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THE EFFECT OF MOTHER-CHILD INTERACTIONAL SYNCHRONY:  
IMPLICATIONS FOR PRESCHOOL AGGRESSION AND SOCIAL COMPETENCE

by  
Cassandra Pasiak

A Thesis  
Submitted to the Faculty of Graduate Studies  
through Psychology  
in Partial Fulfillment of the Requirements for  
the Degree of Master of Arts at the  
University of Windsor

Windsor, Ontario, Canada  
2011  
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The Effect of Mother-Child Interactional Synchrony: Implications for Preschool  
Aggression and Social Competence

by

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July 13, 2011

## AUTHOR'S DECLARATION OF ORIGINALITY

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## ABSTRACT

The present study examined the relations between the quality of mother-child interaction and preschoolers' aggressive behavior and social skills. Fifty-nine preschool-aged children (3-6 years; 29 aggressive and 30 non-aggressive) and their mothers engaged in a videotaped free play task and a structured task. The interactions were coded for interactional synchrony and shared affect. A series of t-tests and ANOVAS revealed that non-aggressive dyads exhibited more interactional synchrony, shared positive affect, and less shared negative affect, than aggressive dyads. Regression analyses showed that level of interactional synchrony, shared positive affect, and child aggression predicted children's social skills. The results also provided some support that the quality of the interactions differed by task type. The findings are discussed in terms of implications for intervening with aggressive young children.

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## TABLE OF CONTENTS

AUTHOR’S DECLARATION OF ORIGINALITY	iii
ABSTRACT	iv
ACKNOWLEDGEMENTS	v
LIST OF TABLES	ix
LIST OF FIGURES	x
CHAPTER	
I. INTRODUCTION	1
Statement of the Problem	1
Aggression and the Preschool Age Group	2
Parent-Child Interaction	3
Interactional Synchrony	5
Interactional Synchrony and the Development of Social Competence	7
Interactional Synchrony and Childhood Aggression	9
Components of Interactional Synchrony	13
Shared Affect	14
Differences in Types of Interaction Task	16
Advantages of the Current Study	18
Hypotheses	20
II. METHOD	22
Participants	22

	Group Differences on Demographic Data	23
	Procedure	25
	Measures	26
	Demographics Questionnaire	26
	Child Behavior Checklist	26
	Social Skills Rating System	26
	Battelle Developmental Inventory	27
	Videotape Coding	27
	Interactional Synchrony	28
	Mother-Child Shared Affect	29
III.	RESULTS	32
	Preliminary Analyses	32
	Data Cleaning	32
	Examination of the Assumptions of Univariate Analyses	32
	Examination of the Assumptions of Regression Analyses	34
	Descriptive Statistics	35
	Primary Analyses	41
	Difference in Interactional Synchrony	41
	Difference in Shared Positive Affect	44
	Difference in Shared Negative Affect	45
	Interactional Synchrony, Shared Positive Affect, and Children's Social Competence	46



	Shared Negative Affect and Children’s Social Competence	51
	Difference in Interactional Synchrony and Shared Positive Affect Between Two Tasks	53
	Difference in Shared Negative Affect Between Two Tasks	55
	Additional Analyses	56
IV.	DISCUSSION	58
	Interactional Synchrony Variables and Child Aggression	58
	Interactional Synchrony Variables and Children’s Social Skills	60
	Differences in the Interactional Synchrony Variables Between Tasks	63
	Additional Findings	65
	Limitations and Implications for Future Research	67
	Implications for the Treatment of Clinical Aggression	69
	Conclusion	70
	REFERENCES	71
	VITA AUCTORIS	80

## LIST OF TABLES

TABLE 1:	Demographic Characteristics of the Aggressive and Non-Aggressive Dyads	24
TABLE 2:	Mean, Standard Deviation, and Range of Variables for the Total Sample	37
TABLE 3:	Pearson Correlations Between Study Variables	39
TABLE 4:	Social Competence for Aggressive and Non-Aggressive Preschoolers	40
TABLE 5:	Interactional Synchrony, Shared Positive Affect, and Shared Negative Affect for Aggressive and Non-Aggressive Dyads	42
TABLE 6:	Summary of Regression Analyses for Predicting the SSRS Total Score with Interactional Synchrony	48
TABLE 7:	Summary of Regression Analyses for Predicting the SSRS Total Score with Shared Positive Affect	50
TABLE 8:	Summary of Regression Analyses for Predicting the SSRS Total Score with Shared Negative Affect	52
TABLE 9:	Comparison of Interactional Synchrony, Shared Positive Affect, and Shared Negative Affect Between Two Tasks	54

## LIST OF FIGURES

FIGURE 1:	Interaction between group and household income for interactional synchrony during block task	43
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# CHAPTER I

## Introduction

### *Statement of the Problem*

Childhood aggression is a serious societal concern that has garnered a vast amount of research in recent years. This trend is not surprising when taking into consideration the fact that externalizing problems are one of the most common reasons for referral for mental health services during childhood (Luby & Morgan, 1997) and that the number of preschoolers presenting to clinics with high levels of aggression is growing (Landy & Menna, 2001). Longitudinal research supports the relative stability of aggression throughout the lifespan (Kokko & Pulkkinen, 2005) and identifies aggression as not only a significant predictor of criminal behavior, but also of poorer life outcome in general (Huesmann, Dubow, & Boxer, 2009). According to Health Canada, 25% of boys and 21% of girls in grades 6 to 10 report being victims of bullying, with 8-16% being victimized once or twice a term and 2-8% being victimized once a week or more. In addition, approximately 23% of Canadian students reported that they bullied others, and 24% of boys and 19% of girls reported being both victims and perpetrators of bullying (Public Health Agency of Canada, 2004). In light of these disconcerting statistics there is a growing need for early clinical identification and intervention, particularly since there are well-supported maladjustment consequences for both perpetrators and victims of aggression (Card & Hodges, 2010). Moreover, there is evidence that those who engage in aggressive and bullying behaviors are at an increased risk for school failure and delinquency (Coie & Dodge, 1998), as well other forms of aggression later in life, such as

sexual harassment, intimate partner violence, child abuse, workplace harassment, and elder abuse (Huesmann, Eron, & Dubow, 2002; Public Health Agency of Canada, 2004).

### *Aggression and the Preschool Age Group*

Aggression is defined as any behavior directed toward another person that is carried out with the intent to cause harm (Anderson & Bushman, 2002), however accidental harm is not considered aggressive because it is not intended. Although there is a preponderance of research with regard to delinquency and violence prevention, relatively few studies have investigated clinical levels of aggression in young children. This dearth in the literature is of concern in light of the fact that externalizing disorders have consistently been found to be one of the foremost reasons for preschooler referrals to mental health services (Luby & Morgan, 1997).

Late toddlerhood and the early preschool years are marked by rapid physical, cognitive, motor, and emotional regulatory growth (Scaramella & Leve, 2004). In addition, improved communication and cognitive growth allow children a more equal role during interactions with caregivers (Harrist & Waugh, 2002). During this period children begin to comply and internalize parental requests, as well as willfully defy them (Kochanska & Aksan, 1995).

One of the difficulties of studying aggression in young children is that many of the behaviors of interest (e.g. tantrums, noncompliance, and aggression toward peers) are normative behaviors of early childhood, which accompany the onset of independence and do not impair functioning (Keenan & Wakschlag, 2000). However, when aggression reaches problematic levels, such that development and social functioning are significantly impaired (e.g., expulsion from preschool or peer rejection of an aggressive child), clinical

diagnosis and intervention should be considered (Keenan & Wakschlag, 2000; Renk, 2008).

