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RECIPROCAL ASSOCIATIONS BETWEEN PARENT-CHILD RELATIONSHIP
QUALITY AND CHILDREN'S EMOTIONAL REACTIVITY

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ABSTRACT

The NICHD SECCYD longitudinal dataset was utilized to examine the reciprocal associations between mother-child and father-child relationships with child emotion reactivity. Parent-child interactions have been shown to affect children's ability to self-regulate their emotions and improve social and emotional competence in middle childhood (McDowell, Kim, O'Neil, & Parke, 2002). Furthermore, the literature shows a bidirectional effect between parent and child interactions. We investigated the reciprocal associations between parent-child relationship quality and children's emotional reactivity from 3rd through 6th grade. We also endeavored to contribute to the few studies that have addressed the effects of father-child relationships on children's emotional reactivity. In the current study, we used a subsample of the NICHD SECC dataset which consisted of 648 triads, including mother (87% Caucasian), father (89% Caucasian), and child (50% male, 86% Caucasian) all living together during the four time points. Mothers and fathers completed the short form of the Child-Parent Relationship Scale to evaluate their levels of closeness and conflict with the child (Pinata, 2001). Mothers and fathers completed the Parent Report on Children's Reactions at 3rd grade, and mothers, fathers, and teachers completed the TRCR at 4th, 5th, and 6th grade. Two cross-lagged models were constructed to assess the reciprocal associations between child emotion reactivity and parent-child relationship quality (i.e., conflict and closeness). Interestingly, parent-child conflict was not a significant predictor of child emotion reactivity. However, parent-child conflict was significantly predicted by child emotion reactivity at all time points. Results indicated that higher child emotion reactivity was associated with higher parent-child conflict reported by both mother and father the next year. In addition, none of the cross-lag effects were significant. Therefore, future research should further investigate the importance of child emotion reactivity in parent-child conflict and the mechanisms of the bidirectional relationship.

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Chapter 1

Introduction

During childhood, one key area of social and emotional development is the ability to regulate one's emotions (Cole, Michel, & Teti, 1994). Much of the research on emotion regulation and reactivity focuses on children's increasing regulatory abilities during the toddler and preschool years. The research on elementary school children is more limited. As children enter elementary school and begin to spend more time with peers, their ability to effectively regulate their emotions is particularly important for their social competence (Eisenberg & Fabes, 2006). Prior research has shown that elementary school children who are poor regulators have a greater risk of developing problem behaviors, such as aggression towards other children, which can lead to peer rejection (Eisenberg & Fabes, 1996). In addition, studies have found that preschool children, who exhibit higher levels of negative emotional reactivity, such as frequent frowning or crying, tended to be more aggressive and were more likely to avoid playing with peers (Carson & Parke, 1996). Children's emerging regulatory ability is influenced by their daily interactions with caregivers, family members, and peers. Parent-child relationships, specifically, are one of children's primary settings for learning and practicing regulating their emotions (Thompson & Meyer, 2007). During daily interactions parents assist young children by teaching them how to manage their negative emotions such as when they are angry, sad, or scared (Scaramella & Leve, 2004). Parent-child relationships are also bidirectional (Zadeh, Jenkins, & Pepler, 2010). When a child exhibits high levels of negative affectivity, parents can respond with their own negative affect or attempt to help the child work through their negative emotions. One study found reciprocal influences between maternal negativity and children's externalizing

behavior, such as physical aggression and hyperactivity, for children 10-15 years of age (Zadeh, Jenkins, & Pepler, 2010). In another example, Harach and Kuczynski (2005) found that parents reported higher levels of intimacy and stronger relationships with their children who responded to parental requests with compliance. Developing a better understanding of the bidirectional effects between parent-child relationships and children's emotional reactivity could help children avoid the negative outcomes associated with poor regulatory and high levels of negative affectivity. For instance, if an association is found between parent-child relationships and children's emotional reactivity, then family-based interventions could be developed that target both pathways to help parents and children work on their relationships that could result in lower levels of children's negative affectivity. Therefore, the current study aims to examine the reciprocal associations between mother-child and father-child relationship quality and children's emotional reactivity.

Emotion regulation in the most basic sense can be defined as one's ability to control their emotional responses (Thompson, 1994). However, emotion regulation is in fact a multi-faceted construct characterized by behavioral, cognitive, and physiological processes (Thompson, Lewis, & Calkins, 2008). Within the current study, we conceptualize emotion regulation as involving the interconnected processes of reactivity and regulation (Blandon, Calkins, Keane, & O'Brien, 2008). Research indicates that considerable individual differences are evident in both reactivity and regulation (Cole, Michel, & Teti, 1994). Emotional reactivity is generally defined by the intensity, duration, and frequency of emotional responses (Lindahl, Bregman, & Malik, 2012; Eisenberg et al, 1995). For instance, during a frustration task the range of reactivity in preschoolers can range from frowning and negative facial expressions up to throwing tantrums. In middle childhood, high levels of negative emotional reactivity may manifest in yelling and screaming or the slamming of the child's door. In general, a child who is high on reactivity is more likely to be quick to overact to a situation where a child who is low on reactivity would not.

For example, some boys get into an argument on the playground. They disagree as to whether or not someone was out during a baseball game. A boy who is high reactivity may easily get very angry during this argument and subsequently physical attack the other boy. Whereas, a boy who is low on reactivity would be able to remain calm and talk through the conflict not letting his emotions get the better of him.

The other interconnected process is the regulatory component. One aspect of emotional regulation occurs when one becomes aware of their emotions and begins the process of self-managing their expression of emotion (Thompson, 1994). There are considerable improvements in emotion regulation from infancy through the preschool years. In infancy, emotion is purely a reaction to stimuli (Jahromi, Putnam, & Stifter, 2004). Infants do not understand or comprehend their emotions and so they rely on caregivers to help them regulate them. When distressed young infants rely mainly on small motor movements, such as turning away from an unpleasant stimuli, and co-regulation with a primary caregiver in order to regulate their emotions (Thompson, Lewis, & Calkins, 2008; Jahromi, Putnam, & Stifter, 2004). During the toddler and preschool years, children begin to become more self-reliant when it comes to emotion regulation. During this period of time, children adapt strategies such as self-talking, and physically removing themselves from emotionally upsetting situations (i.e. walking away) to aid them in regulating their emotions (Thompson & Calkins, 1996). In contrast, children who struggle to regulate their expression of negative emotions may develop less adaptive coping strategies such as throwing tantrums or hitting. There is less research focused on the development of emotion regulation and reactivity during middle childhood. The research that has been done suggests that emotion regulation becomes more about internal and relies on cognitive processes (Thompson & Calkins, 1996). For example, in middle childhood, children begin to think about their emotions more and start to engage more in activities such as journaling (Garnefski et al., 2007). For example, when an 11-year-old is upset about failing a math test he can either blame his teacher for administering an

unfair exam causing him to get angrier or he can decide he accept that he should have studied more reducing his level of anger. The child's thoughts and cognitions are regulating his emotional response, which may not have been possible earlier before the child entered middle childhood (Garnefski et al., 2007).

A person's levels of regulation and reactivity are not stagnate throughout his or her lifespan, but change due to a person's developmental stage and their experiences. What is consistent across multiple developmental stages is that being able to regulate one's emotions is important for the development of social relationships. Highly reactive children struggle to get along with peers (Carson & Parke, 1996). This trend begins in preschool and continues into adolescents (Carson & Parke, 1996; Hoggins & Leadbeater, 2004; McDowell, Kim, O'Neil, & Parke, 2002). By the time children enter preschool; they are expected to regulate their negative emotions and not do things like punch, bite, or kick others when they are angry as some toddlers might do. During elementary and middle school, emotional regulation becomes more vital as most environments (i.e. school, playground, soccer practice, etc.) begin to expect children to be able to manage their emotions in a socially appropriate way, especially within peer relationships (Kochenderfer-Ladd & Skinner, 2002). Therefore, children who have high emotional reactivity particularly negative affectivity (i.e. anger and aggression towards other children) are at much greater risk to be rejected by their peers (Stormshak, Bellanti & Bierman, 1996). Peer rejection has been correlated with many negative outcomes such as loneliness, depression, anxiety, and chronic absences from school (Kochenderfer-Ladd & Skinner, 2002).

