ABSTRACT

WHITEHOUSE, MARY HOLLINGS. An Evaluation of the Bidirectional Effects of Parent-Child Interactions in a Sample of Physically Abused Children. (Under the direction of Dr. Mary Haskett).

One major goal of this study was to advance the research on physically abused children by examining changes in parent and child behavior over time and whether behaviors observed in parent-child interactions demonstrated bidirectional effects contributing to changes in behavior over time. A second goal was to examine whether observed child behavior when the children were in first grade, predicted teacher reports of child behavior in first grade. Participants included 93 parent-child dyads from a longitudinal study designed to examine factors that might contribute to physically abused children's successful transition from preschool to early elementary school. The children ranged in age from 5 to 7 years old and were identified as having a documented history of physical abuse. Parent and child behavior were measured using the Parent Child Interaction (PCI) observational coding scheme. The Teacher Report Form (TRF) of the Child Behavior Checklist was used to measure children's internalizing and externalizing behavior at school. It was hypothesized, within the context of physical abuse, that: (1) parent behavior would change over time such that positive parenting behavior would decrease and negative parenting behavior would increase; (2) child behavior would change over time such that the child's positive mood would decrease and negative mood would increase; (3) there would be a reciprocal effect between parent and child behavior over time; and (4) observed child behavior in the lab when the children were in first grade would predict teacher reports of internalizing and externalizing behaviors in the classroom in first grade. The data were analyzed using structural equation modeling (SEM). None of the hypothesized models proved to be a good

fit for the data analyzed. Considerations of the findings and limitations of the study are discussed.

An Evaluation of the Bidirectional Effects of Parent-Child Interactions in a Sample of Physically Abused Children

by
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DEDICATION

To Mom: The older I get, the more like you I become. And that's a good thing. I wish you were still here to see it and give that knowing smile you always had. I am who I am—and continue to become—largely because of you. I love you.

To Dad: I am my father's daughter—and I like that very much. You have walked through every bit of this with me, knowing more than most what I was getting into and going through at different points along the way. I am thankful for your presence and encouragement and am grateful that we are not only family but also friends and colleagues. I love you.

To Ryan: Although you may not fully understand what it is I have been doing these past few years, know that it has made me a better parent—and advocate—for you. My hope is that I can continue to be the kind of parent you need.

To Al: You have been, without a doubt, my biggest supporter, encourager, listener, and cheerleader. You've kept me grounded and balanced, making sure I endured this process in order to do what I was made to do. There are no words for the gratitude I feel for having you by my side. I love you bunches.

BIOGRAPHY

Mary Whitehouse is from Fayetteville, North Carolina. She received her Bachelor's degree in Psychology with minors in Russian and History at the University of North Carolina at Greensboro in 2002. In 2006, she completed a Master of Divinity degree from Campbell University in Buies Creek, North Carolina. At that time, Mary worked as a chaplain resident at WakeMed in Raleigh, North Carolina where she made the decision to return to the field of psychology. In the fall of 2007, she entered the doctoral program in School Psychology at North Carolina State University. While completing her doctorate, Mary conducted research on reading fluency as well as child maltreatment. For four years, she worked in the Department of Psychology's Advising Office as an advisor to undergraduate psychology majors. Additionally, she served as a primary instructor for Abnormal Psychology. Mary and her husband also became adoptive parents to their son who is originally from Ukraine. Mary's primary areas of interest include working with children, parenting and family work, trauma, and issues pertaining to adoption.

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No part of this process is done in isolation.

To my advisor and committee members: “Thank you” just doesn’t seem to cover it. You have supported me in so many ways throughout this process—and challenged me to become a better professional and a better researcher. Thank you for your willingness and availability, for being reasonable and in my corner, for coming together as my dream team.

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Introduction

Research over the past several decades indicates that abused children are more likely than their non-abused peers to experience internalizing problems (e.g., withdrawal, depression, anxiety) and externalizing problems such as noncompliance, aggression, hostility (e.g., Kaufman & Cicchetti, 1989; Salzinger, Feldman, Hammer, & Rosario, 1991; Shonk & Cicchetti, 2001; Toth, Manly, & Cicchetti, 1992). Although it is often assumed that abusive parenting directly caused these negative child outcomes, research indicates that children are not passive recipients of their environment (DelVecchio & Rhoades, 2010; Hipwell et al., 2008). Instead, parents and children interact in a reciprocal relationship in which the behavior of one affects the behavior of the other (Sameroff, 1995).

Increasingly, researchers have begun to examine this reciprocal relationship between parents and children, specifically within the framework of Patterson's (1982; 2002) coercion theory. Negative patterns of interaction between parents and children have been observed in families in which parents engage in harsh or negative parenting behavior and/or children engage in antisocial or oppositional behaviors (e.g., Combs-Ronto, Olson, Lukenheimer, & Sameroff, 2010; Larsson, Viding, Rijsdijk, & Plomin, 2008; Nicholson, Deboeck, Farris, Boker, & Borkowski, 2011; Verhoeven, Junger, van Aken, Dekovic, & van Aken, 2010; Yates, Obradovic, & Egeland, 2010), all of which may increase the risk for abuse to occur. Although reciprocal influences of parent and child behavior have been described in community samples and investigated in some clinical samples, many questions remain about these influences in parent-child dyads in which physical abuse has occurred. Because abused

children are at very high risk for both concurrent and long-term adjustment problems, understanding the bidirectional influences of parents and children in these families is important. The present study was designed to begin to fill several gaps in the literature. A developmental psychopathology framework guided this investigation.

Researchers who base their investigations within a developmental psychopathology framework focus on the typical (i.e., adaptive) and abnormal (i.e., maladaptive) trajectories of development over time. Leaders in this field argue that an understanding of normal development helps provide an understanding of, and insight into, abnormal development; in addition, investigations of developmental processes that take place in populations that experience or are at risk for psychopathology can inform knowledge of typical development (Cicchetti, 1993; Cicchetti & Toth, 2009). In particular, families in which child maltreatment has occurred have been examined within a developmental psychopathology framework (e.g., Cicchetti, 1993; Kaufman & Cicchetti, 1989; Shonk & Cicchetti, 2001). In addition, this research has contributed to the development of intervention strategies for maltreating parents and their children (Cicchetti, 1993; Cicchetti & Toth, 2006). However, gaps in knowledge of reciprocal influences of parent behavior (e.g., regard for child, sensitivity, intrusiveness, flat affect) and child behavior (e.g., positive and negative mood and compliance) remain and are described in more detail below. One aim of this study was to provide additional knowledge regarding the patterns of parent and child interactions (i.e., the ways in which parent and child behavior may affect one another) in abusive families and, therefore, determine whether

there was theoretical support for bidirectional parent-child interaction patterns in this population.

Another component of the developmental psychopathology framework is the examination of sensitive developmental periods (Cicchetti, 1993). It is during these developmental periods that change can occur so that an individual may continue on—or deviate from—an adaptive trajectory (Cicchetti & Cohen, 1995). The patterns of interaction between parents and children may be most likely to shift during these sensitive developmental periods (e.g., formal school entry for children). The transition from preschool to formal schooling (i.e., kindergarten and first grade) is a time of significant developmental changes for children across multiple domains of functioning (e.g., social, cognitive, and language skills). It is also a time during which disruptive behavior patterns may emerge and stabilize, and continue into the period of school entry. It is important, then, to identify factors that contribute to persistent or discontinuing patterns of problem behavior in children (Combs-Ronto et al., 2010). The present investigation examined the reciprocal nature of the parent-child relationship during the child's transition into formal schooling in order to determine ways in which this relationship contributed to behavior patterns for children. Specifically, parent and child behavior was observed when the children were in preschool, kindergarten, and first grade.

The developmental psychopathology perspective also places value on examining change over time (Cicchetti, 1984). Currently, research is limited as it relates to the temporal ordering of parent and child effects. In many longitudinal studies, parent and child behaviors

are evaluated without controlling for the initial levels of those behaviors (Hipwell et al., 2008). Furthermore, most longitudinal studies on bidirectional parent-child influences focus on brief time periods (e.g., one year or less). Thus, it can be difficult to determine whether bidirectional effects are fairly stable or whether they change across development (Pardini, 2008). Indeed, very few longitudinal studies have examined whether the bidirectional effects of child behavior and parenting practices change over time (Pardini, Fite, & Burke, 2008). Therefore, a second aim of this study was to determine whether patterns of interaction became stable over time by examining the bidirectional effects of parent and child behavior across multiple time points during children's entry into school.

Developing an understanding of the ways in which parents' and children's behavior change and affect one another over time is relevant for developing quality service delivery and interventions for these families (Haskett, Neupert, & Okado, under review). Parent training is the most common intervention service provided to parents involved with child protective services (Barth et al., 2005; Hurlburt, Barth, Leslie, Landsverk, & McCrae, 2007). However, many programs do not provide direct training in the home or with the child (Casanueva, Martin, Runyan, Barth, & Bradley, 2008), and very little is known about the effectiveness of parent training programs with this population (Hurlburt et al., 2007). Additionally, parent training programs used with parents involved with CPS usually do not include programs with the strongest empirical base (e.g., Incredible Years, Parent-Child Interaction Therapy, Triple-P). Programs that *are* used often do not yield the kind of meaningful change one might hope for or expect (Casanueva et al., 2008). Although the

present study was not an intervention study, it was hoped that this study might provide insight into the interactive patterns of abusive parents and their children, which might then inform areas of focus for service delivery and intervention.

In sum, the purpose of the present study was threefold: (1) to evaluate the changes over time in physically abused children's behavior (i.e., positive and negative mood and compliant behavior) during interactions with their abusive parents, (2) to evaluate the changes over time in positive and negative dimensions of parenting behavior (e.g., positive regard for the child, negative regard for the child, sensitivity, intrusiveness, flat affect) among physically abusive parents, and (3) to evaluate the bidirectional effects of parent and child behavior in a sample of young, physically abused children as they transition from preschool to kindergarten and then to first grade. What follows is a review of the literature as it pertains to adjustment of abused children and the influences of parent behavior and reciprocal parent-child interactions.

Adjustment of Abused Children: Internalizing and Externalizing Problems

Given the substantial literature documenting a strong link between parenting practices and children's adjustment, it is not surprising that children who experience physical abuse are at risk for a host of adjustment problems. In general, physical abuse is defined as nonaccidental physical injury resulting from beating, punching, biting, kicking, shaking, stabbing, throwing, hitting, burning, choking, or otherwise harming a child (Child Welfare Information Gateway, 2008). Although recent studies indicate that some abused children appear to be resilient to the impact of abuse (Collishaw et al., 2007; Haskett, Nears, Sabourin

Ward, & McPherson, 2006; Jaffee & Gallop, 2007; Tabone et al., 2011), decades of research indicate that children who have experienced physical abuse are at high risk for emotional, behavioral, and social adjustment problems. Results from a variety of studies consistently indicate that many physically abused children demonstrate internalizing problems such as depression, low self-concept, anxiety, and somatic complaints (Kaufman & Cicchetti, 1989; Lynch & Cicchetti, 1998; Salzinger, Feldman, Hammer, & Rosario, 1991; Shonk & Cicchetti, 2001; Wolfe & Mosk, 1983). To illustrate, in a sample of physically abused, neglected, and nonmaltreated school-aged children and adolescents, those who were physically abused were rated by parents as having higher levels of depression, anxiety and withdrawal than those who were neglected or who had no history of maltreatment (Wodarski et al., 1990). Similar results were found by Toth and colleagues (1992) who evaluated rates of depression among maltreated and nonmaltreated children as they participated in a summer day camp program. The maltreated children (ages 7 to 12 years) were subdivided into those who had been physically abused and those who were neglected. Child self-report (e.g., *Child Depression Inventory*) and teacher rating scales (e.g., *Child Behavior Checklist-Teacher's Report Form*; CBCL-TRF; Achenbach & Rescorla, 2001) were used to obtain a measure of children's depressive symptoms. Children from physically abusive environments demonstrated more depressive symptoms compared to neglected or nonmaltreated comparison children. A subsequent study (Toth, Cicchetti, & Kim, 2002) with similar methodology also indicated that maltreated (e.g., sexually abused, physically abused, neglected) children exhibited higher levels of internalizing problems (e.g., withdrawal,

anxiety, depression) compared to their nonmaltreated peers. These results were based on child and teacher report of child adjustment. Parent reports of child adjustment were collected by Johnson and colleagues (2002), who examined adjustment of children (ages 6 to 8) who experienced physical abuse or witnessed physical violence. Children who experienced physical abuse obtained higher scores for depression compared to children who witnessed physical violence.

Results from a variety of studies indicate that maltreated children also demonstrate more externalizing behavior (e.g., aggression, delinquency) than their nonmaltreated peers (Alessandri, 1992; Bolger & Patterson, 2001; Deater-Deckard, Ivy, & Petrill, 2006; Gershoff, 2002; Keiley, Howe, Dodge, Bates, & Pettit, 2001; Moylan et al., 2010; Shonk & Cicchetti, 2001). These behaviors are especially evident in children who have been physically abused (Kaufman & Cicchetti, 1989; Pears, Kim, & Fisher, 2008; Sternberg et al., 1993). For example, Shonk and Cicchetti (2001) examined adjustment and behavior and academic problems in children ages 5 to 12 who attended a summer day camp. Both the children's teachers and camp counselors consistently rated maltreated children as demonstrating more externalizing behaviors than their nonmaltreated peers. High rates of externalizing problems have been reported by investigators using a wide variety of methods for assessing these problems, including, for example, peer reports of aggression (Gaylord, Kitzmann, & Coleman, 2003; Kaufman & Cicchetti, 1989), teacher reports of disruptive behavior and noncompliance (Eckenrode, Laird, & Doris, 1993; Toth et al., 2002; Wodarski, Kurtz, Gaudin, & Howing, 1990), and records reviews of delinquency and arrests (Loeber et al.,

2005; Maas, Herrenkohl, & Sousa, 2008; Stouthamer-Loeber, Loeber, Homish, & Wei, 2001).

Concerns about the adjustment of abused children are heightened by longitudinal and retrospective studies that show long-term negative adjustment of individuals who experience abuse in childhood. For example, in a longitudinal study examining the timing of physical abuse and its long term effects on externalizing behaviors, mothers and teachers rated children's externalizing behaviors using the *Child Behavior Checklist* (CBCL; Achenbach & Rescorla, 2001). Children who experienced physical abuse in early childhood (prior to age 5) obtained higher scores on externalizing behavior problems at age 5 than did nonabused children. These results indicate that children who are abused early in life are more likely to develop and maintain these behaviors over time and across domains (e.g., home and school) compared to children abused late in childhood. Likewise, children with an initial experience of abuse between ages 6 and 9 demonstrated a more rapid increase in externalizing behavior problems (as rated by teachers) into adolescence (Keiley et al., 2001). More recently, Kaplow and Widom (2007) examined the timing of physical abuse and its long term effects on internalizing behaviors. Participants were identified based on court documents that substantiated a history of abuse with an initial onset between birth and age 11. Participants were interviewed twice in adulthood (at age 29 and again at age 40) and completed measures of distress, anxiety and social functioning each time. Results indicated that participants who experienced physical abuse in early childhood (prior to age 6) reported higher levels of psychological distress in adulthood compared to children whose initial experience of abuse

occurred after age 6. Others examining the age of onset as predictors of later psychopathology have found that children abused at an earlier age had lower levels of self-esteem (Bolger, Patterson, & Kupersmidt, 1999), higher levels of anxiety (Kaplow, Dodge, Amaya-Jackson, & Saxe, 2005), and greater difficulty with daily living skills (English, Graham, Litrownik, Everson, & Bangdiwala, 2005) than children who were abused later.

In summary, abused children are at high risk for developing serious and long-lasting adjustment problems. Currently, service delivery and intervention are not as effective as one might hope for or expect (Casanueva et al., 2008). Research from several bodies of literature can help us understand better the parent-child relationships and interactions in families in which abuse occurs. First, there is substantial literature pointing to the relation between parenting practices and children's adjustment. That literature includes research based on the general population and studies of parenting of physically abusive mothers and fathers. Second, studies that describe the interactions between abusive parents and their children can be informative. Finally, investigations of bidirectional influences of parent-child interactions over time can inform intervention approaches. These three bodies of literature are described below.