Research targeting aggressive young children is imperative because there is growing evidence that interventions conducted during the preschool years may be more effective than interventions conducted during the later school years, both because disruptive behavior is less entrenched and because behavioral control is emerging during this developmental period (Keenan & Wakschlag, 2000). Moreover, there is evidence for the stability of conduct disorder throughout childhood, as demonstrated by the tendency of aggressive young children to continue to exhibit aggressive behavior in late childhood and into adolescence (Haapasalo & Tremblay, 1994). Thus, when it comes to childhood aggression, early intervention is critical.

#### *Parent-Child Interaction*

Widely recognized as central to children's normative development, parent-child interaction has been identified as one of the strongest influences shaping children's problematic behaviors (Davenport & Bourgeois, 2008; Menna & Landy, 2001) and, in fact, interventions that target parent-child interaction have been found to be the most successful (Landy & Menna, 2006; Landy, Menna, & Sockett-Dimarco, 1997; Webster-Stratton, Reid & Hammond, 2001). Parent-child interaction has been linked to the development of children's social competence (Black & Logan, 1995) and emotion regulation, which in turn is critical in the management of aggression and in the prevention of later delinquency and conduct disorder (Landy & Menna, 2001). Because the earliest social interactions occur within the family of origin, researchers have focused on the relation between children's family interactions and interactions outside the family

(Lindsey & Mize, 2001) and considerable support has been found for the link between children's interactions with parents and their interactions with peers (Lindsey, Mize, & Pettit, 1997; Scaramella & Leve, 2004).

Childhood behavior problems, including aggression, have been linked to a cyclical pattern of negative parent-child interaction during early childhood, characterized by aversive child behaviors and inconsistent and ineffective parenting behaviors (Davenport & Bourgeois, 2008). According to attachment theory, repeated interactions with caregivers develop into an internal working model of relationships that is then used when forming new relationships with individuals outside of the primary caregivers (Scaramella & Leve, 2004). As negative interaction patterns become entrenched over time, both partners' expectations during interactions are shaped in ways that contribute to the further escalation of child's behavior problems and may result in the eventual withdrawal of the parent from attempts to connect with the child (Davenport & Bourgeois, 2008). When children feel rejected by their parents' lack of involvement, they fail to use their caregivers to soothe or help regulate negative emotions (Scaramella & Leve, 2004). Such internal working models place children on a developmental trajectory of increased risk for externalizing problems in middle childhood and adolescence (Scaramella & Leve, 2004). On the other hand, warm, responsive, and supportive interactions in early childhood place children on a developmental trajectory of increasing social and emotional competence and the capacity to form trusting relationships (Davenport & Bourgeois, 2008; Scaramella & Leve, 2004). Such findings lend support to the growing consensus that the *quality* of parent-child relationship is one of the most important determinants of the etiology of behavior disorders.

### *Interactional Synchrony*

The present study further investigates the effects of parent-child relations using a construct called interactional synchrony. Interactional synchrony, commonly referred to as dyadic synchrony, is defined as a type of interaction between parent and child in which partners share a mutual focus, mirror each other's affect, exhibit a high degree of reciprocity, and are responsive to each other's cues (Harrist & Waugh, 2002; Mize & Pettit, 1997). There are many constructs in the literature that are highly related to synchrony, including mutuality and reciprocity, however interactional synchrony has gained growing support recently as the construct that best captures this array of positive interaction behaviors between parent and child (for review see Harrist & Waugh 2002).

Interactional synchrony was chosen for the present study over other parent-child relationship variables for several reasons. First, interactional synchrony measures aspects of parent-child interaction on a continuum rather than as an all-or-none phenomenon (i.e. synchrony vs. non-synchrony; Harrist & Waugh, 2002). For example, in a highly synchronous interaction, partners may share a mutual focus, make several responsive exchanges, and laugh together. Whereas in a less synchronous exchange, one partner may be pushy or intrusive or partners may repeatedly interrupt each other or respond inconsistently. In this way, synchrony is a more comprehensive measure of parent-child interaction by avoiding the loss of valuable information.

Second, interactional synchrony is indicative of the quality of interaction between parent and child. Meaning that the focus is on how the interaction is occurring (e.g., smooth-flowing or disjointed) rather than on what is occurring (e.g., play, teaching, or conflict; Harrist & Waugh, 2002) and, as previously stated, the quality of parent-child



interaction has gained growing support as a critical factor in the development of childhood behavior disorder.

Finally, much of the research concerning parent-child relationships focuses on characteristics of the parent, such as parenting style, discipline, warmth, and responsiveness (Lindsey et al., 1997), yet there is increasing recognition that the parent-child relationships are co-constructed and are shaped over time by patterns of reciprocal influence (Pettit & Lollis, 1997). One of the key characteristics of interactional synchrony, which adds to its appeal as a measure of parent-child relations, is that it is dyadic in nature—it assesses the interaction style of parent and child rather than the individual behavior of either partner (Harrist, Pettit, Dodge, & Bates, 1994; Harrist & Waugh, 2002; Lindsey et al., 1997). Synchrony is a complex process of give-and-take by which interacting partners adapt to one another's behavior in order to maintain a coherent and mutually rewarding exchange (Barber, Bolitho, & Bertrand, 2001; Lindsey, Colwell, Frabutt, Chambers, & MacKinnon-Lewis, 2008). In this way interactional synchrony provides a unique perspective of the nature of parent-child relationships that differs from the other constructs that focus on the behavior of one individual in the relationship, such as warmth, responsiveness, or parenting style (Lindsey et al., 2008). Support for this assertion is the evidence of the unique contribution of synchrony to child development over and above individual parenting behaviors (e.g., Criss, Shaw, & Ingoldsby, 2003; Mize & Pettit, 1997). For example, in a review of the synchrony literature, Harrist and Waugh (2002) cite several studies that demonstrate the importance of interactional synchrony in the development of communication competence skills, such as joint attention (Tomasello & Farrar, 1986), verbal turn-taking (Black & Logan, 1995), and

contingent language usage (Raver, 1996). There is also evidence for the contribution of parent-child synchrony to childhood aggression, social competence, and peer acceptance (Ambrose & Menna, 2009; Lindsey et al., 1997; Mize & Pettit, 1997), as well as child compliance and the development of self-control (Harrist & Waugh, 2002). The present study focuses on the effect of synchrony with regard to childhood aggression and social competence.

### *Interactional Synchrony and the Development of Social Competence*

Fostering social competence is a key parental goal of early childhood and synchrony in parent-child interactions is thought to promote such competence by preparing children to become adept social partners (Harrist & Waugh, 2002). Support for the value of synchrony in the development of social competence comes from research that has found children with better developed social skills come from parent-child dyads characterized by synchronous interactions. For example, in an investigation of synchrony in interactions between 35 preschoolers and their parents, Lindsey and colleagues (1997) found that children from more synchronous parent-child dyads were better liked by their peers and rated as more socially competent by their teachers on the *Teacher's Checklist of Peer Relationships* (Coie & Dodge, 1988) than children from less synchronous dyads. Synchrony was assessed using a measure developed by Harrist et al. (1994) which evaluates the extent to which parent-child dyads share the same focus of attention and engaged in reciprocal and responsive interactions during videotaped play sessions. Using the same measure of synchrony in a study of 43 mother-child dyads, Mize and Pettit (1997) found that children from more highly synchronous mother-child dyads were better liked by their peers and were also rated less aggressive by their teachers than children

from less synchronous dyads. In a second study by Mize and Pettit (1997), the interactions of 62 mother-child dyads were examined with regard to synchrony, however, this time the synchrony coding scheme was adapted through the addition of more detailed anchor points in order to facilitate coding. Again, children from more synchronous dyads were better liked by their peers and were rated as less aggressive by their teachers than children from less synchronous dyads (Mize & Pettit, 1997).

