive qualities in the teacher-child relationship, the primary focus will be on parental warmth. Parental warmth is a positive parenting behavior that includes behaviors such as acceptance, praise, positive affect, positive support, and involvement (McKee et al., 2008). Maternal warmth is also most closely associated with a secure parent-child attachment (Sroufe, 1983; Sroufe, Carlson, Levy, & Egeland, 1999).

Parental warmth has been associated with a variety of child outcomes including internalizing and externalizing behaviors in pre-school and academic functioning in fourth grade (Mattanah, 2001; Shaw et al., 1998). In general, high levels of parental warmth are associated with adaptive outcomes and low levels of parental warmth are associated with maladaptive outcomes. In addition, parental warmth has also been related to child emotion regulation. It has been suggested that low parental warmth impedes a child's ability to monitor and modulate their emotional arousal (Brody, Dorsey, Forehand, & Armistead, 2002). This in turn increases the distress a child may experience during stressful events, including the transition to school. Moreover, when a child receives limited amounts of parental warmth, this produces withdrawal or avoidant

behaviors upon becoming dysregulated, thus, becoming a child's coping strategy during distressing situations (Tronick & Gianino, 1986). Children who exhibit withdrawal upon the transition to school may impede the development of their teacher-child relationship.

While parental warmth has been linked to several child outcomes, including emotion regulation, it has not been directly linked to teacher-child relationships. Given the association of maternal warmth with the parent-child attachment (Sroufe, 1983; Sroufe et al., 1999), it may similarly impact additional attachment relationships. Parents who demonstrate higher levels of maternal warmth toward their children may also be reinforcing child behaviors that elicit warm behaviors from others, including teachers. For example, a parent who demonstrates positive affect, praise, and support may only display these behaviors conditionally on adaptive behaviors demonstrated by the child. Therefore, the child has learned adaptive behaviors that elicit positive behaviors from adults in caretaking roles, which results in a positive relationship. Thus, at the transition to school, children may be more likely to demonstrate similar behaviors with the expectation that warm teacher behaviors will follow; ultimately leading to a positive teacher-child relationship.

Alternatively, parental warmth may also impact the teacher-child relationship indirectly through child emotion regulation. Caregiver help children learn effective regulation strategies and are credited with the ability to modify their child's regulation skills (Kopp, 1982). Research has identified other parenting behaviors that are differentially related to emotion regulation abilities (McDowell, Kim, O'Neil, & Parke, 2002). Specifically, maternal over control and intrusiveness are negatively correlated to a

child's emotion regulation (Graziano et al., 2010). Moreover, when positive parenting behavior was high, there was a positive relation between maternal control and emotion regulation (Bandon, Calkins, & Keane, 2010). These results may indicate that higher levels of parental warmth could lead to more adaptive emotion regulation or there may be an interaction between maternal warmth and emotion regulation. Thus, a child who receives high levels of parental warmth is likely to better regulate his or her emotions, which would lead to a closer teacher-child relationship. Taken together, parental warmth may directly or indirectly, through child emotion regulation, impact the development of kindergarten teacher-child relationships. To date, however, no comprehensive models of the development of teacher-child relationships have been posed.

A Contemporary Theoretical Model

Research more often focuses on outcomes associated with teacher-child relationships, with less emphasis on the predictors of this relationship. In addition, recent research has begun to examine child development through a developmental timing lens, most notably through the use of developmental cascade models (e.g., Bandon, Calkins, Grimm, Keane, & O'Brien, 2010; Walker & MacPhee, 2011). One way these cascade models have been used is in regard to the social environment at school and early factors that may influence children at school. For example, Bandon and colleagues (2010) demonstrated a bidirectional association between toddler externalizing behaviors and emotion regulation through age 7. This bidirectional association impacted children's social skills at the transition to school in kindergarten, which then impacted their peer acceptance one year later in elementary school. These findings demonstrate that early

factors, including child emotion regulation, interact with other early factors to predict social outcomes at the transition to school and school success one year later. Further, developmental cascade models take into consideration the developmental timing of when these different constructs come on-line, appreciating that some time points may be pivotal in the development of certain competencies. Lastly, these conceptual models allow researchers to consider the processes through which early factors impact later outcomes while accounting for early individual differences. For example, Bandon and colleagues (2010) demonstrated that individual differences in early externalizing behaviors and emotion regulation were related to a child's first grade peer acceptance indirectly through a child's kindergarten social skills. Thus, a cascade model may provide the most comprehensive theoretical framework for examining the development of early teacher-child relationships and later school success.

The current model demonstrates the developmental timing and cascading effects of parenting behaviors, emotion regulation, teacher-child relationships, and academic performance (Figure 1). The first component of this model focuses on home factors that impact teacher-child relationships at the transition to school in kindergarten. Previous research has consistently identified child emotion regulation and maternal warmth as important contributors to several developmental outcomes (e.g., Bandon, et al., 2010; Calkins, 1994, 1997; McKee et al., 2008). Specifically, emotion regulation strategies tend to be variable until the preschool year when they become relatively stable, but still continue to develop and be refined throughout elementary school (Raffaelli et al., 2005). Further, high levels of maternal warmth are associated with adaptive emotion regulation

(McDowell et al., 2002). Because of this developmental pattern, emotion regulation is expected to vary from infancy until the child transitions to kindergarten, at which point it is expected to become more stable. Furthermore, maternal warmth is expected to impact and be impacted by the development and stability of a child's emotion regulation abilities (Graziano et al., 2010; McDowell et al., 2002). Specifically, this model assumes that high levels of maternal warmth will facilitate the development of effective emotion regulation strategies. Further, over time, poor emotion regulation is expected to constrain the amount of warmth exhibited by a parent whereas appropriate child emotion regulation will increase the parent's displays of warmth toward the child. This reciprocal process is expected to continue throughout development such that adaptive emotion regulation would foster warm parental behaviors, which in turn would foster adaptive emotion regulation.

As these bidirectional home factors continue to interact, children typically transition to the school environment for kindergarten at age five. Kindergarten teacher-child relationships impact school success through sixth grade after controlling for early indicators of school success and child demographics (Jerome et al., 2009). Further, early teacher-child relationships (e.g., kindergarten) are related to subsequent teacher-child relationships (Pianta & Stuhlman, 2004), thus highlighting the importance of pre-kindergarten factors in the development of the kindergarten teacher-child relationship. During the transition to school, children are exposed to a new academic and social environment and teachers begin to serve as alternate caretakers (Pianta & Steinberg, 1992). Thus, the role of the kindergarten teacher-child relationship becomes increasingly

important for a child's school success. Further, we know that early child and parent factors impact the teacher-child relationship. Specifically, children who demonstrate better emotion regulation strategies are more likely to develop closer and less conflicted and dependent teacher-child relationships (Graziano et al., 2007). In addition, maternal warmth may also directly impact the development of the kindergarten teacher-child relationship as children may have learned to behave in a way that would elicit warmth from teachers while limiting conflict and dependency. Conversely, previous research has also demonstrated the mediating role of emotion regulation between parenting behaviors and other child outcomes (Eisenberg et al., 2005). This alternatively indicates that parenting behaviors play an indirect role in the development of kindergarten teacher-child relationships through children's emotion regulation.

Lastly, although pre-school factors of parenting behaviors and emotion regulation are theorized to impact the development of teacher-child relationships, the teacher-child relationship is theorized to impact a child's school success across multiple domains. Specifically, the warmth and open communication in a close teacher-child relationship increases a child's academic performance and also decreases a child's externalizing behaviors and increases social skills in elementary school (Hamre & Pianta, 2001; Howes, 2000; Pianta & Steinberg, 1992; Pianta & Stuhlman, 2004). Conversely, children who have conflicted teacher-child relationships are expected to have less academic and social success in elementary school, and also exhibit more externalizing behaviors (Hamre & Pianta, 2001; Howes, 2000; Pianta & Steinberg, 1992; Pianta & Stuhlman, 2004). Thus, taken together, this theoretical model posits that children who are socialized

toward effective emotion regulation and experience high levels of maternal warmth will later develop closer teacher-child relationships at the transition to school, increasing their elementary school success, compared to children who are not socialized with effective emotion regulation strategies. Based on this theoretical model, five competing models of the development of teacher-child relationships will be examined.

Goals and Hypotheses

The goal of this study is to test competing models regarding the direct or indirect influence of child emotion regulation and maternal warmth on the development of teacher-child relationships at the transition to school in kindergarten and academic performance two years later using a longitudinal sample of children at ages 2, 4, 5, and 7 years of age. To accomplish this goal five models will be examined. First, a continuity model that examines the stability of each respective construct (i.e., maternal warmth, child emotion regulation, and academic performance) over time will be established (Figure 2). Second, the no direct effects model will be expanded to include longitudinal and cross-lagged paths between maternal warmth and emotion regulation at ages 2, 4, and 5 years. In addition, longitudinal associations between maternal warmth and emotion regulation at 4 years to kindergarten teacher-child relationships and academic performance as well as longitudinal associations between kindergarten teacher-child relationships and second grade academic performance will be added (Figure 3). Third, the maternal warmth direct effect model will add a direct path between maternal warmth at 5 years and the teacher-child relationship in kindergarten (Figure 4). Fourth, the emotion regulation direct effect model will replace the maternal warmth direct effect path

with a direct path from emotion regulation at 5 years to the kindergarten teacher-child relationship (Figure 5). Fifth, the final and full model will contain direct paths from both maternal warmth and emotion regulation at 5 years to the kindergarten teacher-child relationship (Figure 6). Based on these models, the following hypotheses are made:

1. Stability paths for maternal warmth and emotion regulation at ages 2, 4, and 5 years, and academic performance in kindergarten and second grade will be positive and significant.

2. All cross-lagged paths between maternal warmth and emotion regulation at ages 2, 4, and 5 years are expected to be significant such that high maternal warmth would predict adaptive (high) emotion regulation whereas low maternal warmth would predict maladaptive (low) emotion regulation.

3. Maternal warmth and emotion regulation at 5 years will each predict kindergarten teacher-child relationships independently. It is also hypothesized that the model containing both predictors will fit significantly better than the models containing only one or neither path. Specifically, children with higher maternal warmth and adaptive emotion regulation at 5 years will have a more positive teacher-child relationship at school entry. Conversely, children with lower maternal warmth and maladaptive emotion regulation strategies at 5 years will have more negative teacher-child relationships in kindergarten.

4. Kindergarten teacher-child relationships are expected to be associated with concurrent and predictive of longitudinal academic performance. Specifically, positive kindergarten teacher-child relationships will be correlated with higher concurrent

academic performance and will predict higher academic performance in second grade compared to negative kindergarten teacher-child relationships.

5. In regard to overall model fit, it is hypothesized that the most complex model, the maternal warmth and direct effects model, will fit the data best.

CHAPTER II

METHODS

Participants

Participants included 443 participants from three cohorts of children ages 2, 4, 5, and 7 years old who attended laboratory assessments as part of the RIGHT Track Project. Four participants were dropped from the current study due to developmental delays. The sample contains approximately equal gender (231 females and 212 males) and is racially diverse with 300 White, 117 Black, and 26 Multiracial/Other participants (See Table 1). Families were economically diverse based on Hollingshead (1975) scores at the 2-year assessment, with a range from 14 to 66 ($M = 39.61$ $SD = 11.13$) thus representing families from each level of social strata typically captured by this scale. Hollingshead scores that range from 40 to 54 reflect minor professional and technical occupations considered to be representative of middle class. Teachers also completed questionnaires of participants in kindergarten and second grades. The current study used data from two laboratory visits and teacher questionnaires during each of these time periods. Data from all cohorts were assessed and included all available data for each participant at each time point.

Recruitment and Attrition

The current study utilized data from three cohorts of children who are part of an ongoing longitudinal study of social and emotional development. The goal for

recruitment was to obtain a sample of children who were at risk for developing future externalizing behavior problems, and who were representative of the surrounding community in terms of race and socioeconomic status (SES). All cohorts were recruited through child day care centers, the County Health Department, and the local Women, Infants, and Children (WIC) program. Potential participants for cohorts 1 and 2 were recruited at two-years of age (cohort 1: 1994-1996 and cohort 2: 2000-2001) and screened using the Child Behavior Checklist (CBCL 2-3; Achenbach, 1992), completed by the mother, in order to over-sample for externalizing behavior problems. Children were identified as being at-risk for future externalizing behaviors if they received an externalizing T-score of 60 or above. Efforts were made to obtain approximately equal numbers of males and females. This recruitment effort resulted in a total of 307 selected children. Cohort 3 was initially recruited when infants were six-months of age (in 1998) for their level of frustration, based on laboratory observation and parent report, and were followed through the toddler period (see Calkins, Dedmon, Gill, Lomax, & Johnson, 2002, for more information). Children whose mothers completed the CBCL at two-years of age were included in the current study ($N = 140$). Of the entire sample ($N = 447$), 37% of the children were identified as being at risk for future externalizing problems and 15% ($N = 447$) were identified as being at risk for future internalizing problems. There were no significant demographic differences between cohorts with regard to gender, $\chi^2(2, N = 447) = .63, p = .73$, race, $\chi^2(2, N = 447) = 1.13, p = .57$, or two-year SES, $F(2, 444) = .53, p = .59$.

Of the 447 original screened participants, 6 were dropped because they did not participate in any two-year data collection. At four years of age, 399 families participated. Families lost to attrition included those who could not be located, moved out of the area, declined participation, or did not respond to phone and letter requests to participate. There were no significant differences between families who did and did not participate at age four in terms of gender, $\chi^2(1, N = 447) = 3.27, p = .07$, race, $\chi^2(1, N = 447) = .70, p = .40$, two-year SES, $t(432) = .81, p = .42$, or two-year externalizing *T* score, $t(445) = -.36, p = .72$. At age five, 365 families participated, including four that did not participate in the four-year assessment. Again, there were no significant differences between families who did and did not participate in terms of gender, $\chi^2(1, N = 447) = .76, p = .38$, race, $\chi^2(1, N = 447) = .17, p = .68$, 2-year SES, $t(432) = 1.93, p = .06$, and 2-year externalizing *T* score, $t(445) = -1.73, p = .09$. At seven years of age, 350 families participated, including 19 that did not participate in the five-year assessment. Again, there were no significant differences between families who did and did not participate in terms of gender, $\chi^2(1, N = 447) = 2.12, p = .15$, race, $\chi^2(3, N = 447) = .60, p = .90$, and two-year externalizing *T* score, $t(445) = -1.30, p = .19$. Families with lower 2-year SES, $t(432) = 2.61, p < .01$, were less likely to participate in the seven-year assessment.

Procedures

Participants and their mothers came into the lab at ages 2, 4, and 5 years to complete two laboratory assessments, an emotion/temperament and IQ/achievement assessment. These assessments included child-examiner and mother-child interaction

tasks as well as child only cognitive and emotional tasks; only the mother-child interaction tasks were used in this study. In addition to completing interaction tasks, children and their mothers completed multiple questionnaires related to child development and psychopathology. In addition, teachers completed questionnaires related to child development and academics in kindergarten and second grade. This study utilized data from mother-child interaction tasks and questionnaires from the 2, 4, and 5-year lab visits as well as teacher questionnaires in kindergarten and second grades. The lab tasks that are applicable to the current study are described below.

2-Year Assessment

Children and their mothers came to the lab when the child was 2 years old. The child engaged in three tasks with his or her mother designed to measure the mother-child relationship. These tasks included a *puzzle task* in which mothers were asked to let their children work on a series of three puzzles increasing in difficulty and to offer help if needed (9 minutes); a *free-play session* in which mother-child dyads were instructed to play with a Sesame Street toy farm as they normally would at home (4 minutes); and a *cleanup task* in which mothers were asked to have their children cleanup the toys from the free-play session (2 minutes).

4-Year Assessment

Children and their mothers came to the lab for a follow-up assessment when the child was 4 years old. The child engaged in six tasks including: a *teaching task*, in which the mother was asked to help their child build blocks to match a model (4 minutes); a *puzzle task*, in which mothers let their child work on two puzzles of increasing difficulty

and assist if they thought their child needed help (5 minutes); a *frustration task* in which the mother and child play a game together, but the child is penalized early in the game resulting in a loss of progress (5 minutes); a *free-play session* in which the mother and child are to play with toys as they normally would at home (5 minutes); a *compliance task* in which mothers were asked to instruct their child to cleanup the toys from the free play session (3 minutes); and a *pretend play session* in which the mother and child played with a pretend/ fantasy toy (6 minutes).

5-Year Assessment

Children and their mothers came into the lab for a follow-up assessment when the children were 5 years old. The mother and child interacted during six laboratory tasks including an *art task* in which the mother was instructed to teach the child how to build a puppet as if they were at home (6 minutes); two *puzzle tasks* in which the mother was instructed to help their child complete two puzzles of increasing difficulty if the child appeared he or she needed help (6 minutes total); a *free-play session* in which the mother was instructed to play with their child as they would at home with age-appropriate toys (5 minutes); a *compliance task* in which the mother was instructed to tell her child to cleanup as she normally would at home (3 minutes); and a *pretend play session* in which the mother and child were to pretend to play with a play box and cash register as they would at home (6 minutes).

Measures

Maternal Warmth

Maternal warmth was measured using global codes adapted from the Early Parenting Coding System (Winslow, Shaw, Bruns, & Kiebler, 1995) during the lab assessments described above at ages 4, 5, and 7 years. Maternal warmth was based on the mother's tone of voice, facial expression, praise, enthusiasm, closeness, friendliness, positive affect, encouragement, and interest in the task. This was coded on a 4-point Likert scale ranging from 0 (none) to 4 (a lot) in regard to the amount of global maternal warmth displayed during each task. Average maternal warmth scores across the mother-child interaction tasks were calculated within each assessment year. For the 4 and 5-year assessments, children needed to have completed at least five of the six tasks to obtain a maternal warmth score; at 2 years all three tasks must have been completed. Thus, each participant had an average maternal warmth score at ages 2, 4, and 5 years respectively. These average scores were used in the current study as a measure of maternal warmth. Two trained graduate research assistants assessed reliability during the mother-child interaction tasks. The raters coded 10% of the sample together. Another 10% were coded separately and were used to reassess reliability throughout the coding project. Adjusted kappas for all mother-child interaction tasks and global ratings were above .70. Cronbach's alphas were .85, .88, and .88, respectively for 2, 4, and 5 years indicating good internal consistency.

Emotion Regulation

To assess children's emotion regulation, parent's completed the Toddler Behavior Questionnaire (TBQ; Goldsmith, 1996; See Appendix A) at the 2 year laboratory visit. The TBQ contains 111 items on a 7-point Likert scale. It yields six subscales: activity level, anger proneness, social fear, interest, pleasure, and social desirability. The study will use the reverse score of the anger subscale as a measure of emotion regulation at 2 years of age; higher numbers will indicate more adaptive regulation abilities. Questions on this subscale include: "*follows requests*" and "*throws tantrum.*" Cronbach's alpha for this scale is .88 indicating good internal consistency.

The Emotion Regulation Checklist was used to assess emotion regulation during the 4 and 5 year laboratory visits (ERC; Shields & Cicchetti, 1997; See Appendix B). This measure contained 24-items on a 4-point Likert scale designed to assess parental perceptions of their children's regulation and reactivity in response to negative emotions. The measure yields two subscales, negativity and emotion regulation. The negativity scale contains 15 items that refer to the degree a child becomes easily aroused when faced with negative emotions and includes sample items of "*is easily frustrated*" and "*is impulsive.*" The regulation scale contains eight items that refers to the child's ability to modulate emotions when distressed and includes items of "*S/he can say when s/he is sad, angry, mad, fearful or afraid*" and "*S/he displays appropriate negative affect (for example, anger, fear, frustration, distress) in response to hostile, aggressive or intrusive play by peers.*" The current utilized only the emotion regulation scale as the focus is on

effective child emotion regulation strategies prior to school entry. Cronbach's alpha for the emotion regulation scale is .59 and .61 at ages 4 and 5 years respectively.