Parent-Child Relationships

Parents play a vital role in the development of children's emotion regulation. Morris et al. (2007) have proposed a model called the Tripartite Model of the Impact of the Family on Children's Emotion Regulation and Adjustment. This model posits that parents influence their children's emotional reactivity and developing emotion regulation through three main pathways:

observation learning, parenting practices, and the emotional climate of the family (Morris et al. 2007). These three aspects of parental influence interact with the child's characteristics to affect the development of the child's ability to regulate their own emotions (Morris et al, 2007). In a review of emotional regulation research, common trends found in the research were emotion regulation and reactivity are related to parenting practices and the development of emotion regulation is affected by the parenting style and family expressiveness (two dimensions that reflect the emotional climate of the family). Within the confines of this model, a positive parent-child relationship, which also reflects a positive family emotional climate, is necessary for the development of children's emotion regulation. Children who are raised by responsive and empathetic parents tend to have lower levels of negative reactivity (i.e. tantrums and aggression; Carson & Parke, 1996). Alternatively, children raised in unsupportive environments tend to become more easily overwhelmed by their emotions causing them to struggle with regulatory control (Thompson, Lewis, & Calkins, 2008). Children in very disorganized environments that lack any support and have extra stressors are also at increased risk for emotional and behavioral problems, which are often driven by regulatory difficulties (Thompson & Calkins, 1996). Current research has been trying to pinpoint what aspects of parent-child relationships are involved in shaping emotion regulation, and how exactly they do so.

Parent-child relationship quality can be measured in different ways. Positive parent-child relationship quality usually consists of high levels of mutual warmth, affection, closeness, and personal sharing and low levels of conflict and shared negative affect (McDowell, Parke, & Wong, 2003; Laible & Thompson, 2002). For the present study, parent-child relationship quality is being defined by parent-child closeness and parent-child conflict. Parent-child closeness is defined in this study as a responsive relationship between parent and child (Driscoll & Pianta, 2011). Parent-child conflict is defined in this study as *deconstructive conflict*, which consists of arguments and disagreements that do not enhance development and are signs of a dysfunctional

relationship (Driscoll & Pianta, 2011). High parent-child relationship quality consists of high levels of closeness and low levels of conflict, whereas low parent-child relationship quality consists of high levels of conflict and low levels of closeness (Driscoll & Pianta, 2011).

Research indicates that the quality of parent-child relationships is important for many developmental outcomes in children from infants to adolescents (Attili, Vermigli, & Roazzi, 2010). Studies have shown that children who are raised by parents who show high levels of warmth, affection, and support perform better in school and have more positive peer interactions throughout the elementary school years (Russell & Russell, 1989; Martin, Ryan, & Brooke-Gunn, 2010). Children's social competence, academic performance, and emotion regulation are just few aspects of development that tend to be positively correlated with the positive quality of parent-child relationships (Russell & Russell, 1989; Martin, Ryan, & Brooke-Gunn, 2010; Attili, Vermigli, & Roazzi, 2010). Similarly, parent-child relationships that have been rated as more negative have been positively correlated with aggression and behavior problems in the child (Attili, Vermigli, & Roazzi, 2010; Thompson & Calkins, 1996). In middle childhood, children begin to become more autonomous, but they still do not have all of the freedoms that most adolescents do (Steinberg, 1987). As children enter middle childhood and adolescents, their relationships with their parents start to change as they begin to spend less time with their parents. Middle childhood starts the transition from a child's emphasis on parental relationships to placing more importance on peer relationships in adolescents. Thus, it is important to examine how the parent-child relationship is associated with emotional regulation and reactivity during middle childhood, since both emotional regulation and reactivity are important contributors to social competence during adolescence (Attili, Vermigli, & Roazzi, 2010), but supports from parents may be decreasing. Despite the importance of this developmental period, there is not as much research on the effects of parent-child relationships on middle childhood. This study will focus

on the possible associations between mothers' and fathers' relationships with their children and their children's emotional reactivity.

Another limitation in the literature is that mother-child relationships have been studied far more frequently than father-child relationships. This focus on mother-child relationships may be due to the fact that, on average, young children generally spend more time with their mothers, and it is assumed learn more from them because of extended time period together (Sayer, Bianchi, & Robinson, 2004). However, as children enter elementary school, fathers tend to spend more time with their children than they did during the preschool years usually under the context of "fun" activities such as play or sporting events (Sayer, Bianchi, & Robinson, 2004). Another factor that has influenced research on father-child relationships is that some studies have found that the effect of mother-child relationship quality is stronger than father-child relationship quality on children's outcomes, such as school readiness and social competence (de Luccie & Davis, 1991). Though, in fact, a better overall representation of the family influences on children's social and emotional takes into account the quality of both relationships. For instance, one study found that mothers' and fathers' supportiveness interacted to predict children's school readiness. Specially, father's supportiveness was important to a child's school readiness in cases where the child had an unsupportive mother (Martin, Ryan, & Brooke-Gunn, 2010). In this case, the father-child relationship acted more as a buffer relationship in the case when the mother-child relationship is not meeting the needs of the child.

Other research, however, suggests that fathers play a unique role in their children's social and emotional development. Fathers' role in parenting is often times different than that of mothers. Fathers often spend time with their children through play activities usually beginning as rough and tumble play and later becoming sporting activities (Sayer, Bianchi, & Robinson, 2004). High energy play with fathers is emotionally arousing for children (de Luccie & Davis, 1991). Due to the high level of arousal, playtime with father becomes a chance for children to work on

their emotion reactivity and regulation (de Luccie & Davis, 1991). In a study examining preschool children's peer competence, it was found that fathers who responded to their child's negative affect with their own negative affect tended to have children who shared less, avoided others, and were more aggressive towards peers (Carson & Parke, 1996). This study found a relationship between the father-child relationship and the child's negative emotional reactivity. It is also important to note that the effects were a result of the shared negative affectivity between father and child. The child had to display negative affectivity first in the relationship and then the father responded with negative affectivity of his own for there to be the association to negative peer outcomes (Carson & Parke, 1996). A relationship was not found between fathers who responded with more understanding and less negativity affectivity to their child's emotional reactivity. In a study investigating father-child relationships across multiple time points, fathers assessed themselves as being most involved with and most trusting of their children in middle childhood compared to when their children are in other age groups (de Luccie & Davis, 1991). Driscoll & Pianta (2011) also found that fathers reported higher levels of closeness with all of their children as they grew older. In a study examining parents' relationships with their children 10 to 15 years of age, mothers reported increased conflict with their sons as their sons matured through puberty where fathers stayed relatively the same (Steinberg, 1987). These findings suggest that if fathers have an impact on preschool children's peer competence through emotional reactivity, then fathers may have a greater impact on their children during middle childhood if they report that they are more involved during this developmental period as well as children having more of an effect on their fathers.

Transactional Model

Research involving parent-child relationships has generally focused on the effects that parent-child relationships have on child outcomes, such as social competence and emotion regulation (Russell & Russell, 1989; Martin, Ryan, & Brooke-Gunn, 2010; Attili, Vermigli, &

Roazzi, 2010). Transactional perspectives take into account the reciprocal influences within parent-child relationships and highlight how children influence their socialization environment. As stated early, socialization is how children initially learn about emotion regulation and reactivity (Morris et al, 2007). Both parents and child are agents of change in the socialization process, meaning it is not simply the parent teaching the child, but the child adapts and alters how their parents respond to them (Kuczynski & Parkin 2007).