With regard to the relation between interactional synchrony and social competence, it has been proposed that synchronous interactions may serve as the optimal context for social learning (i.e., parents are better able to pass on social learning during synchronous interactions as opposed to asynchronous interactions; Harrist et al., 1994). This conceptualization is consistent with the dyadic view of parent-child relations, which posits that partners are more open to each other's influence when interactions are characterized by mutuality and responsiveness (Criss et al., 2003). In fact, in a study of 99 children and their mothers Kochanska (1997) found a higher degree of socialization success in children of mutually responsive dyads, denoted by the degree to which children adopted, embraced, and internalized maternal values as evinced through direct observation and maternal report. Mutual responsivity was similarly assessed with an aggregation of observational measures, as well as maternal self-report (Kochanska, 1997).

In addition, there may also be a direct link between social competence and interactional synchrony in that children may learn to be synchronous (or asynchronous) from their parents (e.g., how to respond contingently, pace interactions appropriately, read social cues, etc.) and generalize this interaction style when socializing with others

(Harrist, et al., 1994).

In sum, these findings indicate that synchronous parent-child interactions are important in the development of social competence in early childhood, both by directly influencing socialization and by providing the ideal context for parental socialization efforts.

### *Interactional Synchrony and Childhood Aggression*

There is considerable evidence for the relation between the level of synchrony in parent-child interactions and early childhood externalizing problems, such as aggression and noncompliance. For example, in a longitudinal study of 83 mother-child dyads Kochanska and Murray (2000) found evidence for the lasting effect of synchrony on child compliance. Mothers and their children were observed during home and laboratory sessions at toddler age ( $M$  age = 32.86 months), laboratory sessions at preschool age ( $M$  age = 46.01 months), and a final laboratory session at early school age ( $M$  age = 65.89 months). Mutually responsive orientation (i.e., shared cooperation and shared positive affect) in early childhood was predictive of children's willingness to accept rules and behavior norms up to 4 years from the initial assessment. Similarly, Feldman, Greenbaum, and Yirmiya (1999) found that synchrony (i.e. shared affect) at age 9 months was related to higher child compliance at age 2, even after controlling for maternal warmth, child temperament, and child IQ. These findings are significant because compliance with parents is critical to optimal child development, whereas persistent noncompliance by the age of 2½ -5 years is associated with poor parent-child relationships, poor internalization of prosocial values, and an increased likelihood for serious behavior problems (Dix, Stewart, Gershoff, & Day, 2007; Kochanska, 2002). For

example, in a study of 73 preschoolers, Ambrose and Menna (2009) found that interactional synchrony during a free play task significantly predicted children's parent-rated physical aggression, with lower levels of interactional synchrony predicting higher levels of child aggression.

In a review of the literature regarding the link between synchrony and child compliance, Harrist and Waugh (2002) posit that a child is more likely to comply with a parental request within the context of synchrony due to the fact that a parental request during a synchronous interaction is more likely to be related to the child's current activity. Furthermore, it is believed that through the experience of interactional synchrony children learn to balance other-control (i.e., parental compliance) and self-control (Harrist & Waugh, 2002).

In addition to child compliance, interactional synchrony has also been linked to children's social-information processing. For example, in a study of 122 families, Criss and colleagues (2003) found that children from synchronous dyads were less likely to endorse aggressive behavioral strategies in hypothetical peer conflicts (i.e., responses were less likely to involve seeking retaliation). The authors propose that, in accordance with attachment theory, children who experience synchronous interactions with their mothers may develop more trustworthy and prosocial schemata of the world. This is a significant finding in light of research that has found that children with positive worldviews are more likely to interpret peer behavior benignly and refrain from aggressive retaliation, whereas children who believe a peer has acted with hostile intent feel justified in aggressive retaliation (Dodge & Somberg, 1987).

Finally, there is also substantial evidence regarding the direct link between

interactional synchrony and childhood aggression. For example, in a study involving 30 mothers and their kindergarteners, Harrist and colleagues (1994) coded synchrony on a five-point scale during four hours of home observations. Positive synchrony (i.e., extended, connected, non-negative interactions) was significantly related to lower levels of child aggression, as rated by both teachers and peers. In contrast, non-synchrony and negative synchrony (i.e., interactions characterized by mutually negative affective tone) were associated with higher levels of child aggression.

In addition, Mize and Pettit (1997) conducted two studies investigating synchrony in interactions between preschool-aged children and their mothers. In the first study, interactional synchrony was coded on a five-point scale, denoting the degree to which mother and child were engaged in mutually focused, reciprocal, and responsive exchanges. This coding scheme provided a global summary of synchrony across the entire interaction session. For the second study, the rating scale used in the first study was adapted by defining the scale points in more concrete ways to allow synchrony to be coded for each 30-second interval of the interactions. In both studies, higher levels of interactional synchrony (i.e., mutual focus, mutual responsiveness, shared affect, and mutual engagement) were related to lower levels of teacher-rated aggression in the children.

Similarly, Deater-Deckard, Atzaba-Poria, and Pike (2004) investigated synchrony in a sample of 125 socioeconomically and ethnically diverse parent-child dyads during home observations of a structured interaction task. Mutuality (i.e., responsiveness, reciprocity, and cooperation), when coupled with shared positive affect, was significantly related to fewer externalizing problems (e.g., aggression and delinquency), across gender,

ethnic, and socioeconomic groups.

In addition to higher levels of compliance and lower levels of aggression, synchronous interactions have been linked to lower likelihood of affiliation with deviant peers. Criss and colleagues (2003) found parent-child interactional synchrony predicts lower levels of child and best friend antisocial behavior (e.g., stealing, getting into fights, etc.), even after controlling for antisocial behavior two years prior.

Interactional synchrony is a particularly advantageous measure of parent-child interaction in light of current research that has focused on the dyadic nature of aggressive relationships. According to Card and Hodges (2010), aggression is a dyadic phenomenon that manifests as a recurring interaction pattern between an aggressor and a victim. Thus, a measure that focuses on the dyadic aspects of social interactions, as synchrony does, would be beneficial to the study of aggression.

Together, these findings demonstrate that interactional synchrony in parent-child relationships may contribute to early childhood social development. However, there may be other characteristics related to the parent-child dyad that account for the effect of interactional synchrony. Thus, it is important to elucidate the unique contribution of interactional synchrony to child development. For example, Mize and Pettit (1997) attempted to clarify the roles of intentional socialization efforts by mothers and the quality of the mother-child relationship in children's socialization. Both interactional synchrony (the indicator of relationship quality) and mother's social skills coaching (advice and guidance regarding videotaped peer dilemmas) were examined, and the results indicated that interactional synchrony accounts for unique variance in teacher

ratings of children's aggression and social competence, apart from mothers' intentional socialization efforts through social coaching.

Criss and colleagues (2003) also addressed this issue by examining interactional synchrony in addition to a variety of other characteristics related to mother-child dyads that could potentially account for the effect of synchrony. These characteristics were maternal harsh discipline (e.g., slap or hit, threaten, yell), parental monitoring (mother-child communication, maternal involvement, and knowledge of child's daily activities), mother-child openness (extent to which the dyadic relationship is positive, warm, and open), and mother-child conflict (frequency of conflict as reported by both mother and child). Again, the unique effect of synchrony was supported, with synchrony in mother-child interactions being a significant predictor of children's antisocial behavior over and above other dyadic characteristics.

In sum, these findings suggest that level of interactional synchrony in parent-child relationships may uniquely contribute to early childhood social development and is particularly important in the study of both behavioral and social competence.