Parenting Behavior and Children's Adjustment

As one may expect, parenting behavior has been linked to child adjustment (Woodruff & Lee, 2011). In general, research points to the following as the optimal combination of parenting behaviors: high support (e.g., helping with everyday problems, showing affection, praising accomplishments), high level of monitoring (e.g., supervising

activities, requiring conformity to family and societal norms, keeping track of child's peer relationships and school work), and avoidance of harsh punishment (e.g., spanking) (Amato & Fowler, 2002; Baumrind, 1968; 1978; Darling & Steinberg, 1993; Maccoby & Martin, 1983; Rollins & Thomas, 1979). However, optimal parenting varies across family contexts. For example, Deater-Deckard and Dodge (1997) found that physical punishment used at a moderate level is a normative disciplinary style in African American families and is not problematic for African American children. In some instances (e.g., poor neighborhoods where violence occurs), higher levels of parental control are necessary for the safety of the child (Baldwin, Baldwin, & Cole, 1990). Family context (e.g., race/ethnicity and/or single or dual parent home) also may make a difference in parenting behavior. For example, physical discipline has been correlated with an increase in externalizing problems in European American children but not in African American children (Deater-Deckard, Dodge, Bates, & Pettit, 1996). Among poor, minority students in single parent families, restrictive and autocratic parenting was associated with high levels of school achievement (Baldwin et al., 1990).

In spite of the variations in parenting behavior across family contexts, there is a common core of parenting behaviors associated with positive child outcomes, irrespective of race, ethnicity, socioeconomic status, or family structure (Amato & Fowler, 2002). These behaviors are commonly referred to as positive parenting behaviors in the literature (e.g., Alessandri, 1992; Pettit, Bates, & Dodge, 1993; Paulson, 1994; Toth et al., 1992). Examples of positive parenting behaviors include: parental warmth, responsiveness, positive discipline,

and consistency (Baumrind, 1967; Maccoby & Martin, 1983). These parenting behaviors have been associated with many indicators of positive child adjustment (e.g., Belsky, 1984; Palmer & Hollin, 2001, Paulson, 1994). For example, parental responsiveness has been associated with fewer behavior problems among children in African American families, especially those with a lower socioeconomic status (Bradley, Corwyn, Burchinal, McAdoo, & Coll, 2001). Authoritative parenting (e.g., parents and children work together to make decisions or solve problems) has been associated with fewer depressive symptoms and higher academic achievement among adolescents, regardless of race or ethnicity (Radziszewska, Richardson, Dent, & Flay, 1996). Chen and colleagues (2000) found that maternal warmth was a significant predictor for children's perceived competence and self-worth. Maternal warmth also was associated with a reduction in children's depressive symptoms over time. Deater-Deckard and colleagues (2006) found that self-reported parental warmth and sensitivity were related to fewer externalizing problems in children as reported by parents. Likewise, parents who exhibited warmth and responsiveness tended to have children who were more cooperative and showed more empathy with peers (Whiteside-Mansell, Bradley, Tresch Owen, Randolph, & Cauce, 2003; Zhou et al., 2002). In sum, studies with normative samples indicate a positive relation between positive parental behavior and children's socioemotional adjustment.

Behaviors such as harsh parenting, physical discipline (e.g., spanking, smacking, slapping), inconsistent and coercive interactions with children, and lack of warmth and responsiveness are considered negative parenting behaviors (e.g., Dallaire et al., 2006;

Harrist et al., 1994; Kim et al., 2003). These behaviors have been associated with poor child adjustment. For example, harsh and negative parenting (i.e., hostile/coercive) behaviors have been found to be associated with elevated rates of depression in children (Dallaire et al., 2006). Deater-Deckard and colleagues (2006) found that high levels of physical punishment were associated with high rates of parent-rated externalizing behavior in children. Likewise, negative parent behaviors (e.g., physical and/or verbal punishment, low warmth, and high directiveness) have been associated with observed aggressive and hostile behavior in children (Rose-Krasnor, Rubin, Booth, & Coplan, 1996). In sum, results from studies in which negative parenting behaviors were examined indicated a significant relation between negative parenting behavior and poor socioemotional adjustment in children.

Parenting behaviors in abuse samples. Through observational studies, researchers have found that physically abusive parents tend to engage in harsh parenting behavior and physical discipline (Deater-Deckard & Dodge, 1997), inconsistent and coercive interactions with children (Patterson, 1982; Mash, Johnston, & Kovitz, 1983), and high rates of negative behavior and low rates of positive behavior when interacting with their children (e.g., Alessandri, 1992; Dadds, Mullins, McAllister, & Atkinson, 2003; Kavanagh, Youngblade, Reid, & Fagot, 1988). In an early study (Alessandri, 1992), the parenting behavior of abusive (e.g., emotionally, physically, sexually abusive and/or neglectful) mothers was observed during two interaction tasks (e.g., free play and a structured task). Abusive parents tended to engage in and demonstrate a low degree of mutual interaction and responsiveness with their children. They also tended to be negative in interactions with their children. More recently,

Lau and colleagues (2006) observed physically abusive parents in three different structured interaction tasks with their children. Results indicated that physically abusive parents were not likely to communicate empathy, praise or reassurance to their children. These parents also were likely to be critical, intrusive, and use emotionally controlling behavior (e.g., guilt, criticism) when interacting with their children. In sum, physically abusive parents are likely to engage in low rates of positive parenting behaviors and resort to negative parenting behaviors with their children. Given the links documented between parenting practices and child behavior, these types of parenting behaviors are likely to result in poor adjustment among abused children.

Parent-Child Interactions in Abuse Dyads

Researchers use a variety of methods for measuring parent behaviors, including observation of parent and child interactions, self-reports of parenting behavior, child report of parenting behavior, or a combination of these measures (e.g., Chen, Liu, & Li, 2000; Deater-Deckard, Ivy, & Petrill, 2006; Palmer & Hollin, 2001; Pettit, Bates, & Dodge, 1993). Likewise, a variety of methods are used to measure child behavior, including observations of children in various settings, teacher reports of child adjustment, and parent reports of child behavior. Although parent reports of their own parenting practices can be informative in terms of parent perceptions, reports from physically maltreating parents do not always match ratings from others (e.g., teachers) or their children's reports of parenting (Lau, Valerie, McCarty, & Weitz, 2006; Wilson et al., 2008). These reports also can be influenced by social desirability bias (Bennett, Sullivan, & Lewis, 2006). Similarly, in instances of abuse, there

may be inconsistencies among respondents in reports of child behavior (Sternberg et al., 1993). For these reasons, many researchers who seek to understand reciprocal influences of parent behavior and child adjustment incorporate observational methods to examine interactions between physically maltreating parents and their children (Wilson et al., 2008; e.g., Alessandri, 1992; Borrego, Timmer, Urquiza, & Follett, 2004; Haskett, Ahern, Ward & Allaire, 2006; Valentino, Cicchetti, Toth, & Rogosch, 2006).

Because child abuse often occurs as part of ongoing patterns of interactions between abusive parents and their children (Urquiza & Timmer, 2002), parent-child interactions are a valuable focal point for study. Observations of parent and child behaviors during interactions can provide insight into parenting behaviors that may lead to behavioral problems in children. For example, Timmer and colleagues (2002) observed the interactions between parents and children (age 4) in 30 dyads. Approximately half of the children in this sample had a history of physical abuse. Parent-child interactions were observed during three semi-structured five-minute sessions. Results indicated that physically abusive parents exhibited significantly fewer instances of positive behavior and praise in their interactions with their children compared to nonabusive parents. Physically abusive parents also demonstrated more negative behaviors in the parent-child interactions, but the group difference was not statistically significant. In terms of observed child behavior, physically abused children were significantly less likely than their nonabused peers to engage in positive behaviors in the parent-child interactions.

As part of the Lehigh longitudinal study, Herrenkohl and colleagues (1984) studied a large sample of young children (ages 18 months to 6 years), some of whom had a history of physical abuse. Observers rated mother and child behaviors during parent-child interactions in the home. Observer ratings were factor analyzed separately for mother and child, and a three-factor solution was selected as most meaningful for each. These three factors, which were similar for both parent and child, were warmth (e.g., achievement oriented, enjoyed self, involved with the other, warm, facilitated each other's work), nervousness (e.g., nervous about self, frustrated with the task, embarrassed about the other), and hostility (e.g., controlling, hostile and/or frustrated toward other, irritability, impeding each other's work). Results indicated that physically abusive parents were more hostile and exhibited less supportive behavior with their children; their children were more negative, less warm, and less task-involved when interacting with their parents (Herrenkohl et al., 1984; Herrenkohl, Herrenkohl, Egolf, & Wu, 1991).

To summarize, findings from observational studies dating back to the 1980s indicate that physically abusive parents are likely to engage in a high rate of negative parenting behaviors (e.g., hostility, harsh discipline) and low rate of positive parenting behaviors (e.g., sensitivity and warmth). Similarly, their children show this pattern of high negative behavior and low positive behavior during interactions with their parents. What we do not know is whether physically abusive parents and their children influence each other in a reciprocal manner *across time*. The present study was designed to fill this gap in our knowledge. Because there are no studies of bidirectional influences of parent and child behavior based on

abuse samples, I draw from the literature, described below, on bidirectional effects of normative and clinical samples.

Bidirectional Effects of Parent-Child Interactions

Although there is substantial research to suggest that parenting behavior has a tremendous impact on children's adjustment, children are not passive recipients of their parents' behaviors (Del Vecchio & Rhoades, 2010). Reciprocal models of socialization regard parent and child behaviors as recurrent and transactional changes over time and as behavioral processes that affect one another (Bell, 1968; Gross et al., 2008; Sameroff, 1995). One of the more widely cited reciprocal models is Patterson's (1982) coercion theory. This theory explains the behavioral contingencies that are initiated by and further affect the interactions between parent and child. These interactions are characterized by the parent's demand for compliance by the child, the child's refusal to comply coupled with intensified complaints or aggressive behavior, and, finally, parental acquiescence. In other words, in order to avoid the child's noncompliance, the parent ceases the demand and the child ceases the aversive behavior. In the end, both the child's aversive behavior and the parent's acquiescence are negatively reinforced by the cessation of both the parent's and the child's aversive behavior. As these interactions become more common between parent and child, both members of the dyad effectively "train" one another to behave in ways that increase the likelihood that the child will engage in more aversive behavior and the parent's control over these behaviors will decrease (Del Vecchio & Rhoades, 2010; Granic & Patterson, 2006; Patterson, 1982).

Researchers have extended Patterson's (1982) coercion theory to physically abusive parent-child dyads, in which the coercive cycle incorporates physical violence as a means for terminating aversive child behaviors or ensuring child compliance (Urquiza & McNeil, 1996). When parents use physical force, children may be more likely to comply with parental demands, thereby reinforcing parents' physically coercive behaviors. Additionally, children may learn that, by escalating their level of defiance and negative behavior, they can provoke their parents to the point where parents focus more on stopping the child's negative behavior than on forcing the child to comply with parental demands. Thus, the parent's inability to impel the child's behavior negatively reinforces the child's use of negative behavior (Timmer et al., 2002; Urquiza & McNeil, 1996). In the present study, the ways in which parents and children interact in a series of laboratory observations were examined to determine children's level of compliance in response to parental directives as well as parent and child positive and negative behavior directed toward one another during interactions.

In addition to examining the nature of parent-child interactions, the developmental focus of the present study was the transition from preschool into kindergarten and first grade. This developmental phase was selected because children experience many changes during the period between ages 4 and 7; such potential for growth provides opportunities for families to establish new patterns of interactions. There is an increase in children's independence and responsibility during these years (Sameroff & Haith, 1996; Whiting & Edwards, 1988). Additionally, children are faced with increasing demands on social and emotional competencies such as independence from adults, successfully negotiating

interactions with peers, establishing and adhering to a routine, and being awake and active for increased periods of time (Rimm-Kaufman & Pianta, 2000). Researchers describe the transition from preschool to school entry as "a particularly compelling time to examine joint contributions of parents and children to the development of persistent disruptive behavior" (Combs-Ronto, 2009, p. 1158). Several recent longitudinal studies have examined the bidirectional effects of parent and child behavior in early childhood to understand the ways in which parent-child interactions affect risk status among children. These studies are not based on samples involving abuse but were selected for review because they are longitudinal in nature with a focus on early childhood. Parenting behavior (e.g., positive and negative parenting) as it relates to child adjustment (i.e., externalizing behavior, internalizing behavior) is examined in these studies, which are described below.

Bidirectional effects and externalizing behavior in children. Over the past few years, researchers have increasingly examined the bidirectional effects of parenting behavior and children's externalizing behavior. These processes between parents and children have been examined in samples with varying characteristics (e.g., low risk or high risk) and with the use of varying methodologies (e.g., parent report, observational studies). Increasingly, researchers are using longitudinal methods to evaluate bidirectional processes. Examples of these studies and their relevance to the present study are described below.

Bidirectional effects have been examined in samples of relatively low risk parents and children. For example, Verhoeven and colleagues (2010) focused on the bidirectional associations between parenting behavior and externalizing behavior in toddlers and how

these associations developed over time. Parenting behavior was divided along positive (i.e., responsiveness, parental involvement, positive reinforcement, inductive reasoning) and negative (i.e., lack of structure, withdrawal of love, yelling, physical punishment) dimensions. Children's externalizing behavior was defined as attention problems and/or aggressive behavior. Measures of parents' and children's behavior were obtained solely through parent report (e.g., self-report of parenting behavior; completion of the CBCL). Results from path models indicated that an increase in children's externalizing behavior was associated with later decreases in parental support and structure and increases in psychological control and physical punishment from the parents. However, there was no statistically significant effect of parent behavior on children's subsequent externalizing behavior, so results did not support a bidirectional effect.

There are a few viable explanations for the lack of bidirectionality in this study. First, the age of the children (i.e., 2-3 years old) may be a factor. Children typically increase self-assertive behaviors during this age as they begin to push for independence. At the same time, parents increasingly impose rules and limits—both in response to their child's increasing autonomy and as part of the socialization process. In other words, the externalizing behavior exhibited by the children in this study may have been part of normal development for this age. A second factor might be that the families in this study consisted of two-parent, intact families that were well-functioning. Parents exhibited high levels of support and positive discipline and low levels of harsh punishment and may have been less likely to respond to

their children's behavior in a negative way. Thus, it may have been difficult to detect bidirectional effects in that sample.

In order to provide additional information regarding the etiology of bidirectional effects of parent and child behavior, Larsson and colleagues (2008) evaluated the effects of parental negativity and child antisocial behavior over time during children's transition to elementary school. Data were collected via parent report at child ages 4 and 7. Parental negativity was measured by a parent questionnaire and specifically included items that measured parent anger, frustration, and distance from the child. Child antisocial behavior was measured by parent report on the *Strengths and Difficulties Questionnaire* (SDQ; Goodman, 1997). The data were analyzed using structural equation modeling (SEM), and the model addressed the patterns of parent behavior separate from child behavior and the bidirectional effects of those behaviors over time. The model indicated that both parental negativity and child antisocial behavior were stable over time. In terms of bidirectional effects, even with the stability taken into account, there were significant influences of parental negativity at age 4 on child antisocial behavior at age 7. Likewise, there were significant effects of child antisocial behavior at age 4 on parental negativity at age 7. Results indicated that the strength of both the parent- and the child-driven effects (i.e., parent behavior influencing child behavior and vice versa) were similar (.12 and .15 respectively), and provided evidence for bidirectionality between parents and children as the latter transitioned into school.

One of the key limitations of these two studies is the sole use of parent report as a means of measuring all constructs. This particular method of reporting can be problematic, as

shared method variance inflates relations between measures (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003; Reio, 2010). Additionally, there tends to be bias in reporting one's own behavior as well as the behavior of one's child (e.g., Achenbach, McConaughy, & Howell, 1987; De Los Reyes & Kazdin, 2005; Duhig, Renk, Epstein, & Phares, 2000). Often, parents will over-emphasize the strength of the child's negative behavior—particularly if the parent engages primarily in negative parenting practices or abuse (e.g., Bauer & Twentyman, 1985; Bradley & Peters, 1991; Lau et al., 2006; Milner, 2003). In spite of this limitation, however, the Larsson et al. (2008) study provides evidence for bidirectional effects of parent and child behavior over time for children who are near or at school entry.