These reciprocal interactions between child and parent are examples of Sameroff's transactional model (1995). Transactional models illustrate the dynamic relationship between children and their environment, where both are constantly influencing the other (Sameroff, 2009). Transactional models are particularly useful for looking how parental and child behaviors change parent-child interactions over time and how parent-child interactions change parental and child behaviors over the same time period (Sameroff, 1995). Parent-child relationships and children's emotional reactivity affect each other through a reciprocal relationship. These reciprocal influences that arise from all from interactions are exactly what the transactional model will be able to test.

Current Study

The current study utilizes longitudinal autoregressive cross-lag models to examine the reciprocal influences between parent-child relationship quality, specifically closeness and conflict, and children's emotional reactivity controlling for the stability in emotional reactivity and parent-child relationships over time (Figure 1). As noted earlier, few studies have examined how parent-child relationships affect emotion reactivity during middle childhood. Many studies target either the first five years of a child's life or the adolescent years. The present study will address this gap. Framed within a transactional model, this study will also examine whether both mother-child and father-child relationships and their effects on the child's levels of emotional

reactivity to be explored while accounting for the reciprocal effects of the child's emotional reactivity on the parent-child relationships.

This study will focus on how parent-child conflict and closeness and the child's emotional reactivity are related and effect during middle childhood. The first aim of the study is to examine whether mother-child and father-child relationship quality influenced children's emotional reactivity at the following time-point. Greater closeness and lower levels of conflict are expected to be associated with lower emotional reactivity. The specific hypotheses are: (1) Higher levels of parent-child closeness will result in lower levels of emotional reactivity across all time points. (2) Higher levels of parent-child conflict will result in higher levels emotional reactivity. The second aim is to examine whether children's emotional reactivity influences later mother-child and father-child relationship quality. The specific hypotheses are: (1) Mother-child relationship quality will have a significant effect on children's emotional reactivity while controlling for father-child relationship quality. (2) Father-child relationship quality will have a significant effect on children's emotional reactivity while controlling for mother-child relationship quality.

Chapter 2

Methods

Participants

The current study included a sample drawn from the NICHD's Study of Early Child Care and Youth Development dataset (SECC), which is a prospective longitudinal study of 1,364 children and their families (NICHD ECCRN, 2001). Families were recruited during hospital visits for the birth of their child in 1991 at ten university hospitals across the United States (University of Arkansas, University of Cal at Irvine, University of Kansas, University of Wellesley, University of Pittsburgh, Temple University, University of Washington, Western Carolina Center, & University of Wisconsin). Families were recruited randomly based on the mother's employment status in a 3:1:1 ratio of full-time, part-time, or no employment. Two weeks after being identified, mothers were called and those interested in participating completed an initial phone interview. Mothers younger than 18 years old at the time of the child's birth, children with disabilities at birth, families who did not anticipate remaining in the area for at least three years, and mothers not sufficiently conversant in English were excluded. Families participated in the initial home visit one month after the child's birth. Data was collected from birth to when the child was 15 years old in four phases across the 10 sites. During each phase there was a home visit, laboratory visit, and a visit to the child care provider or school.

Current Sample. This study utilized data from Phase III, which included four assessments during 3rd, 4th, 5th, and 6th grade respectively. A subsample of 648 mother, father, and child triads were selected on the basis that the father was living in the home with the study child during the targeted time period of 3rd through 6th grade. All mothers and fathers reported were the biological

parents of the child. Most mother-father pairs were married at all four assessments (3rd grade: 97%, 4th grade: 97%, 5th grade: 97%, and 6th grade: 96%). Children were 50% male and 86% Caucasian. Mothers and fathers were also predominantly Caucasian (87% and 89%, respectively). For mothers, 97% had a high school education or GED (30% had some college, 30% had a Bachelor's degree, and 21% had greater than a Bachelor's degree). Almost all father had a high school degree/GED as well (97%, 28% had some college, 28% had a Bachelor's degree, and 23% had greater than a Bachelor's degree). Mother reported the total family income at each assessment (3rd grade: M income = \$91,846, SD = \$71,895; 4th grade: M income = \$95,478, SD = \$72,601; 5th grade: M income = \$101,226, SD = \$79,102; 6th grade: M income = \$103,246, SD = \$80,868).

Procedures

During Phase III, questionnaires were distributed to mothers at biannual lab visits during the 3rd and 5th grade assessments and at biannual home visits during the 4th and 6th grade assessments. They were asked to complete questionnaires during the visits if possible. If they could not complete them, they were given a pre-addressed envelope to return questionnaires. Father questionnaires were mailed to the house for all four assessments prior to either the lab or home visit. Fathers were to complete questionnaires as quickly as possible and return them in a pre-addressed envelope mailed to them with questionnaires. A packet was sent to each child's school during each assessment at the beginning of the school year asking permission to use academic records. There was a booklet inside each packet for the child's teacher that included a consent form and some questionnaires. Each year, the child's primary teacher who taught all of the child's core subjects was chosen to be the reporting teacher. Once a study child began to have subjects with multiple teachers throughout the average school day (some 5th and 6th graders), the reporting teacher was chosen by the following criteria: 1) The teacher who taught all of the child's core subjects, 2) The teacher who taught most of the child's core subjects, or 3) The

teacher who the target child's mother identified as knowing the child best. If none of the child's teachers fit any of the previous criteria, the child's English teacher was asked to be the reporting teacher. Teachers were asked in November of the each school year if they were willing to participate. If they agreed to participate, they were given the questionnaires and preaddressed envelopes and were asked to return completed questionnaires no later than two weeks after the end of the school year.

Measures

Parent-Child Relationship Quality. Mothers and fathers completed the short form of the Child-Parent Relationship Scale based at all four assessments (Pianta, 2001). This is a 15-item assessment that measures the levels of closeness and conflict within the parent-child relationship. Each item was rated on a 5-point Likert scale ranging from (1) *Definitely does not apply to* (5) *Definitely applies*. The closeness subscale assesses the degree of closeness in the parent-child relationship and included statements such as "I share an affectionate, warm relationship with my child." Total closeness sum scores were computed with scores ranging from 8 to 40 with higher scores indicating more reported closeness between parent and child. The reliability for the closeness subscale for mothers and fathers was generally good (3rd grade: mothers $\alpha = .65$, fathers $\alpha = .81$; 4th grade: mothers $\alpha = .74$, fathers $\alpha = .80$; 5th grade: mothers $\alpha = .73$, fathers $\alpha = .80$; 6th grade: mothers $\alpha = .76$, fathers $\alpha = .82$). The conflict subscale included seven items that included statements such as "My child remains angry or is resistant after being disciplined." Total conflict scores were calculated as a sum of the 7 items. Possible scores ranged from 7 to 35 with higher scores indicating more reported conflict between parent and child. The reliability of the conflict subscale for mothers and fathers was generally good (3rd grade: mothers $\alpha = .84$, fathers $\alpha = .79$; 4th grade: mothers $\alpha = .83$, fathers $\alpha = .83$; 5th grade: mothers $\alpha = .84$, fathers $\alpha = .82$; 6th grade: mothers $\alpha = .85$, fathers $\alpha = .87$).