#### *Components of Interactional Synchrony*

Many studies have assessed interactional synchrony using a global construct consisting of components such as shared emotion, joint attention, and verbal turn taking (e.g., Harrist & Waugh, 2002; Lindsey, Cremeens, Colwell, & Caldera, 2009). This operationalization of interactional synchrony has been linked to children's aggression (Harrist et al., 1994) and social skills competency (Lindsey et al., 1997; Mize & Pettit, 1997). However, it remains unclear if interactional synchrony is best conceptualized as a global construct that captures related interactive behaviors (Harrist and Waugh, 2002), as



there is evidence that the global construct and the discrete components of which it is composed make independent contributions to children's adjustment (Isabella & Belsky, 1991; Kochanska & Aksan, 1995; Lindsey et al., 2008; Lindsey et al., 2009).

It has been suggested that research investigating the effect of interactional synchrony on children's adjustment would benefit from the systematic examination of its constituent components (Lindsey et al., 2008; Lindsey et al., 2009). Thus, the current study will examine overall interactional synchrony, as well as the individual component of shared affect.

*Shared Affect.* Parent-child shared affect is the result of emotional communication between parent and child in which both partners acknowledge each other's emotional signals (Lindsey et al., 2009). It is believed that children learn about emotion regulation in the context of synchrony and non-synchrony (Harrist & Waugh, 2002), which in turn is critical in the control of aggression (Rubin, Caplan, Fox, & Calkins, 1995). Commonly referred to as matched affect or emotional reciprocity, shared affect in parent-child interactions has been linked to children's prosocial behavior with peers (Kochanska & Aksan, 1995; Lindsey et al., 2008). Although it is one of the most highly researched components of interactional synchrony, there remain several unresolved issues regarding parent-child shared affect.

First, there is debate regarding whether or not positive emotions are a requisite component of shared affect. Some researchers have included positive affect in the operationalization of synchrony (e.g., Criss et al., 2003; Harrist et al., 1994), but often valence of emotional expression is not specified (e.g., Keown & Woodward, 2002; Mize & Pettit, 1997). Harrist and Waugh (2002) posit that synchrony can occur without the

expression of positive emotions, however maintain that synchrony and positive affect are intrinsically related—the occurrence of synchrony gives rise to positive emotions, whereas mismatched emotions impede the occurrence of synchrony. On the other hand, there is direct evidence for the importance of shared positive affect in synchrony from research that had found mutual positive affect to contribute to children’s compliance and self-control (Kochanska, 1997). For example, in a study of 103 mother-child dyads, Kochanska and Aksan (1995) observed participants across three contexts (e.g., home cleanup task, lab cleanup task, and prohibited toy task). The results indicate that children who shared positive affect with their mothers during the interactions demonstrated a higher degree of committed compliance to mother’s requests.

A second related issue, calls into question the merit of shared affect when there is a negative valence to the emotions expressed. There is evidence that parent-child interactions that are synchronous but marked by mutually negative affect are maladaptive (Harrist & Waugh, 2002). Children from dyads characterized by mutually negative affect have been found to be unsociable, uncooperative, and more aggressive in their interactions with peers (Carson, & Parke, 1996). Moreover, shared negative affect between partners can be detrimental by contributing to coercive parenting, which in turn places children on a trajectory of increasing risk for externalizing problems in middle childhood and adolescence (Scaramella & Leve, 2004). However, few studies to date have been able to successfully measure shared negative affect within the context of synchrony due to the low occurrence of negative affect in the parent-child interactions examined (e.g., Mize & Pettit, 1997). For example, in a study of 80 families with toddler-aged children, Lindsey, Cromeens, Colwell, and Caldera (2009) investigated mother-

child and father-child interactions during a semi-structured play task. Although the authors were able to successfully measure global interactional synchrony, mutual initiation, mutual compliance, and shared affect, the authors reported difficulty measuring shared negative affect because its occurrence was so rare.

Finally, interactional synchrony has been found to occur without the presence of emotional expression or during intervals of non-shared affect, such as when one partner expresses negative emotion and the other responds in a neutral or positive way (Harrist & Waugh, 2002). Thus, shared affect may be indicative of highly synchronous interactions, but is a less adept measure of low or moderate levels of synchrony.

Despite these issues, shared affect is an important marker of synchronous interactions and the study of interactional synchrony would benefit from the further investigation of shared affect (both positive and negative) as an individual component of synchrony. Furthermore, to the author's knowledge, no study to date has examined shared affect as an individual component of interactional synchrony with regard to its relation to early childhood aggression and social competence.

#### *Differences in Types of Interaction Tasks*

A final issue addressed in the current study concerns the two different interaction tasks being investigated. The parent-child interactions studied in the synchrony literature typically take place during two types of tasks: a free play task, in which parent and child play with a variety of toys, or a structured task, in which parent and child are instructed to engage in a goal directed task (for review see Harrist & Waugh 2002). These tasks provide different interaction contexts that vary greatly in their goals and degree of structure. In fact, in a study of 34 three-year-old to five-year-old boys and their parents,

Davenport, Hegland, and Melby (2007) found evidence that parenting style differs between structured tasks and free play. Parenting behaviors were assessed using the Iowa Family Interaction Rating Scales (IFIRS; Melby et al., 1998; Melby & Conger, 2001) during a free play and a structured puzzle task. In assessing parenting behaviors between the tasks, only moderate correlations were found between the scales, indicating that the free play and structured tasks elicited somewhat different parent behaviors. Moreover, parent behavior in free play, but not the structured task, was significantly related to boys' problem behaviors.

There has been little investigation into whether the differences between tasks holds true for levels of interactional synchrony, although one study involving 73 preschoolers and their mothers found higher levels of interactional synchrony in a free play task than in a structured block task (Ambrose & Menna, 2009). The authors propose two possible explanations for lower synchrony scores during the structured task: 1) mothers may be more inclined to direct the child during a structured goal-oriented task, thus throwing off the balance in leading and following, and 2) children may find the structured task more frustrating and may become upset, resulting in a decreased likelihood for shared affect, eye contact, mutual engagement, and balance (Ambrose & Menna, 2009). Ambrose and Menna (2009), however, used a global measure of interactional synchrony (see Keown & Woodward, 2002; Mize & Pettit, 1997), so it is difficult to determine how individual components of synchrony differ by task type and which components in particular contributed to the difference in synchrony between tasks. Therefore, research investigating the effect of interactional synchrony with regard to

differences between interaction tasks would benefit from further investigation of both global synchrony, as well as individual components, such as shared affect.

### *Advantages of the Current Study*

Interactional synchrony has gained support in recent years as a preeminent measure of the quality of parent-child relationship, as demonstrated by a growing body of empirical research (Harrist & Waugh, 2002; Lindsey et al., 2009). The current study aims to add to this literature by offering several advantages over past studies.

First, the current study investigates a sample of both clinically aggressive and non-aggressive preschoolers. Although the relation between interactional synchrony and childhood aggression has been studied in the past, the majority of these studies involve community samples with preschoolers that are relatively homogenous with regard to levels of aggression, which may have compromised effect size. Moreover, previous researchers have had difficulty studying the shared negative affect component of synchrony due to the low occurrence of negative affect in the parent-child interactions under investigation (e.g., Lindsey et al., 2009; Mize & Pettit, 1997). With a sample of clinically aggressive preschoolers, as the current study proposes, there is a greater likelihood for negativity in the interactions, which in turn will facilitate the measurement of shared negative affect and aid in the elucidation of its role in child development.

Second, the current study aims to further clarify the conceptualization of interactional synchrony, as it remains unclear if synchrony is best regarded as a global measure or as a composition of discrete components. Many have suggested that both the study of synchrony and child adjustment would benefit from the examination of individual components of synchrony, such as shared affect (Lindsey et al., 2008; Lindsey

et al., 2009). Moreover, a review of the literature did not reveal any studies to date that have investigated global interactional synchrony and the individual component of shared affect specifically in relation to early childhood aggression and social competence.