Additionally, the two studies described here included children at very different developmental levels. Verhoeven et al. (2010) included children between the ages of 2 and 3; Larsson et al. (2008) included children between the ages of 4 and 7. It is common for parents to observe externalizing behaviors around ages 2 and 3 as children begin to assert newfound independence and parents begin to increase limits on that behavior. Thus, changes in the level of child behavior at this age may have more to do with individual characteristics of the child than parent behavior. As children enter school and interact with others (e.g., teachers, peers), externalizing behaviors may become more evident if children lack the skills and strategies to navigate these new interactions successfully (Verhoeven et al., 2010). The present study included children ages 4 to 7, an age range that is similar to the Larsson et al. (2008) sample, in which bidirectional effects were detected. Thus, because of the age of the children in the sample and the history of abuse and other risk factors in the families, I

anticipated finding bidirectional effects in the present study.

In order to address the limitation of using a single informant, Yates and colleagues (2010) measured parent and child behavior at multiple time points with multiple informants. They evaluated the bidirectional effects of parent and child behavior over time in a sample of young children (i.e., ages 2 to 6) and their mothers who were identified as "at-risk" for negative parenting because of young maternal age, poverty, and single motherhood. The purpose of the study was to examine bidirectionality over time while taking into account contextual factors (e.g., stressful life events, relational tension, social support). Parenting quality was measured via laboratory observations of parent-child interactions at 2 and 4 years. Behavioral indicators of child noncompliance, anger, negative affect, ego control, hyperactivity, and distractibility also were observed. At age 6, the quality of the caregiving environment was evaluated by observers using the *Home Observation for Measurement of the Environment* (HOME; Caldwell & Bradley, 1984). Teachers completed the CBCL-TRF to obtain a measure of children's externalizing behavior at age 6. A measure of the children's academic achievement also was obtained when the children were 6 years old. Researchers used path analysis to examine the trend in parenting quality, the trend in child behavior (i.e., noncompliance, anger, negative affect), and the transactional relations over time. Parenting quality and child behavior were stable over time based on the observations. Transactional relations were modest overall. However, there was a significant trend for bidirectionality in mother-son dyads such that the son's behavior at age 2 was related to decreases in expressions of maternal sensitivity and effective limit setting at age 4, which was related to

significant decreases in levels of academic achievement at age 6. The bidirectional effects were modest for this particular study.

A similar study (Combs-Ronto, Olson, Lunkenheimer, & Sameroff, 2009) was conducted with a large sample of children (age 3 at time one; age 5.5-6 at time two) who were considered at-risk for school-age conduct problems based on high scores on the parent-report form of the CBCL. Risk factors among parents were very few. The purpose of the study was to examine the association between negative maternal parenting and disruptive child behavior across the period from preschool to formal school entry. The researchers obtained parent report measures of parenting, discipline style, and child behavior at two time points. Additionally, parents and children engaged in 45 minutes of various laboratory observation tasks (e.g., work together on challenging puzzles, free play with toys, clean-up task without parent help). Child noncompliance was also coded as part of the observed interactions. A series of regression analyses was conducted to determine the direction of associations between parent and child behaviors. Changes in negative parenting were predicted by children's early externalizing behavior. Likewise, changes in children's externalizing behavior were predicted by parents' early negative parenting. Additionally, negative parenting in the preschool years interacted with children's early disruptive behavior to predict teacher reports of externalizing behavior in kindergarten. Results from this study support previous evidence that the combination of early child disruptive behavior and negative parenting behavior predict subsequent externalizing behavior (e.g., Miner & Clarke-Stewart, 2008; Rubin, Burgess, Dwyer, & Hastings, 2003). If the quality of early parent-child

relationships provides an important context for understanding why some children's problem behavior endures (Bates, Goodnight, Fite, & Staples, 2009), then understanding patterns of parent-child interaction and how they impact broader externalizing problems becomes important as children transition to school (Combs-Ronto et al., 2010).

Taken together, results from these studies are mixed in terms of providing evidence for bidirectional effects of parent and child behavior. Some of the discrepancies across studies may be accounted for by variation in age of child, risk factors for parents and children (i.e., low risk vs. at-risk), and methodology (i.e., solely parent report vs. multiple informants and observations). There is, however, some basis for support of bidirectional influences, particularly in samples of parents or children who are considered "at-risk" (e.g., Combs-Ronto et al., 2009; Yates et al., 2010). There is also support for prior theory (Patterson, 2002; Scaramella & Leve, 2004) which suggests that harsh, negative parenting behaviors and externalizing behavior in children may begin to interact in the preschool years and establish a negative, coercive interactive cycle that is maintained into school entry (Combs-Ronto et al., 2009). One aim of the present study was to determine whether those reciprocal processes were observed in a sample of physically abusive parents and their young children.

Bidirectional effects and internalizing behavior in children. Although several studies have examined parenting behaviors as they are associated with internalizing behavior in children (e.g., Barnett, Shanahan, Deng, Haskett, & Cox, 2010; Hipwell et al., 2008; Nicholson, Deboeck, Farris, Boker, & Borkowski, 2011; Rubin, Hastings, Stewart, Henderson, & Chen, 1997), evidence for the bidirectional effects of the parent-child

relationship as it relates to internalizing behavior is lacking. Researchers have cited two primary reasons for this lack of research. First, as mentioned previously, researchers have focused primarily on the relation from parenting to child behavior as opposed to examining both parent and child effects. In other words, research regarding internalizing problems has been examined within the context of unidirectional effects (Hipwell et al., 2008; Reitz, Dekovic, & Meijer, 2006). Second, it can be difficult to detect internalizing behavior problems in children (Reitz et al., 2006) because behaviors such as sadness, fear, and withdrawal tend to be more subtle and less likely to be disruptive compared to externalizing problems, and are therefore more likely to be overlooked by an observer (e.g., parent or teacher) (Eisenberg et al., 1999).

Researchers have developed ways to quantify behavioral indicators of internalizing problems in children. These indicators were developed as a two-factor model for mood: positive affect and negative affect (Watson, Clark, & Tellegen, 1988; Watson & Tellegen, 1985). Positive affect reflects an individual's level of enthusiasm, alertness, and activity. High positive affect is a state of pleasurable engagement, full engagement, and high energy. Low positive affect is indicated by sadness and lethargy. Negative affect encompasses discontented engagement and distress. This dimension includes a variety of mood states including anger, fear, contempt, hostility, guilt, and nervousness (Watson et al., 1988). These indicators have been used to develop scales primarily for self-report (or parent/teacher report for children). However, for reasons listed above, observations of affect as it relates to internalizing behaviors in children are limited.

An examination of the bidirectional processes of parent and child behavior in the present study was exploratory in nature as these processes were examined primarily through observed parent-child interactions. Specifically, children's positive and negative mood, which include behaviors such as those described in conjunction with positive (e.g., demonstrations of contentment, pleasurable engagement, engagement) and negative (e.g., sadness, anger, fear, hostility) affect, were examined. These types of behaviors are consistent with measures of children's internalizing behaviors (e.g., CBCL), and may be indicative of internalizing problems in the present sample. Although bidirectional effects related to children's internalizing problems were not found in a community sample (e.g., Eisenberg et al., 1999), it was possible that a different pattern would emerge with a sample of physically abused children due to maladaptive interactions between parents and children.

The Present Study

Bidirectional effects of parent-child interactions (particularly as they relate to externalizing behaviors) have been demonstrated in samples including nonclinical and at-risk parent-child dyads (e.g., Combs-Ronto et al., 2009; Del Vecchio & Rhoades, 2010; Gross et al., 2008; Larsson et al., 2008; Nicholson et al., 2011; Verhoeven et al., 2010). The field currently is bereft of research regarding bidirectional effects of parent and child behaviors in young children who have been physically abused. One goal of the present study was to understand the interactive processes between physically abusive parents and their children. In other words, this goal was to determine whether positive or negative patterns of parent-child interactions extended to a sample in which physical abuse has occurred. It was thought that

examining these interactions could extend knowledge regarding the interactive patterns between parents and children in abusive families as well as the nature of any bidirectional effects of these interactions.

Researchers, child clinicians, developmental specialists and educators agree that the transition from preschool to formal schooling is a time of significant developmental change in children. Problems that may have been developing in the early years can be exacerbated when expectations for children increase during this developmental phase. In other words, difficulties navigating this transition may contribute to difficulties in children's interactions with others, including their parents. Negative patterns of interaction between parents and children may develop and become entrenched relatively quickly during the transition into school (Combs-Ronto et al., 2009; Del Vecchio & Rhoades, 2010). Just as negative patterns of interaction are possible, it is possible that positive trajectories of parent-child interactions also emerge as parents and children adjust and find more positive ways to interact. The present study was designed to examine the types of patterns of parent-child interactions that emerged for these families during this transition period.

Another goal of the present study was to improve on methodological approaches used in prior studies regarding this subject. First, very few longitudinal studies have been conducted to examine behavioral trajectories of children identified by Child Protective Services (CPS). Behavioral patterns (e.g., positive and negative affect and compliance) of children identified by CPS were examined in the present study. Second, the majority of longitudinal studies that examine parent and child behaviors and interactions cover the span

of one year or less. It can be difficult to determine whether bidirectional effects are stable or whether they change in such a short period of time (Pardini, 2008). The present study spanned three years. Finally, of the longitudinal studies conducted to examine parent and child behaviors over time, very few control for the initial (i.e., Time 1) levels of the behaviors being studied (Hipwell et al., 2008). Thus, the estimate of the effect of parent behavior on child behavior may not be assessed accurately. In other words, without controlling for the initial time point, large biases in estimates of effects may result (Gollob & Reichardt, 1987). Initial levels of both parent and child behaviors were controlled for in the present study.

In order to address the study's primary goal, two key aims were investigated. First, it was the aim of this study to examine the ways in which parent and child behaviors changed over time among parent-child dyads. Although there are some inconsistencies in past research on fluctuation in parent and child behavior over time, results generally point to overall stability in parent and child behavior (e.g., Keiley et al., 2001; Kemppinen, Kumpulainen, Raita-Hasu, Moilanen, & Ebeling, 2006; Larsson et al., 2008; Yates et al., 2010). However, analyses examining stability in parent behavior over time based on the sample to be used in the present study show that several dimensions of parenting behavior change over time such that parenting behavior deteriorates over time (Hastkett et al., under review). Given the changes in parenting behavior with this particular sample, it was expected that child behavior would follow suit so that both parent and child behavior would become less positive and more negative across the three years. Second, it was the aim of this study to

provide additional knowledge regarding the patterns of parent-child interactions in abusive families. Using SEM, the bidirectional effects of the interactions were examined to determine the ways in which interactive patterns changed or stabilized over time. In keeping with transactional (e.g., Sameroff, 1995) and coercive models (e.g., Patterson, 1982; 2002) of interaction, if parent or child behavior deteriorates over time (i.e., an increase in negative behavior and/or a decrease in positive behavior), it was expected that the behavior of the other member of the dyad would deteriorate also. Parent and child behavior were measured during structured parent-child play sessions in a laboratory setting. Whether observed child behavior (i.e., positive and negative affect, compliance) during parent-child interactions in first grade was related to child internalizing and externalizing behaviors in first grade (based on teacher report via CBCL-TRF) also was examined. Research suggests that patterns of behavior may stabilize or deviate from an adaptive trajectory, particularly during sensitive developmental periods such as school entry (Cicchetti, 1993; Cicchetti & Cohen, 1995). Examining this association between observed child behavior and internalizing or externalizing behaviors in school (e.g., Combs-Ronto et al., 2010) may provide additional insight into developmental trajectories for physically abused children in terms of adjustment in the school setting. Specific hypotheses are as follows:

1. Parenting behavior will change over time such that positive parenting behavior will decrease and negative parenting behavior will increase.
2. Child behavior will change over time such that positive mood will decrease and negative mood and noncompliance will increase.

3. A reciprocal effect will be found between parent and child behavior over time.
4. Observed child behavior (i.e., positive and negative mood, compliance) at Time 3 (i.e., when the children were in first grade) will predict teacher reports of internalizing and externalizing behavior in first grade.

Method

Participants

Parent/child dyads (N = 93) were recruited to participate in a study designed to examine factors that contributed to physically abused children's adjustment during the transition from preschool into kindergarten and, subsequently, first grade. All families lived in an urban area of a large county in the South. For a summary of the demographics and characteristics of the county population, see Appendices A-C. All families were recruited from Child Protective Services (CPS). For a summary of the number of substantiated cases identified by CPS in Wake County from the years data were collected (Duncan et al., 2012), see Table 1. All children in the study had a history of substantiated physical abuse within one year prior to enrollment in the study. Criteria for inclusion in the study included (a) a substantiated report of physical abuse within 12 months prior to enrollment in the study, (b) confirmation that the physically abusive parent and child were living in the same home, (c) an absence of sexual abuse of the child, and (d) the child was between 4 and 7 years of age. With three exceptions, the parent in the dyad was the abuser. Most dyads were enrolled prior to the child's kindergarten entry (i.e., during preschool). Optimally, dyads were assessed at enrollment, again when the children were in kindergarten, and, finally, when the children were in first grade, for a total of three time points. Data collection began in 2004 and continued until 2009, with families being recruited throughout that time period.

Some parents enrolled in the study with multiple children. Because each parent-child dyad offered a unique contribution to the study, all dyads were included to maximize

statistical power. The sample included 93 parent-child dyads (parents *N* = 78; children *N* = 93). Most of the participants enrolled in the study were African American (*N* = 66; 71%).

Table 1

Cases of Substantiated Abuse and Abuse Demographics in the County*

Year	Total	Males	Females	White	African American	Native American	Hispanic	Other Race
2004	129	46 (36%)	83 (64%)	53 (41%)	72 (56%)	0 (0%)	17 (13%)	4 (3%)
2005	86	26 (30%)	60 (70%)	33 (38%)	48 (56%)	0 (0%)	8 (9%)	5 (6%)
2006	64	24 (38%)	40 (62%)	40 (63%)	20 (31%)	0 (0%)	9 (14%)	4 (6%)
2007	75	29 (39%)	46 (61%)	39 (52%)	32 (43%)	0 (0%)	22 (29%)	4 (5%)
2008	60	22 (37%)	38 (63%)	27 (45%)	28 (47%)	0 (0%)	18 (30%)	5 (8%)
2009	92	29 (32%)	63 (68%)	40 (43%)	48 (52%)	0 (0%)	12 (13%)	4 (4%)

*Type of abuse was not specified. This category was differentiated from Neglect, Abuse and Neglect, and Dependency.
Note: Percentages related to ethnicity add up to greater than 100%. These statistics may be due to the ways in which people identified themselves when they reported their ethnicity (i.e., individuals may have identified themselves as more than one ethnicity).

Additionally, a majority of the children enrolled in the study were male (N = 58; 62%); the majority of parents were female (N = 75; 95%). Additional demographic information (e.g., marital status, socioeconomic status, educational attainment, etc.) can be found in Table 2.

Measures

Parenting behavior. Parenting behavior was examined using an observational measure of parent-child interaction (PCI). The PCI procedure involved three, 7-minute structured interactions between a parent and their child. Observations of parent-child interactions were videotaped via an unobtrusive camera installed in a clock in the room. The first interaction consisted of parent and child "free play," in which the dyad was instructed to play together with various toys and materials (e.g., K'nex construction toys, markers, paper, a series of magnetic numbers and tray) on the table in front of them. In the second interaction, the "instruction" task, parents were asked to tell their child to: (1) clean up; (2) draw a picture of a person; and (3) sit quietly while you read a magazine. The same toys present from the first situation were available on the table for the child. Additionally, newly introduced and potentially more appealing toys (e.g., Lite Brite, Play-Doh and tools) and a container of candy were placed on a bookshelf in the room. The parent was instructed prior to the session not to let the child play with those toys. The third interaction was a "teaching/frustration" segment. Parents were instructed to help their child complete two age-appropriate puzzles (e.g., Winnie the Pooh, The Lion King, etc.) without touching any puzzle

pieces. To increase the sense of urgency, a timer was set for 7 minutes and placed on the table. A more detailed description of these interaction segments can be found in Appendix A.