Children's Emotional Reactivity. Mothers and fathers reported on their child's levels of emotional reactivity by completing the Parent Report of Children's Reactions at all four assessments (Eisenberg et al., 1995). The 10 items were rated on a 5-point Likert scale ranging from (1) *Never* to (5) *Always*, and included statements such as "When my child feels an emotion, either positive or negative, my child feels it strongly." A total sum score was computed with possible scores ranging from 10 to 50 with higher scores indicating higher reported levels of children's emotional reactivity. The reliability for mothers and fathers reports was good (3rd grade: mothers $\alpha = .76$, fathers $\alpha = .69$; 4th grade: mothers $\alpha = .74$, fathers $\alpha = .71$; 5th grade: mothers $\alpha = .77$, fathers $\alpha = .72$; 6th grade: mothers $\alpha = .78$, fathers $\alpha = .73$).

Teachers also reported on the child's levels of emotional reactivity by completing the Teacher Report of Children's Reactions at 4th, 5th, and 6th grade (Shields & Cicchetti, 1997). The 10 items were rated on a 5-point Likert scale ranging from (1) *Never* to (5) *Always*, and included statements such as "When this child accomplishes something difficult, he/she feels delighted or elated." A total sum score was computed with possible scores ranging from 10 to 50. Higher scores indicate higher reported levels of children's emotional reactivity. The reliability for teacher reports across all waves was good (4th grade: $\alpha = .83$; 5th grade: $\alpha = .83$; 6th grade: $\alpha = .84$).

Chapter 3

Results

Missing Data

The percentages of missing data for all study variables at each assessment are presented in Table 1. Most data was available for both mothers and fathers at all four assessments. Fathers were missing on average four times as much data as mothers at each assessment. Most data was also available for teachers from the 4th, 5th, and 6th grade assessments. Given that listwise deletion and mean substitution have been shown to bias parameter estimates and unnecessarily limit power (e.g., Howell, 2007; Widaman, 2006) the cross-lag models were estimated using full information maximum likelihood to account for the missing data.

Preliminary Analysis

Means, standard deviations, and ranges for all study variables are presented in Table 2. Overall, both mothers and fathers reported very high levels of closeness across all assessments. All means for parent-reported closeness were within one or two standard deviations of the maximum score of 40 meaning highest levels of closeness. The minimum score of 8 (lowest levels of closeness) was not within three standard deviations for parent-reported closeness at any of the four assessments. Means for both mother and father reported conflict were closer to the median possible score of 21 (moms $\mu = 15$, dads $\mu = 16$). In this sample, there appears to be greater variability in parent-reported conflict than parent-reported closeness. Means were similar for both mother and father report of child's emotional reactivity across all four assessments.

Correlations for mother and father reported study variables are presented in Table 3. Closeness variables for mothers at each grade assessment were positively correlated with other

mother-child closeness variables during the other assessment years. Conflict variables for mothers were positively correlated with other mother-child conflict variables during all assessment years. Mother-reported closeness and conflict were negatively correlated across all assessments. Mother reports of their child's emotional reactivity were not correlated with their reports of closeness with their child. Mother reports of their child's emotional reactivity were positively correlated with their reports of conflict with their child. Mother's reports of her child's levels of emotional reactivity are highly positively with her reports of conflict with her child. Closeness variables for fathers at each grade assessment were positively correlated with other father-child closeness variables during the other assessment years. Conflict variables for fathers were positively correlated with other father-child conflict variables during all assessment years. Father-reported closeness and conflict were negatively correlated across all assessments. Father reports of their child's emotional reactivity were not correlated with their reports of closeness with their child. Father reports of their child's emotional reactivity were positively correlated with their reports of conflict with their child. Father's reports of his child's levels of emotional reactivity are also highly positively with his reports of conflict with his child. Mother-reported and father-reported closeness variables were positively correlated within each grade assessment. Mother-reported and father-reported conflict variables were positively correlated within each grade assessment.

Correlations between teachers' reports of the child's emotional reactivity and mothers' and fathers' reports of closeness and conflict within same-grade assessments are presented in Table 4. Teacher reports were not correlated with mother or father reports on closeness at all assessments or father reports on conflict at the 4th and 6th grade assessments, but did have a positive correlation with mother reports on conflict in the relationship at the 4th, 5th, and 6th grade assessments. Correlations between teachers' reports of the child's emotional reactivity and mothers' and fathers' reports of child's emotional reactivity are presented in Table 5. Teacher

reports of the child's levels of emotional reactivity were positively correlated with mother, father, and other teacher reports across all assessments.

Longitudinal Cross-Lag Models

Two longitudinal cross-lagged autoregressive models were conducted to examine the reciprocal influences among parent-child relationship quality, specifically closeness and conflict, and children's emotional reactivity from 3rd through 6th grade. The conceptual model of the model is presented in Figure 1. All models were tested using Mplus 5.1 using full information maximum likelihood estimation. For each model mother-child and father-child relationship quality was included as an observed variable. Children's emotional reactivity was a latent construct based on mother, father, and teacher report of children's emotional reactivity (no teacher report at 3rd grade). Standardized coefficients are reported in the figures.

Overall for parent-child conflict, model fit was adequate. The chi-square was significant ($\chi^2(123) = 430.83$), which is not surprising due to the size of the sample. Since the chi-square was significant additional fit statistics were examined. First, the CFI (Comparative Fit Index) was .95, which meets the recommended range of .95 and 1 for good fit. Next, RMSEA (Root Mean Square Error of Approximation) was .06 which meets the recommended cutoff of .06 or lower for good fit. Finally, we examined the SRMR (Standardized Root Mean Residual) which was .06 which meets the recommended .08 or below cutoff for good fit. The model for parent-child closeness had a significant chi-square ($\chi^2(170) = 550.85$), which as previously stated is not surprising due to the largeness of the sample. Additional fit statistics were also examined. The closeness model had a CFI of .92, which is below the recommended .95 cutoff, indicating poor fit. Next, RMSEA was .07, which is slightly above the .06 cutoff indicating less desirable fit. However, it is still below .08, which is considered adequate. Finally, SRMR was .08 which meets the recommended cutoff of .08 or lower for good fit. The overall fit statistics indicate adequate fit; however, the CFI and RMSEA indicate there could potentially be room for improvement.

For the parent-child closeness model (Figure 2), the stability coefficients (autoregressive paths) for mother and father reports of closeness with their child ranged from .55 - .62 and all were significant. This indicates that there is fairly high stability in both mother's and father's reports of parent-child closeness across the middle childhood period. Specifically, a mother or father who reported having higher closeness with their child during 3rd grade relative to other parents during 3rd grade also reported higher level closeness during 4th grade compared to those other 4th parents. The stability pathways for the child's emotional reactivity were very high. This indicates that a child who was rated as more reactive than his peers during the 3rd grade assessment continued to be rated as more reactive than other children across the 4th, 5th and 6th grade assessments. The within-time correlations for mothers and fathers were not significant at all four assessments. Mother-child closeness and father-child closeness did not have a significant effect on the child's emotional reactivity. Child's emotional reactivity did not have a significant effect on either mother-child closeness or father-child closeness.

For the parent-child conflict model (Figure 3), the stability coefficients for mothers' report of conflict with the child were significant but decreased slightly in strength from each assessment to the next. This suggests that the level of conflict reported between mother and child generally stayed the same relative to other mother-child pairings, although mother-child conflict was not as stable as mother-child closeness. The stability coefficients for fathers' report of conflict with the child were significant. This suggests that the level of conflict reported between father and child was the same across assessments relative to other father-child pairings. The within-time correlations for mothers and fathers were significant at all four assessments (3rd grade: mothers $r = .79, p < .001$, fathers $r = .59, p < .001$; 4th grade: mothers $r = .34, p < .01$, fathers $r = .21, p < .01$; 5th grade: mothers $r = .41, p < .01$, fathers $r = .27, p < .05$; 6th grade: mothers $r = .23, p < .001$, fathers $r = .15, p < .01$). These results indicated that children's emotional reactivity is associated with mother-child and father-child conflict during the same

time point. With respect to the cross-lag pathways, the pathways from mother-child conflict and father-child conflict to child's emotional reactivity at the later time point were not significant. The pathways from child's emotional reactivity to mother-child and father-child conflict were significant. These results indicate that, a child's emotional reactivity appears to be a predictor of mother-child conflict and father-child conflict during the following year. The strongest predictor for both mother-child and father-child conflict was the child's levels of emotional reactivity during the 5th grade assessment on the parent-child conflict during the 6th grade assessment.