Teacher-Child Relationship

To assess the teacher-child relationship each participant's kindergarten teacher completed the Student-Teacher Relationship Scale (STRS; Pianta, 2001; See Appendix C). This scale consisted of 28 Likert scale questions that assessed the teacher's perception of his/her relationship with the participant. The questionnaire contained three subscales (Conflict, Closeness, and Dependency) as well as an overall relationship scale. Sample items for the subscales respectively include: "*This child and I always seem to be struggling with each other,*" "*I share an affectionate, warm relationship with this child,*" and "*This child appears hurt or embarrassed when I correct him/her.*" Because this study is interested in the contributions of all qualities of the teacher-child relationship, the overall relationship scale was used. The overall relationship scale was calculated by averaging the closeness and reverse coded conflict and dependency subscales such that high scores are indicative of a more positive student-teacher relationship (Graziano et al., 2007). This scale was used as a measure of the quality of the student-teacher relationship and has good internal consistency (Cronbach's Alpha=.85).

Academic Performance

The Academic Performance Rating Scale (APRS; DuPaul, Rapport, & Perriello, 1991; See Appendix D) was used to measure teacher-reported academic performance in the child's kindergarten and second grade classrooms. The APRS contains 19 items on a five-point Likert scale completed by the teacher to assess classroom academic

performance. It contains three subscales: impulse control, academic success, and academic productivity. Sample items for these subscales respectively include “*how frequently does the student accurately follow teacher instructions and/or class discussing during large group instruction,*” “*estimate the accuracy of completed written math work,*” and “*estimate the percentage of written math work completed.*” The average of the academic success and academic productivity subscales was used to measure overall academic achievement in the classroom. Cronbach’s alpha for academic performance was .93 and .90 for kindergarten and second grade respectively.

Statistical Analysis Plan

Prior to conducting the main analyses, preliminary analyses were conducted in SPSS version 20. These analyses included descriptive statistics for all study and relevant demographic variables (gender, ethnicity, SES). Normality was assessed for all study variables and any necessary transformations were computed. Further, intercorrelations for all study and demographic variables were computed. Multicollinearity among study variables was assessed in regard to the significance and magnitude of the correlations. Demographic variables (i.e., gender, race, SES) that violated the multicollinearity assumption were controlled for during the main analyses.

After preliminary analyses were completed, data were imported into Mplus version 7.0 (Muthén & Muthén, 1998-2007). Five structural equation models (SEM) were analyzed based on Blandon and colleagues’ (2010) procedure for developmental cascade models. Data were analyzed using a maximum likelihood (ML) estimation procedure. Missing data were accounted for by using a full information maximum

likelihood (FIML) procedure. Nested models, from simple to complex, were compared using a chi-square difference test to determine the best fitting model. Specifically, more complex models were directly compared to less complex models.

Each model's fit was based on Hu and Bentler's (1999) criteria for samples including less than 500 participants. Overall, model examination was based on several indices of model fit. It is recommended that the Root Mean Error of Approximation (RMSEA) should be less than .06, the Comparative Fit Index (CFI) and the Tucker-Lewis Index (TLI) should be greater than .96, and the standardized Root Mean Square Residual (SRMR) should be less than .06. The chi-square test of model fit also assessed statistical non-significance, which indicates good model fit.

CHAPTER III

RESULTS

Preliminary Analyses

Descriptive statistics are provided in Table 2 for all study variables. Distributions for emotion regulation at 4 and 5 year, kindergarten teacher-child relationships, and academic performance in kindergarten and second grade were positively skewed indicating that most children in this sample had more adaptive emotion regulation skills at 4 and 5 years, positive kindergarten teacher-child relationships, and higher academic performance in kindergarten and second grade. All other study variables were adequately and normally distributed.

T-tests were conducted to examine gender differences among study variables (Table 3). Results indicated that females had significantly higher emotion regulation skills at 4 year, $t(372) = -.273, p < .01$, and 5 year, $t(341) = -3.55, p < .01$, compared to boys. In addition, girls also demonstrated significantly more positive kindergarten teacher-child relationships, $t(263) = -2.49, p < .05$, and significantly higher academic performance in kindergarten, $t(222) = -2.42, p < .05$. Due to the multiple significant gender differences, gender was entered as a covariate in the main study analyses.

One-way ANOVAs were conducted to assess differences among study variables by ethnicity. Results indicated that maternal warmth at 2 year, $F(2,418) = 41.47, p < .05$, 4 year, $F(2,369) = 45.61, p < .05$, and 5 year assessments, $F(2,327) = 22.26, p < .05$,

differed by ethnicity. Specifically, White participants scored significantly higher than Black participants at all time points and Multiracial/Other participants scored significantly higher than Black participants at the 2 and 4-year time points. In addition, there were significant differences for emotion regulation at 2 years, $F(2,344) = 7.60, p < .05$, and 4 years, $F(2,371) = 3.80, p < .05$. Specifically, White participants demonstrated higher emotion regulation than Black participants at both time points. Lastly, there were significant differences by ethnicity for kindergarten teacher-child relationships, $F(2,262) = 3.16, p < .05$, and second grade academic performance, $F(2,273) = 6.84, p < .05$. Specifically, White participants had significantly more positive kindergarten teacher-child relationships and higher second grade academic performance compared to Black participants. No other ethnicity differences were noted. Given the significant ethnicity differences, ethnicity was entered as an additional covariate in the main study analyses.

Correlations were conducted between SES and all study variables (Table 4). Results indicated that maternal warmth at 2, 4, and 5 year and academic performance in kindergarten and second grade were significantly and positively correlated with SES. Thus, higher maternal warmth and higher academic performance was significantly associated with higher SES. Given the multiple significant correlations, SES was entered as the final covariate in the main study analyses.

Correlations were also conducted for all study variables (Table 4). All correlations were in the expected direction. Maternal warmth at 2 years was significantly and positively correlated with maternal warmth at 4 and 5 years, emotion regulation at 2 years, and academic performance in second grade. Maternal warmth at 4 years was

positively and significantly correlated with maternal warmth at 5 years, emotion regulation at 2 years, and academic performance in second grade. Emotion regulation at 2 years was significantly and positively correlated with emotion regulation at 5 years, kindergarten teacher-child relationship, and academic performance in kindergarten and second grade. Emotion regulation at 4 years was significantly and positively correlated with emotion regulation at 5 years, kindergarten teacher-child relationship, and kindergarten and second grade academic performance. Emotion regulation at 5 years was significantly and positively correlated with the kindergarten teacher-child relationship and academic performance in kindergarten and second grade. The kindergarten teacher-child relationship was positively and significantly correlated with academic performance in kindergarten and second grade. Academic performance in kindergarten and second grade were significantly and positively correlated.

Lastly, a series of one-way ANOVAs were conducted to assess differences between demographic, maternal warmth (2, 4, and 5 years), and emotion regulation (2, 4, and 5 years) for participants with complete school data (i.e., kindergarten teacher-child relationship and kindergarten and second grade academic performance) versus participants with incomplete school data. Results indicated no significant differences between complete and incomplete groups for sex, $F(1, 442) = .03, p > .05$, race, $F(1, 442) = .06, p > .05$, and SES, $F(1, 442) = 2.05, p > .05$. There were also no significant group differences between pre-school predictive variables including 2 year maternal warmth, $F(1, 442) = .00, p > .05$, 4 year maternal warmth, $F(1, 442) = 1.39, p > .05$, 5 year maternal warmth, $F(1, 442) = .99, p > .05$, 2 year emotion regulation, $F(1, 442) = .54, p >$

.05, 4 year emotion regulation, $F(1, 442) = .08, p > .05$, and 5 year emotion regulation, $F(1, 442) = .30, p > .05$. Taken together, these results indicate no confounds for participants with complete school data versus incomplete school data.

Model Specification

Gender, race, and SES were statistically controlled for in all models. Direct paths from control variables to all study variables at the first time points were specified (Table 5). The first model examined was the continuity model (Figure 2) in which the autoregressive stability paths of maternal warmth, emotion regulation, and academic performance were assessed. Specifically, maternal warmth at 4 years was predicted by maternal warmth at 2 years and maternal warmth at 5 years was predicted by maternal warmth at 4 years; the same pattern followed for emotion regulation as it was assessed at the same ages. Academic performance in second grade was predicted by academic performance in kindergarten. The kindergarten teacher-child relationship and within-age correlations between all variables were also specified in this model.

The second model examined was the no direct effect developmental cascade model (Figure 3). All autoregressive paths (each variable is predicted by itself at the previous time), as well as specific cross-lagged or cascade paths were analyzed based on recommendations made by Burt and colleagues (2008). The autoregressive paths included those described in the previous model. The specific cascade effects included cross-lag predictions of maternal warmth to emotion regulation and emotion regulation to maternal warmth at ages 2, 4, and 5 years. In addition, longitudinal paths from maternal warmth and emotion regulation at 4 years to the kindergarten teacher-child relationship

and academic performance in kindergarten were included, respectively. Lastly, longitudinal paths from the kindergarten teacher-child relationship to academic performance in second grade were entered.

To test competing models for the effect of emotion regulation and maternal warmth on the kindergarten teacher-child relationship, three additional models were assessed using the same base structure as model two. The third model added a direct path from maternal warmth at 5 years to the kindergarten teacher-child relationship (Figure 4). Model four removed the maternal warmth direct path and added a direct path from emotion regulation at 5 years to the kindergarten teacher-child relationship (Figure 5). The fifth model contained both the maternal warmth and emotion regulation direct paths (Figure 6). Models were assessed from most basic (continuity model) to the most complex (maternal warmth and emotion regulation direct effects model).

Model Results

Model fit for all models included covariates of sex, race, and SES. The continuity model (Figure 7) evidenced adequate model fit, $\chi^2(38) = 149.65, p < .05$, RMSEA = .08, CFI = .86, TLI = .77, SRMR = .09. Maternal warmth was significantly and positively predictive of itself from 2 to 4 years ($\beta = .59, p < .01$) and from 4 to 5 years ($\beta = .64, p < .01$). Emotion regulation also significantly and positively predicted itself from 4 to 5 years ($\beta = .61, p < .01$) and academic performance was a significant and positive predictor of itself from kindergarten to second grade ($\beta = .58, p < .01$). Residual correlations between maternal warmth and emotion regulation at age 2 ($r = .13, p < .05$), emotion regulation at age 5 and academic performance in kindergarten ($r = .23, p < .01$),

and the teacher-child relationship in kindergarten and academic performance in kindergarten ($r = .55, p < .01$) were also significant. All other paths and correlations in this model were non-significant.

Despite a less strong model fit, the continuity model established the stability of study variables over time. Thus, four nested cascade models were analyzed. The no direct effects model (Figure 8) resulted in adequate model fit, $\chi^2(31) = 131.76, p < .05$, RMSEA = .09, CFI = .88, TLI = .75, SRMR = .07. This model fit significantly better than the continuity model, $\Delta\chi^2(7) = 17.89, p < .05$ (See Table 6 for all model fit comparisons). The same pattern of significant paths was found between the continuity and no direct effects models. In addition, the no direct effects model demonstrated that emotion regulation at 4 years was a significant predictor of kindergarten teacher-child relationships ($\beta = .12, p < .05$) and academic performance ($\beta = .20, p < .01$) in kindergarten.

The maternal warmth direct effect model (Figure 9) evidenced adequate model fit $\chi^2(30) = 131.73, p < .05$, RMSEA = .09, CFI = .88, TLI = .74, SRMR = .07. This model did not fit significantly better than the no direct effects model, $\Delta\chi^2(1) = .03, p > .05$ (See Table 6 for model fit comparisons). The same pattern of significant paths was found as the no direct effects model. Moreover, the added direct path from maternal warmth at 5 years to the kindergarten teacher-child relationship was not significant ($\beta = .01, p = ns$).

The emotion regulation direct effect model (Figure 10) resulted in adequate model fit, $\chi^2(30) = 131.02, p < .05$, RMSEA = .09, CFI = .88, TLI = .74, SRMR = .07 and did not fit significantly better than the no direct effects model, $\Delta\chi^2(1) = .74, p > .05$ (See

Table 6 for model fit comparisons). The emotion regulation direct effect model demonstrated the same pattern of significance as the no direct effect and the maternal warmth direct effect models; the direct path from emotion regulation at 4 year to the kindergarten teacher-child relationship was no longer significant ($\beta = .08, p = ns$). The added path from emotion regulation at 5 year to the kindergarten teacher-child relationship was also not significant ($\beta = .07, p = ns$).

The maternal warmth and emotion regulation direct effects model evidenced adequate model fit, $\chi^2(29) = 130.99, p < .05$, RMSEA = .09, CFI = .88, TLI = .73, SRMR = .07. This model was not significantly different from either the maternal warmth direct effect, $\Delta\chi^2(1) = .74, p > .05$, or the emotion regulation direct effect models, $\Delta\chi^2(1) = .03, p > .05$ (See Table 6 for model fit comparisons). This model demonstrated the same pattern of significant paths as the emotion regulation direct effect model. Moreover, neither of the direct paths from maternal warmth at 5 year ($\beta = .01, p = ns$) or emotion regulation at 5 year ($\beta = .07, p \leq ns$) to the kindergarten teacher-child relationship was significant.

Given that the neither maternal warmth direct effect, the emotion regulation direct effect, nor the maternal warmth and direct effect model fit the data significantly better than the no direct effects model, the no direct effects model is deemed the best fitting model as it is the most parsimonious of these models. Because the study's main hypotheses were not supported, an exploratory analysis examining the role of an alternate parenting behavior was conducted.

Exploratory Analysis

An exploratory analysis was conducted to examine the impact of an alternate parenting behavior, maternal hostility, on the development of kindergarten teacher-child relationships. Hostility has been conceptualized as anger, criticism, intrusiveness, negative affect, and verbal punishment by a parent toward a child (McKee et al., 2008). Similarly to maternal warmth, hostile parenting behaviors are associated with higher levels of maladaptive behaviors (Conger, Conger, Elder, & Lorenz, 1992; Ge et al., 1996). Research has suggested that Patterson's coercive cycle of interaction is likely the explanatory mechanism through which parental hostility impacts externalizing behaviors in children (Granic & Patterson, 2006; McKee et al., 2008). Specifically, the negative reinforcement a child receives when behaving poorly maintains the externalizing behavior initially displayed by that child (Granic & Patterson, 2006). In addition, hostility is related to academic performance such that higher parental hostility is related to lower academic performance (Melby & Conger, 1996). In contrast to warmth, hostility is a negative parenting behavior that is associated with maladaptive outcomes when children are exposed to higher levels of parental hostile behaviors. Similar to parental warmth, parental hostility has not been researched in regard to the teacher-child relationship. Children who are exposed to higher levels of parental hostility may be more likely to develop teacher-child relationships characterized by higher conflict. Specifically, high parental hostility may lead to child expectations that attachment relationships are characterized by hostility. Therefore, when the child transitions to school and begins to develop a secondary attachment with their teacher, the child may act

in accordance with their expectations and demonstrate more acting out and behavior problems in class. This, in turn, would increase the likelihood of a conflicted teacher-child relationship. To explore the impact of maternal hostility on the development of the kindergarten teacher-child relationship, the same analytic steps and variables used in the main analyses were replicated for the exploratory analyses except that maternal warmth at all time points was replaced with maternal hostility for the same time points.

The continuity model for hostility (Figure 12) evidenced adequate model fit, $\chi^2(38) = 112.91, p < .05$, RMSEA = .07, CFI = .86, TLI = .77, SRMR = .09. Maternal hostility was significantly and positively predictive of itself from 2 to 4 years ($\beta = .38, p < .01$) and from 4 to 5 years ($\beta = .37, p < .01$). Emotion regulation also significantly and positively predicted itself from 4 to 5 years ($\beta = .61, p < .01$) and academic performance was a significant and positive predictor of itself from kindergarten to second grade ($\beta = .58, p < .01$). In addition, residual correlation of maternal hostility at 2 years was significantly and negatively correlated with emotion regulation at 2 years ($r = -.11, p < .05$). The residual correlation of maternal hostility at 5 years was also negatively associated with the kindergarten teacher-child relationship ($r = -.20, p < .05$), and kindergarten academic performance ($r = -.23, p < .05$). Residual correlations for emotion regulation at age 5 and academic performance in kindergarten ($r = .23, p < .01$) and the teacher-child relationship in kindergarten and academic performance in kindergarten ($r = .55, p < .01$) were also significantly, positively associated. All other paths and correlations in this model were non-significant.

Given that the stability of study variables was established in the continuity model for hostility, four competing cascade models were analyzed. The no direct effects model for hostility (Figure 13) yielded adequate model fit, $\chi^2(31) = 108.10, p < .05, RMSEA = .08, CFI = .87, TLI = .72, SRMR = .08$. This model did not fit significantly better than the continuity model, $\Delta\chi^2(7) = 4.81, p > .05$ (See Table 7 for model fit comparisons). The same pattern of significant paths was found between the continuity and no direct effects models. In addition, the no direct effects model evidenced significant stability between emotion regulation at 2 and 4 years ($\beta = .12, p < .05$). Furthermore, emotion regulation at 4 years significantly predicted more positive teacher-child relationships ($\beta = .13, p < .05$) and higher academic performance ($\beta = .21, p < .01$) in kindergarten. All other paths were non-significant.

The maternal hostility direct effect model (Figure 14) evidenced adequate model fit $\chi^2(30) = 95.87, p < .05, RMSEA = .07, CFI = .88, TLI = .75, SRMR = .07$. This model fit significantly better than the no direct effects model, $\Delta\chi^2(1) = 12.23, p < .01$ (See Table 7 for model fit comparisons). The same pattern of significant paths was found as the no direct effects model. However, the additional direct path from maternal hostility at 5 years to the kindergarten teacher-child relationship was significant ($\beta = -.22, p < .01$), such that higher maternal hostility resulted in a less positive teacher-child relationship.

The emotion regulation direct effect model (Figure 15) evidenced adequate model fit $\chi^2(30) = 107.45, p < .05, RMSEA = .08, CFI = .86, TLI = .70, SRMR = .07$ and did not fit significantly better than the no direct effects model, $\Delta\chi^2(1) = .65, p > .05$ (See

Table 7 for model fit comparisons). The emotion regulation direct effect model demonstrated the same pattern of significance as the no direct effect and the maternal hostility direct effect models; the direct path from emotion regulation at 4 year to the kindergarten teacher-child relationship was no longer significant ($\beta = .09, p = \text{ns}$). Moreover, the added path from emotion regulation at 5 year to the kindergarten teacher-child relationship was not significant ($\beta = .06, p = \text{ns}$).

The maternal hostility and emotion regulation direct effects model evidenced adequate model fit, $\chi^2(29) = 95.55, p < .05$, RMSEA = .07, CFI = .88, TLI = .74, SRMR = .07. This model was not significantly different from either the maternal hostility direct effect, $\Delta\chi^2(1) = .32, p > .05$, but fit significantly better than the emotion regulation direct effect models, $\chi\Delta^2(1) = 11.90, p < .05$ (See Table 7 for model fit comparisons). This model demonstrated the same pattern of significant paths as the previous models. Moreover, the direct path from maternal hostility at 5 year to the kindergarten teacher-child relationship was significant ($\beta = -.22, p < .01$); the direct path from emotion regulation at 5 year to the kindergarten teacher-child relationship was not significant ($\beta = .04, p = \text{ns}$).