Finally, the current study investigates interactional synchrony and shared affect across two different types of interaction tasks. A structured task and a free play task differ considerably in their goals and degree of structure, and there is emerging evidence that parenting style varies depending on the task type (e.g. Davenport, Hegland, & Melby, 2007). To date, there has been little investigation into whether this phenomenon applies to overall interactional synchrony or the individual component of shared affect.

In addressing these issues, the current study aims to extend and refine the literature regarding interactional synchrony. The use of a clinically aggressive sample, the critical evaluation of interactional synchrony as well as the discrete component of shared affect, and the comparison of two different interaction tasks may provide important insights into the phenomenon of interactional synchrony, with practical implications for early interventions with aggressive young children.

### *Hypotheses*

The purpose of the present study is to expand our understanding of parent–child interactional synchrony by comparing the interactions of mothers and preschoolers in aggressive mother-child pairs to non-aggressive mother-child pairs with regard to levels of global interactional synchrony and shared affect—a constituent component of synchrony. Like the majority of research pertaining to parent-child interaction, the current study focuses on interactions between mothers and their children due to the fact that mothers tend to be the primary caregivers. Moreover, attempts were made to recruit fathers, but the original researchers were not successful.

Archival, videotaped mother-child interactions (Dr. R. Menna, Principal Investigator) during a structured task and a free play task were coded for interactional synchrony. The videotaped interactions were previously used in research concerning play and limit-setting (Landy & Menna, 2001; Landy & Menna, 1997; Menna & Landy, 2001). The current examination of mother-child interactions during the structured task and free play task marks the first time these data will be coded for interactional synchrony and shared affect.

Based on the research of the preceding literature review (e.g., Ambrose & Menna, 2009; Deater-Deckard, et al., 2004; Harrist et al., 1994; Lindsey et al., 1997; Mize & Pettit, 1997) it is predicted that:

1. Mother-child interactions of non-aggressive dyads will be more globally synchronous than aggressive dyads.
2. Non-aggressive mother-child dyads will exhibit more shared positive affect than aggressive dyads.

3. Non-aggressive mother-child dyads will exhibit less shared negative affect than aggressive dyads.
4. Interactional synchrony and shared positive affect will be positively related to children's social competence.
5. Shared negative affect will be negatively related to children's social competence.
6. There will be greater levels of interactional synchrony and shared positive affect during the free play task than the structured block task.
7. There will be greater levels of shared negative affect during the structured block task than the free play task.



## CHAPTER II

### Method

#### *Participants*

Participants were 59 mother-child dyads (29 aggressive and 30 non-aggressive). The children's ages ranged from 3 to 6 years, with a mean age of 4.58 years. Participants were recruited through advertisements in local newspapers, parenting magazines, parent resource centers and daycares, doctors' offices, and mental health centres between 1996 and 1999 in a large metropolitan Canadian city. The aggressive group consisted of preschoolers with a Child Behavior Checklist (CBCL, Achenbach, 1991) score within the clinical range (above the 95<sup>th</sup> percentile) for the Aggressive Behavior Syndrome. The comparison group was comprised of preschoolers with a score within the normal range (below the 70<sup>th</sup> percentile) on all syndromes measured by the CBCL and were matched with the aggressive sample for age and gender. Children with serious developmental delays, medical conditions or physical disabilities were excluded from the study. The final sample consisted of 76% (45) male and 24% (14) female children. Ninety-four percent of mothers and 88% of children were Caucasian, 3.4% of mothers and children were Asian, 1.7% of mothers were Aboriginal, and 10.2% of children were of mixed race (6.8% mixed African, 1.7% mixed Asian, and 1.7% mixed Aboriginal). Mother's ages ranged from 18 to 50 years with a mean age of 33.7 years. Fifty-four percent of mothers completed college or university and 59% reported household incomes over \$40,000 per year. In addition, 78% of the sample were from two-parent and 15% were from single-parent households.

*Group differences on demographic data.* Independent sample t-tests were conducted on the mother and child demographic variables in order to rule out potential confounds. The only significant differences between the groups, aside from children's CBCL scores, was found between family structure,  $t(53) = 2.70, p < .01$ , indicating that there were more single parent mothers in the aggressive group than in the non-aggressive group. Demographic data are presented in Table 1.

Table 1.

*Demographic Characteristics of the Aggressive and Non-Aggressive Dyads*

Characteristic	Aggressive (N = 29)	Non-Aggressive (N = 30)
Child's Mean Age	4.62	4.59
Child's Gender (%)		
Male	76	77
Female	24	23
Child Behavior Checklist		
Aggressive Scale Mean	78.34**	46.0
Externalizing Scale Mean	73.34**	44.67
Battelle Developmental Inventory		
Cognitive Mean	50.7	58.8
Communication Mean	48.9	58.0
Mother's Mean Age	32.3	35.1
Mother's Education Level (%)		
Did Not Complete High School	6.8	10.0
Completed High School	41.4	20.0
College Diploma	6.9	16.7
University Degree	31.0	53.3
Household Income (%)		
Below 17,000	10.3	3.3
17,000-24,000	10.3	3.3
24,000-30,000	3.4	3.3
30,000-40,000	10.3	16.7
40,000+	48.3	70.0
Family Structure (%)		
Single Parent	24.1*	6.6
Two Parents	64.3	93.3

\*Significant at  $p < .05$ \*\*Significant at  $p < .01$

### *Procedure*

The data used in the present study consisted of archival videotaped mother-child interactions, parent-report measures of children's social skills, and emotional and behavioural functioning and children's developmental quotients. These data were originally collected as part of a larger study investigating preschool aggression and parenting characteristics, as well as intervention efforts for aggressive preschoolers (Landy & Menna, 2001; Landy & Menna, 1997; Menna & Landy, 2001; Landy & Menna, 2006). The present use of the archival data was approved by the research ethics board of the University of Windsor.

Testing took place at a children's mental health centre and involved two assessment sessions. In the first session informed consent was obtained for each participant and mothers completed questionnaires. In the second session the videotaped mother-child interaction tasks took place. Only following the videotaped interaction session did aggressive mother-child dyads return for a third session to complete tasks for the larger intervention study (Landy & Menna, 2006).

The interactions were videotaped in a room with a one-way observation mirror. Two research assistants administered the tasks—one operated the camera and gave instructions and the other watched from the observation room and brought materials as needed. The mother-child pairs were asked to engage in the four components of the Parent-Child Early Relational Assessment (ERA; Clarke, Musick, Stott, Klehr, & Cohler, 1984) which were adapted for young children. The ERA involves a 10-minute structured teaching task, a 10-minute snack period, a 10-minute free play task, and a 10-minute

separation and reunion. For the present study, only the structured teaching task and the free play task were analyzed.

For the structured teaching task the mother and child were provided with 12 colored one-inch blocks and block design cards deemed likely too difficult for the child to complete on his or her own. The mother was instructed to build a tower with 9 blocks and a bridge with the remaining 3 and then was to instruct her child to do the same. Next, the mother was to instruct her child to make designs with the blocks that matched the designs on the cards. Finally, if time permitted, the pair was to read a book together.

For the free play task the mother and child pairs were given a variety of toys to play with. The toys provided were chosen to encourage symbolic play, such as a doll's house with figures, toy telephones, blocks, cars, and crayons and paper. A few toys were also chosen to encourage aggressive play, such as a crocodile and plastic dinosaurs.

### *Measures*

*Demographics Questionnaire.* The children's mothers completed a demographics questionnaire with questions regarding mother's age, education level, ethnicity, and marital status, and child's age, gender, and health history.

*Child Behavior Checklist (CBCL; Achenbach, 1991).* Mothers completed the Child Behavior Checklist. The CBCL is a widely used, standardized behavioral checklist consisting of 118 items outlining behavioral and emotional problems. The scale has high construct validity and high correlations with other parent checklists. Test-retest reliability is .89 and inter-rater reliability varies from .67-.74.