Chapter 4

Discussion

Children's emotional reactivity and regulation are important for social and emotional development, particularly peer relationships. Prior research has shown that elementary school children who are high on emotional reactivity and struggle to regulate their emotions are at greater risk of being rejected by peers (Eisenberg & Fabes, 1996). Peer rejection has been found to be associated with many negative outcomes such as depression and anxiety (Stormshak, Bellanti & Bierman, 1996; Kochenderfer-Ladd & Skinner, 2002). The present study investigated the reciprocal associations between parent-child relationship quality and children's emotional reactivity from 3rd through 6th grade. Specifically, this study focused on two dimensions of parent-child relationship quality, conflict and closeness, and whether or not they have longitudinal effects on children's emotional reactivity. Prior research has identified parent-child closeness and conflict as important predictors of emotional development (Driscoll & Pianta, 2011; Russell & Russell, 1989; Laible & Thompson, 2002). To date, much of the research has focused solely on mother-child relationship quality. Fathers may play an important role in the development of children's emotional reactivity through their high energy interactions, such as rough-housing and sports, which increase in frequency as children become enter preschool and elementary ages (Sayer, Bianchi, & Robinson, 2004). The current study extends the research by also focusing on the role that father-child relationship quality plays in children's emotional development during grade school. To approach the question from a family perspective the current study utilized longitudinal autoregressive cross-lag structural equation models that included both mother-child and father-child relationship quality within the same model. Therefore, the pathways between mother-child and father-child relationship quality and children's

emotional reactivity were estimated controlling for the child's relationship quality with the other parent.

The first aim of the study was to examine whether mother-child and father-child relationship quality influenced children's emotional reactivity at the following time-point. Greater closeness and lower levels of conflict were expected to be associated with lower emotional reactivity. The second aim was to examine whether children's emotional reactivity influences later mother-child and father-child relationship quality. It was hypothesized that higher levels of parent-child closeness and lower levels of parent-child conflict will result in lower levels of emotional reactivity. In addition, given that some research suggests that fathers may play a unique role in the development of children's emotion regulation and reactivity it was predicted that father-child relationship quality would significantly influence the child's levels of emotional reactivity even while controlling for mother-child relationship quality. Counter the hypotheses, the results from the parent-child closeness model indicated that there were no significant associations between child's emotional reactivity and either mother-child closeness or father-child closeness. Many studies have shown that parent-child relationships in middle childhood that have high levels of closeness, warmth, and affection have been correlated to many positive outcomes for the child such as better emotion regulation, social competence, and academic performance (Brotherson, Yamamoto, & Acock, 2003; Russell & Russell, 1989; Martin, Ryan, & Brooke-Gunn, 2010; Attili, Vermigli, & Roazzi, 2010). One potential reason for the inconsistent results in the current study is that across the grades assessed children's emotional reactivity was highly stable not leaving much variability at subsequent time points to account for. Another factor is that the measure of parent-child closeness used in the current study focused on parent-report of the child's perceptions and feelings rather than the affective aspects of the relationship such as warmth and affection. For instance, some of the questions were: "My child values his/her relationship with me." This item only evaluates how the parent perceives their child feels

about their relationship and does not evaluate affection or warmth within the parent-child relationship. In fact, the only item that actually evaluates affection is “My child is uncomfortable with physical affection or touch from me.” Children’s emotional reactivity and regulation have been found to be associated with the affection and warmth aspects of closeness. The CPRS does not appear to evaluate affection or warmth, which could be the reason no association was found between parent-child closeness and children’s emotional reactivity in this study.

However, not all studies show that positive aspects of the relationship are associated with lower reactivity. For example, in a study on different parenting styles of mothers while their one year old was exhibiting distress reactivity, such as frequent fussing and crying, researchers found that positive and supportive parenting was not correlated with a decrease in the baby’s level of negative reactivity by 2 years of age (Scaramella et al, 2008). This seems counter intuitive until one continues reading their results where they also found that high levels of distress reactivity were correlated with a decline in supportive parenting by 2 years of age (Scaramella et al, 2008). It might be that during the reciprocal interactions of parenting children’s negative reactivity has an upper-hand on positive parenting that causes positive to decline before negative reactivity does.

Another possibility for these results could be the lack of variability in the present sample. Almost all of the mothers and fathers reported high levels of closeness with their child. It may be that high levels of closeness in the parent-child relationship do not lessen emotional reactivity in a child, but a lack of closeness in the parent-child relationship could actually cause a rise in negative reactivity. It is also likely that emotional reactivity is very stable during the elementary school years. Children’s emotional reactivity’s stability pathways in were very strong, and it appears that the only good predictor of what level of negative reactivity a child will have in 5th grade is his levels of negative reactivity in 4th grade.

It was hypothesized that lower levels of parent-conflict would predict lower levels of children's emotional reactivity. The results for the parent-child conflict as a predictor of children's emotional reactivity were also not significant. The stability coefficients for children's emotional reactivity were also very high in the conflict model showing again that children's emotional reactivity is very stable over time. The best predictor for children's emotional reactivity at 4th grade seems to be children's emotional reactivity at 3rd grade. The within-time correlations between mother-child and father-child conflict and children's emotional reactivity were significant at each time point demonstrating that there is an association between them during the same grade level. The finding that parent-child conflict was not a predictor of children's emotional reactivity goes against Scaramella and Leve's (2004) Early Childhood Coercion Model. The model posits that highly reactive children will struggle to learn to regulate their negative emotions and evoke harsher parenting. Through mutual reinforcement, harsh parenting and children's negative emotional reactivity both increase causing more conflict within the parent-child relationship (Scaramella & Leve, 2004). One would expect that the continued parent-child conflict would also reinforce children's emotional reactivity since it is positively correlated with harsh parenting (Laursen, Coy, & Collins, 1998). The CPRS does not contain any items that would allow for researchers to know if there was harsh parenting in the relationship. Without knowing items pertaining to parenting styles and strategies available to this particular study, we lacked the ability to evaluate if harsh parenting occurred during these parent-child relationships. Another possibility for these results is that in the absence of harsh parenting, parent-child conflict is no longer associated with children's emotional reactivity.

Emotional reactivity was a significant predictor of both mother-child conflict and father-child conflict for all three cross-lags. These findings are consistent with Scaramella and Leve's (2004) Early Childhood Coercion Model described in the paragraph above. Negative emotional reactivity and harsher parenting are considered to reinforce each other within the model. Since

harsh parenting and parent-child conflict have been found to be positively correlated, higher levels of children's emotional reactivity should predict higher levels of parent-child conflict (Laursen, Coy, & Collins, 1998). Studies have also found that boys who are high on emotional reactivity are more likely to initiate and participate in conflict (Lindahl, Bregman, & Malik, 2012). Children who exhibit high levels of emotional reactivity are prone to problem behaviors such as aggression towards other children, and their aggression later leads to conflict with peers (Carson & Parke, 1996; Stormshak, Bellanti & Bierman, 1996). What is most interesting about our finding that children's emotional reactivity predicts parent-child conflict is that our sample contained children in middle childhood. The previous studies reported all used younger children that were toddlers and preschool age or older children that were adolescents (Carson & Parke, 1996; Lindahl, Bregman, & Malik, 2012; Laursen, Coy, & Collins, 1998). These results illustrates that middle childhood may be a critical time period where the child's behavior has a strong affect on molding the parent-child relationship. It may be that by middle childhood children's personalities are more stable than in younger age groups so they are less likely to change as a result of the parent-child relationship. Pianta's (2001) Child-Parent Relationship Scale may have not been the best scale to evaluate conflict as was the case with closeness even though the cross-lags were significant. For example, one item is "My child remains angry or is resistant after being disciplined." This item does not evaluate conflict as much as the parent's perceptions of the child's reactions to punishment. To gain better results for conflict and closeness in future studies, a new scale should be developed that better assesses conflict by adding items such as, "My child and I fight about everything." Different items may better explain why our study found that children's emotional reactivity predicted parent-child conflict, but parent-child conflict did not predict children's emotional reactivity, which was contrary to what previous studies lead us to believe we would find (Carson & Parke, 1996; Scaramella & Leve, 2004).