After examining all model fit and comparison indices, the maternal hostility direct effects model best fit the data. Because the maternal hostility and emotion regulation direct effects model did not fit significantly better than both the maternal hostility and emotion regulation direct effects models independently, the most parsimonious and best fitting model is the maternal hostility direct effects model.

CHAPTER IV

DISCUSSION

A child's ability to successfully navigate the school environment requires success in many domains such as social, behavioral, and academic areas. One may argue, however, that academic performance, particularly early performance, is the most salient influence on overall school success as it is related to later academic performance as well as success in other domains at school (Arbona, 2000; Cairns & Cairns, 1994; Garnier et al., 1997). Given the abundance of literature that examines school outcomes, research has often assessed specific factors that can maximize the success of children at school.

One common factor that has been examined in the school context is that of the early teacher-child relationship. The kindergarten teacher-child relationship has been identified as a predictor of school success, including academic performance (e.g., Hamre & Pianta, 2001; Hamre et al., 2008; Jerome et al., 2009). The impact of the teacher-child relationship has been well documented; however, significantly less research has addressed pre-school factors that may influence the development of the teacher-child relationship. Thus, the present study aimed to identify a specific child factor, emotion regulation, and a specific parenting factor, maternal warmth, that may influence the development of the kindergarten teacher-child relationship which in turn would influence a child's academic performance both concurrently and two years later.

It was hypothesized that maternal warmth and child emotion regulation would be stable across ages 2, 4, and 5 years. In addition, a child's academic performance was predicted to be stable from kindergarten to second grade. Maternal warmth and child emotion regulation were also expected to predict each other over time and the kindergarten teacher-child relationship was expected to be associated with concurrent academic performance and predictive of academic performance in second grade. Lastly, maternal warmth and child emotion regulation at 5 year were hypothesized to directly impact the development of the kindergarten teacher-child relationship and that the model containing both of these direct relations would fit the data significantly better than models without one or both of those direct effects.

Preliminary Findings

Preliminary analyses indicated significant associations between demographic (sex, race, SES) and study variables. Thus, the contribution of these variables will be discussed first. Most control variables evidenced similar patterns across the stability and competing models. Specifically, in regard to sex, girls evidenced significantly higher levels of academic performance in kindergarten compared to boys for all models. Girls also evidenced significantly more positive teacher-child relationships, but only for the competing models. Both of these findings are consistent with previous literature noting higher academic performance and more positive teacher-child relationships for girls (Ewing & Taylor, 2009; Pomerantz, Altermatt, & Saxon, 2002; Saft & Pianta, 2001). In addition, race was a significant and negative predictor of maternal warmth at 2 years, emotion regulation at 2 years, and the kindergarten teacher-child relationship.

Specifically, children in the Black or Other ethnic group experienced less maternal warmth, more maladaptive emotion regulation, and more negative teacher-child relationships compared to children in the White category. Lastly, children who have a family from higher SES experienced higher levels of maternal warmth at age 2 and higher academic performance in kindergarten. The effect of SES on academic performance was only present for the continuity model; not for any competing model.

Main Findings

In regard to the main goals of this study, as hypothesized maternal warmth at ages 2, 4, and 5 years and academic performance from kindergarten to second grade were stable. Children whose mother's demonstrated higher levels of maternal warmth at 2 years continued to exhibit high degrees of maternal warmth at 4 years and again at 5 years. This stability indicates that early levels of maternal warmth do not change significantly as a function of time. Because maternal warmth was stable from ages 2 to 5 years, this indicates that when examining factors upon the transition to school earlier maternal warmth may be as good of a predictor of these factors as concurrent maternal warmth.

Children's academic performance was similarly stable; academic performance in kindergarten was a significant predictor of academic performance in second grade. This is consistent with previous literature that has documented the stability of child academics through early elementary school (Alexander & Entwisle, 1988). The significant stability of academic performance in this study provides further support for identifying and

maximizing early influences of child academics, particularly those at the transition to school when academic performance has not yet been established.

This study also examined the stability of emotion regulation at ages 2, 4, and 5 years. Child emotion regulation was stable from ages 4 to 5 years, but not from ages 2 to 4 years. The lack of stability from ages 2 to 4 years may be due to a low Cronbach's alpha for the Emotion Regulation Checklist at 4 years suggesting that the items in this measure are not measuring the same construct. Moreover, the lack of stability from ages 2 to 4 year may also be due to different measurement tools at these time points. Although both measures relied on maternal report of emotion regulation, the Toddler Behavior Questionnaire (Goldsmith, 1996) used at age 2 contained more items and may have represented a more broad emotion regulation construct compared to the Emotion Regulation Checklist (Shields & Cicchetti, 1997) at ages 4 and 5 years. However, given that the same behavior can be expressed differently as a function of age, the different measures may best capture the construct in a developmentally appropriate manner. Alternatively, emotion regulation changes at a more rapid rate between ages 2 and 4 years resulting in less stability (Bronson, 2000; Raffaelli et al., 2005). Previous research has indicated that emotion regulation improves from infancy to preschool and then becomes *relatively* stable (Bronson, 2000; Raffaelli et al., 2005). Thus, the 2 to 4 year age may represent the continued development of emotion regulation prior to its stability that becomes more evident from ages 4 to 5 years. Future research should consider consistent measurement of emotion regulation over time to better identify its stability in toddlerhood.

Although the stability of maternal warmth, child emotion regulation, and academic performance was mostly supported, consistent with the study's hypotheses, the transactional relations among maternal warmth and child emotion regulation were mostly unsupported. Consistent with the study's hypotheses, child emotion regulation at age 2 was a significant predictor of maternal warmth at age 4 such that more adaptive emotion regulation at 2 years was predictive of higher levels of maternal warmth at 4 years. This finding is consistent with previous research that emotion regulation develops in part through extrinsic factors (Calkins & Hill, 2007) and that early support and flexibility offered by caregivers is critical to the development of emotion regulation (Kopp, 1982; Sroufe, 2000). However, contrary to other hypotheses, none of the remaining transactional relations were significant.

One explanation for the lack of transactional relations between maternal warmth and emotion regulation may be due the stability of emotion regulation from ages 4 to 5 years. Because emotion regulation may still be developing from ages 2 to 4 years (Bronson, 2000), the variability in child emotion regulation at 2 years may explain the significant association with maternal warmth at 4 years. In other words, children with higher emotion regulation at 2 years predicted higher maternal warmth at 4 years when emotion regulation is still developing. However, once child emotion regulation is more developed and becomes more stable around 4 to 5 years (Raffaelli et al., 2005), extrinsic factors such as maternal warmth have less influence in the refinement of emotion regulation skills in preschool (Calkins, 1994).

Another explanation is that maternal warmth may be an independent parenting behavior that is not significantly associated with emotion regulation. Maternal warmth has been defined as the acceptance, praise, positive affect, positive support, and involvement exhibited by a parent toward their child (McKee et al., 2008); however, conditional child behaviors required to provide maternal warmth are absent from this definition. This may indicate that mothers high in maternal warmth may demonstrate high levels of acceptance, praise, positive affect, positive support, and involvement regardless of the behavior exhibited by the child. Because maternal warmth is not contingent on adaptive child behaviors, including emotion regulation, it may not impact the development of emotion regulation as strongly as a contingent parent behavior.

Similar to the transactional associations, maternal warmth, at 4 or 5 years, was also not a significant predictor of the kindergarten teacher-child relationship. It was hypothesized that children whose mothers exhibited higher levels of maternal warmth would also demonstrate more positive teacher-child relationships. This rationale was based on the parent-child attachment literature and premise that children who are supported and praised by their mothers would engage in similar behaviors in the classroom that would elicit warm responses from teachers, thus developing a positive teacher-child relationship (Sroufe, 2000). However, similar to the above discussion, the definition of maternal warmth does not include conditional behaviors, which may result in no impact on the development of the teacher-child relationship.

Conversely, child emotion regulation at age 4 was a significant predictor of the kindergarten teacher-child relationship such that higher emotion regulation at 4 years

predicted a more positive kindergarten teacher-child relationship; this is consistent with the current hypotheses and previous literature (e.g., Graziano et al., 2007). Contrary to hypotheses, emotion regulation at 5 years was not significantly predictive of the concurrent teacher-child relationship. One explanation for this finding is that the variance in the kindergarten teacher-child relationship that was explained by emotion regulation at 4 years precluded the remaining variance to be explained by emotion regulation at 5 years. This may be particularly true, as emotion regulation from 4 to 5 years remained relatively stable. Thus, when using cascade models to examine the complex development of constructs over time, researchers should carefully consider when a construct should be first entered and/or removed in the model developmentally.

Emotion regulation at 4 and 5 year was also significantly associated with academic performance in kindergarten. Specifically, children who exhibited more adaptive emotion regulation at ages 4 and 5 evidenced higher academic performance in kindergarten. This is consistent with previous literature that noted children with higher levels of emotion regulation tend to also have higher levels of academic performance (e.g., Graziano et al., 2007; Pianta, 1999). Children who are able to effectively regulate emotions, particularly negative ones, may be more successful in the classroom as challenging academic tasks are presented. Children are always being challenged in the classroom with new and more advanced topics and lessons. The constant challenge could cause a child to become frustrated which in turn could cause negative academic results, especially for a child with maladaptive emotion regulation strategies. However, for a child whose emotion regulation strategies are adaptive, this same level of frustration may

not occur which would allow the child to meet with more success on the task, compared to a child with maladaptive emotion regulation strategies.

The kindergarten teacher-child relationship was significantly associated with concurrent academic performance, which is consistent with previous research (e.g., Hamre & Pianta, 2001; Jerome et al., 2009). Children who possessed more positive teacher-child relationships in kindergarten demonstrated higher concurrent academic performance. Children who developed more positive teacher-child relationships with their teacher in kindergarten may have been better able to access their teacher as a resource for academic work compared to children with a more negative teacher-child relationship. Moreover, teachers who view their relationship as warmer and less conflicted with particular students may be more willing to offer help and support that may not be available to other children. Further, these same teachers may initiate interactions to facilitate success in school compared to children with negative teacher-child relationships. Of note, these results should be interpreted with caution as the same-reporter, the kindergarten teacher, completed questionnaires about the teacher-child relationship and the child's academic performance. Future research should consider alternate methods for assessing academics in early elementary school that may rely less on teacher report.

Although the kindergarten teacher-child relationship was significantly associated with concurrent academic performance, it was not a significant predictor of academic performance two years later. The kindergarten teacher-child relationship did have a significant indirect effect on second grade academic performance through kindergarten

academic performance. This is in contrast to the current hypotheses and is not consistent with previous literature that has found that the kindergarten teacher-child relationship is predictive of academic success throughout elementary school (e.g., Hamre & Pianta, 2001; Jerome et al., 2009). Previous research does not statistically control for the same measure of academics during an earlier time point, however. Another possibility is that children in the current sample evidenced mostly positive teacher-child relationships and higher academic performance in second grade than would be expected in the general population. Because the average score of these variables was shifted in a positive direction, the truncated range of scores may have prevented such associations to be identified. Additional research with samples containing more variability in teacher-child relationships and academic performance are warranted.

In addition, as the teacher changes from kindergarten to second grade, children may develop different relationships with their teachers and may not have access to the same resources as described for the concurrent teacher-child relationship. Previous research has indicated that teacher and observer views of a teacher-child relationship often differ (Doumen, Koomen, Buyse, Wouters, & Verschueren, 2012). Thus, it may be that the teacher-child relationship may have the most impact on concurrent academic performance, as this is when the resources associated with the positive teacher-child relationship are available. This may hold true despite a study noting that children's kindergarten teacher-child relationships are predictive of future teacher-child relationships through sixth grade (Jerome et al., 2009). Additional research replicating

the stability of teacher-child relationships would provide further evidence for this assertion.

Moreover, the present study and the majority of studies reviewed were based on the teacher's perception view (Pianta & Steinberg, 1992) of teacher-child relationships. This perspective may be inherently flawed as it neglects the view of the child when classifying the quality of the teacher-child relationship. In regard to a teacher's perception, it may be that teacher perceptions of a child are a function of specific characteristics of the child, which would explain the stability in this sample. If those child characteristics develop over time or if an individual teacher's perceptions are based on different child characteristics, similar teacher-child relationships may not be evident over time based on this perspective. Thus, additional research that examines the concordance between teacher and child perceptions of the teacher-child relationship is needed.

Exploratory Findings

Although the study's main hypotheses were mostly unsupported, exploratory analyses evidenced a significant relation between another parenting behavior, maternal hostility, and teacher-child relationships. Similarly to the main findings, maternal hostility and emotion regulation were stable from ages 2 to 5 years. Maternal hostility and emotion regulation were also associated such that higher maternal hostility was associated with poorer emotion regulation at 2 years; no other significant associations between these two variables were identified. This indicates that both maternal hostility and child emotion regulation are stable over time from toddlerhood to pre-school and are

inversely related at 2 years. Transactional relations among these variables from 2 to 4 or 4 to 5 years were not evidenced. This may be because emotion regulation variability is low by age 4 as previous research notes that emotion regulation is only relatively stable in pre-school (Raffaelli et al., 2005). Thus, extrinsic factors, such as maternal hostility, may not be as impactful at this age. Future research should test this notion by examining transactional relations between emotion regulation and parenting behaviors at earlier ages such as from infancy through 2 years.

The exploratory analysis added to the literature a significant and negative relation between 5-year maternal hostility and kindergarten teacher-child relationships. These results indicate that children who experience higher levels of maternal hostility at the transition to kindergarten are more likely to develop a negative teacher-child relationship. This is consistent with research noting that negative parenting behaviors can inhibit children from developing secure attachments with other caregivers in the future (Sroufe, 1983; Sroufe et al., 1999). This outcome is likely because parents high in hostility are not as responsive or sensitive to a child's needs and, therefore, set inconsistent expectations for the child during distressing situations (Bowlby, 1980; Goldsmith & Alansky, 1987). These inconsistent expectations can then generalize to secondary attachment relationships such as those with teachers at the transition to school. At this transition, the current findings indicate that children who experienced high levels of hostility would develop less positive teacher-child relationships. Additional research is needed to determine if a pattern of negative teacher-child relationships continues

throughout a child's school career or if the consistency of teacher's can alter a child's internal working model of an attachment relationship.

This exploratory analysis also evidenced a significant association between concurrent kindergarten teacher-child relationships and academic performance and a significant indirect effect from the kindergarten teacher-child relationship to second grade academic performance through kindergarten academic performance. These results are consistent with previous findings demonstrating a significant relation between concurrent teacher-child relationships and academics (Hamre & Pianta, 2001; Jerome et al., 2009). Again, it should be noted that in the current study the same kindergarten teacher that reported on the teacher-child relationship also reported on the child's academic performance confounding the results. Future research should consider alternate methods for assessing child academics, particularly at a young age. Considering the negative relation between maternal hostility and the teacher-child relationship, the cascading effects of children who experience maternal hostility at the transition to kindergarten are not only less likely to develop a positive teacher-child relationship, but they are also more likely to demonstrate poorer academic performance.

The significant relation between maternal hostility and the kindergarten teacher-child relationship begs the question of why maternal warmth was not also related to the kindergarten teacher-child relationship. In general, the present results suggest that negative parenting behaviors (i.e., hostility) may have a greater impact on kindergarten teacher-child relationships than positive parenting behaviors (i.e., warmth). One factor may be that most children in the present sample experienced high levels of maternal

warmth as well as low levels of maternal hostility. Thus, it may be that because the majority of children do not experience high levels of maternal hostility, when a child does experience high levels of maternal hostility its impact is significant. Future research should assess this by examining comparable statistical models and comparing a high to low maternal hostility group. In addition, research could assess if children who experience very low levels of maternal warmth demonstrate similar patterns to children who experience high levels of maternal hostility.

Another explanation may be that teacher behaviors are likely more similar to parents who exhibit high warmth and low hostility. This would allow more consistency in the attachment figures from home to school, particularly at the transition to school, which may in turn increase the likelihood of a positive teacher-child relationship. The present study cannot provide data to support this notion, as teacher behaviors were not collected. Therefore, future research should consider gathering and analyzing classroom and teacher level data, as this would provide a more complete representation of the relationship dynamic between children and teachers.

Summary, Limitations, and Future Directions

In summary, the present study sought to identify a child and parent factor that would impact the development of the kindergarten teacher-child relationship and concurrent and longitudinal academic performance. The results evidenced relative stability of maternal warmth, maternal hostility, and emotion regulation from 2 to 5 years. Further, emotion regulation at 4 years was a significant predictor of the kindergarten teacher-child relationship and kindergarten academic performance; maternal warmth did

not significantly predict these outcomes. In addition, maternal hostility at 5 years was a significant predictor of the kindergarten teacher-child relationship such that higher levels of maternal hostility at 5 years resulted in less positive kindergarten teacher-child relationships. Neither maternal warmth nor emotion regulation at 5 years was a significant predictor of concurrent teacher-child relationships. The kindergarten teacher-child relationship was associated with concurrent academic performance, but was not predictive of academic performance in second grade. Rather, the kindergarten teacher-child relationship had an indirect effect on second grade academic performance through kindergarten academic performance. Academic performance was stable from kindergarten to second grade. These results yielded partial support for the study's main hypotheses; however, there were some limitations to the present study, which also lend to future areas of research.

The present study examined both a child and parent factor that was thought to contribute to the development of the teacher-child relationship. In regard to a child factor, emotion regulation was found to have a longitudinal association with the teacher-child relationship, but not a concurrent one at the transition to school. The present study relied on parental report of emotion regulation at all three time points utilizing two different questionnaires. Thus, future research may consider alternative measures of emotion regulation such as coded laboratory tasks, physiological regulation, or a combination of different measures when examining its impact on the teacher-child relationship as different associations may be noted. In addition, as noted by Calkins and Hill (2007), emotion regulation is comprised of several different components. Thus,

future research may also consider the influence of several specific components or a latent construct containing multiple components of emotion regulation in the development of the kindergarten teacher-child relationship.

Although emotion regulation has been well-established as a powerful child factor, (e.g., Calkins & Hill, 2007; Cassidy, 1994; Graziano et al., 2007), other child factors may also be important in the development of teacher-child relationships. Specifically, child qualities such as leadership, school involvement/engagement, and, more broadly, social skills may also be influential predictors of the kindergarten teacher-child relationship. Children who are able to navigate the social world effectively by using effective social skills may be viewed as more prosocial by their teacher's resulting in more positive teacher-child interactions and subsequently more positive teacher-child relationships. Further, children with more advanced social skills who can initiate conversations with teachers and who are more apt to ask questions and are involved in the classroom may also help to promote positive teacher-child relationship development. Thus, future research should examine other potential child influences in regard to developing early teacher-child relationships.

Another child factor that may be impactful and is related to emotion regulation is that of child externalizing behavior (e.g., Bandon, Calkins, Grimm, et al., 2010). Previous research has indicated that kindergarten teacher-child relationships are related to child externalizing behavior concurrently and through 8th grade (Hamre & Pianta, 2001). However, research examining the influence of pre-school levels of externalizing behavior on kindergarten teacher-child relationships is not present. Thus, future research should

consider examining the predictive effects of child externalizing behaviors on the kindergarten teacher-child relationship. In addition, this research could also assess changes in child externalizing behavior as a function of the kindergarten teacher-child relationship.