Table 2

Demographic Characteristics of Children (*N*=93) and Parents (*N*=78)

Variable	Number (%)
Child Race	
African American	66 (71%)
European American	19 (20%)
Other/Biracial	8 (9%)
Child Gender	
Male	58 (62%)
Female	35 (38%)
Parent Marital Status	
Single	42 (45%)
Married	24 (26%)
Divorced	9 (10%)
Separated	15 (16%)
Widow/Widower	3 (3%)
Educational Attainment	
Less than high school	14 (15%)
High school	32 (34%)
Some college or specialized training	37 (40%)

Table 2, continued

Variable	Number (%)
College/Graduate degree	10 (11%)
*SES Time 1	
I	1 (1%)
II	19 (21%)
III	15 (16%)
IV	28 (30%)
V	30 (32%)
*SES Time 2	
I	0 (0%)
II	14 (15%)
III	11 (12%)
IV	24 (26%)
V	18 (19%)
*SES Time 3	
I	0 (0%)
II	11 (12%)
III	14 (15%)

Table 2, continued

Variable	Number (%)
IV	16 (17%)
V	13 (14%)
Parent Age	
Time 1	31.5 (7.8)
Time 2	33.0 (9.3)
Time 3	34.8 (8.4)
Child Age	
Time 1	4.5 (.50)
Time 2	5.4 (.50)
Time 3	6.1 (.43)
Parent IQ	89.1 (12.8)
Child IQ	90.3 (14.0)

Note: *SES represented by Hollingshead Index ranging from I-V; I=highest; V=lowest

Parenting behavior was coded from videotapes using a version of the Qualitative Ratings of Parent-Child Interactions/Young Family Interaction Coding System (YFICS; Cox & Paley, 1997). That system was originally designed and developed as a triadic or whole family coding system for use with families with children age 2-3 years. The system has been adapted for use with families of older children by using age-appropriate tasks (Paley, Cox, & Kanoy, 2001). The parenting dimensions coded for the present sample were Positive Regard for the Child, Negative Regard for the Child, Flatness of Affect, Intrusiveness, Sensitivity, and Detachment. Positive regard for the child indicated the frequency and intensity of verbal or physical warmth and positive expressions (e.g., hugs, smiles) toward the child. Negative regard indicated the frequency and intensity of verbal or physical hostile, negative behaviors (e.g., pushing away, name-calling). Flatness of affect represented the degree to which parents lacked animation in behavior and demeanor. Intrusiveness described the degree to which parents' behavior dominated the interaction such that the child was unable to follow his or her own interests, desires, and needs. Sensitivity indicated the degree to which parent behavior was responsive and reciprocal, based on the child's needs. Finally, detachment indicated the parents' level of interest and emotional involvement with the child during the interaction. These six parenting dimensions were coded on a scale of 1 (Not at all characteristic) to 7 (Highly characteristic) for each of the three situations. For a full description of parenting behaviors, see Appendix D. Scores for each dimension were averaged across the three situations, yielding a mean score for each dimension at each time point. The higher the score, the more characteristic the behavior was of the observed parent.

Results from previous studies indicated that, with the exception of detachment, scores from each situation were highly correlated and therefore can be combined in this way (e.g., Haskett, Allaire, Kreig, & Hart, 2008). Because detachment scores were not correlated across all three situations (Lewis, 2011), those scores were not included in this study.

The developers of the YFICS coding system established interrater reliability using data from 138 families. Developers found moderate to excellent interrater reliability on all parenting dimensions (Paley et al., 2001). This coding system has been used in previous studies of maltreated children in the same age range as the proposed study (e.g., Haskett et al., 2008). Interrater reliability (based on 25% of the PCI sessions) of the parenting codes has been calculated previously with this sample and the following adequate intra-class correlation (ICC) coefficients were obtained: Positive Regard r = .75; Negative Regard r = .65, Sensitivity r = .72; Intrusiveness r = .64; and Flatness of Affect r = .69 (Lewis, 2011). Internal consistency also has been found to be adequate (ranging from r = .64 on Sensitivity to r = .80 on Negative Regard) in previous studies with physically abused children (e.g., Lewis, 2011). Regarding the validity of the coding system, cluster analysis of abusive parents' scores on the parenting dimensions of the PCI showed clinically meaningful subgroups of abusive parents (Haskett, Smith Scott, & Sabourin Ward, 2004).

Child behavior. Child behavior also was examined using the PCI. The child behaviors that were coded for the present study are Positive Mood, Negative Mood, and Compliance. Positive mood was the extent to which the child was content and satisfied overall. Indicators of positive mood included laughter, smiles, positive tone of voice, and

expressions of enthusiasm and/or playfulness. Negative mood was the extent to which the child fussed, frowned, cried, or otherwise expressed discontentment. Included in this measure also was the degree to which the child demonstrated hostility, aggression, anger, or dislike toward the parent. Compliance was defined as the degree to which the child demonstrated willingness to listen to the parent's suggestions and comply with the requests in a reasonable manner. These three behaviors were coded on a scale of 1 (Not at all characteristic) to 5 (Highly characteristic). A description of the coding scales for child behavior can be found in Appendix E. As with the parenting scale, the higher the score, the more characteristic the behavior was of the observed child. Child behaviors were not highly correlated (r = .4 to .6) across all three situations. Therefore, mean scores for each dimension were not calculated. Raw scores for each dimension at each time point were used for analyses.

This coding scale has been used previously in studies examining observed child behavior (e.g., McPherson, Lewis, Lynn, Haskett, & Behrend, 2009; Paley et al., 2001). Interrater reliability across coders of child behaviors was moderate to excellent for McPherson et al (2009), with kappa coefficients ranging from .75 to .94. Internal consistency also has been found to be adequate (α = .80) for the child behavior scales (McPherson et al., 2009). In the present study, coding procedures were conducted as described above regarding parent behavior. Intra-class correlation (ICC) coefficients were calculated to determine interrater reliability for 25% of the PCI sessions. The following ICC coefficients were obtained: Positive Mood r = .85; Negative Mood r = .86; and Compliance r = .82. In the

present study, good internal consistencies were found (ranging from r = .86 on Negative Mood and Compliance to r = .90 on Positive Mood).

For the present study, undergraduate research assistants not involved in collecting data coded the videotaped parent and child behavior; separate coding teams were used to code parent and child behavior and the teams did not have access to coded data from the other team. To code parent behavior, each coder first watched the taped parent-child interaction while taking notes of parent behaviors. The coder then assigned a score for each of the six parent behaviors and watched the tape again to verify the scores. To code child behavior, each coder watched the taped parent-child interactions and assigned a score for each of the three child behaviors (i.e., positive mood, negative mood, compliance). Ratings were based on the quantity and quality of the interactions. Coders received a training manual and were trained in small groups until each behavior was scored reliably (80% interrater agreement with the trainer). Once trained, approximately 25% of the interactions were coded by two coders to obtain interrater agreement.

Socioemotional adjustment: Child behavior. First grade teachers of the child participants rated children's behavior via the CBCL-TRF (Achenbach & Rescorla, 2001). The CBCL-TRF is a 113-item questionnaire completed by teachers of children ages 6-18. It provides a measure of children's behavioral and emotional problems as well as children's competencies. Teachers indicate how true each item is for the child at the time the scale is completed or within the past six months using the following scale: 0 = not true; 1 = somewhat or sometimes true; 2 = very true or often true. Raw scores are converted to *T*-

scores (M = 50; SD = 10) based on gender and age group for three composites: Internalizing Problems, Externalizing Problems, and Total Problems. The T-scores from the third time point (i.e., first grade) for the Internalizing and Externalizing scales were used in this study.

The CBCL-TRF is a psychometrically sound and widely used instrument (Edelbrock & Achenbach, 1985). Excellent alpha coefficients have been reported for the Internalizing (α = .90) and Externalizing (α = .95) scales (Achenbach & Rescorla, 2001). There was adequate interrater agreement among camp counselors for internalizing (r = .64) and externalizing (r = .85) behaviors in a sample that included physically abused children (Shonk & Cicchetti, 2001). Additionally, developers reported strong discriminative and content validity of the measure, and scores on the CBCL-TRF have correlated with psychiatric diagnoses (Achenbach & Edelbrock, 1984).

Procedures

Participants were identified through CPS as having substantiated cases of physical abuse. Parents of abused children who met the research inclusion criteria were sent a letter informing them of the study and providing them with contact information for the research office. Interested parents contacted the research office, were screened by a doctoral level psychologist, and completed a 20-30 minute interview to gather background information. If the family met the research criteria described above, they were informed of the purpose and procedures of the study and were scheduled for a three-hour data collection session at a university-based clinic. Families also were informed that the study would include three data collection sessions over the course of three years and that they would be scheduled to attend

one session each year. Ideally, the initial session was scheduled when the child was in preschool, with subsequent sessions occurring at annual intervals (i.e., kindergarten and first grade).

To encourage participation, transportation to the data collection site and childcare on site were provided. Each parent received $70 in exchange for participating. To encourage continued participation in all time points of the study, payments increased by $10 each year the family participated. Parents were entered into a monthly drawing for an additional $50 gift certificate when they scheduled their appointment. Parents also received a book of local resources; children received educational materials and a small toy.

To maintain confidentiality, identification numbers were assigned to all participating families. Data were catalogued according to these numbers and contained in locked filing cabinets. A Certificate of Confidentiality, which protects families from research information being used in court proceedings, also was obtained from the Department of Health and Human Services. All procedures for the study were approved by the university's Institutional Review Board. At the beginning of each session, informed consent from the parents and assent from the children were obtained. All measures with parents and children were administered by teams of undergraduate research assistants who were supervised by a graduate student. Undergraduate research assistants were not informed of the families' involvement with CPS or aware of participants' history of abuse. The undergraduates' lack of knowledge regarding CPS involvement or abuse history helped ensure unbiased data collection. Data collection for the larger study required 2-3 hours; administration of the PCI

occurred in a standard order at the end of the first hour of data collection and was immediately followed by a family snack. For parents, measures preceding the PCI were an interview about their involvement in their children's learning, a measure of receptive vocabulary, and a measure of mental health functioning. For children, measures preceding the PCI included a puppet interview about their parents' caregiving behavior, a measure of intellectual functioning, and a puzzle task to assess regulation.

Parents signed a consent form allowing their child's teacher to be contacted for the teacher to complete rating scales regarding children's behavior and socioemotional adjustment. Once consent was obtained from the parent, the teacher was contacted about participating in the study. All teachers were given the option of declining but none declined. When teachers agreed to participate, a visit to the school was scheduled and measures were given to the teacher for completion. Among the measures completed was the CBCL-TRF. Teachers who participated received $15. Teacher-report measures were administered within one month of the clinic-based data collection.

Results

Descriptive Statistics

Means, standard deviations, and ranges were calculated for all variables at each time point to assess normality of the data (see Tables 3-5). Additionally, to examine the distribution of all variables at each time point, skewness and kurtosis values were computed. Each variable's skewness and kurtosis was converted to a z-score by computing the ratio of skewness and kurtosis to its standard error and comparing the z-score to the value of ± 1.96 (Field, 2005). The variables of parent negative regard and child negative mood were skewed at each time point. Child compliance was skewed for Free Play during the first two time points and for Puzzle during the first time point only. Child positive mood also was skewed during the puzzle task at the second time point. Parent negative regard and child compliance were kurtotic only at the first time point. Child negative mood was kurtotic for the puzzle task at the third time point only. In cases of extreme values for skewness and kurtosis (i.e., z-scores greater than 3.29; Field, 2005), variables were transformed. Specifically, parent negative regard at each time point, compliance for the puzzle task at the first time point, child negative mood for the free play task at the first time point, the puzzle task at the second time point and all situations for the third time point were transformed. A log transformation was selected for this process as most of the extreme scores were positive and none of the data included zeros or negative numbers (Field, 2005). Skew and kurtosis values for all transformed variables can be found in Tables 6-8. In addition, correlational analyses were conducted to examine the strength of the relation among parenting behaviors and among

child behaviors for each time point separately. Correlations among all variables can be found in Tables 9-14.

Table 3

Number of Participants, Mean Scores, and Standard Deviations of Measures at Time 1

Variable	*n*	*M*	*SD*	Range
Positive Parenting				
Positive Regard	58	3.74	1.14	1.00-6.33
Flatness of Affect	58	3.63	.89	1.67-5.33
Negative Parenting				
Negative Regard	58	2.01	.85	1.00-5.00
Intrusiveness	58	3.56	1.13	1.33-6.67
Sensitivity	58	4.22	1.06	2.00-6.33
Child Behavior				
Positive Mood (Free Play)	55	3.09	.80	1.00-5.00
Negative Mood (Free Play)	55	1.35	.55	1.00-3.00
Compliance (Free Play)	55	4.31	.61	2.00-5.00
Positive Mood (Instruction)	55	2.25	.80	1.00-4.00
Negative Mood (Instruction)	55	2.00	.98	1.00-5.00
Compliance (Instruction)	55	3.56	1.05	1.00-5.00

Table 3, continued

Variable	*n*	*M*	*SD*	Range
Positive Mood (Puzzle)	54	2.20	.76	1.00-4.00
Negative Mood (Puzzle)	54	1.81	.91	1.00-4.00
Compliance (Puzzle)	54	4.07	.89	1.00-5.00

Note: Parenting behavior is represented by composite factor loading scores; child behavior is represented by raw scores. The possible range of scores was 1.0-7.0 for parenting behavior and 1.0-5.0 for child behavior.

Table 4

Number of Participants, Mean Scores, and Standard Deviations of Measures at Time 2

Variable	*n*	*M*	*SD*	Range
Positive Parenting				
Positive Regard	68	3.54	1.25	1.00-6.00
Flatness of Affect	68	4.02	.93	2.33-6.00
Sensitivity	68	3.91	1.13	1.67-6.67
Negative Parenting				
Negative Regard	68	2.10	.82	1.00-4.33
Intrusiveness	68	3.48	1.09	1.33-6.33
Child Behavior				
Positive Mood (Free Play)	65	3.08	1.09	1.00-5.00
Negative Mood (Free Play)	65	1.60	.66	1.00-3.00
Compliance (Free Play)	65	4.40	.66	3.00-5.00
Positive Mood (Instruction)	65	2.31	.97	1.00-5.00
Negative Mood (Instruction)	65	1.86	.92	1.00-5.00
Compliance (Instruction)	65	3.80	.87	2.00-5.00

Table 4, continued

Variable	*n*	*M*	*SD*	Range
Positive Mood (Puzzle)	64	2.05	.98	1.00-4.00
Negative Mood (Puzzle)	64	1.72	.81	1.00-4.00
Compliance (Puzzle)	64	4.22	.65	3.00-5.00

Note: Parenting behavior is represented by composite factor loading scores; child behavior is represented by raw scores. The possible range of scores was 1.0-7.0 for parenting behavior and 1.0-5.0 for child behavior.

Table 5

Number of Participants, Mean Scores, and Standard Deviations of Measures at Time 3

Variable	*n*	*M*	*SD*	Range
Positive Parenting				
Positive Regard	60	3.37	1.17	1.00-6.00
Flatness of Affect	60	4.17	1.03	1.33-6.00
Sensitivity	60	3.65	.98	1.67-6.00
Negative Parenting				
Negative Regard	60	2.14	.75	1.00-4.33
Intrusiveness	60	3.43	1.00	1.33-5.67
Child Behavior				
Positive Mood (Free Play)	60	3.02	1.00	1.00-5.00
Negative Mood (Free Play)	60	1.28	.49	1.00-3.00
Compliance (Free Play)	60	4.22	.69	3.00-5.00
Positive Mood (Instruction)	60	2.48	.98	1.00-4.00
Negative Mood (Instruction)	60	1.60	.81	1.00-4.00
Compliance (Instruction)	60	3.67	.68	2.00-5.00

Table 5, continued

Variable	*n*	*M*	*SD*	Range
Positive Mood (Puzzle)	60	2.27	.97	1.00-5.00
Negative Mood (Puzzle)	60	1.53	.77	1.00-4.00
Compliance (Puzzle)	60	4.15	.73	3.00-5.00
TRF Internalizing	54	49.54	9.51	37.00-70.00
TRF Externalizing	54	54.41	10.89	41.00-83.00

Note: Parenting behavior is represented by composite factor loading scores; child behavior is represented by raw scores. The possible range of scores was 1.0-7.0 for parenting behavior and 1.0-5.0 for child behavior. TRF is represented by T-scores.