*Social Skills Rating System (SSRS; Gresham & Elliott, 1990).* Mothers completed the Social Skills Rating System Parent Form in order to assess the children's social

competence. The SSRS measures problem behavior and social skills. The social skills subscales measure the frequency of four social skills - cooperation, assertion, responsibility, and self-control. The SSRS also provides an overall rating of children's social skills. Ratings were made on a 3-point Likert scale (0 = Never; 2 = Very Often). The social skills subscale of SSRS parent form has moderately high test-retest reliability (varying from .77 to .87) and a relatively high degree of scale homogeneity with internal consistency ranging from .74 to .90 (Gresham & Elliot, 1990).

*Battelle Developmental Inventory (BDI; Newborg, Stock, Wnek, Guidubaldi, & Svinicki, 1984).* The BDI is a standardized, individually administered assessment battery designed to test developmental skills in children from birth to 8 years. Test items fall under 5 domains of development: personal-social, adaptive, motor, communication, and cognitive. The BDI is highly correlated with the WISC-R (Wechsler, 1974), Stanford-Binet (SB:IV; Thorndike, Hagen, & Sattler, 1986), and the Peabody Picture Vocabulary Test (PPVT-III, Dunn & Dunn, 1997), and test-retest reliability is high for each domain (varying from .68 to .98). Two subscales, communication and cognitive, were used to derive a Developmental Quotient (DQ) of the children.

#### *Videotape Coding*

The parent-child videotaped 10-minute structured teaching tasks and the 10-minute free play tasks, were coded using two rating scales: 1) global interactional synchrony and 2) shared affect. Each interaction task was divided into 30-second intervals in accordance with previous research that suggests that this span of time is optimal to reliably assess parent-child interaction at the microanalytic level (Lindsey et al., 1997).

The researcher of the study and two fellow graduate students in the Clinical Psychology program coded the videotaped mother-child interactions. The researcher and the research assistants were blind to all information regarding the participants whose tapes they coded. One research assistant acted as the co-rater for each of the two coding systems.

*Interactional Synchrony* (Keown & Woodward, 2002; Mize & Pettit, 1997). The coding scheme created by Mize and Pettit (1997) and later adapted by Keown and Woodward (2002) was used to code the levels of interactional synchrony for each mother-child pair. Each 30-second interval was individually rated for the level of interactional synchrony that was exhibited, on a 6-point scale ranging from 0 (no interaction) to 5 (partners are peer-like, responsive, balanced, engaged in the same activity, and exhibit eye contact, physical closeness, or shared affect). A total interactional synchrony score was created for each mother-child pair for each task by averaging the ratings across the intervals.

High ratings were given when mother and child shared the same focus of attention, mirrored their partner's affect, and were responsive to their partner's cues, whereas low ratings were given when parent and child did not share a common focus, frequently changed topics abruptly, or one or both partners were unresponsive for many interaction sequences.

The present researcher was previously trained by a researcher who used the scale for a previous study (Ambrose & Menna, 2009). The first stage of the coding process required the coders to review the interactional coding manual (Keown & Woodward, 2002; Mize & Pettit, 1997), which contain the definitions of interactional synchrony,

descriptions of each scale point and the behaviors that are associated with them, and multiple examples of mother-child interactions for each scale point. Next, 10 videotapes of mother-child pairs interacting were randomly selected for training tapes. First the coders coded one interaction task separately and then discrepancies between the codes assigned were discussed until both raters agreed on codes that should be given for each 30-second segment of the interaction. Second, the coders coded two interaction tasks separately then met to discuss and to come to an agreement on any discrepancies in the ratings. The coders did this 3 times for a total of 9 interaction tasks, until they were able to reach adequate reliability ( $ICC = .80$ ). For the present study, inter-rater reliability was assessed on the basis of 23% of all videotaped interactions.

The interactional synchrony coding system has exhibited acceptable levels of inter-rater reliability in the past, from kappa of .66 (Keown & Woodward, 2002) to  $r$  of .75 (Mize & Pettit, 1997). The inter-rater agreement for the present study was 74% and inter-rater reliability was significant,  $ICC(27) = .6, p < .01$ . Intraclass reliability above .55 is considered adequate for these types of data (Mitchell, 1979).

*Mother-Child Shared Affect (Kochanska & Aksan, 1995).* The coding scheme used by Kochanska and Aksan (1995) was used to code the 10-minute structured teaching task and 10-minute free play task for shared affect for each mother-child pair. Each 30-second interval was coded for parent and child affect using four affect codes: 1) highly positive (smiling, laughing, joy, enthusiasm), 2) neutral/pleasant (no clear "full-blown" joy, but the mood nevertheless pleasant or neutral), 3) neutral/negative (no clear signs of negative affect, but some hints of irritation, impatience, boredom, apprehension, an impression that he or she "would rather be elsewhere"), 4) highly negative (angry yelling, crying,



whining, punishment, scowling). The codes were not mutually exclusive, and more than one affect could be coded for each interval. Thus, mother or child received a highly positive code, as well as a highly negative code if both emotions were expressed during the interval.

A total shared positive affect score and total shared negative affect score was created for each mother-child pair for each task by averaging the ratings across the intervals. The total shared positive affect score consisted of the proportion of intervals in which both partners exclusively exhibited highly positive affect when neither neutral nor highly negative affect was coded for either partner. Due to the rarity of shared negative affect, the total shared negative affect score consisted of the proportion of intervals in which both partners exhibited highly negative affect, regardless of whether or not other affects were coded.

High ratings of shared positive affect were given when mother and child smiled throughout the interval, laughed together, or played together with clear enthusiasm and joy, whereas high ratings of shared negative affect were given when parent and child argued, snapped at each other, or exhibited other clear signs of mutual anger, sadness, or distress.

The researcher of the present study trained the other graduate student research assistant as the second coder for shared affect. The first stage of the coding process required the coders to review each coding manual (Kochanska & Aksan, 1995), which contain the definitions of shared positive and shared negative affect, descriptions of each code and the behaviors that are associated with them, and multiple examples of mother-child interactions for each code. Next, 10 videotapes of mother-child pairs interacting

were randomly selected for training tapes. Coders first coded one interaction task together, discussing and agreeing upon codes for each 30-second interval. Three tapes were then coded independently and discrepancies between the codes were discussed until codes were agreed upon for each interval. The coders did this three times, for a total of eight interaction tasks, where inter-rater agreement was 80 percent. Inter-rater reliability was assessed on the basis of 24% of all videotaped interactions.

The shared affect coding system has exhibited acceptable levels of inter-rater reliability in the past ranging from kappa .87 to .92 (Kochanska & Aksan, 1995). The inter-rater agreement achieved for shared positive affect in the present study was 83% and inter-rater reliability was significant,  $ICC(28) = .83, p < .01$ . The inter-rater agreement for shared negative affect was 84% and inter-rater reliability was also significant,  $ICC(28) = .62, p < .01$ . Again, intraclass reliability above .55 is considered adequate for observational data (Mitchell, 1979).

## CHAPTER III

### Results

#### *Preliminary Analyses*

*Data cleaning.* Prior to conducting the primary analyses, all demographic, independent, and dependent variables were examined for missing data and outliers. Examination of the data set revealed 16 cases without complete data on the Social Skills Rating System. The pattern of the missing data was examined in order to determine the nature of its distribution within the sample. For the 16 cases with missing data on the dependent measure, expectation maximization methods were used in order to generate imputed values. Expectation maximization avoids the risk of overfitting or the solutions that look better than they are and provides realistic estimates of variance (Tabachnick & Fidell, 2007). Further support for this decision was provided on the basis of Little's MCAR test which suggested that the missing data were absent in a fashion that suggested randomness,  $\chi^2(6) = 6.49, p = .370$ . Thus, the sample used for all subsequent analyses consisted of 59 mother child dyads (29 aggressive and 30 non-aggressive).