In addition, the present study only examined maternal warmth and hostility. These parenting behaviors do not occur in isolation of other parenting behaviors or other parent factors. Specifically, McKee (2008) noted three specific parenting behaviors including warmth, hostility, and intrusiveness. Thus, another parenting behavior or combination of multiple parenting behaviors may have a different impact on the development of kindergarten teacher-child relationships. Moreover, one may consider how specific parenting techniques (e.g., discipline) or practices also influence school relationships as these practices may impact how children behave at school which in turn may impact the teacher's perception of a particular child. In addition, factors that are specific to the parent but may not be directly impactful to the child may also be considered. This could include parental involvement, parent emotion regulation, or parental stress. Parents who can effectively regulate their own emotions, and cope with their stress may promote positive teacher-child relationships for their children indirectly by modeling adaptive relationships at home prior to the school transition. Lastly, parent's relationships with their child's teachers may also impact the development of the teacher-child relationship. Parents who develop positive relationships with their child's teacher may promote positive teacher-child relationships for their children. Additional parent factors may be considered in future research on teacher-child relationships.

Although individual child and parent factors are likely important in the development of teacher-child relationships and ultimately school success, this study was unable to account for greater environmental factors, such as the child's classroom or teacher level constructs when examining teacher-child relationship development and academic performance. Previous research has demonstrated that classroom behaviors and classroom behavior management can impact the classroom environment, which in turn may impede teacher-child relationship development. Classrooms that are highly managed result in predictability and structure for children (La Paro, Pianta, & Stuhlman, 2004). Given that classrooms with high compositions of behavior problems are negatively associated with social adjustment (Dishion, Spracklen, Andrews, & Patterson, 1996), the impact of behavior management systems may be of particular importance. Ineffective classroom behavior management systems, particularly in classes with high compositions of behavior problems, can result in frustrated and angered reactions from teachers (Buyse, Verschueren, Doumen, Van Damme, & Maes, 2008). This type of reactive teacher response can result in a negative classroom environment, which may then be associated with increased behavior problems. Conversely, effective behavior management systems may allow for classrooms with high compositions of behavior management problems to demonstrate more adaptive patterns of school success. This may be because teachers using an effective strategy may not have to spend as much time managing behaviors and would be less prone to the frustration and anger reactions often found in this type of classroom. Thus, classroom level factors should be included in future work in this area.

In addition to the limitations described above, there were some measurement concerns throughout the study. First, child emotion regulation at 2 years was measured using a different questionnaire than at ages 4 and 5 years. This may have resulted in an inaccurate representation of emotion regulation stability from ages 2 to 4 years. It is also important to balance consistent measurement of a construct with measures that are sensitive to the developmental appropriateness of the construct expression at a particular age. Thus, it may be best to assess child emotion regulation using the same measure over time that is also sensitive to the developmental appropriateness of emotion regulation at the measured time points. In addition the average scores for child emotion regulation, kindergarten teacher-child relationships, and academic performance in kindergarten and second grade were positively skewed. This indicated that most children in this sample possessed adaptive emotion regulation skills, had a positive teacher-child relationship, and had higher levels of academic performance. Future research should consider more sensitive measures that may better capture the variability in these constructs and performance in each respective domain. This may be particularly challenging for academic performance, as student performance is difficult to measure because teacher-reports, including grades, often have limited variability. Moreover, standardized testing often results in average performance as these scores are standardized within age. Thus, future research may consider a latent factor of child academic performance that may better capture variability in student performance, particularly in early elementary school.

Another consideration is that, although most previous research views the teacher-child relationship from the teacher's perception view (Pianta & Steinberg, 1992), this

perspective only takes into account the teacher's perspective as well as ignores reciprocal behaviors from the child (Zhang & Sun, 2011). This may limit the inference about the true nature of the teacher-child relationship. Thus, future research may consider the development of measurement tools designed to assess the teacher-child relationship from the child's view (e.g., Spilt & Koomen, 2009; Spilt, Koomen, & Mantzicopoulos, 2010) or consider alternate approaches such as an interpersonal approach (Thijs, Koomen, Roorda, & ten Hagen, 2011). This would then allow researchers to examine the development and outcomes of the teacher-child relationship from multiple perspectives. It would also allow studies to assess the concordance between teacher and child perceptions to determine if both perceptions are needed or if only one perception is sufficient, and if so, whose. Furthermore, related to the current project, the maternal warmth and emotion regulation direct effects models may have been supported if the child reported on the teacher-child relationship. Because the child's emotion regulation and maternal warmth are more proximal constructs to the child, this may have allowed for additional paths to become significant. However, since the study utilized the teacher's perception, maternal warmth and child emotion regulation may have been too distal of constructs to impact the development of the kindergarten teacher-child relationship.

Despite the low magnitude of the results in the present study, when considering the examination of child, parent, teacher, and classroom level constructs, future research may benefit from utilizing a developmental cascade perspective. Developmental cascade models allow researchers to best assess child constructs as they come on line

developmentally. For example, the cascading effects in this study from 5 year maternal hostility to the kindergarten teacher-child relationship and indirectly to second grade academic performance demonstrates the utility of a developmental cascade model as this perspective considers the many dynamic transactional relations among constructs through a child's development. Developmental cascade models allow researchers to analyze several different constructs over time, but also allows for constructs to be examined as they come online developmentally which may reflect a more accurate portrayal of a particular phenomenon in the real world. Therefore, future research examining the development of teacher-child relationships should consider the use of developmental cascade models. Specifically, researchers could identify several pre-school constructs (e.g., parent factors, child factors, teacher factors, environmental factors, etc.) and could analyze these constructs when they come online developmentally or when the most impact is theorized to begin. In addition, researchers can further extend the analysis to multiple outcome factors throughout elementary school and examine the dynamic transactional relations between them such as academic, behavioral, and social transactions; these dynamic systems have been identified in the literature (e.g., O'Connor, 2010), however, more complex models to assess these dynamics have been underutilized. Taken together, framing research questions from a developmental perspective readily parallels the use of a developmental cascade model for analysis.

Overall, the present research sought to establish a parent and child factor that contributed to the development of the teacher-child relationship. Although this was not fully supported, the present study did establish the longitudinal association between

emotion regulation at age 4 and the kindergarten teacher-child relationship and academic performance. Several suggestions for additional research were made based on the findings in the current study. Given the magnitude of the outcomes associated with positive teacher-child relationships, (e.g., Cairns & Cairns, 1994; Garnier et al., 1997; Hamre & Pianta, 2001; Jerome et al., 2009; Pianta, Hamre, & Stuhlman, 2003), future research that can maximize the number of children who experience these relationships is warranted. This may also allow for additional intervention techniques to be identified that utilize the school and teacher environment in promoting child well-being similar to Teacher-Child Interaction Therapy (TCIT; Lyon et al., 2009; McIntosh, Rizza, & Bliss, 2000). Other prevention and intervention techniques could benefit from additional research on teacher-child relationship development.

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APPENDIX A
TABLES AND FIGURES

Table 1

Descriptive Statistics for Demographic Measures

Variable	N	%	M	SD	Min	Max
<i>Child Gender</i>						
Male	212	47.90	-	-	-	-
Female	231	52.10	-	-	-	-
<i>Ethnicity</i>						
White	300	67.7	-	-	-	-
Black	117	26.4	-	-	-	-
Multiracial/Other	26	5.9	-	-	-	-
Hollingshead (SES)-2 year	423	-	39.61	11.13	14.00	66.00

Table 2

Descriptive Statistics for Study Variables

Measure	N	Min.	Max.	M	SD	Skewness	Kurtosis
Maternal Warmth-2 year	421	1.00	4.00	3.12	.76	-.68	-.40
Maternal Warmth-4 year	372	1.00	4.00	2.71	.72	-.33	-.53
Maternal Warmth-5 year	330	1.00	4.00	2.66	.71	-.05	-.70
Emotion Regulation-2 year	347	1.57	6.04	3.82	.86	-.08	-.18
Emotion Regulation-4 year	374	2.13	4.00	3.31	.32	-.23	.23
Emotion Regulation-5 year	343	2.38	4.00	3.33	.32	-.16	-.49
Teacher-Child Relationship-Kindergarten	265	2.22	4.71	4.10	.44	-1.26	1.61
Academic Performance-Kindergarten	224	1.38	5.00	4.00	.68	-1.25	1.56
Academic Performance -2 nd Grade	276	1.56	5.00	3.97	.80	-.94	.07

Table 3

Gender Differences for Study Variables

Measure	<i>t</i>	<i>df</i>	<i>p</i>	Gender Means (N)
Maternal Warmth-2 year	-.685	419	.49	Male = 3.09 (202) Female = 3.14 (219)
Maternal Warmth-4 year	1.09	370	.28	Male = 2.75 (171) Female = 2.67 (201)
Maternal Warmth-5 year	.86	328	.39	Male = 2.69 (153) Female = 2.63 (177)
Emotion Regulation-2 year	.09	345	.93	Male = 3.83 (163) Female = 3.82 (184)
Emotion Regulation-4 year	-2.76	372	.01**	Male = 3.26 (171) Female = 3.35 (203)
Emotion Regulation-5 year	-3.55	341	.00**	Male = 3.23 (161) Female = 3.38 (182)
Teacher-Child Relationship-Kindergarten	-2.49	263	.02*	Male = 3.99 (118) Female = 4.13 (147)
Academic Performance-Kindergarten	-2.42	222	.02*	Male = 3.88 (102) Female = 4.10 (122)
Academic Performance-2 nd Grade	-1.38	274	.17	Male = 3.90 (128) Female = 4.04 (148)

p* < .05. *p* < .01.

Table 4

Correlations Among Study Variables

Measure	2	3	4	5	6	7	8	9	10
1. SES	.25**	.34**	.27**	.08	.06	.04	.04	.15*	.18*
2. Maternal Warmth-2 year	-								
3. Maternal Warmth-4 year	.59**	-							
4. Maternal Warmth-5 year	.58**	.64**	-						
5. Emotion Regulation-2 year	.18**	.15*	.10	-					
6. Emotion Regulation-4 year	.06	.08	.04	.10	-				
7. Emotion Regulation-5 year	.00	.01	-.01	.12*	.62**	-			
8. Teacher-Child Relationship-Kindergarten	.06	.09	.08	.24**	.18*	.15*	-		
9. Academic Performance-Kindergarten	.06	.11	.03	.31**	.27**	.33**	.54**	-	
10. Academic Performance-2 nd Grade	.18**	.12*	.08	.22**	.12*	.17**	.31**	.50**	-

* $p < .05$. ** $p < .01$.

Table 5

Regression Coefficients for Control Variables by Model

Regression	Continuity	No Direct Effect	Maternal Warmth Direct Effect	Emotion Regulation Direct Effect	Maternal Warmth and Emotion Regulation Direct Effect
Maternal Warmth-2 year ON:					
Sex	.06	.06	.06	.06	.06
Race	-.25**	-.25**	-.25**	-.25**	-.25**
SES	.20**	.20**	.20**	.20**	.20**
Emotion Regulation-2 year ON:					
Sex	.01	.01	.01	.01	.01
Race	-.20**	-.20**	-.20**	-.20**	-.20**
SES	.05	.05	.05	.05	.05
Teacher-Child Relationship-Kindergarten ON:					
Sex	.15	.13*	.13*	.13*	.13*
Race	-.15*	-.12	-.12	-.12	-.12
SES	.01	-.01	-.01	-.01	-.01
Academic Performance-Kindergarten ON:					
Sex	.18**	.15*	.15*	.14*	.14*
Race	-.08	-.02	-.02	-.03	-.01
SES	.15*	.11	.11	.10	.10

Note: Values listed are standardized regression coefficients for control variable that are not displayed in figures.

* $p < .05$. ** $p < .01$.

Table 6

Model Fit and Comparison Indices for Maternal Warmth Models

Fit Statistic	Continuity	No Direct Effect	Maternal Warmth Direct Effect	Emotion Regulation Direct Effect	Maternal Warmth and Emotion Regulation Direct Effect
Chi-Square (df)	149.65 (38)**	131.76 (31)**	131.73 (30)**	131.02 (30)**	130.99 (29)**
RMSEA	.08	.09	.09	.09	.09
CFI	.86	.88	.88	.88	.88
TLI	.77	.75	.74	.74	.73
SRMR	.09	.07	.07	.07	.07
Chi-Square Δ (df)	-	^a 17.89 (7)*	^b .03 (1)	^b .74 (1)	^c .74 (1) ^d .03 (1)

* $p < .05$. ** $p < .01$. ^a comparison to continuity model. ^b comparison no direct effect model. ^c comparison to maternal warmth direct effect model. ^d comparison to emotion regulation direct effect model.

Table 7

Model Fit and Comparison Indices for Maternal Hostility Models

Fit Statistic	Continuity	No Direct Effect	Maternal Hostility Direct Effect	Emotion Regulation Direct Effect	Maternal Hostility and Emotion Regulation Direct Effect
Chi-Square (df)	112.91 (38)**	108.10 (31)**	95.87 (30)**	107.45 (30)**	95.55 (29)**
RMSEA	.07	.08	.07	.08	.07
CFI	.86	.87	.88	.86	.88
TLI	.77	.72	.75	.70	.74
SRMR	.09	.08	.07	.07	.07
Chi-Square Δ (df)	-	^a 4.81 (7)	^b 12.23 (1)**	^b .65 (1)	^c .32 (1) ^d 11.9 (1)**

* $p < .05$. ** $p < .01$. ^a comparison to continuity model. ^b comparison no direct effect model. ^c comparison to maternal hostility direct effect model. ^d comparison to emotion regulation direct effect model.

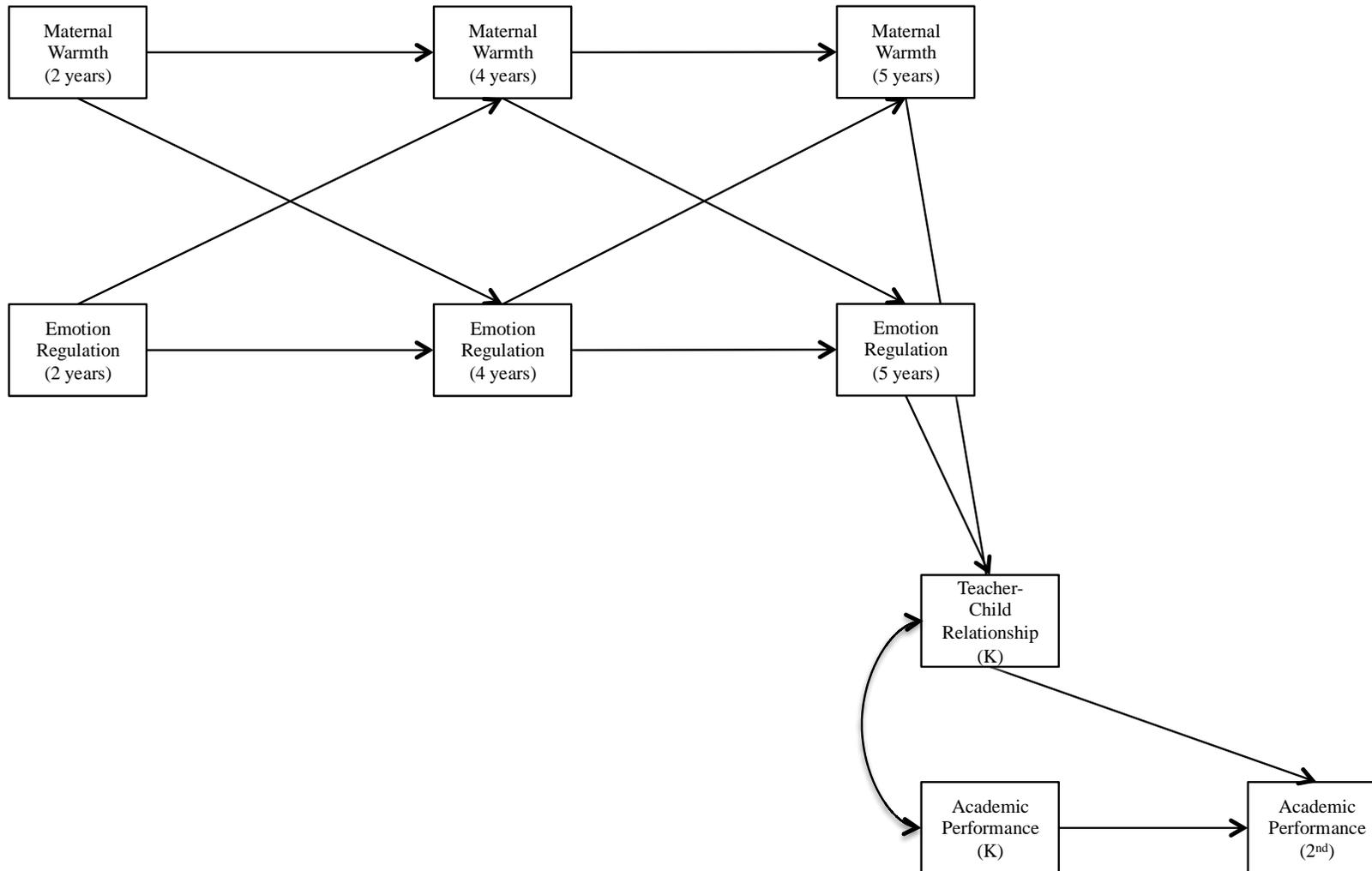


Figure 1. Theoretical model of the impact of maternal warmth and emotion regulation on kindergarten teacher-child relationships and academic performance.

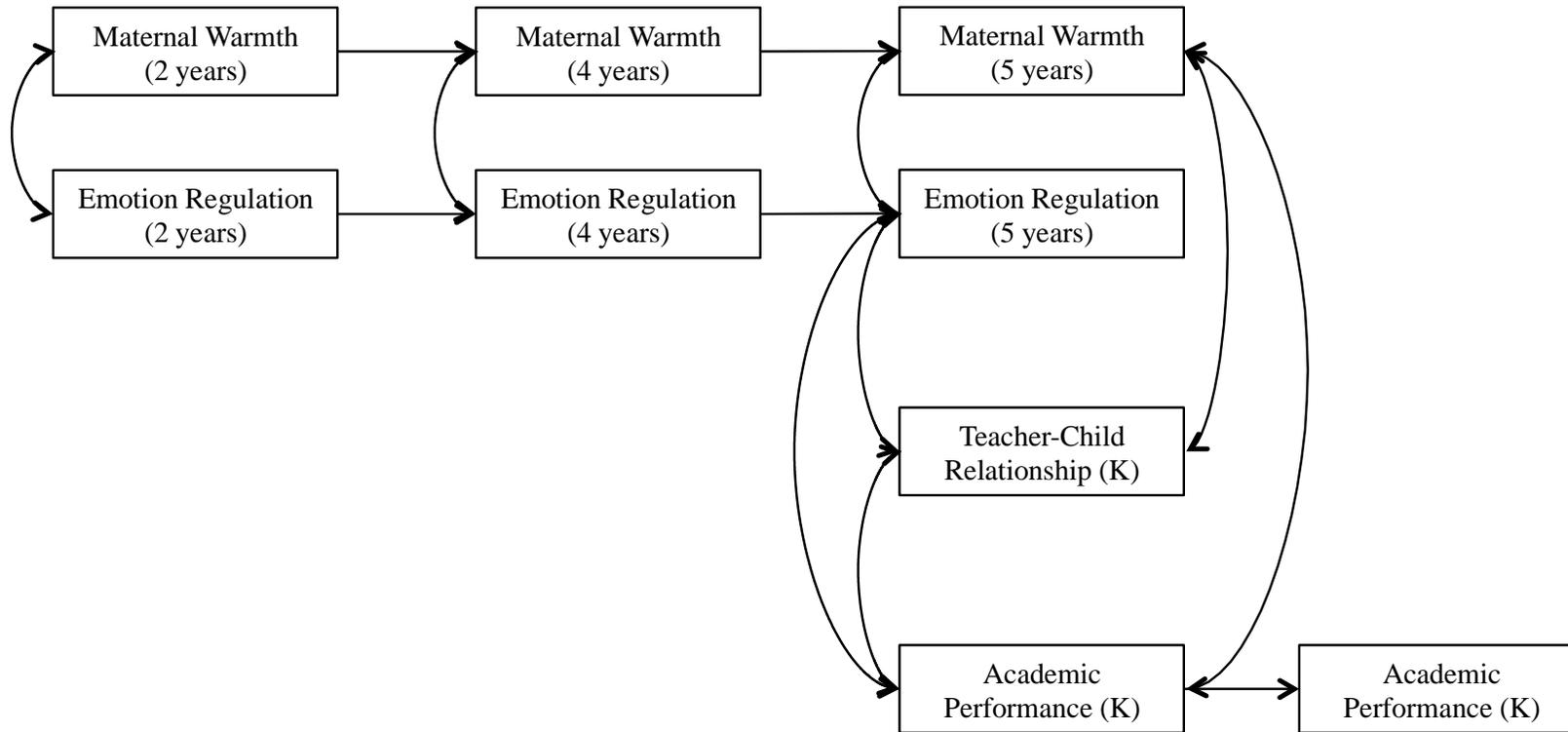


Figure 2. Stability model used to assess the stability/continuity of maternal warmth, emotion regulation, and academic performance from 2 years to second grade. Within age correlations are also included in the model.