Although the current research provides an important contribution to the literature, there are some limitations that need to be considered. First, the sample of this study was selected by requiring the father to be living in the home with the mother child during all four assessments. By choosing families this way, it limited families where the mom and dad are both involved in the child's life, but the father might just not live with them. Also, the model could look very different for children whose fathers do not live in the home and we do not know. Another limitation of the sample is its composition. The mothers, fathers, and children in this study were predominantly Caucasian. This homogeneity in the composition of the sample hurts the generalizability of the findings. Another limitation is not having a teacher report of the child's emotional reactivity during 3rd grade. Having the teacher's reports factored in the child's emotional reactivity score within the model allows a better picture of the child's true emotional reactivity since the scores are coming from different the child's behavior in different settings. The last limitation lies in the methodology used in this study. The parent-child relationship quality scores are based solely off of the parents self-report. If parent-child interaction task could have been set up, coded, and used to help make the closeness and conflict scores, the relationship quality scores would be a little more reliable since they would have multiple perspectives.

Despite these limitations, this study still provides valuable findings about the associations between children's emotional reactivity and parent-child conflict. It is a significant contribution to the field, as it is one of the few studies to research residual effects that children have on their relationships with mothers and fathers during middle childhood. Studies have examined how negative reactivity affects mother-child relationships. Similar to the findings in this study, studies have shown the higher levels of negative reactivity in toddlers are associated with the development of mother-child relational conflict (Laible & Thompson, 2002; Scaramella, et al, 2008). Almost all of the previous studies that have researched emotional reactivity are examine infants, toddlers, or pre-school aged children, and all of them just examine the affect reactivity

has on the mother-child relationship. The current study is moving this research forward by transitioning to middle childhood, a rarely studied age-group, and including the relationship of both mothers and fathers while controlling for the affects their relationships have on each other. Future studies should focus on how the child's emotional reactivity affects parent- child conflict. Although nothing was found involving closeness, researchers may still want to look at some positive aspects of the parent-child relationship such as warmth or affection to see in the child's emotional reactivity affects them in any way. Future studies may also want to try to get a more diverse sample so the findings will have greater generalizability. When a more diverse sample is used, researchers can begin to examine additional factors such as family income and parent education level to see if these variables affect the associations between parent-child relationship quality and children's emotional reactivity. Nevertheless, the contributions of this study serve as important starting points by highlighting children's emotional reactivity as an influence on parent-child conflict.

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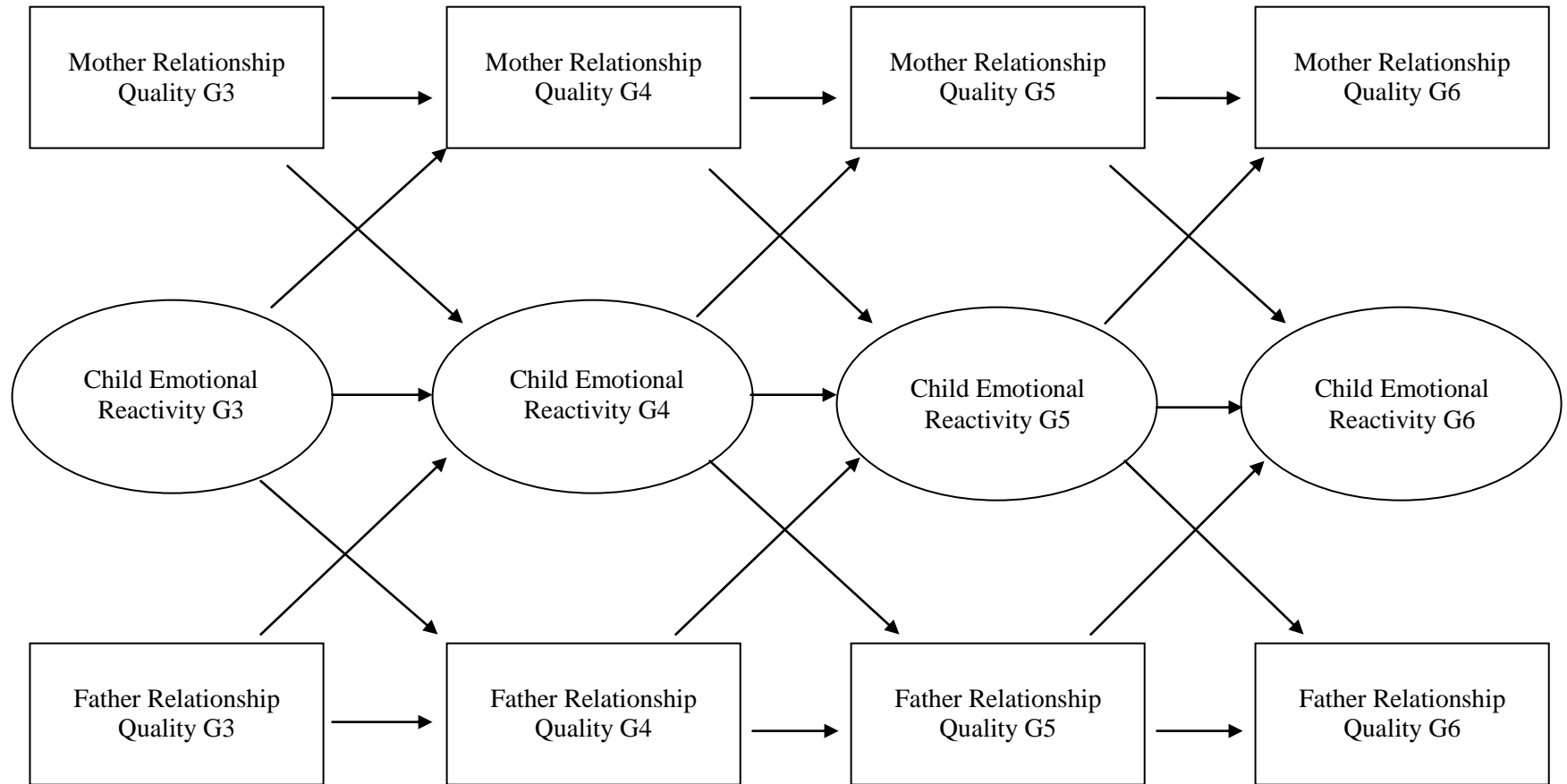
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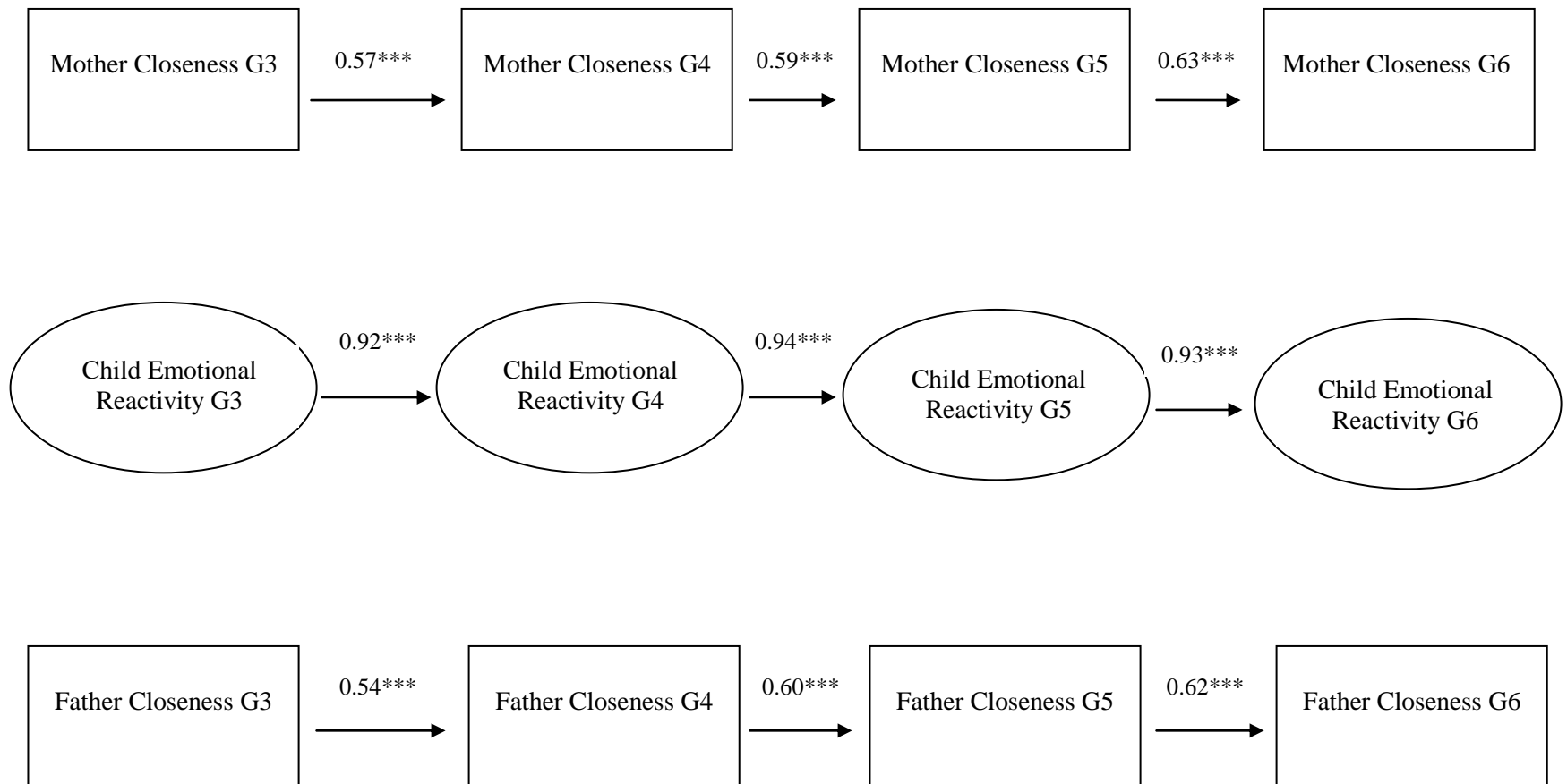
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Figure 1. Conceptual cross-lag model examining reciprocal associations between parent-child relationship quality and child emotional reactivity.