*Examinations of the assumptions of univariate analyses.* The data were then analyzed to ensure the assumptions of univariate analyses were met, including normality, homogeneity of variance, and independence of observations. The distributions of the independent and dependent variables were assessed for the assumption of normality through the examination of skewness and kurtosis for each the aggressive and non-aggressive groups. The distributions of the children's Social Skills Rating Systems scores, for both the aggressive and non-aggressive group, were not significantly different from normal. Similarly, the distributions of the dyads' interactional synchrony and shared

positive affect scores, for both the free play and block task, were not significantly different from normal for either group. There were no instances of shared negative affect during the free play task for the non-aggressive group, however, the distribution for the aggressive group was significantly positively skewed and leptokurtic ( $M = 0.06$ ,  $SD = 0.15$ ). Furthermore, the distributions of shared negative affect during the block task for both the aggressive group ( $M = 0.06$ ,  $SD = 0.13$ ) and the non-aggressive group ( $M = 0.002$ ,  $SD = 0.11$ ) were significantly positively skewed and leptokurtic. Despite these violations of normality, no transformations were performed because the skewed variables shared the same direction of skewness and the kurtosis of the variables was not considered detrimental to the analyses due to the fact that the sample included a clinical population.

Next, the assumption of homogeneity of variance was assessed using Levene's test for Equality of Variances. For both the aggressive and non-aggressive groups, Levene's test was not significant for the children's Social Skills Rating System scores, mother-child shared positive affect (during both the free play and structured block task), or interactional synchrony during the free play task. On the other hand, Levene's test was significant for shared negative affect during the free play task,  $F(1, 57) = 18.57$ ,  $p < .01$ , and structured block task,  $F(1, 57) = 19.52$ ,  $p < .01$ , as well as interactional synchrony during the structured block task,  $F(1, 57) = 10.87$ ,  $p < .01$ , indicating that group variances were not equal. As a result, a more robust test of group difference, Welch's F, was used for the main analyses, however, there was no difference in terms of significance findings between the standard univariate analyses and Welch's F. Moreover, Welch's F was unable to analyze group differences in shared negative affect during the play task due to

zero variance (i.e., no shared negative affect) in the non-aggressive group. Thus, standard univariate analyses were interpreted.

Finally, to test the assumption of independence of observations, Cook's distance was calculated for all independent and dependent variables. No influential observations were noted.

*Examinations of the assumptions of regression analyses.* The data were then analyzed to ensure the assumptions of regression analyses were met. The predictor variables were examined for outliers by inspecting Hat's Element (Leverage Values) using the formula recommended by Field (three times the value of  $(k+1)/n$ ; 2009). One outlier was found for shared negative affect. The dependent variable was then examined for outliers by checking the standardized residuals with the recommended cut-off of 2.5 (Field, 2009). Two outliers were found for the SSRS total. All three outliers were removed and the analyses were re-run, but the pattern of the correlations between the study variables and the results of the regression analysis did not change substantially, thus, the cases were not removed in order to preserve the data.

Next, the data set was examined for influential observations using Cook's Distance with the recommended cutoff of 1 (Field, 2009). No influential observations were found.

The assumption of large enough sample size was then evaluated. The recommended sample size to detect true effects is between 10 to 15 participants per predictor (Field, 2009). The present study had 53 cases (due to missing data on one of the control variables), thus the regressions could include four to five predictor variables.

Next, the assumption of multicollinearity was checked by examining the correlation matrix of the predictor variables, Tolerance ( $> 0.1$ ), and VIF ( $< 10$ ). No issues with multicollinearity were raised by any of these methods, thus this assumption was met.

The assumption of independence of errors was checked with the Durbin-Watson statistic and all of the Durbin-Watson values fell well within the range of one to three.

Scatterplots were created with predicted outcome values on the y-axis and standardized residual values on the x-axis to check if the assumptions of linearity and homoscedasticity. The scatterplots for each regression did not form a curved shape, nor was there a pattern in which the data points were wider on one end than the other, suggesting that both assumptions were met.

The assumption of normally distributed errors was checked by examining the histograms of the standardized residuals. The distribution of errors was approximately normal for the SSRS total, indicating that this assumption was met.

Finally, the assumption of normally distributed dependent variables was checked through the examination of skewness and kurtosis and the SSRS total was found to be normally distributed (*skewness* = 0.14, *kurtosis* = -0.31).

*Descriptive statistics.* The interactional synchrony scores obtained in the present study are comparable, although slightly lower, than those obtained in previous studies. For example, with a community sample of 33 hyperactive preschool boys and a comparison sample of 34 boys, Keown and Woodward (2002) obtained a mean synchrony score of 2.92 ( $SD = 0.45$ ) for the hyperactive group and 3.44 ( $SD = 0.50$ ) for the control group. The present study also obtained lower scores for shared positive affect than previous research. For example, in a study of 103 dyads of mothers and their

normally developing 26-41-month-old children, Kochanska and Aksan (1995) obtained mean shared positive affect scores ranging from .74-.76 ( $SD = .22 - .28$ ) across two cleanup tasks and a prohibition task (i.e., child prohibited from playing with desirable toys). However, lower levels of interactional synchrony and shared positive affect would be expected with a sample that includes a clinically aggressive group. To the author's knowledge, no study to date has used the present shared affect coding system to examine shared negative affect, although negative affect of individual partners has previously been studied (see Kochanska, Aksan, & Nichols, 2003). Of note, is that shared negative affect was observed in 10% of play task interactions and 17% of structure block interactions in the present study, in contrast to past studies that have had difficulty measuring shared negative affect due to its rarity (Lindsey et al., 2009; Mize & Pettit, 1997). The means, standard deviations, and ranges for the variables of the present study are listed in Table 2.

Table 2.

*Mean, Standard Deviation, and Range of Variables for the Total Sample*

Measure	<i>N</i>	<i>M</i>	<i>SD</i>	<i>Min.</i>	<i>Max.</i>
Child Age (Months)	59	55.29	12.8	35.0	83.0
Child Behavior Checklist					
Aggressive Scale	59	61.90	18.9	7.0	95.0
Externalizing Scale	59	58.76	16.9	7.0	85.0
Social Skills Rating System					
Cooperation	59	10.88	3.4	3.0	19.0
Assertion	59	13.79	3.7	4.7	20.0
Responsibility	59	10.95	3.9	1.0	18.0
Self-Control	59	10.38	4.1	1.0	20.0
Total	59	45.85	13.0	16.17	76.0
Interactional Synchrony					
Play Task	59	2.52	0.42	1.35	3.50
Block Task	59	2.46	0.38	1.44	3.07
Shared Positive Affect					
Play Task	59	0.52	0.26	0.0	1.00
Block Task	59	0.40	0.27	0.0	1.00
Shared Negative Affect					
Play Task	59	0.03	0.11	0.0	0.5
Block Task	59	0.03	0.01	0.0	0.59



Prior to testing the main hypotheses, bivariate correlations were conducted between all study variables in order to examine the associations between variables and to determine which variables to control for during the primary analyses. Notable correlations are presented in Table 3. Both interactional synchrony and shared positive affect during the play task were negatively correlated with child aggression ( $p < .05$ ), as were interactional synchrony and shared positive affect during the block task ( $p < .01$ ). In contrast, shared negative affect during the play task was not significantly correlated with child aggression, although shared negative affect during the block tasks was positively correlated ( $p < .05$ ).