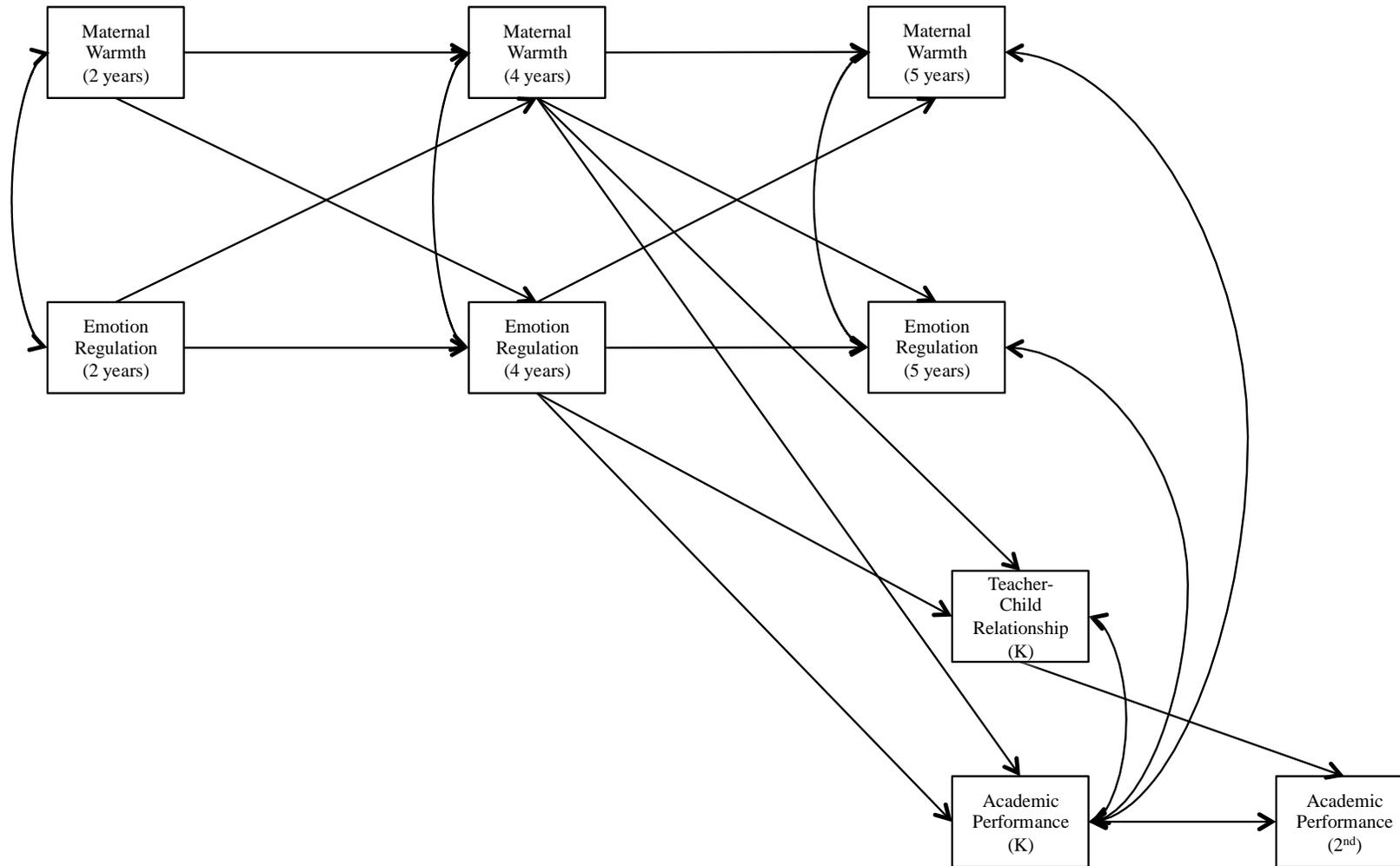


Figure 3. No direct effects model to assess the cross-lagged and longitudinal paths between study variables.

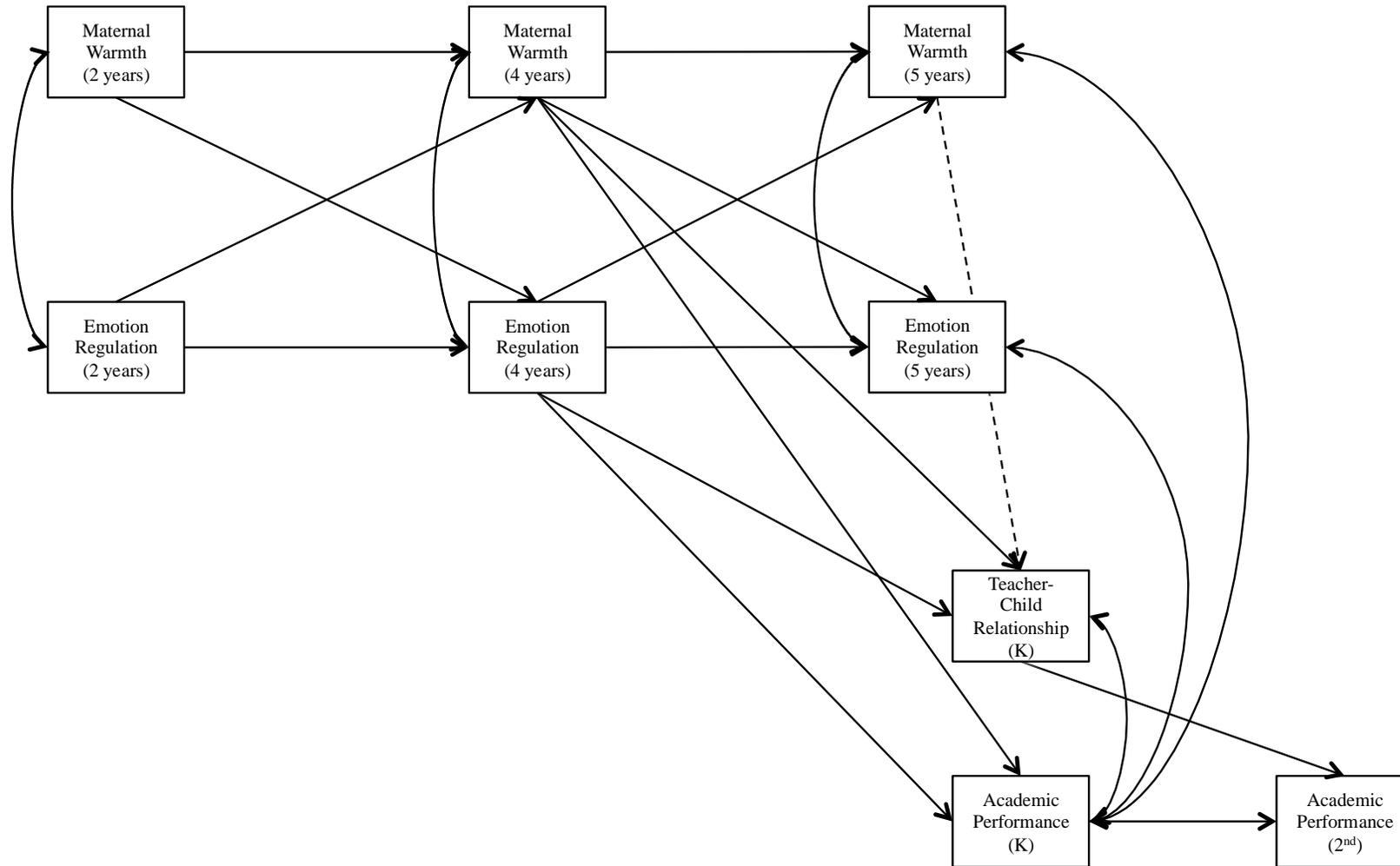


Figure 4. Maternal warmth direct effect model. Dashed line is added path from no direct effects model.

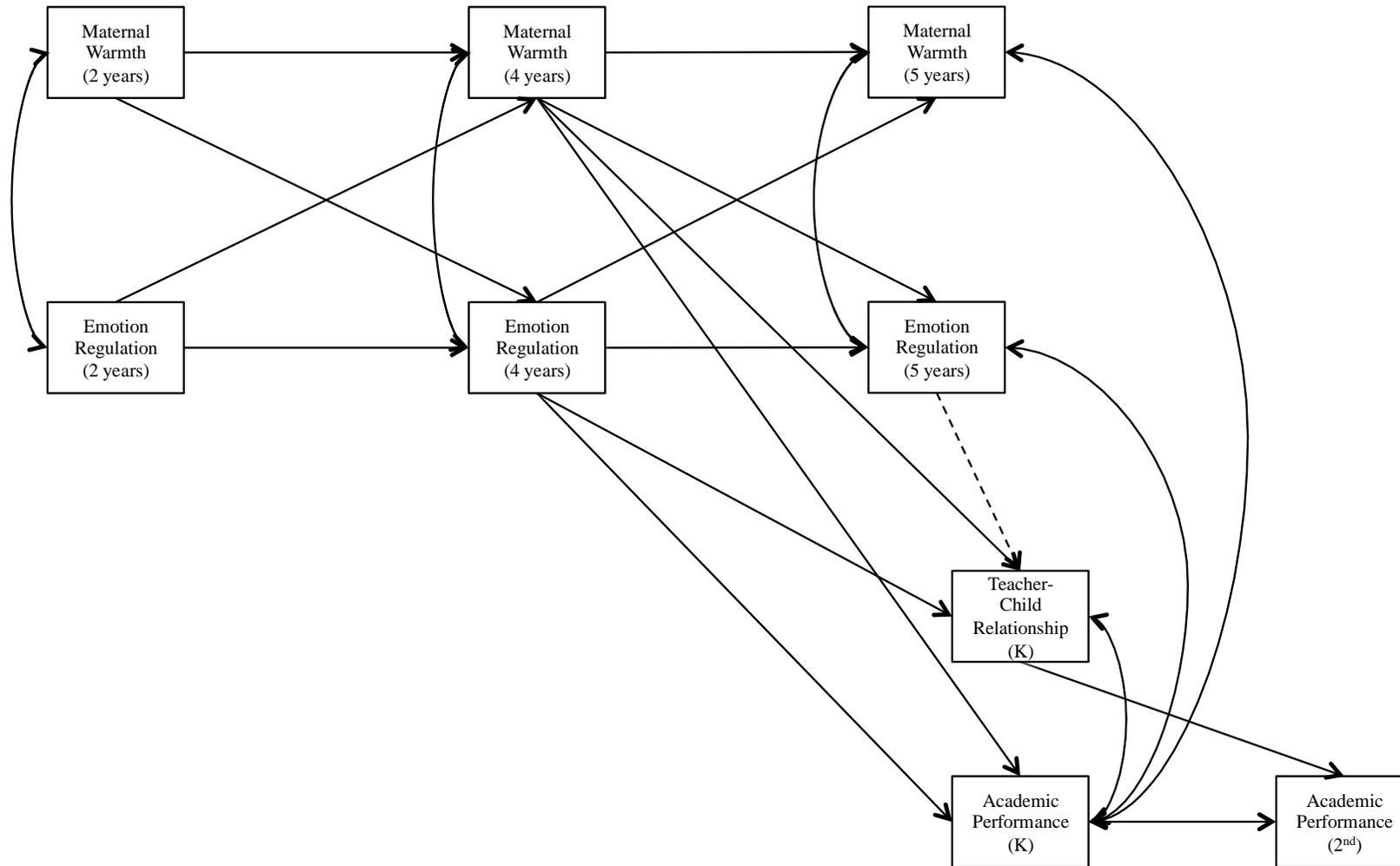


Figure 5. Emotion regulation direct effect model. Dashed line is added path from no direct effects model.

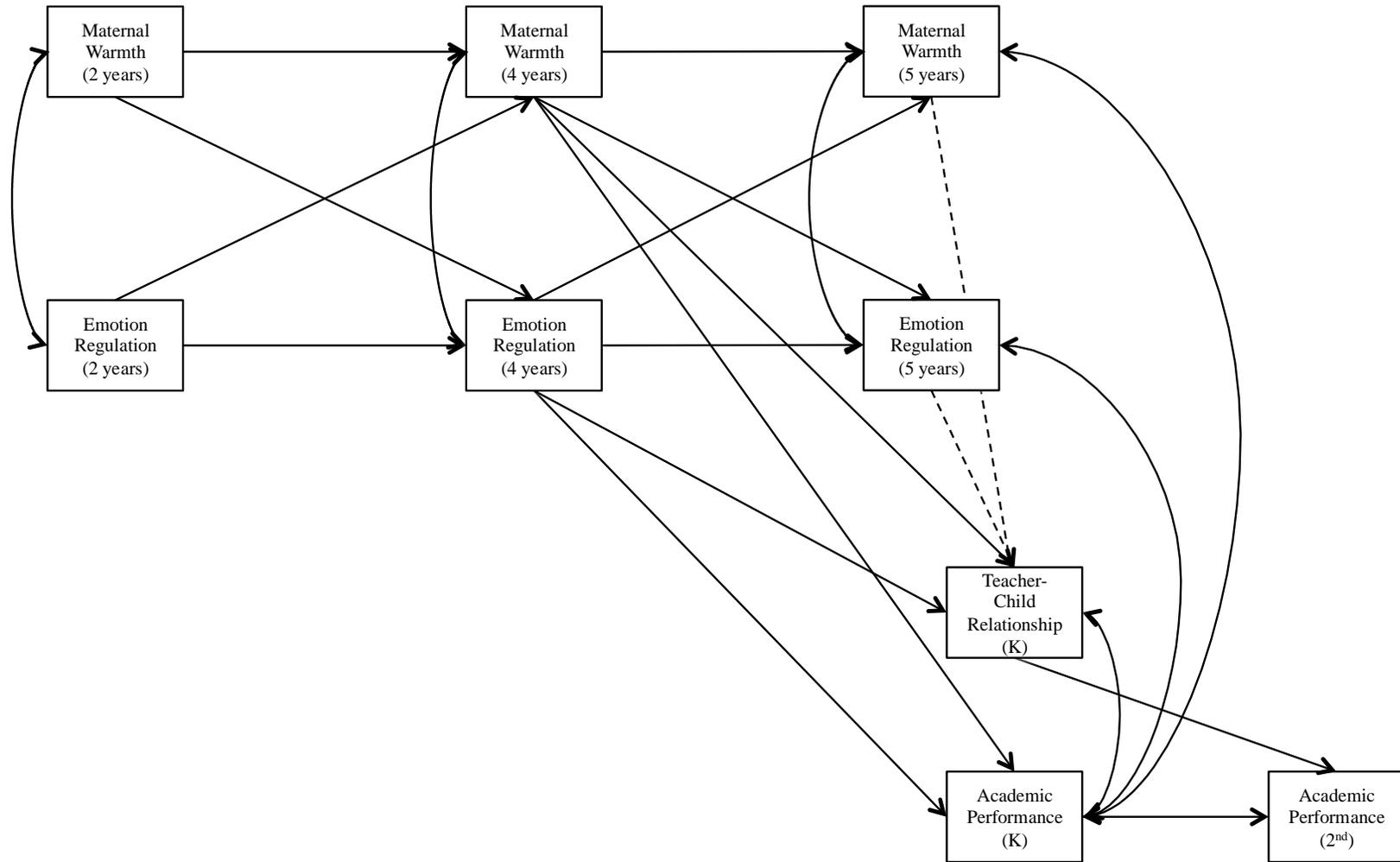


Figure 6. Maternal warmth and emotion regulation direct effect model. Dashed lines are added paths from no direct effects model.