Note. Conceptual model of hypothesized cross-lags. All models include within-time correlations (not shown) G3 = 3rd grade, G4 = 4th grade, G5 = 5th grade, G6 = 6th grade.

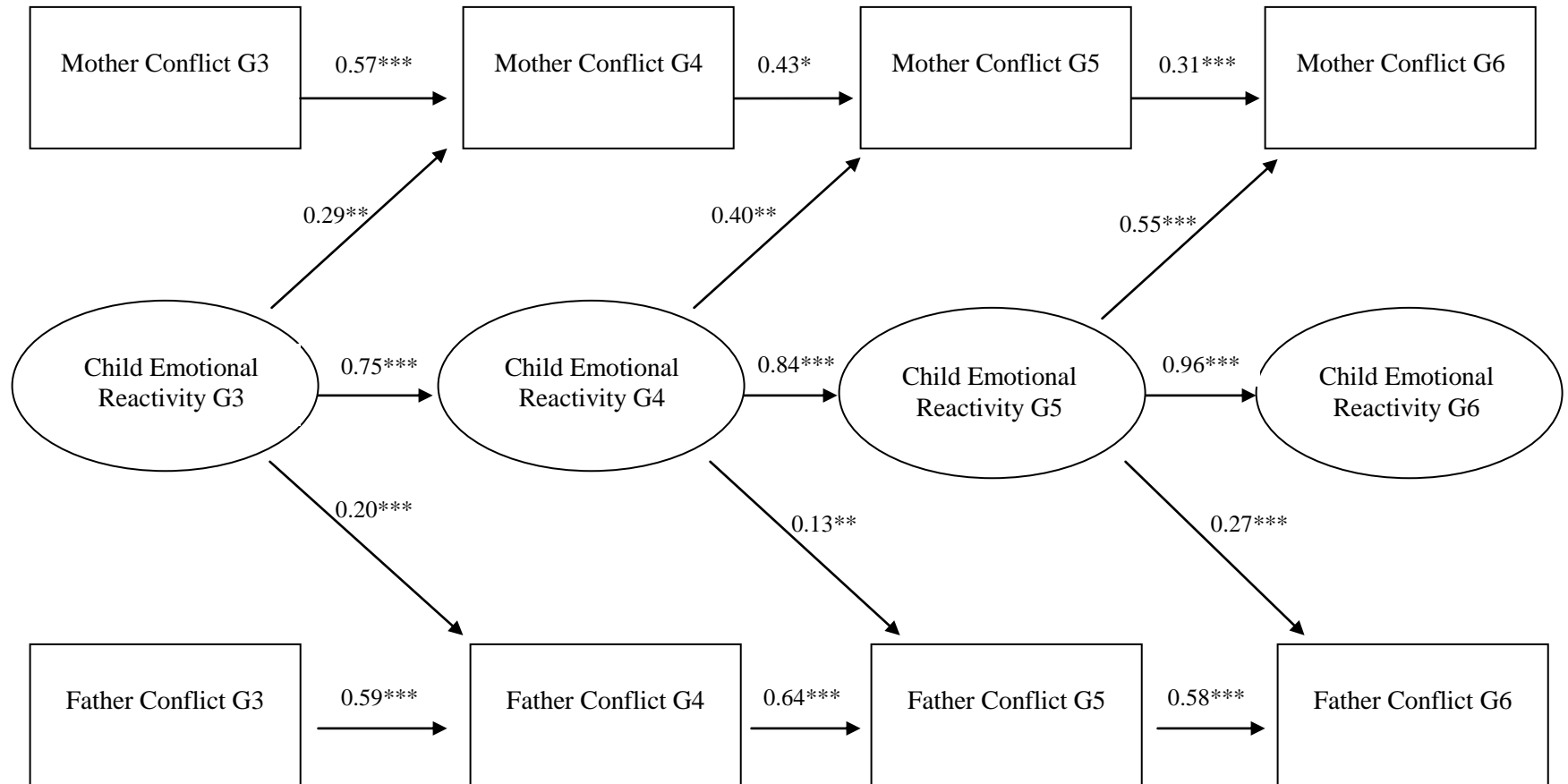
Figure 2. Cross-lag model examining reciprocal associations between parent-child closeness and child emotional reactivity.



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

Note. Standardized coefficients are reported. Only significant pathways are shown. G3 = 3rd grade, G4 = 4th grade, G5 = 5th grade, G6 = 6th grade.