Table 6

Skew and Kurtosis of Variables at Time 1

Variable	Skew	S.E.	Kurtosis	S.E.
Positive Parenting				
Positive Regard	-.14	.31	-.13	.62
Flatness of Affect	-.43	.31	-.34	.62
Negative Parenting				
Negative Regard	.40	.31	.29	.62
Intrusiveness	.08	.31	-.10	.62
Sensitivity	-.11	.31	-.63	.62
Child Behavior				
Positive Mood (Free Play)	-.17	.32	-.20	.63
Negative Mood (Free Play)	1.03	.32	.91	.63
Compliance (Free Play)	-.78	.32	2.43	.63
Positive Mood (Instruction)	.41	.32	-.05	.63
Negative Mood (Instruction)	.85	.32	.40	.63
Compliance (Instruction)	-.22	.32	-.71	.63
Positive Mood (Puzzle)	.17	.32	-.28	.64
Negative Mood (Puzzle)	.85	.32	-.22	.64
Compliance (Puzzle)	1.50	.32	3.66	.64

Table 7

Skew and Kurtosis of Variables at Time 2

Variable	Skew	S.E.	Kurtosis	S.E.
Positive Parenting				
Positive Regard	-.13	.29	-.74	.57
Flatness of Affect	.02	.29	-.88	.57
Sensitivity	.26	.29	-.28	.57
Negative Parenting				
Negative Regard	.22	.29	-.39	.57
Intrusiveness	.39	.29	.06	.57
Child Behavior				
Positive Mood (Free Play)	-.01	.30	-.82	.59
Negative Mood (Free Play)	.64	.30	-.57	.59
Compliance (Free Play)	-.64	.30	-.57	.59
Positive Mood (Instruction)	.52	.30	-.17	.59
Negative Mood (Instruction)	1.04	.30	1.04	.59
Compliance (Instruction)	-.33	.30	-.49	.59
Positive Mood (Puzzle)	.63	.30	-.58	.59
Negative Mood (Puzzle)	.35	.30	-1.04	.59
Compliance (Puzzle)	-.26	.30	-.67	.59

Table 8

Skew and Kurtosis of Variables at Time 3

Variable	Skew	S.E.	Kurtosis	S.E.
Positive Parenting				
Positive Regard	-.08	.31	-.67	.61
Flatness of Affect	-.25	.31	-.12	.61
Sensitivity	.20	.31	-.61	.61
Negative Parenting				
Negative Regard	.27	.31	-.05	.61
Intrusiveness	.15	.31	-.38	.61
Child Behavior				
Positive Mood (Free Play)	-.14	.31	-.47	.61
Negative Mood (Free Play)	1.20	.31	-.31	.61
Compliance (Free Play)	-.32	.31	-.85	.61
Positive Mood (Instruction)	.10	.31	-.97	.61
Negative Mood (Instruction)	.69	.31	-.93	.61
Compliance (Instruction)	.20	.31	-.38	.61

Table 8, continued

Variable	Skew	S.E.	Kurtosis	S.E.
Positive Mood (Puzzle)	.58	.31	-.06	.61
Negative Mood (Puzzle)	.85	.31	-.59	.61
Compliance (Puzzle)	-.24	.31	-1.08	.61
TRF Internalizing	.45	.33	-.47	.64
TRF Externalizing	.61	.33	-.19	.64

Table 9

Correlations Among Child Behavior Variables by Segment at Time One

Variable	1	2	3	4	5	6	7	8	9
Free Play									
1. Positive Mood	-								
2. Negative Mood	-.17	-							
3. Compliance	-.02	-.35**	-						
Clean Up									
4. Positive Mood	.40**	-.17	.06	-					
5. Negative Mood	.45**	.02	-.13	.07	-				
6. Compliance	-.44**	-.04	.28*	-.09	-.68**	-			

Table 9, continued

Variable	1	2	3	4	5	6	7	8	9
Puzzle									
7. Positive Mood	.31*	-.21	.06	.38**	-.08	-.12	-		
8. Negative Mood	.13	.02	-.03	.17	.50**	-.32*	-.27	-	
9. Compliance	-.35**	-.14	.31*	-.05	-.47**	.60**	-.11	-.45	-

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

Table 10

Correlations Among Means of Parent Behaviors and Child Behavior by Segment at Time One

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Parent Means														
1. Positive Regard	-													
2. Negative Regard	-.55**	-												
3. Sensitivity	.73**	-.61**	-											
4. Intrusiveness	-.37*	.69**	-.62**	-										
5. Affect	-.51**	.16	-.31**	-.01	-									

Table 10, continued

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Child Behavior														
Free Play														
6. Positive Mood	.11	-.05	.17	-.12	-.28*	-								
7. Negative Mood	-.41**	.38**	-.35**	.19	.11	-.17	-							
8. Compliance	.09	-.28	.18	-.12	-.03	-.02	-.35	-						
Instruction														
9. Positive Mood	.25	-.11	.30*	-.14	-.23	.40**	-.17	.06	-					
10. Negative Mood	-.12	.24	-.06	.18	-.06	.45**	.02	-.13	.07	-				
11. Compliance	.07	-.28*	.04	-.19	.16	-.44**	-.04	.28*	-.09	-.68**	-			

Table 10, continued

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Puzzle														
12. Positive Mood	.11	-.16	.05	-.11	-.07	.31*	-.21	.06	.38**	-.08	-.12	-		
13. Negative Mood	-.24	.13	-.04	.24	.03	.13	.02	-.03	.17	.50**	-.32*	-.27*	-	
14. Compliance	.27*	-.30*	.27*	-.35**	.02	-.35**	-.14	.31*	-.05	-.47**	.60**	-.11	-.45**	-

Note: *p< .05; **p< .01

Table 11

Correlations Among Child Behavior Variables by Segment at Time Three

Variable	1	2	3	4	5	6	7	8	9
Free Play									
1. Positive Mood	-								
2. Negative Mood	-.39**	-							
3. Compliance	.04	-.38**	-						
Clean Up									
4. Positive Mood	.67**	-.39**	.12	-					
5. Negative Mood	-.18	.58**	-.37**	-.34**	-				
6. Compliance	-.05	-.36**	.36**	.07	-.58**	-			

Table 11, continued

Variable	1	2	3	4	5	6	7	8	9
Puzzle									
7. Positive Mood	.53**	-.22	.17	.50**	-.29*	-.08	-		
8. Negative Mood	.11	.25*	-.20	-.06	.32*	-.19	-.01	-	
9. Compliance	-.14	-.20	.42**	-.05	-.19	.27*	-.09	-.38**	-

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

Table 12

Correlations Among Means of Parent Behaviors and Child Behavior by Segment at Time Two

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Parent Behavior														
1. Positive Regard	-													
2. Negative Regard	-.44**	-												
3. Sensitivity	.81**	-.58**	-											
4. Intrusiveness	-.11	.58**	-.40**	-										
5. Affect	-.57**	-.06	-.40**	-.28*	-									

Table 12, continued

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Child Behavior														
Free Play														
6. Positive Mood	.42**	-.05	.27*	.22	-.28*	-								
7. Negative Mood	-.22	.12	-.23	.09	-.03	-.39**	-							
8. Compliance	.07	-.13	.09	-.13	.05	.04	-.38	-						
Instruction														
9. Positive Mood	.33**	.04	.22	.12	-.22	.67**	-.39**	.12	-					
10. Negative Mood	-.10	.34**	-.18	.28*	-.23	-.18	.58**	-.37**	-.34**	-				
11. Compliance	-.13	-.22	-.07	-.20	.37**	-.05	-.36**	.36**	.07	-.58**	-			

Table 12, continued

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Free Play														
12. Positive Mood	.24	-.15	.21	.04	-.16	.53**	-.22	.17	.50**	-.29*	-.081	-		
13. Negative Mood	.06	.08	.03	.16	-.30*	.12	.25*	-.20	-.06	.32*	-.19	-.01	-	
14. Compliance	-.13	-.15	.03	-.24	.20	-.14	-.20	.42**	-.05	-.19	.27*	-.09	-.38**	-

Note: *p< .05; **p< .01

Table 13

Correlations Among Child Behavior Variables and TRF scores by Segment at Time Three

Variable	1	2	3	4	5	6	7	8	9	10	11
Free Play											
1. Positive Mood	-										
2. Negative Mood	-.14	-									
3. Compliance	.17	-.38**	-								
Clean Up											
4. Positive Mood	.60**	-.24	.19	-							
5. Negative Mood	.03	.60**	-.24	-.19	-						
6. Compliance	.21	-.22	.30*	.40**	-.26*	-					

Table 13, continued

Variable	1	2	3	4	5	6	7	8	9	10	11
Instruction											
7. Positive Mood	.59**	-.17	-.01	.36**	-.13	.27*	-				
8. Negative Mood	.10	.35**	-.10	.06	.43**	-.19	-.19	-			
9. Compliance	-.12	-.17	.37**	-.06	-.09	.37**	-.06	-.31*	-		
10. TRF INT	.07	.19	-.10	-.17	.28*	-.10	.09	.24	-.05	-	
11. TRF EXT	-.17	.06	-.004	-.20	.16	-.18	-.19	.15	-.12	.47**	-

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

Table 14

Correlations Among Means of Parent Behaviors and Child Behavior by Segment at Time Three

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Parent Means														
1. Positive Regard	-													
2. Negative Regard	-.30*	-												
3. Sensitivity	.85**	-.23*	-											
4. Intrusiveness	-.12	.66**	-.20	-										
5. Affect	-.71**	-.07	-.65**	-.14	-									

Table 14, continued

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Child Behavior														
Free Play														
6. Positive Mood	.42**	-.23	.35**	-.27*	-.37**	-								
7. Negative Mood	-.08	.19	-.06	.38**	.03	-.14	-							
8. Compliance	.03	-.31*	.10	-.40**	-.13	.17	-.38**	-						
Instruction														
9. Positive Mood	.38**	-.28*	.38**	-.25	-.36**	.60**	-.24	.19	-					
10. Negative Mood	.06	.10	.02	.14	-.01	.03	.55**	-.24	-.19	-				
11. Compliance	.25	-.29*	.20	-.18	-.21	.21	-.22	.30*	.40**	-.26*	-			

Table 14, continued

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Free Play														
12. Positive Mood	.35**	-.12	.21	-.03	-.27*	.59**	-.17	-.01	.36**	-.13	.27*	-		
13. Negative Mood	.11	-.03	.14	.10	-.10	.10	.35**	-.10	.06	.43**	-.19	-.19	-	
14. Compliance	-.10	-.15	-.26*	-.25	.09	-.12	-.17	.37**	-.06	-.09	.37**	-.06	-.31*	-

Note: *p< .05; **p< .01

Data Reduction: Parenting Behavior

In previous research with this dataset (e.g., Lewis, 2011), scores for each of the five parenting dimensions (i.e., positive regard, negative regard, intrusiveness, sensitivity, and flat affect) from each of the three PCI segments (i.e., free play, instructions, and puzzles) were significantly correlated and mean scores were created for each dimension. The mean scores were derived from an average of each dimension score for the three segments. Although an exploratory factor analysis has been conducted previously with this measure from this dataset, that analysis did not incorporate all three time points (Lewis, 2011). In the present study, another exploratory factor analysis was conducted to determine whether parenting behavior loaded onto one or more factors for each time point. A Principle Component Analysis (PCA) was chosen for factor analysis as this method is commonly used for factor analysis and produces results similar to those derived from Principle Axis Factoring, another popular method (Field, 2005; Garson, 2012a). PCA is also appropriate for the purpose of data reduction (Garson, 2012a). An oblique rotation, specifically direct oblimin, was chosen to aid in interpretation. This type of rotation allows the underlying factors to be correlated (Field, 2005) and should be used when theory suggests such relationship (Garson, 2012a). As predicted, a two-factor solution did emerge for parenting behavior at each time point. At Time 1, Positive Regard and Flatness of Affect loaded onto one factor (i.e., Positive Parenting) and Negative Regard, Intrusiveness, and Sensitivity loaded onto the other factor (i.e., Negative Parenting), accounting for a total of 82% of the variance. The factors differed slightly for Times 2 and 3. At both of those time points, the Positive Parenting factor was

comprised of Positive Regard, Flatness of Affect, and Sensitivity, and the Negative Parenting factor was comprised of Negative Regard and Intrusiveness. These factors accounted for 84% and 85% of the variance at Times 2 and 3 respectively. The Positive and Negative Parenting factors were used as observed variables that comprised the latent parent behavior variables in subsequent analyses. A display of the factor loading value for each parenting dimension can be found in Table 15.

Statistical Analyses

Analyses were conducted with structural equation modeling (SEM) using maximum likelihood estimation in AMOS (Arbuckle, 2006), which is part of SPSS 19. There are six basic steps involved in SEM analyses. The first is model specification, or the representation of the hypotheses in the form of a structural equation model. The model can be specified using a set of graphical symbols or by a series of equations, which define the model's parameters. These parameters correspond to the speculated relations among the observed or latent variables in the model. Results from the later steps assume that the specified model is essentially correct (Kline, 2011). The second step is model identification. When it is theoretically possible for the analysis software to extract a unique estimate for every model parameter, then the model is identified. Model identification is a property of the model itself instead of the data. Models that are not identified should be respecified, which is a return to the first step. In step three, the constructs are operationalized, measures are selected, and data are collected and prepared for analysis (Kline, 2011).

Table 15

Rotated Factor Loading Scores of PCI Dimensions

Variable	Factor 1 (Positive Parenting)	Factor 2 (Negative Parenting)
Time 1		
Positive Regard	0.65	-0.49
Negative Regard	-0.24	0.87
Sensitivity	0.33	-0.75
Intrusiveness	0.24	0.95
Flatness of Affect	-0.95	-0.12
Time 2		
Positive Regard	0.89	-0.20
Negative Regard	-0.22	0.83
Sensitivity	0.74	-0.49
Intrusiveness	0.16	0.90
Flatness of Affect	-0.87	-0.41

Table 15, continued

Variable	Factor 1 (Positive Parenting)	Factor 2 (Negative Parenting)
Time 3		
Positive Regard	0.93	-0.13
Negative Regard	-0.94	0.90
Sensitivity	0.89	-0.19
Intrusiveness	0.06	0.91
Flatness of Affect	-0.90	-0.27

Note: Rotated using Direct Oblimin

Several things occur within estimation, which is the fourth step. The data are analyzed via a computer tool such as AMOS. The model fit, or how well the model explains the data, is evaluated (Kline, 2011). To evaluate model fit, various goodness of fit statistics are used. Model chi-square (χ^2) values with relatively low degrees of freedom (*df*) and *p* values greater than .05 indicate a good model fit. The Comparative Fit Index (CFI; values greater than 0.90), Standardized Root Mean Square Residual (SRMR; less than 0.08), and Root Mean Square Error of Approximation (RMSEA; values between 0.05 and 0.08 indicate acceptable fit) also indicate model fit and are the statistics that are commonly reported with SEM analyses (Garson, 2012a; Kline, 2011; Maikovich, Jaffee, Odgers, & Gallop, 2008; Xing, Wang, Zhang, He, & Zhang, 2011).

Assuming a model that fits the data emerges, the parameter estimates are then interpreted for specific effects. Finally, within this fourth step, equivalent or near-equivalent models are considered. For a given model, there may be other models that fit the data well and researchers must account for why their preferred model should not be rejected in favor of other models that are statistically equivalent. The fifth step in SEM is to re-specify the model. When models lack goodness of fit, the models are re-specified and re-analyzed as outlined in step four. The sixth and final step is to report the results of the model (Kline, 2011).

Missing data. Some families were not enrolled in the study at the initial time point, and others were absent at a later time point. A summary of the number of dyads present for one, two, or three time points can be found in Table 16. At each time point, there were

Table 16

Percentage of Parent-Child Dyads Present for Data Collection by Number of Time Points

	Number of Dyads Present	%
All three time points	33	35.11
Two of three time points	29	30.85
One time point	31	33.33
Total	93	

missing data for parent behavior variables and for child behavior variables. At Time 1, 37.6% of parent behavior data were missing and 40.9% of child behavior data were missing. At the second time point, the percentages of missing data for parents and children were 26.9% and 30.1%, respectively. At Time 3, the percentage of missing data for parent and child behavior data were equal at 35.5%. Missing data were addressed using maximum likelihood (ML) estimation. This method is a default setting for AMOS and is widely accepted for addressing missing data in SEM as it allows for the inclusion of all available data points (Arbuckle, 1996; Byrne, 2010; Kline, 2011; Maikovich et al., 2008), and can be used when the percentage of missing data is high (e.g., >25%; Collins, Schafer, & Kam, 2001).