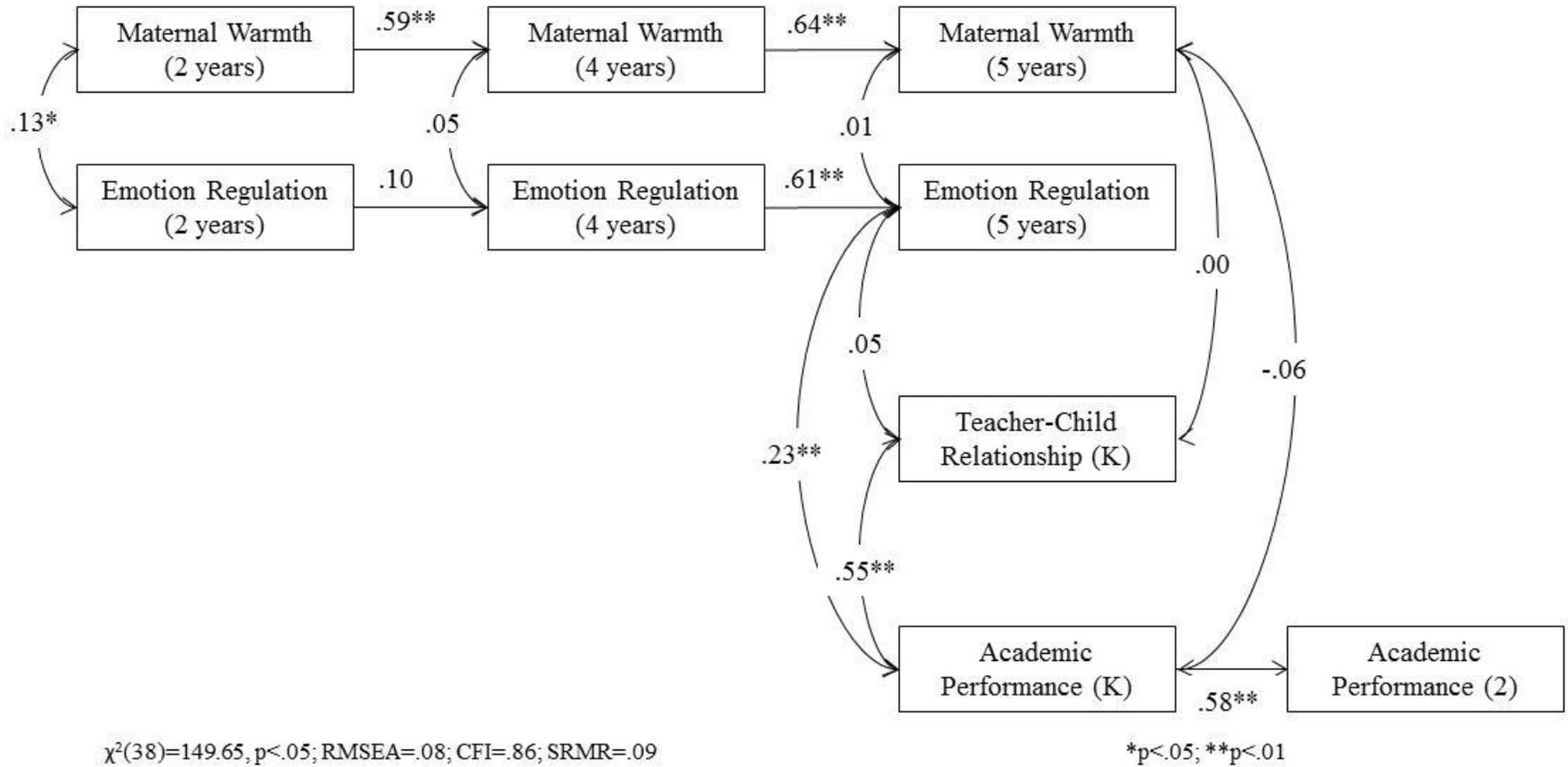
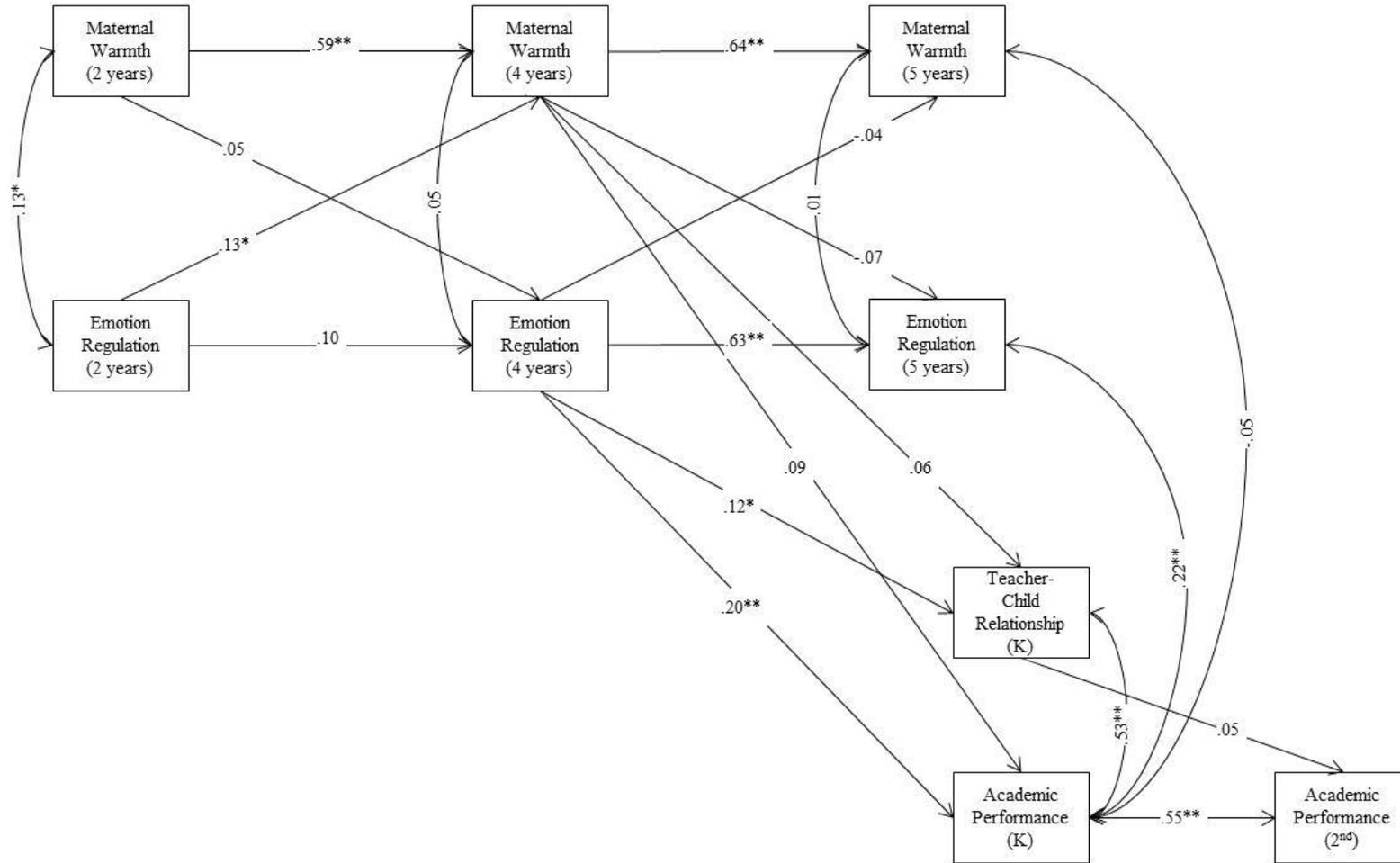


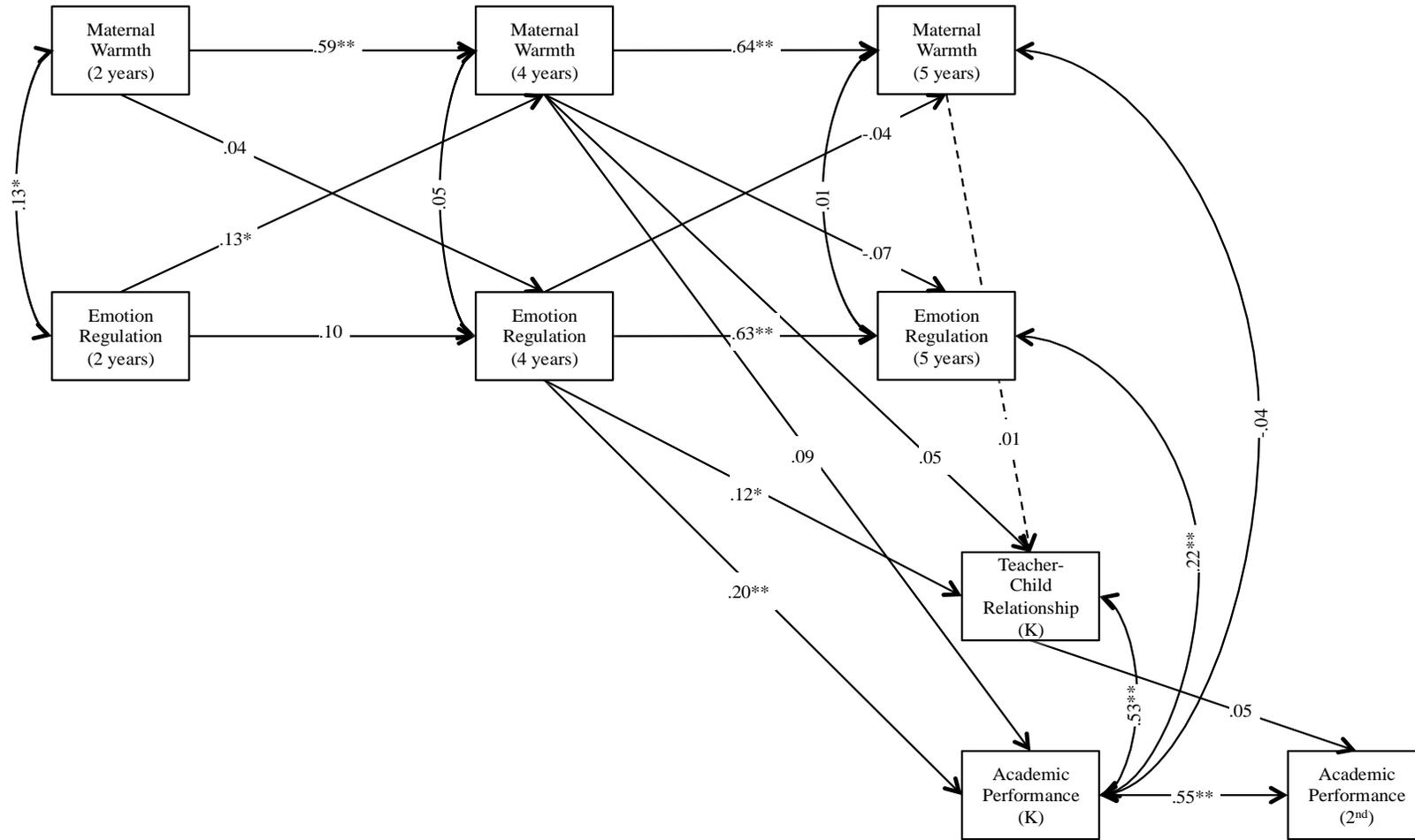
Figure 7. Path diagram for continuity model. Control variables are not displayed in the figure; see Table 5 for regression coefficients for the effects of control variables on study variable.



$\chi^2(31)=131.76$, $p<.05$; RMSEA=.09; CFI=.88; SRMR=.07

* $p<.05$; ** $p<.01$

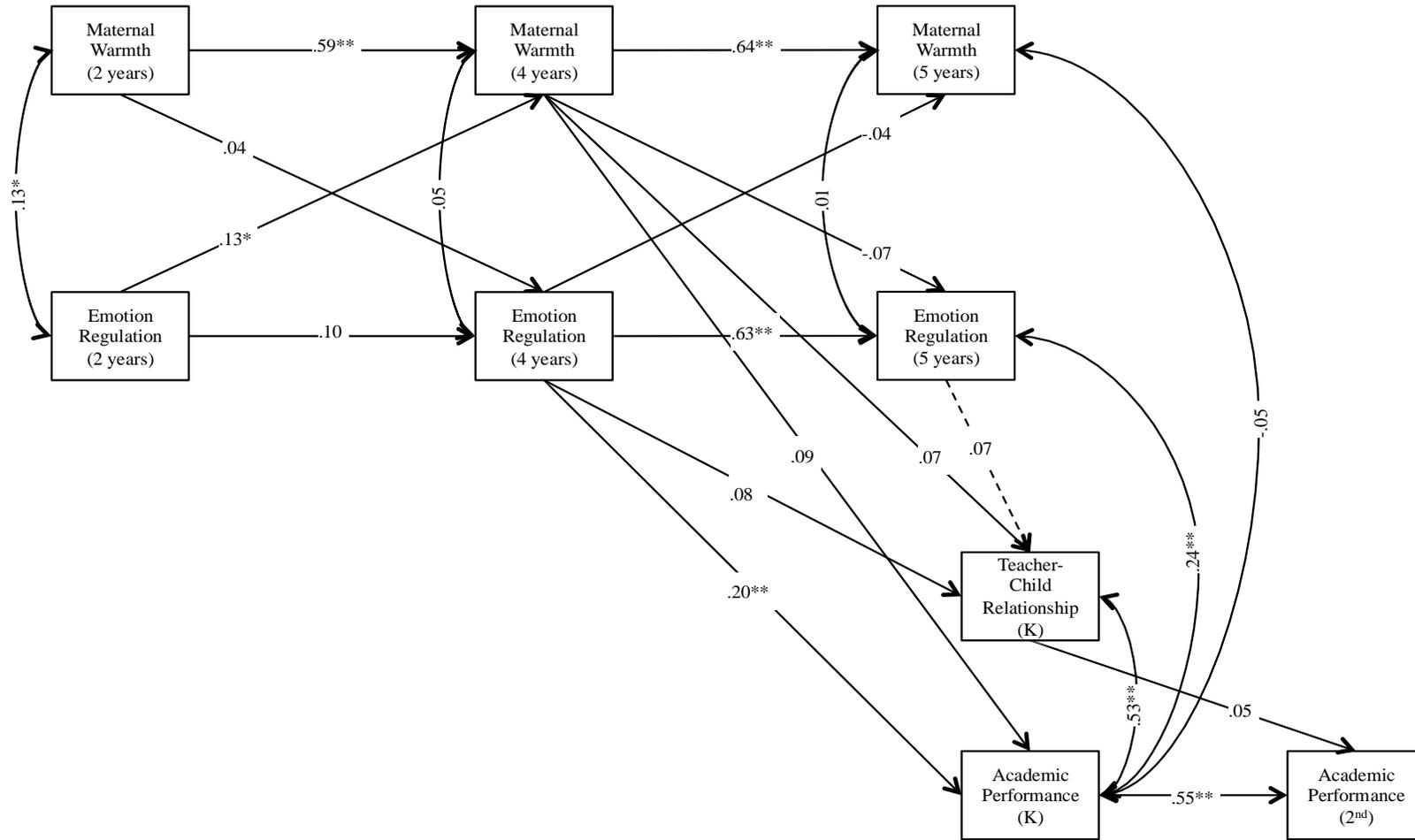
Figure 8. Path diagram for no direct effects model. Control variables are not displayed in the figure; see Table 5 for regression coefficients for the effects of control variables on study variables.



$\chi^2(30) = 131.73, p < .05, RMSEA = .09, CFI = .88, TLI = .74, SRMR = .07$

* $p < .05$. ** $p < .01$.

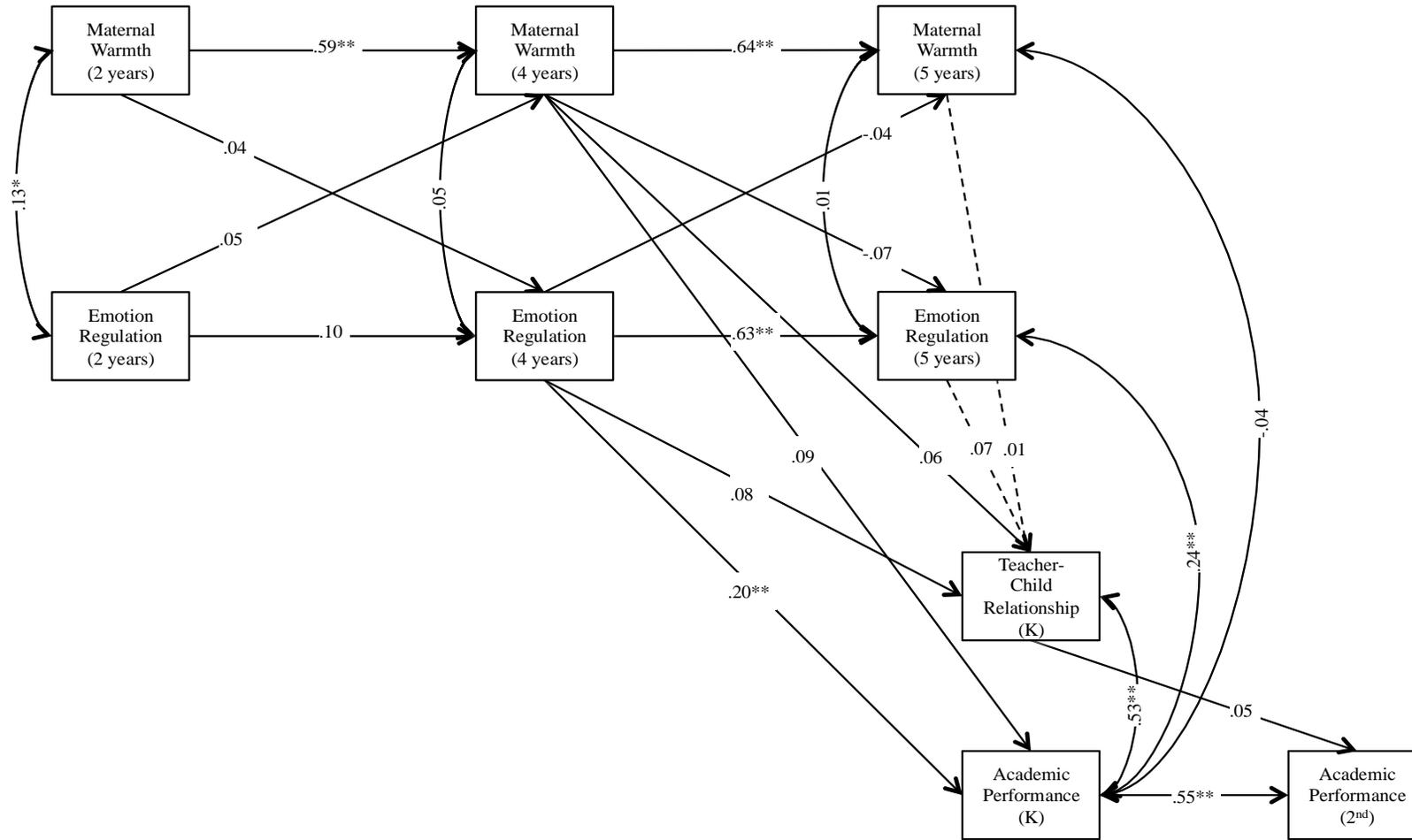
Figure 9. Path diagram for maternal warmth direct effect model. Control variables are not displayed in the figure; see Table 5 for regression coefficients for the effects of control variables on study variables.



$\chi^2(30) = 107.45, p < .05, RMSEA = .08, CFI = .86, TLI = .70, SRMR = .07$

* $p < .05$. ** $p < .01$.

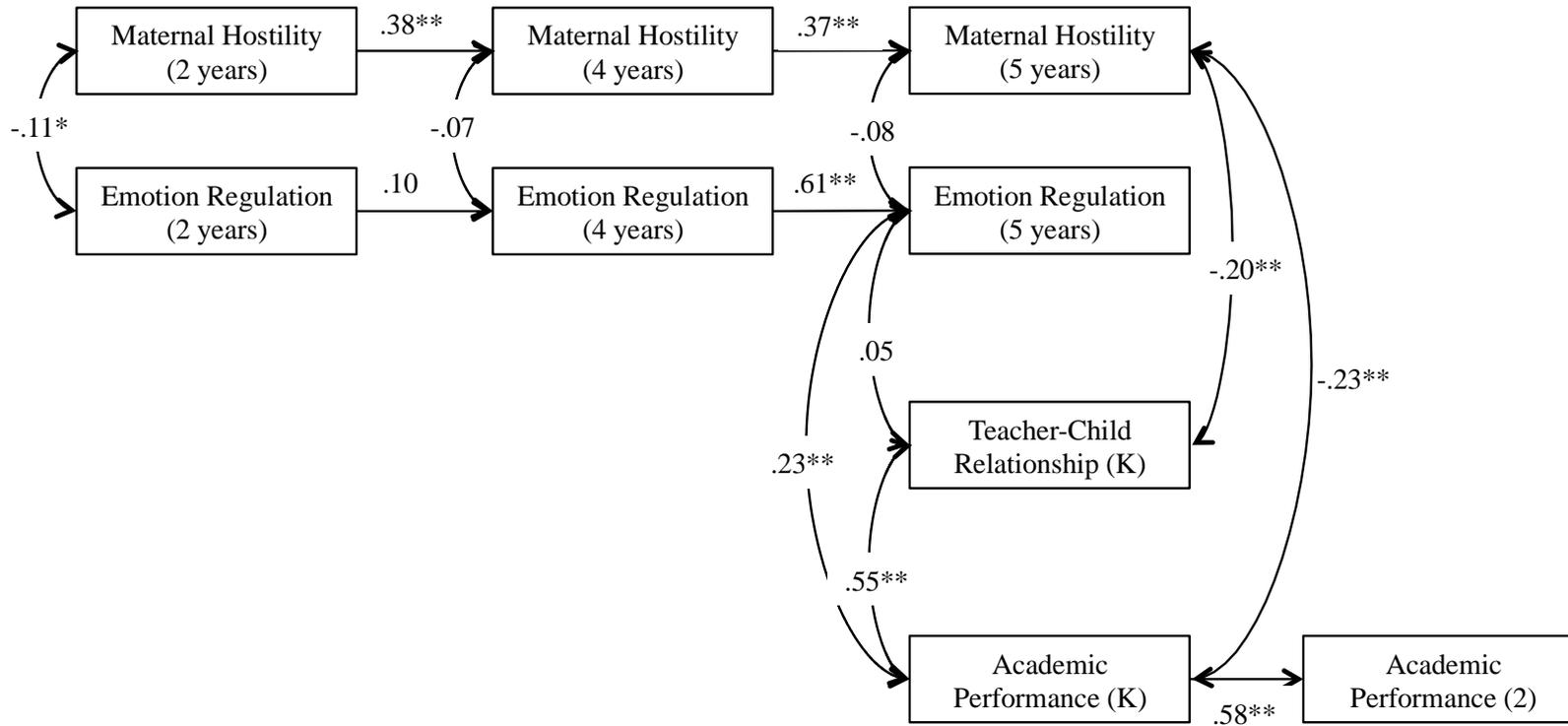
Figure 10. Path diagram for emotion regulation direct effect model. Control variables are not displayed in the figure; see Table 5 for regression coefficients for the effects of control variables on study variables.