Figure 3. Cross-lag model examining reciprocal associations between parent-child conflict and child emotional reactivity.



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

Note. Standardized coefficients are reported. Only significant pathways are shown. G3 = 3rd grade, G4 = 4th grade, G5 = 5th grade, G6 = 6th grade.

Table 1. Percentages of missing data for study variables at each assessment.

Variable	3 rd Grade	4 th Grade	5 th Grade	6 th Grade
Closeness (Mother)	5%	4%	3%	3%
Closeness (Father)	12%	16%	11%	12%
Conflict (Mother)	5%	4%	3%	3%
Conflict (Father)	12%	16%	11%	12%
Emotional Reactivity (Mother)	5%	4%	3%	3%
Emotional Reactivity (Father)	12%	17%	11%	14%
Emotional Reactivity (Teacher)	---	13%	10%	18%

Table 2. Descriptive statistics for study variables.

Variable	Mothers			Fathers			Teachers		
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range
Closeness G3	37.41	2.515	22 – 40	35.58	3.518	18 – 40	---	---	---
Closeness G4	37.33	2.792	22 – 40	35.51	3.635	23 – 40	---	---	---
Closeness G5	36.77	2.983	25 – 40	34.58	3.814	18 – 40	---	---	---
Closeness G6	36.46	3.320	12 – 40	34.67	4.028	15 – 40	---	---	---
Conflict G3	15.89	6.027	7 – 32	14.73	5.066	7 – 31	---	---	---
Conflict G4	15.71	5.921	7 – 35	14.70	5.209	7 – 33	---	---	---
Conflict G5	16.17	5.865	7 – 33	15.61	5.164	7 – 34	---	---	---
Conflict G6	16.24	6.171	7 – 33	15.58	5.397	7 – 33	---	---	---
Emotional Reactivity G3	33.68	5.725	13 – 49	32.35	4.877	18 – 46	---	---	---
Emotional Reactivity G4	33.43	5.638	18 – 48	32.17	4.972	20 – 46	28.09	6.525	12 – 48
Emotional Reactivity G5	33.39	5.936	16 – 49	32.27	5.033	18 – 48	27.84	6.445	11 – 47
Emotional Reactivity G6	32.99	5.844	14 – 49	31.91	5.115	18 – 45	27.06	6.893	10 – 49

Note. G3 = 3rd grade, G4 = 4th grade, G5 = 5th grade, G6 = 6th grade

Table 3. Correlations between mother and father study variables.

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Closeness G3	.17***	.64***	.59***	.56***	-.36***	-.31***	-.28***	-.29***	-.01	.01	.02	-.01
2. Closeness G4	.63***	.18***	.60***	.59***	-.30***	-.37***	-.31***	-.29***	-.02	-.002	-.01	-.04
3. Closeness G5	.63***	.64***	.28***	.66***	-.25***	-.26***	-.34***	-.31***	.03	.08*	.05	.05
4. Closeness G6	.57***	.64***	.60***	.28***	-.31***	-.30***	-.26***	-.38***	-.01	.04	.04	.05
5. Conflict G3	-.33***	-.25***	-.27***	-.27***	.47***	.79***	.75***	.70***	.45***	.40***	.37***	.41***
6. Conflict G4	-.33***	-.39***	-.33***	-.35***	.69***	.50***	.75***	.73***	.42***	.42***	.39***	.41***
7. Conflict G5	-.30***	-.30***	-.36***	-.33***	.65***	.71***	.49***	.75***	.43***	.40***	.46***	.44***
8. Conflict G6	-.31***	-.32***	-.33***	-.45***	.63***	.68***	.71***	.50***	.42***	.41***	.41***	.47***
9. Emotional Reactivity G3	.02	.04	.03	.02	.32***	.30***	.31***	.24***	.38***	.76***	.72***	.71***
10. Emotional Reactivity G4	-.07	-.04	-.03	-.07	.30***	.35***	.34***	.30***	.61***	.38***	.76***	.73***
11. Emotional Reactivity G5	-.02	-.01	-.01	-.01	.27***	.36***	.39***	.33***	.61***	.66***	.42***	.78***
12. Emotional Reactivity G6	-.06	-.07	-.05	-.06	.27***	.32***	.33***	.38***	.58***	.61***	.68***	.43***

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

Note. Data for mothers are above the diagonal and data for fathers are below the diagonal. The intercorrelation between mothers and fathers is bolded on the diagonal. G3 = 3rd grade, G4 = 4th grade, G5 = 5th grade, G6 = 6th grade.

Table 4. Correlations between teacher report of child emotional reactivity and parent-child relationship quality variables within time point.

Teacher Report of ER	Mother		Father	
	Closeness	Conflict	Closeness	Conflict
4 th Grade	.003	.14***	-.04	.08
5 th Grade	.02	.14**	-.003	.13**
6 th Grade	.08	.10*	-.04	.07

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

Table 5. Correlations between teacher report of child emotional reactivity and mother, father, and teacher report of emotional reactivity variables.

Variable	Teacher Report of ER G4	Teacher Report of ER G5	Teacher Report of ER G6
Mother Report of ER G3	.22***	.14***	.14***
Mother Report of ER G4	.26***	.14***	.13***
Mother Report of ER G5	.25***	.19***	.18***
Mother Report of ER G6	.24***	.19***	.20***
Father Report of ER G3	.20***	.18***	.13***
Father Report of ER G4	.18***	.20***	.13***
Father Report of ER G5	.17***	.19***	.13***
Father Report of ER G6	.18***	.15***	.18***
Teacher Report of ER G4	---	.40***	.34***
Teacher Report of ER G5	.40***	---	.30***
Teacher Report of ER G6	.34***	.30***	---

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

Note. ER = Emotional Reactivity, G3 = 3rd grade, G4 = 4th grade, G5 = 5th grade, G6 = 6th grade.

ACADEMIC VITA

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Education

B.S., Psychology, 2013, Pennsylvania State University, University Park, PA

Honors in Psychology, 2013, Pennsylvania State University, University Park, PA

Honors and Awards

- Dean's List, Pennsylvania State University, Fall 2009; Spring 2010; Fall 2010; Spring 2011; Fall 2011; Spring 2012; Fall 2012; Spring 2013

Association Memberships/Activities

- American Psychological Association
- The National Society of Leadership and Success
- Atlas THON

Professional Experience

- **Friendship Group** State College, PA October 2011 – March 2012
 - Ran Friendship Group Intervention Program for boys in 3rd, 4th, and 5th grade under the supervision of Dr. Janet Welsh, PhD
 - Planned activities with other coaches that facilitated communication between the boys, helped develop emotional intelligence and self-regulation, and demonstrated affective strategies to resolve conflict with peers
 - Had a conference with one child's parent and provided final report on child's progress

- **Penn State Learning GSG Leader** State College, PA August 2011 – December 2011
 - Tutored STAT 200: Elementary Statistics
 - Held 2 study sessions a week
 - Prepared all materials for sessions

- **Research Assistant** State College, PA September 2010 – June 2013
 - Worked in Family and Child Development under Dr. Alysia Blandon, PhD
Developmental Psychology
 - Made recruit phone calls to families
 - Worked with children 2-5 years of age during family visits
 - Trained new undergraduate research assistants
 - Member of the Heart Rate Editing Team

Research Interests

I have broad interests in the developmental and child psychology. More specifically, I am interested in the various relationships children develop as both within and outside of their family. I am interested in the complex reciprocal effects of all these relationships and how different environment factors change the dynamic of relationships.

Publications and Papers

- Reciprocal associations between parent-child relationship quality and children's emotional reactivity
 - Honors thesis written under the supervision of Dr. Alysia Blandon, PhD