Initial Model. Analyses were conducted to investigate longitudinal changes in parent and child behavior, as well as bidirectional effects that may have been evident in parent-child interactions over time. The proposed model for analyses appears in Figure 1. Results from that model indicated that the full model was unidentified (i.e., it was not possible to uniquely estimate all of the model's parameters; Kline, 2011) and that an additional 59 constraints were required in order to achieve identifiability. In an effort to simplify the model, pathways of parent and child behavior across time were maintained, but pathways between parent and child behavior at each time point were removed and the model re-analyzed with only bidirectional paths across time points included. Minimization of that model also was unsuccessful and the model was unidentified. Time points 2 and 3 included more complete data compared to time point 1. Hence, variables from the first time point were

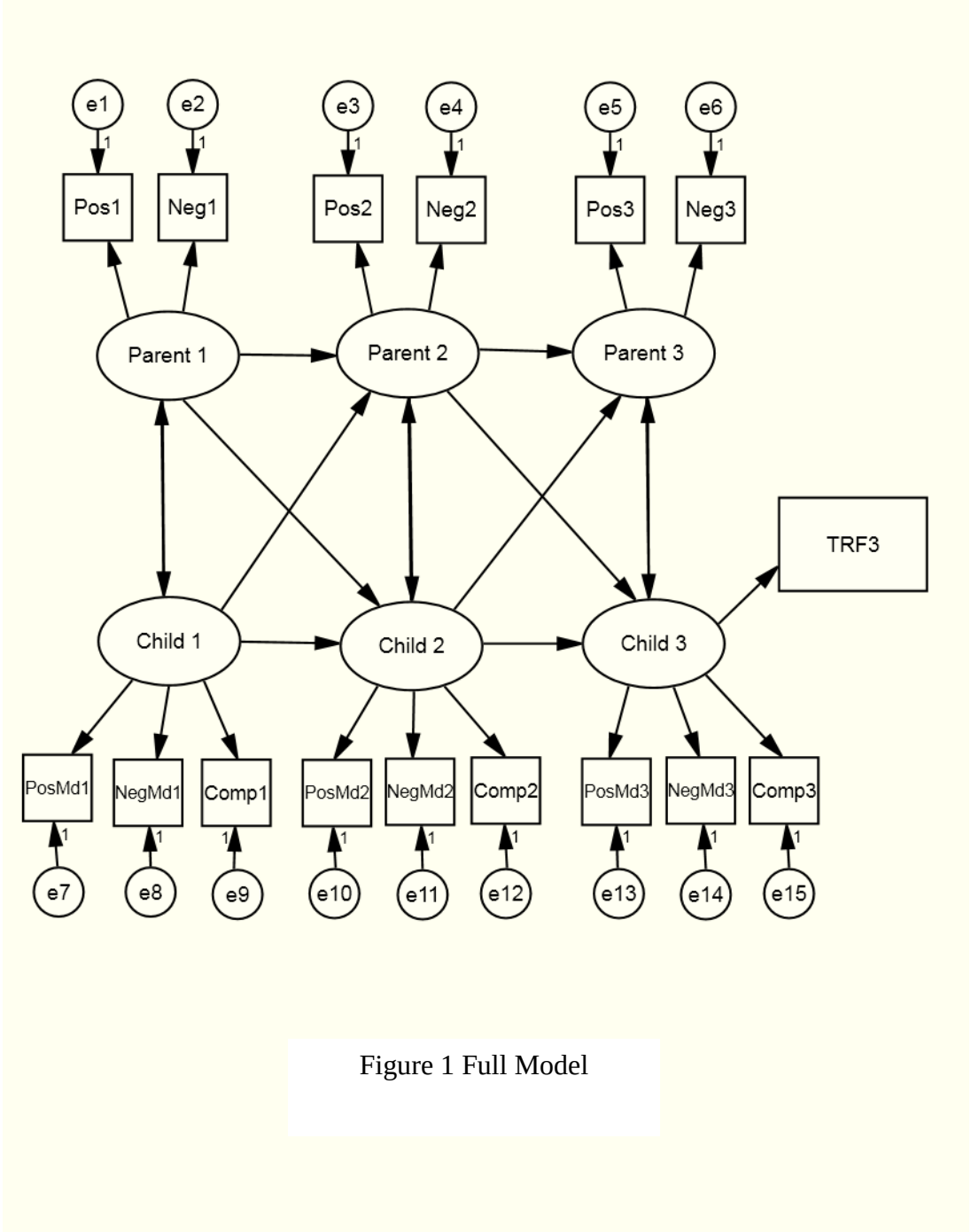

Figure 1 Full Model

removed from the model, and the model was re-analyzed for the third time. That model was identified but was a poor fit for the data, $\chi^2(399) = 872.97$, $p < .001$; CFI = 0.41; SRMR = not reported in the output; RMSEA = 0.11, $p < .001$.

Because the full models as described above did not fit the data as analyzed, additional analyses were conducted with a series of independent models based on the type of behavior (e.g., parent positive regard and child positive mood; parent negative regard and child negative mood; see Figures 2-5 for a visual representation). These models were even less complex and included fewer paths than the full models described above and thus had potential to yield a better fit for the data. For these analyses, the independent models included all three time points initially. The first model examined parents' positive behavior over time (i.e., positive regard, flatness of affect, sensitivity), children's positive mood over time, and children's mood at time three predicted by teacher reports of child internalizing and externalizing behavior (see Figure 2). This model was a poor fit for the data, $\chi^2(147) = 330.31$, $p < .001$; CFI = 0.62; SRMR = not reported in the output; RMSEA = 0.12, $p < .001$. Parameters were removed in order to see if model fit could be improved. As with the full model, the first time point was removed, leaving the time points that included the most complete data. The model for positive parent behavior and positive child mood for time points 2 and 3 and teacher report for time point 3 also was a poor fit for the data, $\chi^2(74) = 176.46$, $p < .001$; CFI = 0.72; SRMR = not reported in the output; RMSEA = 0.12, $p < .001$.

The next model examined parents' negative behavior (i.e., negative regard, intrusiveness), children's negative mood over time, and whether children's mood at Time 3

predicted by teacher reports of child internalizing and externalizing behavior (see Figure 3). This model was a poor fit for the data, $\chi^2(130) = 225.42$, $p < .001$; CFI = 0.65; SRMR = not reported in the output; RMSEA = 0.09, $p = .001$. As with the model for positive parent and child behavior, the first time point was removed. The model for negative parent and child behavior at Time points 2 and 3 also was a poor fit, $\chi^2(51) = 87.22$, $p < .001$; CFI = 0.74; SRMR = not reported in the output; RMSEA = 0.09, $p = .03$.

The final two models examined child compliance and positive parent behavior (Figure 4) and negative parent behavior (Figure 5). The model for positive parent behavior and child compliance at all three time points was a poor fit, $\chi^2(147) = 366.67$, $p < .001$; CFI = 0.52; SRMR = not reported in the output; RMSEA = 0.13, $p < .001$. That model was reduced to Time points 2 and 3 and was unidentified. The model for negative parent behavior and child compliance at all three time points was a poor fit, $\chi^2(130) = 255.03$, $p < .001$; CFI = 0.60; SRMR = not reported in the output; RMSEA = 0.10, $p < .001$. That model also was reduced to Time points 2 and 3 and yielded another model that was a poor fit, $\chi^2(51) = 93.27$, $p < .001$; CFI = 0.68; SRMR = not reported in the output; RMSEA = 0.10, $p = .01$.