$\chi^2(29) = 130.99, p < .05, RMSEA = .09, CFI = .88, TLI = .73, SRMR = .07$

* $p < .05$. ** $p < .01$.

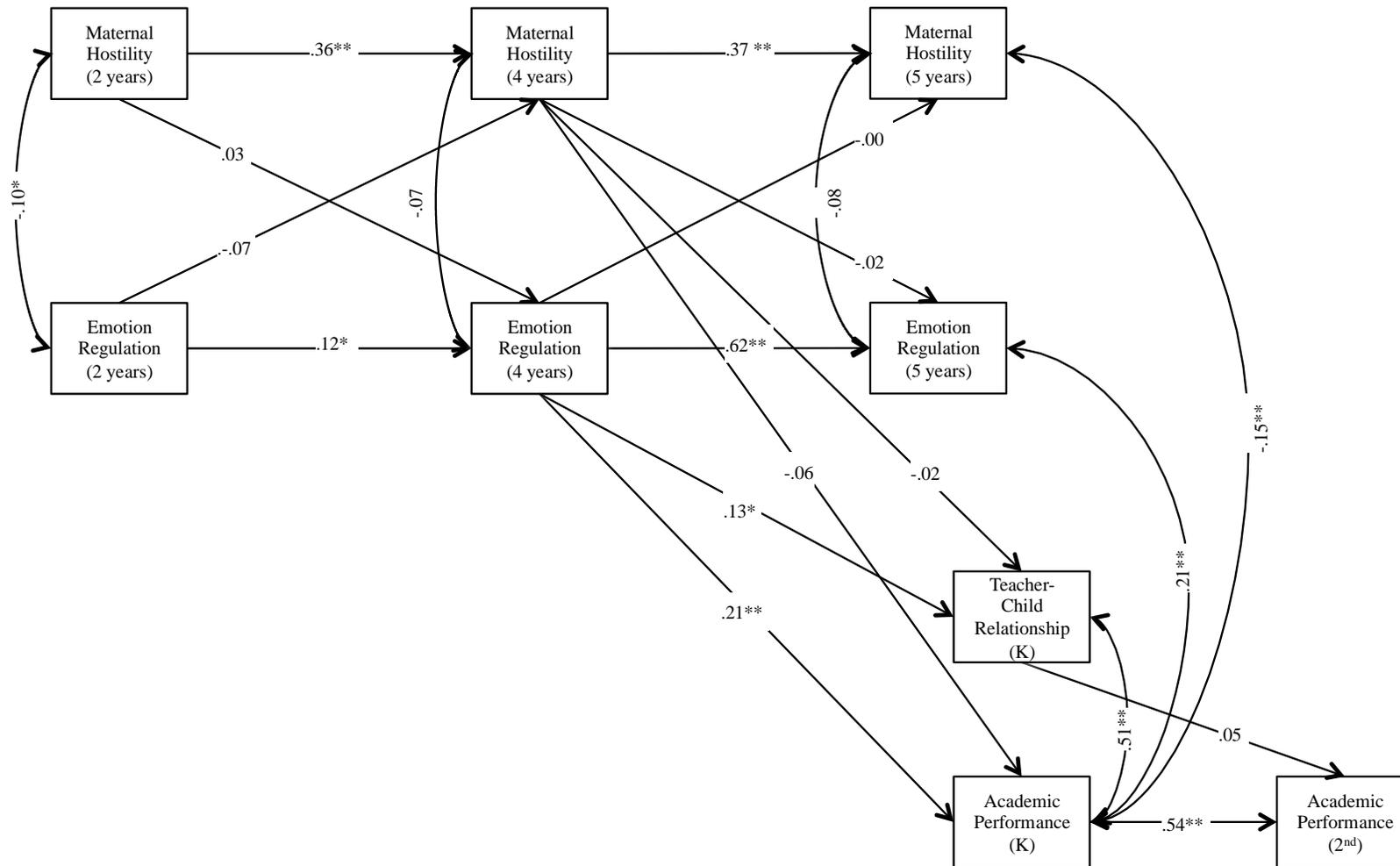
Figure 11. Path diagram for maternal warmth and emotion regulation direct effects model. Control variables are not displayed in the figure; see Table 5 for regression coefficients for the effects of control variables on study variables.



$\chi^2(38) = 112.91, p < .05, RMSEA = .07, CFI = .86, TLI = .77, SRMR = .09$

* $p < .05$; ** $p < .01$

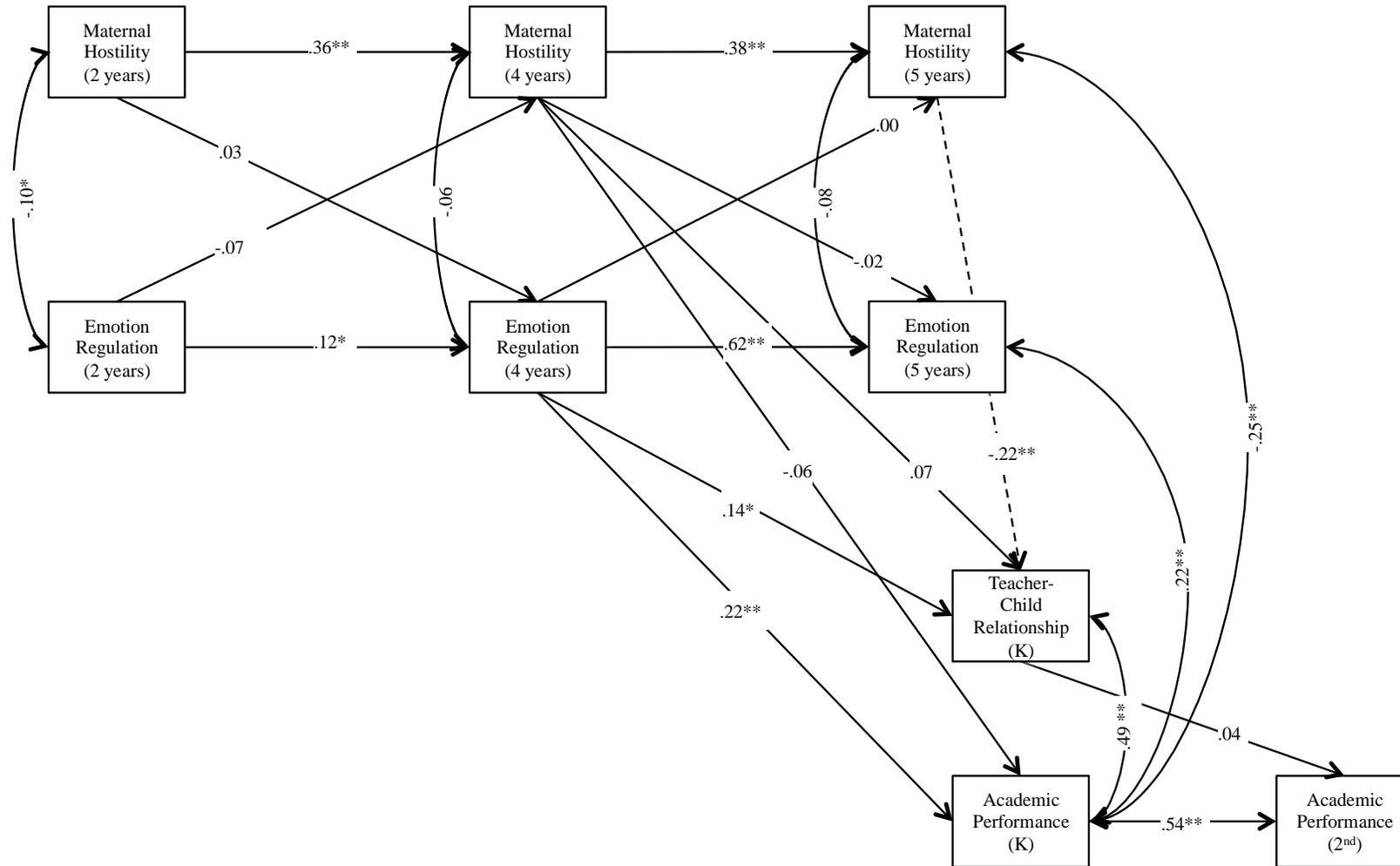
Figure 12. Path diagram for hostility continuity model. Control variables are not displayed in the figure.



$\chi^2(31) = 108.10, p < .05, RMSEA = .08, CFI = .87, TLI = .72, SRMR = .08$

* $p < .05$; ** $p < .01$

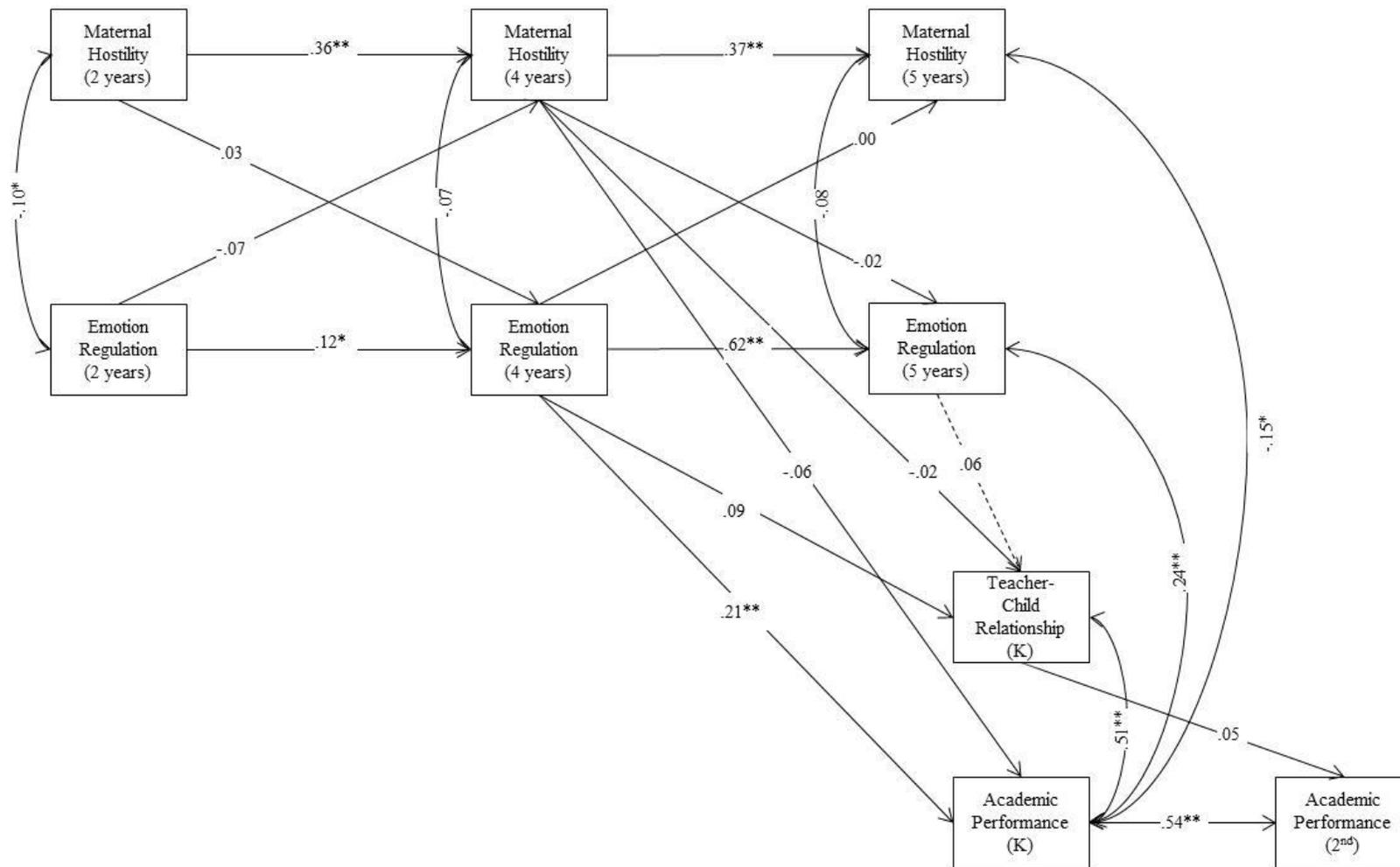
Figure 13. Path diagram for no direct effects model. Control variables are not displayed in the figure.



$\chi^2(30) = 95.87, p < .05, RMSEA = .07, CFI = .88, TLI = .75, SRMR = .07$

* $p < .05$. ** $p < .01$.

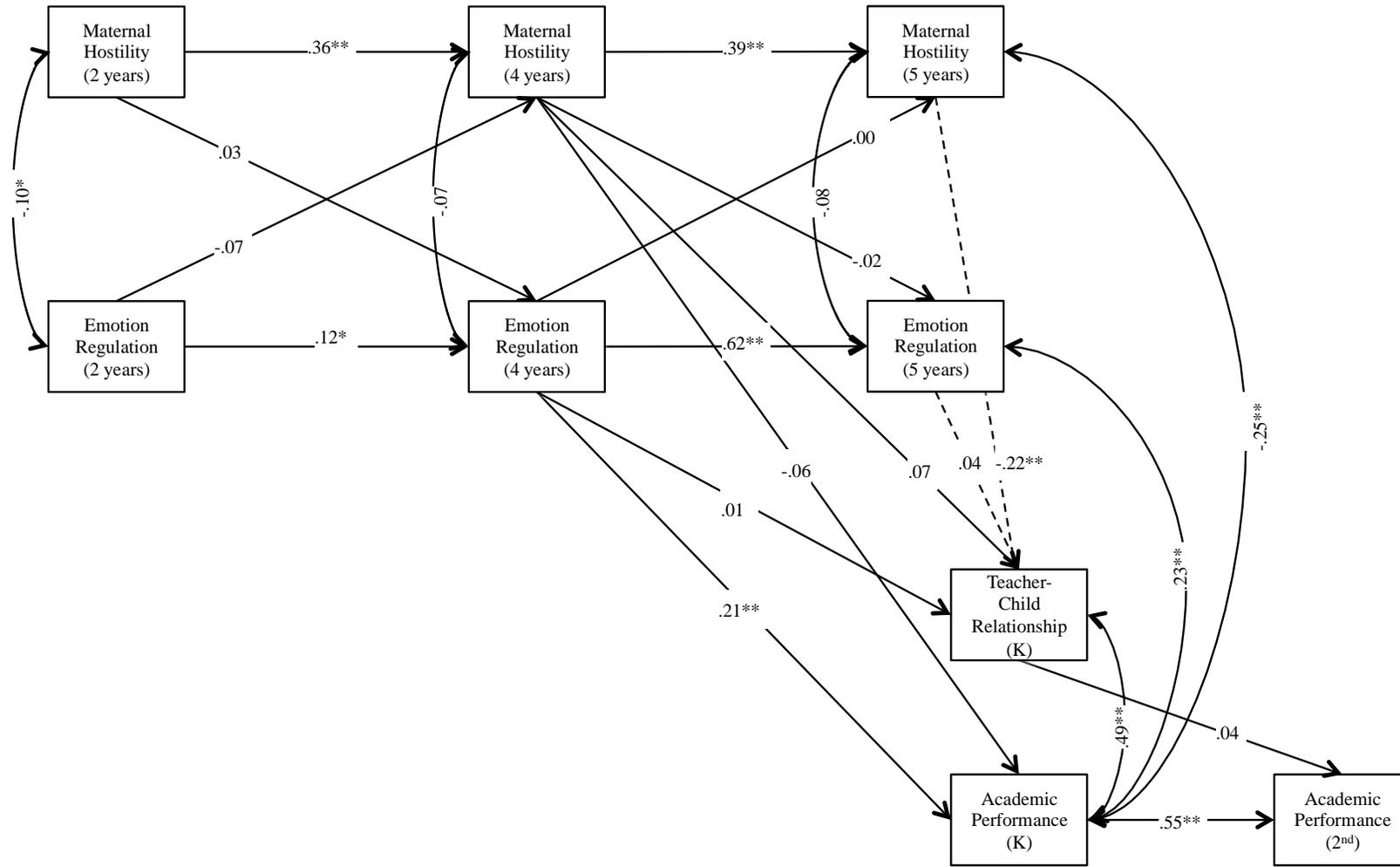
Figure 14. Path diagram for maternal hostility direct effect model. Control variables are not displayed in the figure.



$\chi^2(30)=107.45$, $p<.05$; RMSEA=.08; CFI=.86; SRMR=.07

* $p<.05$. ** $p<.01$.

Figure 15. Path diagram for emotion regulation (exploratory analysis) direct effect model. Control variables are not displayed in the figure.



$\chi^2(29) = 95.55, p < .05, RMSEA = .07, CFI = .88, TLI = .74, SRMR = .07$

* $p < .05$. ** $p < .01$.

Figure 16. Path diagram for maternal hostility and emotion regulation direct effects model. Control variables are not displayed in the figure.

APPENDIX B
QUESTIONNAIRES

Toddle Behavior Assessment Questionnaire

ID#: ___ Today's Date ___/___/___ Child's Gender _____ Birthdate: ___/___/___ Age of Child ___, ___ (mos, wks)

INSTRUCTIONS: Please read carefully before starting.

This questionnaire should be filled out by the mother. As you read each description of the child's behavior below, please indicate how often the child did this during the last month by circling one of the numbers in the left column. These numbers indicate how often you observed the behavior described during the last month.

(1) Never (2) Very Rarely (3) Less than (4) About half (5) More than (6) Almost (7) Always (NA) Does not apply half the time the time half the time always

The "Not Applicable" column (NA) is used when you did not see the child in the situation described during the last month. For example. If the situation mentions the child going to the doctor and there was not time in the last month when the child went to the doctor, circle the NA column. "Does not apply" (NA) is different from "Never" (1). "Never" is used when you saw the child in the situation but the child never engaged in the behavior mentioned during the last month. **Please be sure to circle a number or NA for every item.**

PLAYING

When playing inside the house (ex. Because of bad weather), how often did your child:

- | | | | | | | | | |
|---------------------------|---|---|---|---|---|---|---|----|
| 1. Run through the house? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 2. Climb over furniture? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

When playing on a movable toy, such as a tricycle, how often did your child:

- | | | | | | | | | |
|---|---|---|---|---|---|---|---|----|
| 3. Attempt to go as fast as s/he could? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
|---|---|---|---|---|---|---|---|----|

When s/he saw other children while in park or playground, how often did your child:

- | | | | | | | | | |
|---|---|---|---|---|---|---|---|----|
| 4. Approach and immediately join in play? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 5. Join in laughing and giggling? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

When playing alone in a sandbox (ex. Digging sand to fill up toys), how often did your child:

- | | | | | | | | | |
|--|---|---|---|---|---|---|---|----|
| 6. Remain interested for 30 minutes or longer? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 7. Remain interested for 10 minutes or longer? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 8. Remain interested for less than 10 minutes? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

***When you removed something your child should not have been playing with, how often did s/he:**

- | | | | | | | | | |
|----------------------------------|---|---|---|---|---|---|---|----|
| 9. Scream? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 10. Try to grab the object back? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

11. Follow your request without signs of anger? 1 2 3 4 5 6 7 NA
- When making a discovery (such as fitting two Lego pieces together, learning to stack blocks, or learning to turn a light switch on and off), how often did your child:**
12. Smile? 1 2 3 4 5 6 7 NA
13. Seem pleased? 1 2 3 4 5 6 7 NA
- *When your child was asked to share her/his toys, how did s/he:**
14. Protest in a whining tone of voice? 1 2 3 4 5 6 7 NA
15. Follow the request without signs of anger? 1 2 3 4 5 6 7 NA
- When coloring by her/himself, how often did s/he:**
16. Continue to color alone for 20 minutes or more? 1 2 3 4 5 6 7 NA
17. Continue to color alone for 10-20 minutes? 1 2 3 4 5 6 7 NA
- When in a shopping mall or store, how often did your child:**
18. Seem eager to explore the store? 1 2 3 4 5 6 7 NA
- *When another child took away a favorite toy that your child was playing with, how often did s/he:**
19. Object? 1 2 3 4 5 6 7 NA
20. Find something else to play with? 1 2 3 4 5 6 7 NA
21. Try to hit, kick, or bite the other child? 1 2 3 4 5 6 7 NA
- When playing quietly with one of her/his favorite toys, how often did your child?**
22. Smile? 1 2 3 4 5 6 7 NA
23. Make happy noises? 1 2 3 4 5 6 7 NA
- *When your child wanted to play outside, but you said “no”, how often did s/he:**
24. Protest by crying loudly? 1 2 3 4 5 6 7 NA
25. Protest in a whining tone of voice? 1 2 3 4 5 6 7 NA
26. Pout or frown? 1 2 3 4 5 6 7 NA
- When looking at picture books by her/himself, how often did you child:**
27. Continue to look through two or more books by her/himself? 1 2 3 4 5 6 7 NA
28. Look at only part of one book before losing interest? 1 2 3 4 5 6 7 NA
- When your child joined in an active game with other children (ex. One that involved running or jumping), how often did s/he:**
29. Keep up with the most energetic and active children? 1 2 3 4 5 6 7 NA
- How often did your child play alone with her/his favorite toy for:**
30. 30 minutes or longer? 1 2 3 4 5 6 7 NA
31. 10 minutes or longer? 1 2 3 4 5 6 7 NA
32. Less than 10 minutes? 1 2 3 4 5 6 7 NA
- While being tossed about playfully or wrestled with, how often did your child:**
33. Smile? 1 2 3 4 5 6 7 NA
34. Laugh? 1 2 3 4 5 6 7 NA

35. Ask for more? 1 2 3 4 5 6 7 NA

When you told your child s/he would have to play alone for a short time, how often did:

36. s/he require constant encouragement to remain constructively occupied? 1 2 3 4 5 6 7 NA

37. Just one activity or object keep her/him occupied? 1 2 3 4 5 6 7 NA

How often in the past month did your child:

38. Play games which involved running around, banging, or dumping toys out? 1 2 3 4 5 6 7 NA

39. Play quiet games that did not involve moving, such as looking at books or arranging toys?

1 2 3 4 5 6 7 NA

While playing with a detailed or complicated toy (such as a big doll house or toy garage),

How often did your child:

40. Explore the toy thoroughly? 1 2 3 4 5 6 7 NA

41. Become easily bored or restless? 1 2 3 4 5 6 7 NA

42. Only give a toy a quick try? 1 2 3 4 5 6 7 NA

EATING, DRESSING, BATHING, AND GOING TO BED

***When your child was given something to eat or drink that s/he did not like, how often did s/he:**

43. Cry? 1 2 3 4 5 6 7 NA

44. Accept the food or drink without sign of anger or protest? 1 2 3 4 5 6 7 NA

45. Push the plate away? 1 2 3 4 5 6 7 NA

***When your child wanted dessert before dinner was finished but did not get it, how often did s/he:**

46. Protest by crying loudly? 1 2 3 4 5 6 7 NA

47. Push the plate away and refuse to eat? 1 2 3 4 5 6 7 NA

When in the bathtub, how often did you child:

48. Laugh? 1 2 3 4 5 6 7 NA

49. Babble or talk happily? 1 2 3 4 5 6 7 NA

50. Sit quietly? 1 2 3 4 5 6 7 NA

51. Splash or kick? 1 2 3 4 5 6 7 NA

52. Play with toys with a lot of energy? (IF the child never has toys in the bath, mark NA.)

1 2 3 4 5 6 7 NA

When being dressed or undressed, how often did your child:

53. Squirm or try to get away? 1 2 3 4 5 6 7 NA

54. Lie or sit quietly long enough for you to get her/him ready? 1 2 3 4 5 6 7 NA

When your child was having her/his hair brushed or face washed, how often did s/he:

55. Act playfully? 1 2 3 4 5 6 7 NA

When being gently rocked or hugged, how often did you child:

56. Smile? 1 2 3 4 5 6 7 NA

57. Giggle? 1 2 3 4 5 6 7 NA

*When it was time for bed or a nap and your child did not want to go, how often did s/he:

58. Protest by crying loudly? 1 2 3 4 5 6 7 NA
59. Physically resist or struggle? 1 2 3 4 5 6 7 NA

OTHER ASPECTS OF YOUR CHILD'S BEHAVIOR

When your child was involved in a game or activity by her/himself and you interrupted the game because it was mealtime or time for an outing, how often did your child:

60. Shift attention rapidly to the new activity? 1 2 3 4 5 6 7 NA

When given a wrapped package or new toy in a bag, how often did your child:

61. Remain neutral (ex. Not smile)? 1 2 3 4 5 6 7 NA
62. Squeal with joy? 1 2 3 4 5 6 7 NA
63. Laugh? 1 2 3 4 5 6 7 NA

While reading a story of average length to your child, how often did s/he:

64. Remain attentive during the entire story? 1 2 3 4 5 6 7 NA
65. Become restless after the first few pages? 1 2 3 4 5 6 7 NA

When at the doctor's office, how often did your child:

66. Cling to the parent? 1 2 3 4 5 6 7 NA
67. Seem unconcerned and comfortable? 1 2 3 4 5 6 7 NA
68. Cry or struggle when the doctor tried to touch her/him? 1 2 3 4 5 6 7 NA

When the child needed to sit still, as in church, a waiting room, or restaurant, how often did s/he:

69. Try to climb out of the chair? 1 2 3 4 5 6 7 NA
70. Paly quietly with 1 or 2 toys? 1 2 3 4 5 6 7 NA
71. Try to climb all over other chairs? 1 2 3 4 5 6 7 NA
72. Remain still and calm even though other children started to giggle laugh?
1 2 3 4 5 6 7 NA

When first meeting a stranger coming to visit in the home, how often did your child:

73. Allow her/himself to be picked up without protest? 1 2 3 4 5 6 7 NA
74. Abandon the parent to go to the stranger? 1 2 3 4 5 6 7 NA
75. "warm up" to the stranger within 10 minutes? 1 2 3 4 5 6 7 NA

While watching a favorite children's television program such as Sesame Street, how often did your child:

76. Remain attentive for the entire show? 1 2 3 4 5 6 7 NA
77. Watch only the first few minutes of the show before showing signs of restlessness?
1 2 3 4 5 6 7 NA

When placed in a car seat or stroller, how often did your child:

78. Kick? 1 2 3 4 5 6 7 NA
79. Squirm? 1 2 3 4 5 6 7 NA
80. Sit still? 1 2 3 4 5 6
7 NA

When the child knew the parents were about to leave her/him at home, how often did the child:

- | | | | | | | | | |
|-----------------------------------|---|---|---|---|---|---|---|----|
| 81. Cry? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 82. Cling to the parent? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 83. Show no evidence of distress? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

When one of the parents' friends, who does not have daily contact with your child, visited the home, how often did the child:

- | | | | | | | | | |
|--|---|---|---|---|---|---|---|----|
| 84. Check with the parent for assurance? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 85. Talk much less than usual? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 86. Enthusiastically greet them? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 87. Squeal with joy? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 88. Smile? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 89. Babble or talk happily? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

***While shopping, if you did not agree to buy your child a toy that s/he wanted, how often did s/he:**

- | | | | | | | | | |
|--|---|---|---|---|---|---|---|----|
| 90. Protest in a whining tone of voice? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 91. Physically struggle when you tried to separate her/him from the toy? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

***When you were going out and your child did not want to stay with the regular sitter, how often did s/he:**

- | | | | | | | | | |
|-----------------------------|---|---|---|---|---|---|---|----|
| 92. Pout or frown? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 93. Show no signs of anger? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

How often did interesting outdoor sights (such as water sprinklers or windsocks hanging outside) hold your child's attention for:

- | | | | | | | | | |
|--------------------------|---|---|---|---|---|---|---|----|
| 94. 5 minutes or longer? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 95. Less than 5 minutes? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

***When you did not allow your child to do something for her/himself (ex. Dressing, getting into car seat),**

how often did your child:

- | | | | | | | | | |
|---|---|---|---|---|---|---|---|----|
| 96. Show signs of anger because s/he wanted to do it her/himself? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 97. Try to push you away? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

***If you were not able to give immediate attention o your child because you were busy (ex. You were cooking dinner or talking on the phone), how often did your child:**

- | | | | | | | | | |
|--|---|---|---|---|---|---|---|----|
| 98. Cry loudly? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 99. Find something else to do until you were free? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

While a story was being read to your child, how often did s/he:

- | | | | | | | | | |
|--------------------|---|---|---|---|---|---|---|----|
| 100. Sit quietly? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 101. Get restless? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

When first visiting a babysitting co-op, daycare center, or church nursery, how often did your child:

- | | | | | | | | | |
|---|---|---|---|---|---|---|---|----|
| 102. Cry when not being held by the parent and resist being put down? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 103. Feel at ease within 10 minutes? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 104. Immediately begin to explore? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

When your child was being approached by an unfamiliar adult while shopping or out walking, how often did your child:

- | | | | | | | | | |
|--|---|---|---|---|---|---|---|----|
| 105. Babble or talk? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 106. Show distress or cry? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 107. Avoid possible danger by looking to parent for assurance? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

***When you turned off the television (ex. Bedtime, dinnertime, or leaving), how often did your child:**

- | | | | | | | | | |
|-----------------------|---|---|---|---|---|---|---|----|
| 108. Throw a tantrum? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
|-----------------------|---|---|---|---|---|---|---|----|

***When it was time to leave a friend's house and your child did not want to go, how often did s/he:**

- | | | | | | | | | |
|---|---|---|---|---|---|---|---|----|
| 109. Follow you without signs of anger? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
|---|---|---|---|---|---|---|---|----|

When your child was playing alone or with a friend and a friend or relative (not in immediate family) came into the room, how often did s/he:

- | | | | | | | | | |
|---|---|---|---|---|---|---|---|----|
| 110. Temporarily ignore the visitor and continue playing? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
|---|---|---|---|---|---|---|---|----|

When you or another person were visibly upset, how often did your child:

- | | | | | | | | | |
|----------------------|---|---|---|---|---|---|---|----|
| 111. Smile or laugh? | 1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
|----------------------|---|---|---|---|---|---|---|----|

*Indicates items were used to compute anger proneness subscale used in this study.

Children's Emotions

The following questions are about ranges of emotions that children often display. Please circle the answer you feel best describes how often your child displays these emotions.

	Never	Sometimes	Often	Always
1. S/he is a cheerful child.*	1	2	3	4
2. S/he exhibits wide mood swings (for example, the child's emotional state is difficult to anticipate because s/he moves quickly from very happy to very sad or mad)	1	2	3	4
3. S/he responds positively when adults talk to or pay attention to her/him.*	1	2	3	4
4. S/he transitions well from one activity to another (for example, does not become anxious, angry, distressed, or overly excited when moving from one activity to another)	1	2	3	4
5. S/he can recover quickly from episodes of upset or distress (for example, does not pout or remain sullen, anxious, or sad after emotionally distressing events)	1	2	3	4
6. S/he is easily frustrated.	1	2	3	4
7. S/he responds positively when other children talk to or pay attention to her/him.*	1	2	3	4
8. S/he is prone to angry outbursts/tantrums easily.	1	2	3	4
9. S/he is able to delay gratification; can wait for something when asked to do so.	1	2	3	4
10. S/he takes pleasure in the distress of others (for example, laughs when another person gets hurt or punished; enjoys teasing others.)	1	2	3	4
11. S/he can modulate excitement in emotionally arousing situations (for example, does not get "carried away" in high energy play situations, or overly excited in inappropriate contexts.)	1	2	3	4
12. S/he is whiny or clingy with adults.	1	2	3	4
13. S/he is prone to disruptive outbursts of energy and exuberance.	1	2	3	4

14. S/he responds angrily to limit-setting by adults (for example, gets upset when told “no”)	1	2	3	4
15. S/he can say when s/he is sad, angry, mad, fearful or afraid.*	1	2	3	4
16. S/he seems sad or listless.	1	2	3	4
17. S/he is overly exuberant/excitable when attempting to engage others in play.	1	2	3	4
18. S/he displays flat affect (for example, expression is vacant and unexpressive, child seems emotionally absent)	1	2	3	4
19. S/he responds negatively when children talk to or pay attention to her/him (for example, speaks in an angry tone of voice or responds angrily)	1	2	3	4
20. S/he is impulsive.	1	2	3	4
21. S/he is empathic towards others; shows concern or sadness when others are upset or distressed.*	1	2	3	4
22. S/he displays exuberance that others find intrusive or disruptive.	1	2	3	4
23. S/he displays appropriate negative affect (for example, anger, fear, frustration, distress) in response to hostile, aggressive or intrusive play by peers.*	1	2	3	4
24. S/he displays negative affect when attempting to engage others in play.	1	2	3	4

*Indicates items were used to compute emotion regulation subscale used in this study.

STUDENT-TEACHER RELATIONSHIP SCALE

Robert C. Pianta

Child: _____ Teacher: _____ Grade: _____

Please reflect on the degree to which each of the following statements currently applies to your relationship with this child. Using the scale below, circle the appropriate number for each item.

Definitely does not apply 1	Not really 2	Neutral/not sure 3	Applies somewhat 4	Definitely applies 5	
1. I share an affectionate, warm relationship with this child.	1	2	3	4	5
2. This child and I always seem to be struggling with each other.	1	2	3	4	5
3. If upset, this child will seek comfort from me.	1	2	3	4	5
4. This child is uncomfortable with physical affection or touch from me.	1	2	3	4	5
5. This child values his/her relationship with me.	1	2	3	4	5
6. This child appears hurt or embarrassed when I correct him/her.	1	2	3	4	5
7. When I praise this child s/he beams with pride.	1	2	3	4	5
8. This child reacts strongly to separation from me.	1	2	3	4	5
9. This child spontaneously shared information about himself/herself.	1	2	3	4	5
10. This child is overly dependent on me.	1	2	3	4	5
11. This child easily becomes angry with me.	1	2	3	4	5
12. This child tries to please me.	1	2	3	4	5
13. This child feels that I treat him/her unfairly.	1	2	3	4	5
14. This child asks for my help when s/he really does not need help.	1	2	3	4	5
15. It is easy to be in tune with what this child is feeling.	1	2	3	4	5
16. This child sees me as a source of punishment and criticism.	1	2	3	4	5
17. This child expresses hurt or jealousy when I spend time with other children.	1	2	3	4	5
18. This child remains angry or is resistant after being disciplined.	1	2	3	4	5
19. When this child is misbehaving, s/he responds well to my look or tone of voice.	1	2	3	4	5
20. Dealing with this child drains my energy.	1	2	3	4	5
21. I've noticed this child copying my behavior or ways of doing things.	1	2	3	4	5
22. When this child is in a bad mood, I know we're in for a long and difficult day.	1	2	3	4	5
23. This child's feelings toward me can be unpredictable or can change suddenly.	1	2	3	4	5
24. Despite my best efforts, I'm uncomfortable with how this child and I get along.	1	2	3	4	5
25. This child whines and cries when s/he wants something from me.	1	2	3	4	5
26. This child is sneaky or manipulative with me.	1	2	3	4	5

27. This child openly shares his/her feelings and experiences with me.	1	2	3	4	5
28. My interactions with this child make me feel effective and confident.	1	2	3	4	5

All indicates items were used to compute teacher-child relationship subscale used in this study

Academic Performance Rating Scale

For each of the below items, please estimate the student's performance over the PAST WEEK. For each item, please circle ONE choice only.

1. Estimate the percentage of written math work <i>completed</i> (regardless of accuracy) relative to classmates.*	0-49% 1	50-69% 2	70-79% 3	80-89% 4	90-100% 5
2. Estimate the percentage of language arts work <i>completed</i> (regardless of accuracy) relative to classmates.*	0-49% 1	50-69% 2	70-79% 3	80-89% 4	90-100% 5
3. Estimate the <i>accuracy</i> of completed written math work (i.e., percent correct of work done).*	0-49% 1	50-69% 2	70-79% 3	80-89% 4	90-100% 5
4. Estimate the <i>accuracy</i> of completed written language arts work (i.e., percent correct of work done).*	0-49% 1	50-69% 2	70-79% 3	80-89% 4	90-100% 5
5. How consistent has the quality of this student's academic work been over the past week?*	Consistently Poor 1	More Poor than Successful 2	Variable 3	More Successful than Poor 4	Consistently Successful 5
6. How frequently does the student accurately follow teacher instructions and/or class discussion during large-group (e.g., whole class) instruction?*	Never 1	Rarely 2	Sometimes 3	Often 4	Very Often 5
7. How frequently does the student accurately follow teacher instructions and/or class discussion during small-group (e.g., reading group) instruction?*	Never 1	Rarely 2	Sometimes 3	Often 4	Very Often 5
8. How quickly does this student learn new material (i.e., pick up novel concepts)?*	Very Slowly 1	Slowly 2	Average 3	Quickly 4	Very Quickly 5
9. What is the quality or neatness of this student's handwriting?	Poor 1	Fair 2	Average 3	Above Average 4	Excellent 5

10. What is the quality of this student's reading skills?*	Poor 1	Fair 2	Average 3	Above Average 4	Excellent 5
11. What is the quality of this student's speaking skills?*	Poor 1	Fair 2	Average 3	Above Average 4	Excellent 5
12. How often does the student complete written work in a careless, hasty fashion?	Never 1	Rarely 2	Sometimes 3	Often 4	Very Often 5
13. How frequently does the student take more time to complete work than his/her classmates?*	Never 1	Rarely 2	Sometimes 3	Often 4	Very Often 5
14. How often is the student able to pay attention without you prompting him/her?*	Never 1	Rarely 2	Sometimes 3	Often 4	Very Often 5
15. How frequently does this student require your assistance to accurately complete his/her academic work?*	Never 1	Rarely 2	Sometimes 3	Often 4	Very Often 5
16. How often does the student begin written work prior to understanding the directions?	Never 1	Rarely 2	Sometimes 3	Often 4	Very Often 5
17. How frequently does this student have difficulty recalling material from a previous day's lesson?*	Never 1	Rarely 2	Sometimes 3	Often 4	Very Often 5
18. How often does the student appear to be staring excessively or 'spaced out'?*	Never 1	Rarely 2	Sometimes 3	Often 4	Very Often 5
19. How often does the student appear withdrawn or tend to lack an emotional response in a social situation?*	Never 1	Rarely 2	Sometimes 3	Often 4	Very Often 5

* Indicates items were used to compute teacher-child relationship subscale used in this study