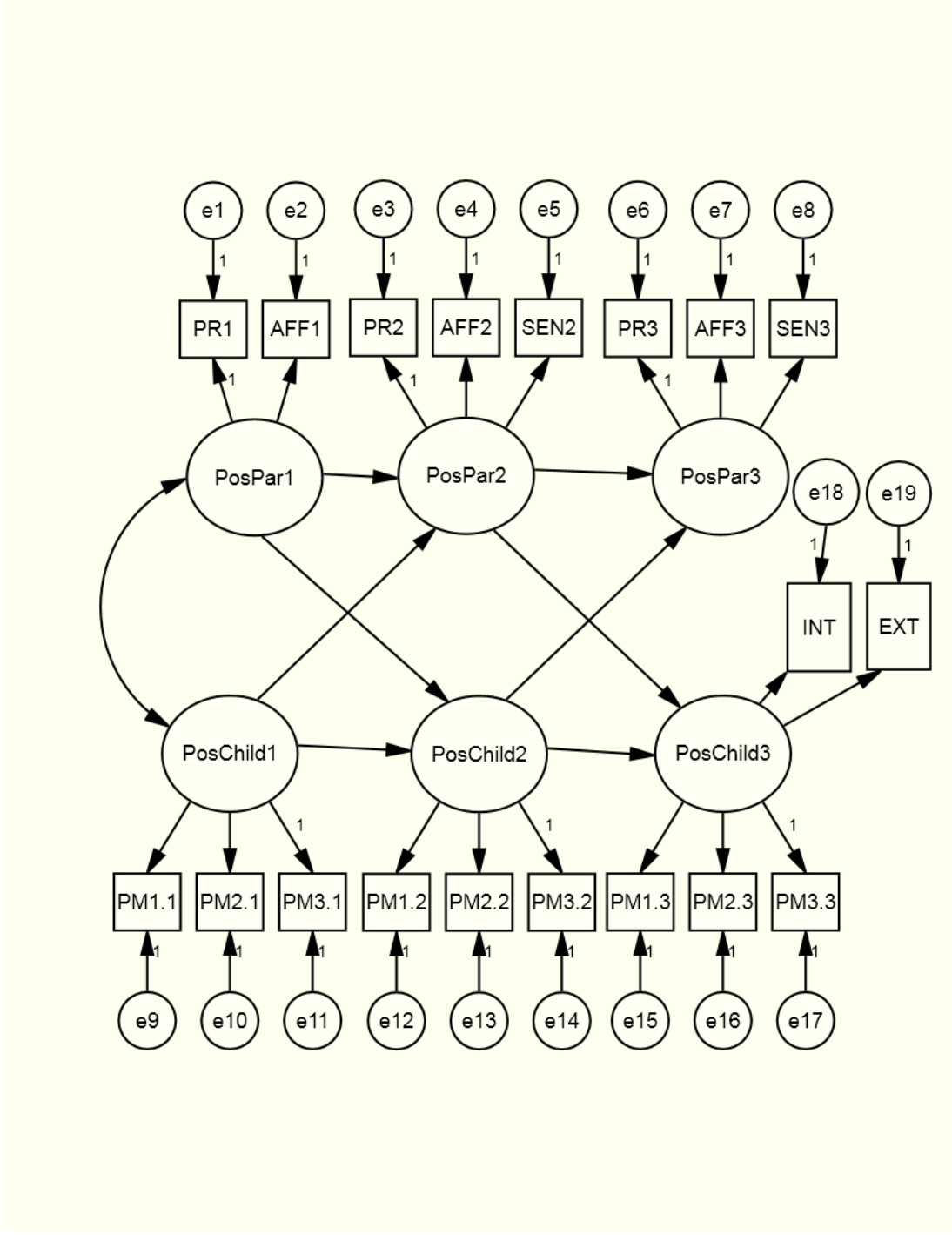

Figure 2 Positive Parenting Behavior and Positive Child Mood

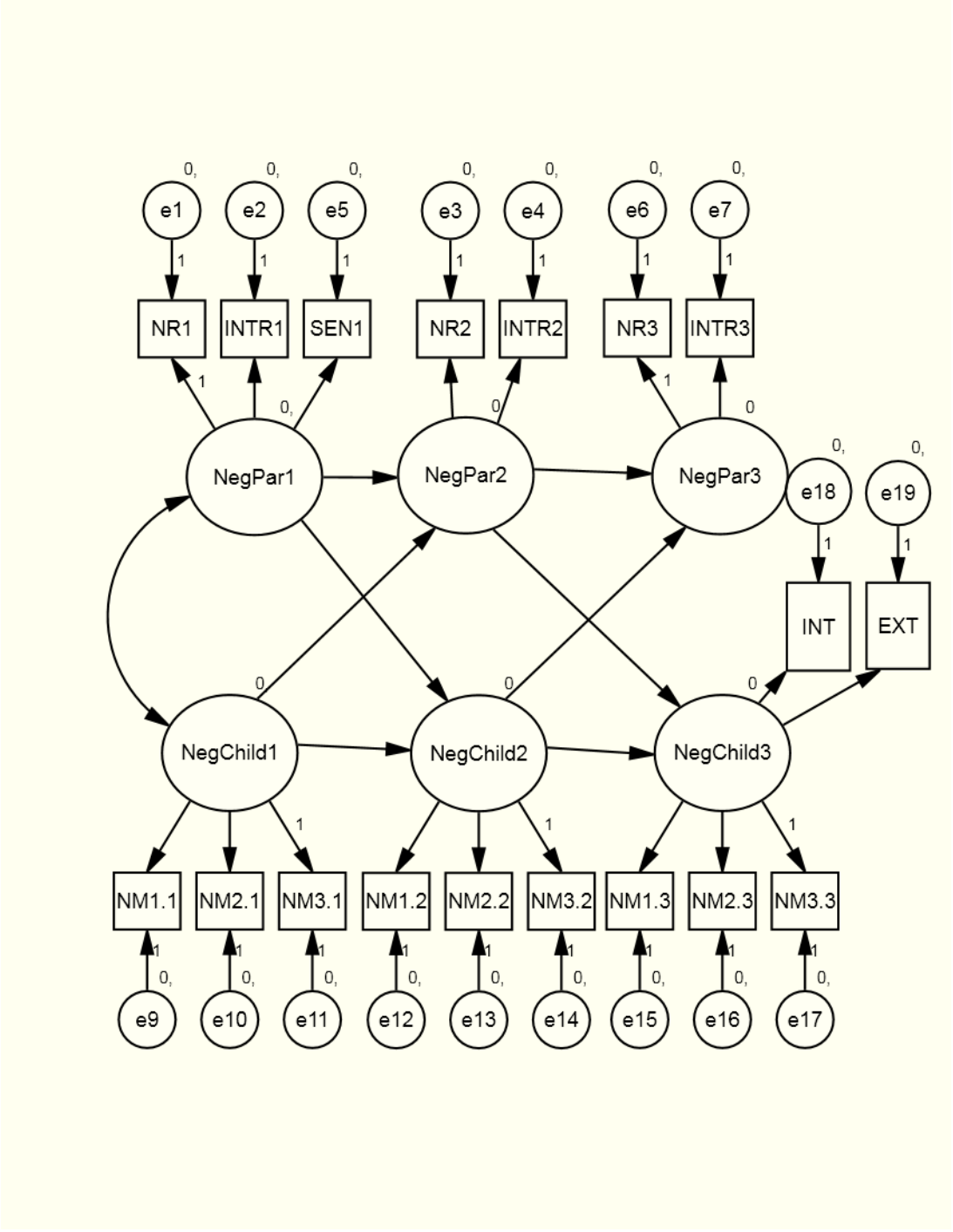

Figure 3 Negative Parenting Behavior and Negative Mood

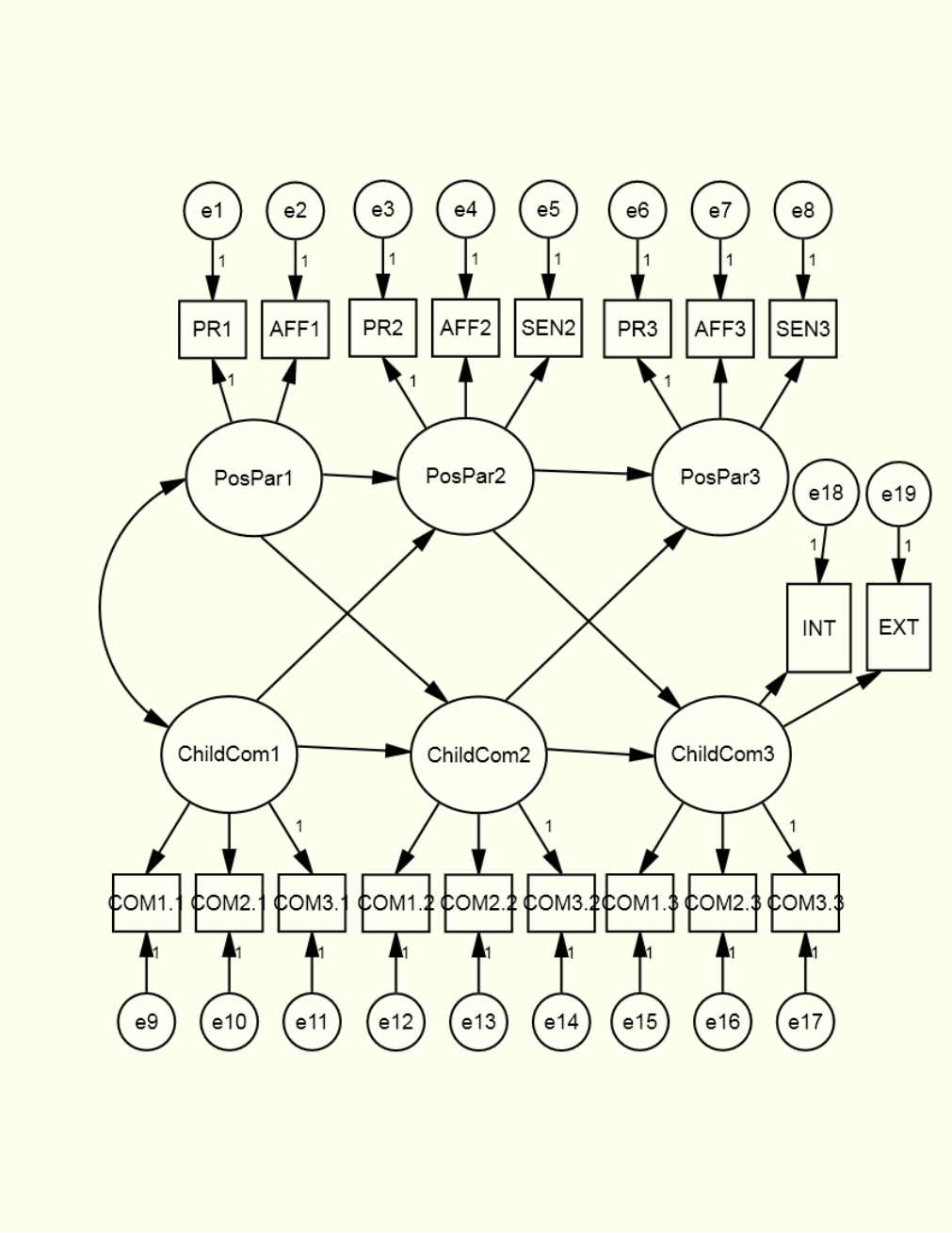

Figure 4 Positive Parenting Behavior and Child Compliance

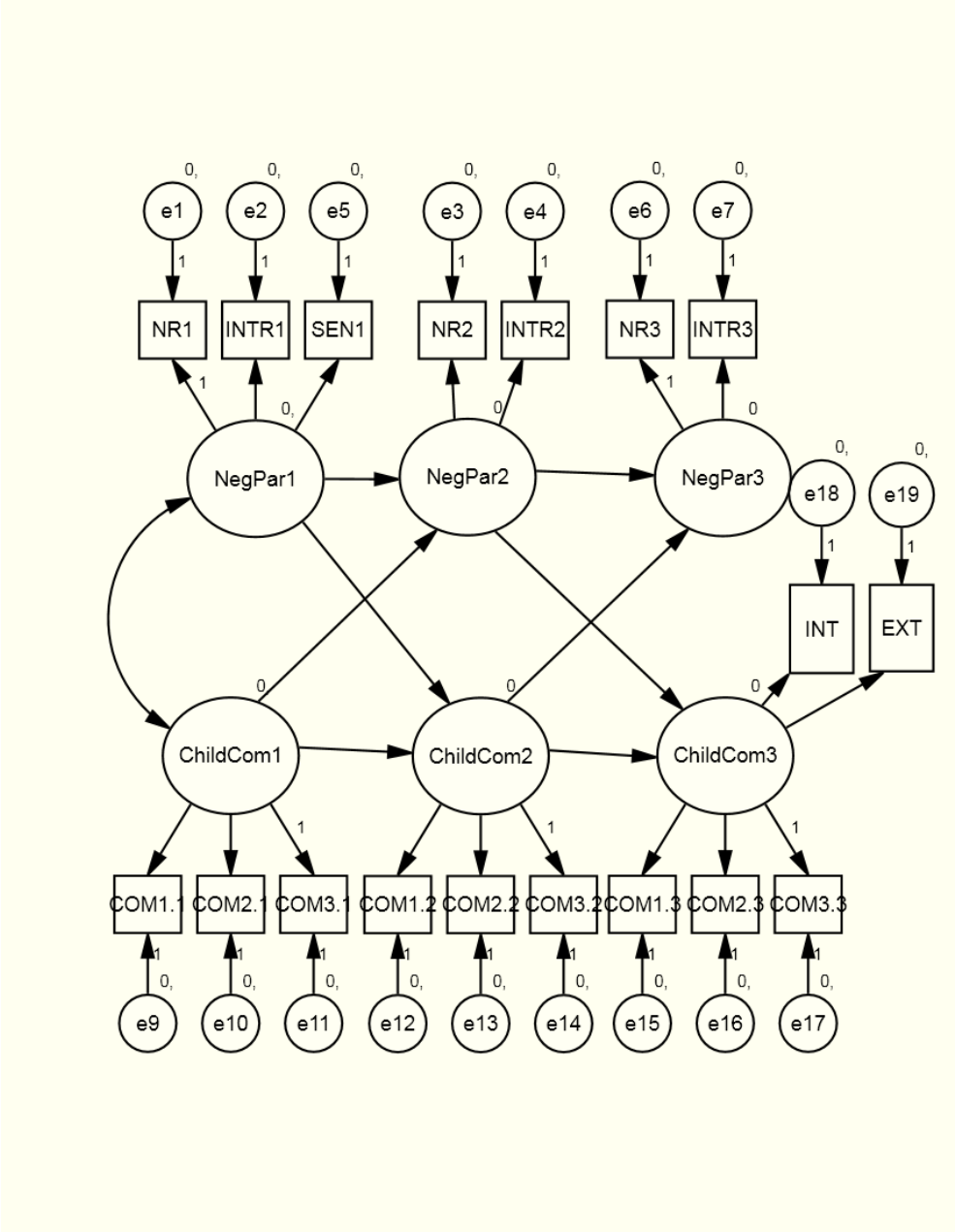

Figure 5 Negative Parenting Behavior and Child Compliance

Discussion

Child maltreatment has been linked to an array of negative consequences for children. Researchers have found that physically abused children tend to display higher levels of internalizing and externalizing problems compared to their non-abused peers—particularly in the school setting (Kaufman & Cicchetti, 1989; Salzinger et al., 1991; Shonk & Cicchetti, 2001; Wolfe & Mosk, 1983). Parenting behavior has been linked to child adjustment (Woodruff & Lee, 2011), with parental warmth, positive discipline, and responsiveness associated with positive child outcomes (Alessandri, 1992; Pettit et al., 1993; Toth et al., 1992), and physical discipline and hostile/coercive behaviors associated with negative child outcomes (Dallaire et al., 2006; Deater-Deckard et al., 1996). Physically abusive parents tend to engage in the latter (Deater-Deckard & Dodge, 1997; Patterson, 1982; Mash et al., 1983), and their interactions with their children tend to be negative (Alessandri, 1992). Because child abuse occurs as part of ongoing negative patterns of interactions between physically abusive parents and their children (Urquiza & Timmer, 2002), parent-child interactions are a relevant focal point for study.

Previous studies have examined the bidirectional effects of parent and child behavior in early childhood. Evidence from previous research examining the bidirectional effects of parent and child behavior is mixed (Combs-Ronto et al., 2009; Del Vecchio & Rhoades, 2010; Miner & Clarke-Stewart, 2008; Verhoeven et al., 2010; Yates et al., 2010), and we have no information to date regarding whether the same trends exist among abusive parents and their young children. Within a family context where abuse is present, a coercive cycle

(Patterson, 1982) of parent-child interactions may be present and may include physical violence as a means of halting aversive child behaviors or ensuring compliant behavior in children (Timmer et al., 2002; Urquiza & McNeil, 1996). The present study sought to extend the current knowledge base about changes in parent and child behavior over time, specifically in cases of physical abuse. Additionally, the present study sought to examine the ways each one's behavior may affect the other bidirectionally over time. Having knowledge of how parents' behavior affects that of their children—and vice versa—may allow for greater understanding of relationship difficulties between parents and children and how to intervene. A related purpose of this study was to determine whether children's behavior with their parents was related to children's behavior at school, as reported by teachers.

One of the primary strengths of this study was the use of longitudinal analyses in examining the relationships between parent and child behavior at three time points. Another strength was that the developmental period examined in this study was the transition to formal school entry. This transition is fraught with developmental changes for children across multiple areas of functioning (e.g., cognitive demands, language skills, social skills/interactions). It is also a period during which negative behavior patterns may emerge and stabilize. Identifying and evaluating factors that contribute to or reduce problem behaviors in children can help make the transition a more positive experience (Combs-Ronto et al., 2010).

Unfortunately, the nature of change in parent and child behavior over time and any bidirectional effects that might have been present could not be confirmed for this sample

using SEM. Neither the full nor the independent models examined in this study fit the data well. In other words, the proposed models examined here did not explain the data. There are a host of factors that could have contributed to the results of this study. Some of those factors pertain specifically to characteristics of the families that participated. Other factors are related to features of the measures used with participants. Still other factors, which also are inherent limitations, include sample size and missing data. These factors are addressed in turn below.

Considerations in Interpretation of the Findings

As noted above, there are inconsistent findings across studies that have examined reciprocal influences of parent and child behavior. There are too few extant studies to identify the factors that account for discrepancies across studies but one could speculate that the strength of bidirectionality might vary by family or contextual factors and/or evidence of bidirectionality might be most evident using certain methodological approaches. Perhaps bidirectional influences of parents and children are most likely to be witnessed when there is stability in the family context, which may provide a foundation for parents and children to serve as primary sources of influence on one another. It is possible the families included in this sample were characterized by high family instability so bidirectional influences were minimal and not apparent using our methods. Contributors to elevated levels of stress in the home may have included contextual factors such as low socioeconomic status, changes in housing, and changes in composition of the family (e.g., the addition of a significant other or spouse in the home; a co-parenting figure leaving the home) as well as adjusting to the

developmental transitions of the children. These parents may have been more concerned with contextual risks such as these because of the level of stress they invoke. Consequently, the parent may have interacted less often with the child (Dietz et al., 2008; Kohl, Kagotho, & Dixon, 2011), which could minimize the establishment of set patterns of parent-child interaction. Likewise, the presence of another supportive adult involved with the family may buffer the establishment of negative patterns of interaction between the primary parent and the child (Greenfield, 2011). Thus, bidirectional effects between parent and child may not be evident in highly stressed families. Future research should be directed to the degree to which family instability and high stress impacts bidirectional parent-child effects.

Bidirectional influences also might be observed most readily when there is stability (i.e., a consistent pattern of interaction) in the parent-child relationship. For this sample, there was a documented history of physical abuse within the year prior to initial entry into the study. Results from previous studies of maltreated children indicate that the most common pattern of attachment for maltreated children is disorganized attachment (Madigan, Moran, Schuengel, Pederson, & Otten, 2007; van IJzendoorn, Schuengel, & Bakermans-Kranenburg, 1999). This type of attachment, when present, occurs when the caregiver is both a source of safety and fear for the child (Main & Hesse, 1990). The result is often a tendency on the part of the child to alternately approach and flee the parent (Madigan et al., 2007). Although determining the nature of attachment patterns in these families was not part of this study, if disorganized attachment was characteristic of the parent-child dyad, bidirectional effects of

each person's behavior may have been masked because the nature of the interactions themselves lacked organization and stability.

Bidirectionality might not be evident in cases where children are resilient to poor parenting. In this case, insensitive and harsh parenting would not be associated with negative child behavior. Intelligence is one contributing factor in resilience. An above-average intelligence allows a child to understand what is happening to him or her, to determine what is controllable versus what is not, to select effective means of coping, and to seek out supportive environments (Condly, 2006). In addition to individual factors such as intelligence and temperament, one of the key factors in overcoming obstacles or hostile environments is external support from people and institutions outside of the individual and family (Condly, 2006; Garmezy, 1991). School-aged children spend the majority of their day at school, a place with a variety of adults available (e.g., teachers, intervention specialists, school psychologists, school counselors, administrators). Given the amount of time children spend there each day, schools may be a source of considerable social support. Indeed, a positive school experience for physically abused children may promote resilience (Blum, McNeeley, & Rinehart, 2002; Bogenschneider, Wu, Raffaelli, & Tsay, 1998; Perkins & Jones, 2004; Rutter, 1987), which may offset the effects of negative parent-child interactions or relationships. In that case, bidirectional influences of parents and children would be minimized. The presence of protective factors was not examined for the current sample, but it is likely that at least a small proportion of the sample of abused children demonstrated resilient functioning (Cicchetti & Rogosch, 1997).

Finally, the method of measuring parent and child behavior might not have been optimal for capturing bidirectional influences. The primary method used in this study was a very brief single observation of parent and child interaction. For each time point, the parent-child dyad was observed for approximately 20 minutes in three brief situations. Although observational methods have been widely used, particularly with physically abusive parents (Wilson et al., 2008), the observational measure used in this study was a brief snapshot of parent and child behavior at yearly intervals. One might expect that the behavior observed in the lab is a subsample of typical behavior for a parent-child dyad. However, research has demonstrated that when families are observed for longer than 30 minutes in more naturalistic settings, physically abusive parents tend to exhibit substantially more aversive behavior than non-abusive parents. It is possible that, because a shorter time period is pleasant and relatively undemanding, some behaviors may not be detected to the magnitude with which they actually occur (Wilson et al., 2008). Thus, bidirectional influences may be less evident because these observations occurred for a brief period of time at yearly intervals, providing limited data for analysis. In other words, the observations conducted as part of this study were limited in frequency and duration. It is possible that more frequent and longer observations would have provided more data regarding the patterns of interactions between parents and children in a way that would have yielded meaningful results.

In sum, there were a variety of factors that may have affected the findings of this study. There were various parent and child factors which would have been difficult—if not impossible—to control (e.g., SES, changes in marital status, presence of additional adults in

the home). Though we do not have information regarding school experience, a positive school experience for the child may have mitigated some of the negative effects of any negative parenting that might have occurred. Additionally the primary measure of parent and child behavior was a relatively short (i.e., <30 minutes) observation at annual intervals and provided limited information for analysis. Perhaps for these reasons, there was no evidence to support the notion that one person's behavior shaped that of the other person.

Limitations

Sample size and missing data. Although there is no set standard for sample size with SEM, the most common recommendation is a minimum sample size of 200 (Byrne, 2010; Fan & Wang, 1998; Garson, 2012b; Hoelter, 1983; Kline, 2011). However, some researchers have successfully conducted SEM analyses with smaller samples (e.g., Kim-Spoon, Haskett, Longo, & Nice, 2012; Maschi, Morgen, Bradley, & Hatcher, 1008; Verhoeven et al., 2010). At the same time, simulation studies have found that SEM analyses of small samples (e.g., N = 100) resulted in a lack of convergence and improper solutions for models analyzed (Fan & Wang, 1998). Additionally, decrease in power is most pronounced in small samples (Hammervold & Olsson, 2012).

The sample size for the present study (N = 93) appeared to be inadequate for the models analyzed. Initial full models for this study resulted in a lack of convergence and had some improper solutions (e.g., negative error variances). When analyzing data with SEM, sample size also should be taken into account regarding model complexity (Fan & Wang, 1998). The analysis of a complex model typically requires more cases than analysis of a

simpler model. More complex models have more parameters, which require more estimates. Thus, larger samples are required for results to be stable. Indeed, when a sample size is less than 100, anything other than a simple model likely will be untenable (Kline, 2011).

Some would argue that goodness of fit for a global model may overlook goodness of fit for component parts of the structure (McCoach, Black, & O'Connell, 2007; Tomarken & Waller, 2003). Thus, in order to develop more parsimonious models, which might have fit the data better and been less affected by sample size (Garson, 2012b), a series of simpler independent models based on type of behavior (e.g., positive or negative) were analyzed as well. With one exception (i.e., positive parenting and child compliance at time points two and three), all models converged but lacked goodness of fit. Essentially, even these simplified models failed to provide a sufficient description for the data (McCoach et al., 2007). As such, none of the hypotheses were supported for this study.

Another potential problem in this particular dataset is the deviation from multivariate normality for some of the variables measured (e.g., parent negative regard, parent flatness of affect, and child behavior variables). SEM methods (e.g., maximum likelihood) are derived based on the assumption that the data analyzed are multivariate normal (Tomarken & Waller, 2005). When data are non-normal, the maximum likelihood statistic has a tendency to reject true models when they are present at a rate higher than the nominal (0.05) rejection rate (Fouladi, 2000; Tomarken & Waller, 2005), even when variables have been transformed.

In addition to a small sample, this data set also contained missing data. These data were assumed to be missing not at random (MNAR) because the nature of the missingness

was due to factors that were beyond the control of the researcher (Tomarken & Waller, 2005). At the time of initial recruitment of participants, fewer than expected participants met criteria for their inclusion in the study. Consequently, the first time point in the study had fewer participants overall compared to the second and third time points. Although steps were taken to promote participation at each time point (e.g., transportation provided, a small payment that increased each year for participation, providing resources to the parent and educational materials and a small toy to the child), not all families returned for subsequent data collection sessions. Likewise, some families entered the study when the child was already in kindergarten or first grade, so earlier time points were not available. Because data were MNAR, and because there were some violations of multivariate normality, data could not be imputed for analyses. Imputation methods are appropriate for data missing at random (or completely at random) and produce unbiased estimates only under those two conditions (Tomarken & Waller, 2005). There is no correction available for data MNAR (McDonald & Ho, 2002).

Sample demographics. This sample was non-representative in terms of gender and ethnicity in the general population of NC and in comparison to state and national reports of child abuse (Child Welfare Information Gateway, 2010), as well as more local county reports (Duncan et al., 2012). The majority of parents in this sample were mothers and the majority of children were boys. The majority of participants overall in this study were African American. In 2010, boys made up 34% and girls made up 66% of the number of unique counts of abuse in North Carolina (Duncan et al., 2012). These numbers are somewhat

dissimilar to national reporting data in which boys comprised 48.5% and girls comprised 51.2% of abuse victims (Child Welfare Information Gateway, 2010). In terms of ethnicity, at both the state and national levels, the majority of the victims of child abuse were white (58% and 45%, respectively). African American children who were victims of child abuse comprised 31% of cases reported in North Carolina and 22% of cases reported nationally (Child Welfare Information Gateway, 2010; Duncan et al., 2012). It should be noted that these reporting data included all types of abuse, including sexual abuse, which occurs at a higher rate among girls. This fact may explain, at least in part, the differences between the sample population and the population at large.

We can only speculate at the reasons underlying the overrepresentation of African American children in the present sample. It might be that this phenomenon is less a function of race and more a function of socioeconomic status. In some respects, the two may be conflated for this geographical area. In 2009, 10.1% of the population in this county was classified as living in poverty. Of those identified, 5.8% were white, 17.4% were African American, and 25.6% were Hispanic/Latino (Onboard Informatics, 2010). In 2010, 48% of total households in this county were considered low income (i.e., at or below 80% of the median income or $61,500 for a family of four; US Census Bureau, 2010). The majority of families included in this study were from a low socioeconomic status. Given that many of these parents experienced a lack of resources for their families, it is possible that the payment for participation, free childcare and transportation to the data collection site, and appropriate

referrals for community support offered to these families were strong motivators for participation.

Future Directions

As complicated as it is to conduct research in the area of child maltreatment, additional research is still needed to aid in determining factors that might be targeted for intervention and policy. To the extent possible, this research should be conducted with larger, more representative samples. The sample for this study was relatively small and comprised primarily of African American mothers and their sons. Because the sample for this study was small and lacked diversity in ethnicity and gender, further research with a larger, more diverse sample might facilitate the use of more complex analyses, such as those attempted here, and provide more information regarding the functioning of abused children. Likewise, research with more ethnically diverse samples would be useful as it might align more closely with state and national trends related to maltreatment.

Although the models analyzed here did not detect patterns of parent and child behavior or interactions for the full sample, there may have been subgroups of this sample that are more similar to other samples that do operate in the way originally hypothesized (i.e., bidirectional influences). For example, we did not have access to information regarding whether physical abuse re-occurred after beginning participation in the study or whether the children in this sample experienced neglect as well as physical abuse. Researchers have documented that chronically maltreated children demonstrate more problems (e.g., internalizing and externalizing behaviors) than children who experience transitory

maltreatment (Jaffee & Maikovich-Fong, 2011). Future research might examine subgroups based on the experience of abuse only versus the combination of abuse and neglect. Another characteristic of subgroups that might be examined is the quality of the parent-child relationship. It is possible that relationships with high quality at the outset might be more stable over time (Keijers, Loeber, Branjes, & Meeus, 2011) and demonstrate stronger parent-child bidirectional influences. Future research might examine subgroups based on the initial quality of the parent-child relationship.

Finally, observational coding schemes for parent-child interactions do not typically take into account behaviors at the dyadic level. It might be that coding the quality of various aspects of the interaction at the dyadic level would provide more information regarding the condition of the parent-child interaction pattern. The PCI includes only one code for quality of interaction, which was not included in the present study. That particular code, however, provides limited information regarding the quality of parent-child interactions. Thus, future research might draw upon and apply coding schemes, such as those used in observations of family processes (Dishion et al., 1987) or couples (Humbad, Donnellan, Klump, & Burt, 2011; Malik & Lindahl, 2004), that include codes for dyadic behaviors (e.g., the response of one member of the dyad to the behavior of the other, positive and negative reciprocity, cohesiveness, balance of power). Doing so might provide more useful information regarding relationship quality of the parent-child dyad as well as more understanding of bidirectional processes that may underscore those interactions. Likewise, future observational research

might include observations that occur in naturalistic settings and at more frequent time points to detect the presence of bidirectionality in parent-child interactions (Wilson, et al., 2008).

In summary, the current study was designed to investigate the ways in which physically abusive parents' and their children's behavior changed over time, whether the behavior of one affected or predicted the behavior of the other, and whether child behavior as observed in the parent-child interaction was related to child behavior as reported by the child's teacher. Because of the lack of model fit, the present study did not provide support for the hypotheses that parent and child behavior would change over time, that one's behavior affects the other's, and that child behavior observed in parent-child interactions would be related to child behavior in the classroom as reported by teachers.

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APPENDICES

Appendix A

*Population of the County by Race and Ethnicity**

Year	Race/Ethnicity	Population
2005	White	513,419
	African American/Black	143,238
	Native American	1,706
	Asian	33,744
	Native Hawaiian/Pacific Islander	188
	Hispanic	54,816
	Other	23,373
2006	White	538,590
	African American/Black	157,427
	Native American	2,398
	Asian	35,134
	Native Hawaiian/Pacific Islander	348
	Hispanic	62,674
	Other	40,024

Appendix A, continued

Year	Race/Ethnicity	Population
2007	White	562,214
	African American/Black	171,079
	Native American	3,066
	Asian	37,059
	Native Hawaiian/Pacific Islander	62
	Hispanic	70,278
	Other	47,552
2008	White	598,154
	African American/Black	174,687
	Native American	2,957
	Asian	39,584
	Native Hawaiian/Pacific Islander	213
	Hispanic	76,375
	Other	37,908

Appendix A, continued

Year	Race/Ethnicity	Population
2009	White	627,073
	African American/Black	182,651
	Native American	3,292
	Asian	42,861
	Native Hawaiian/Pacific Islander	39
	Hispanic	80,870
	Other	26,537

*US Census Bureau, 2010

Appendix B

*Census Data Regarding County-wide Family Structure by Household**

Year	Household Type	Number of Households
2005	Households with families	192,598
	Presence of unmarried partner	7,628
	Male householder, no female spouse present	3,142
	Female householder, no male spouse present	4,011
	No unmarried partner present	184,970
	Male householder	7,936
	Female householder	35,573
2006	Households with families	199,328
	Presence of unmarried partner	8,242
	Male householder, no female spouse present	5,465
	Female householder, no male spouse present	2,578
	No unmarried partner present	191,086
	Male householder	4,759
	Female householder	35,909
2007	Households with families	217,266
	Presence of unmarried partner	7,412

Appendix B, continued

Year	Household Type	Number of Households
2007	Male householder, no female spouse present	3,300
	Female householder, no male spouse present	3,741
	No unmarried partner present	209,854
	Male householder	6,799
	Female householder	43,675
2008	Households with families	225,506
	Presence of unmarried partner	7,715
	Male householder, no female spouse present	4,249
	Female householder, no male spouse present	3,185
	No unmarried partner present	217,791
	Male householder	7,463
	Female householder	41,672

Appendix B, continued

Year	Household Type	Number of Households
2009	Households with families	236,755
	Presence of unmarried partner	16,836
	Male householder, no female spouse present	10,146
	Female householder, no male spouse present	6,216
	No unmarried partner present	219,919
	Male householder	7,466
	Female householder	43,753

*US Census Bureau, 2010

Appendix C

*Poverty Status for Families in Wake County**

Year	Subject	Number (%) Below Poverty Level
2005	Total families	188,369 (6.9%)
	With related children under 18 years	106,315 (10.4%)
2006	Total families	189,232 (5.3%)
	With related children under 18 years	102,884 (8.1%)
2007	Total families	207,875 (5.6%)
	With related children under 18 years	116,710 (8.3%)
2008	Total families	210,698 (6.1%)
	With related children under 18 years	114,328 (9.1%)
2009	Total families	215,071 (6.5%)
	With related children under 18 years	116,397 (9.7%)

*US Census Bureau, 2010

Appendix D

Description of Parent Behaviors

Positive Regard for the Child: degree to which parent speaks in a warm tone of voice, is affectionate towards child, laughs and smiles with child, is enthusiastic, praises child, listens, watches attentively, looks into the child's face when talking to him/her, and is playful

Negative Regard for the Child: degree to which parent shows disapproval, maintains a tense body and a negative voice, is abrupt, harsh, and is threatening and demeaning to the child; both frequency & intensity are to be considered

Sensitivity: how the parent responds to the child's distress or non-distress; degree of emotional support provided by the parent; degree to which parent shows a good balance between encouraging autonomy and maintaining involvement; degree to which parent helps the child stay engaged and interested in the task and maintain awareness of the child's arousal and affect (a parent would score low on this scale if he/she is either too intrusive, detached, or aloof and completely fails to be supportive of the child's needs)

Disengagement/Detachment: degree to which parent appears emotionally uninvolved and uninterested, misses child's cues, does not respond to child's needs, and is passive; a detached parent might face away from the child, ignore the child, or pay greater attention to other objects in the room, and appear to "just be going through the motions."

Intrusiveness: degree to which parent interferes with the child's needs and desires, provides respect to the child, and provides the child a sense of personal autonomy; intrusiveness can occur in a harsh way (e.g., grabbing child's arm to redirect him/her) or by being overly affectionate (e.g., kissing/hugging child when he/she is trying to work)

Flatness of Affect: degree to which parent is animated in demeanor and behavior; a parent with flat affect might have a blank, impassive facial expression, and/or a flat tone in vocal expression and body movements

Appendix E

Description of Child Behaviors

Child POSITIVE MOOD

This scale assesses the extent to which the child is satisfied, content, and pleased with the situation overall. Measures of child positive affect include smiles, laughter, and positive tone of voice, as well as enthusiasm expressed with arms, legs, and body tone. Lack of positive affect may be manifested by neutral or negative mood.

Ratings on this scale should be based on quality and quantity of behavior. Attempt to balance both the intensity of the child's positive affect and the relative amount of time positive behavior is shown. A rating of 1 should be given to those children who exhibit almost no positive affect. If a child spends a very brief portion of the total observation period exhibiting high positive affect and also displays negative affect, he/she would receive a rating of 3. A child might also receive a 3 for an entire observation period of weak positive affect (i.e., contentment). A rating of 5 should be given to those children who regularly display high-intensity positive affect, who "sparkle."

1 = Not at all characteristic. This rating should be given to children who display no signs of positive mood. The child's mood is either negative or no affect is displayed.

2 = Minimally characteristic. This rating should be given to children who display infrequent or weak positive affect. This child may show fleeting instances of strong positive affect paired with instances of negative affect (instances of negative affect not required). These fleeting instances of positive affect will be characterized by slight smiles and/or positive tone. These behaviors will occur in less than half of the interaction segment.

3 = Somewhat characteristic. This rating should be given to children who are generally content but not overly positive. These children will display smiling, laughter/giggling, and/or positive tone throughout about half of the observation.

4 = Moderately characteristic. This rating should be given to children who predominantly display positive affect. The child exhibits several instances of strong positive affect (expresses enthusiasm, playfulness, smiling and laughter) and is frequently pleasant.

5 = Highly characteristic. This rating should be given to children who are exceptionally positive, in terms of physical and vocal expressiveness. This child displays multiple instances of strong positive affect and is characteristically "pleasant" for most of the remainder of the observation period. The child should truly "radiate" or "sparkle." For this rating, a child can have no episodes of strong distress.

Child NEGATIVE MOOD

This scale assesses the extent to which the child cries, fusses, frowns, tenses body while crying, or otherwise expresses his/her discontentment. Included also is the degree to which the child shows anger, hostility, or dislike toward the parent. At the high end, the child may be repeatedly and overtly angry at the parent (e.g., forcefully rejecting her ideas, showing angry and resistant expression, pouting, or being unreasonably demanding or critical of her). At the low end, there are neither overt nor covert signs of such anger. Lack of negative affect may be manifested as either strong positive affect or contentment.

Ratings on this scale should be based on both qualitative and quantitative assessments.

1 = Not at all characteristic. This rating should be given to children who display no negative affect.

2= Minimally characteristic. This rating should be given to children who display infrequent or weak negative affect. The child displays fleeting instances of mild negative affect; negative affect is more present than absent. There may be some subtle anger or resistance in the child's behavior toward the parent. This behavior will occur in less than half of the interaction segment.

3 = Somewhat characteristic. This rating should be given to children who display weak negative affect (e.g., pouting, frowning) throughout the interaction. This child will appear discontent through at least half of the interaction but may not express instances of strong negative affect.

4 = Moderately characteristic. This rating should be given to children who display stronger negative affect. The child displays one or two instances of strong negative affect (e.g., crying, overt anger) or is moderately discontented ("fussy") throughout most of the observation period.

5 = Highly characteristic. This rating should be given to children who display high levels of negative affect. The child displays several instances of strong negative affect during the observation period and appears to be rarely contented. The child's anger or resistance appears repeatedly in interactions with the parent.

Child COMPLIANCE

Child complies with parent task directions. This scale measures the degree to which the child shows willingness to listen to parent's suggestions in the setting and to comply to requests in a reasonable manner. At the high end, a child matches his/her behavior to parental direction in a detailed fashion (e.g., if parent asks the child to try to use a certain block, the child uses that block). The child also is attentive to parent and may focus his/her activity around parent's directions to the extent that parent provides direction. At the low end of the scale, the child actively refuses to comply with parental directions throughout most of the session. The child may do so by overt denial of demands and pulling away from the parent or leaving the table, rejecting the parent's physical efforts to help solve the task, and acting contrary to suggestions. An intermediate rating is given to the child who shows a mixture of compliant and rejecting responses to parent's plans, acts as though incognizant of parent's suggestions—either because the child is involved in his/her own schedule of activity or the parent gives few directions with which to comply. It is important to consider whether or not the child understands the directions he/she has been given; unclear directions which are not responded to by the child does not indicate noncompliance.

NOTE: Questions asked by the parent are considered implied directives and thus should be included in assessment of child compliance.

1. Child rejects all directions of parent during the session. In effect, the child does nothing demanded of him/her.

2. Child shows strong tendency toward noncompliance but it is mixed with a few efforts to follow suggestions and directions given by the parent. This child will tend to initially refuse to comply with directives but may eventually become compliant with a few directives.

3. There are major, but isolated, episodes of noncompliance during the session, or tendencies toward noncompliance throughout. This child will tend to display a mixture of compliance and non-compliance throughout the interaction.

4. The child seems not to be strongly invested in noncompliance and basically complies with most directives. There may be a few instances of initial noncompliance, but the child generally will comply with parent directives. (Note: Any child who is obedient and conforming to the parent's demands out of fear can only get a maximum score of 4).

5. The child is compliant toward the parent's demands and willing to work in collaboration. Child does not seem invested in rejecting the parent's directions and is compliant throughout the observation.