In addition, interactional synchrony during both the free play task and the structured block task was positively correlated ( $p < .01$  and  $p < .05$ ) with all subscales and the children's total score of the Skills Rating System. Shared positive affect during both tasks was also positively correlated ( $p < .01$ ) with the subscales and total score of the SSRS. In contrast, shared negative affect across both tasks was negatively correlated ( $p < .01$  and  $p < .05$ ) with all subscales and total score of the SSRS, except that shared negative affect during the play task was not significantly correlated with children's assertion.

Finally, independent sample t-tests were performed to assess the difference between the aggressive and non-aggressive preschoolers with regard to social competence. The results indicated significant differences between the aggressive and non-aggressive preschoolers on their total score of the Social Skills Rating System. The means and standard deviations are shown in Table 4. As a result, group (aggressive vs. non-aggressive) was controlled for during the regression analyses.

Table 3.

*Pearson Correlations Between Study Variables*

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
1. Child Age		.08	.02	.21	-.03	.01	.19	.21	.19	.08	.19	.06	.02	.16	.11	.00	-.09
2. Child Gender			.02	.04	.05	.02	-.09	.10	.06	.07	.01	.05	.04	.17	-.09	.03	.02
3. Mother Education				.46**	-.38**	-.10	.02	.11	.15	.27*	.21	.20	.40**	.10	.18	.00	-.23
4. HH Income							.33*	.15	.30*	.26	.30*	.25	.36**	.25	.34*	.00	-.46**
5. Family Structure								-.06	-.26	-.35**	-.35**	-.20	-.24	-.24	-.20	-.05	.31*
6. CBCL									-.47**	-.73**	-.67**	-.27*	-.38**	-.32*	-.36**	.24	.31*
7. SSRS-C								.57**	.71**	.81**	.88**	.38**	.37**	.47**	.40**	-.49**	-.31*
8. SSRS-A									.72**	.60**	.83**	.38**	.37**	.47**	.40**	-.49**	-.31*
9. SSRS-R										.64**	.88**	.27*	.54**	.41**	.41**	-.31*	-.29*
10. SSRS-SC											.88**	.44**	.52**	.49**	.48**	-.31*	-.29*
11. SSRS-Total												.42**	.55**	.54**	.51**	-.36**	-.46**
12. IS Play													.34**	.49**	.39**	.01	-.03
13. IS Block														.39**	.76**	-.07	-.42**
14. SPA-Play															.48**	-.16	-.14
15. SPA-Block																-.13	-.39**
16. SNA-Play																	.14
17. SNA-Block																	

SSRS: Cooperation (C), Assertion (A), Responsibility (R), Self Control (SC)      \*Significant at  $p < .05$       \*\*Significant at  $p < .01$

Household Income (HH Income)  
 Interactional Synchrony (IS)  
 Shared Positive Affect (SPA)  
 Shared Negative Affect (SNA)

Table 4.

*Social Competence for Aggressive and Non-Aggressive Preschoolers*

	Aggressive			Non-Aggressive			<i>t</i>
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	
Cooperation	29	8.68	2.65	30	13.01	2.6	-6.34**
Assertion	29	11.68	3.22	30	15.84	2.81	-5.3**
Responsibility	29	8.88	3.15	30	12.92	3.45	-4.69**
Self-Control	29	7.28	2.28	30	13.38	3.03	-8.72**
Total	29	36.38	8.09	30	54.99	9.94	-7.88**

\*\*Significant at  $p < .01$

### *Primary Analyses*

*Difference in interactional synchrony.* The first hypothesis was that the level of interactional synchrony would be greater in the non-aggressive dyads than in the aggressive dyads. An independent sample t-test was performed for synchrony during the play task and the results supported this hypothesis; non-aggressive dyads exhibited significantly higher levels of interactional synchrony than aggressive dyads. The means and standard deviations are shown in Table 5.

Because mother's education level,  $r(55) = .40, p < .01$ , and household income,  $r(53) = .36, p < .01$ , were significantly correlated with levels of interactional synchrony for the block task (Table 3), an ANOVA was performed to examine any main effects for these variables. The results partially supported the hypothesis, with a significant main effect for group (aggressive vs. non-aggressive),  $F(1, 49) = 10.58, p < .01$ , and no significant main effects for mother's education level,  $F(1, 49) = 4.13, p = .05$ , or household income  $F(1, 49) = 1.10, p > .05$ . However, there was a significant interaction between group and household income  $F(4, 43) = 2.8, p < .05$ , with greater levels of interactional synchrony in the non-aggressive dyads, particularly for dyads whose household income was between \$17,000-\$24,000 and \$24,000-\$30,000. This interaction is depicted in Figure 1. No other interactions were observed. The means and standard deviations are shown in Table 5.

Table 5.

*Interactional Synchrony, Shared Positive Affect, and Shared Negative Affect for Aggressive and Non-Aggressive Dyads*

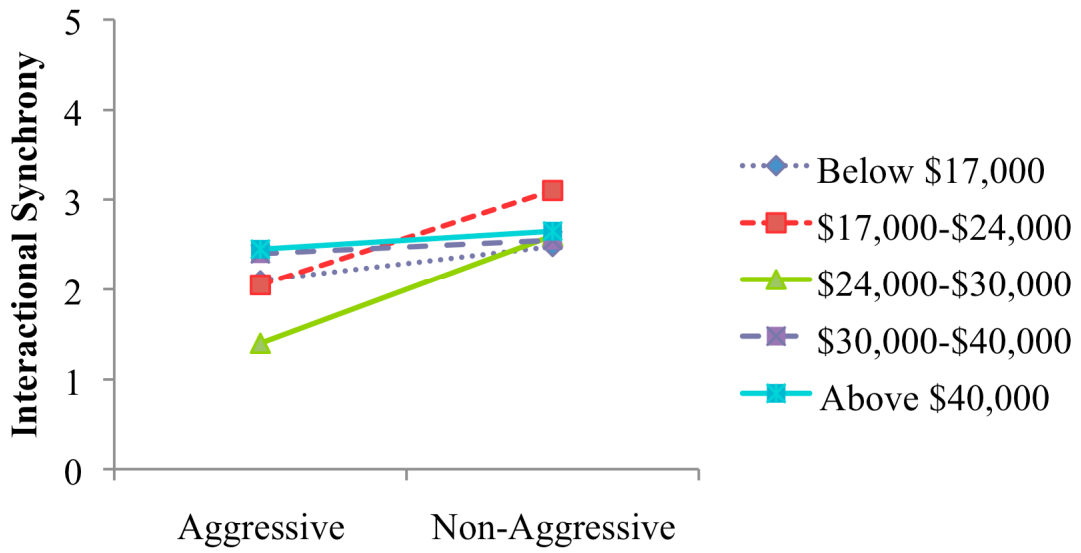
	Aggressive			Non-Aggressive			<i>t</i>
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	
Interactional Synchrony							
Play Task	29	2.37	0.43	30	2.67	0.37	-2.8**
Block Task	29	2.27	0.39	30	2.67	0.25	
Shared Positive Affect							
Play Task	29	0.40	0.23	30	0.63	0.24	-3.75**
Block Task	29	0.27	0.25	30	0.52	0.23	
Shared Negative Affect							
Play Task	29	0.06	0.15	30	0.00	0.00	2.11*
Block Task	29	0.06	0.25	30	0.002	0.23	

\*Significant at  $p < .05$

\*\*Significant at  $p < .01$

Figure 1.

*Interaction between group and household income for interactional synchrony during block task.*



\*Significant at  $p < .05$

*Difference in shared positive affect.* The second hypothesis was that the level of shared positive affect would be greater in the non-aggressive dyads than in the aggressive dyads. An independent sample t-test was performed for shared positive affect during the play task and the results supported this hypothesis; non-aggressive dyads exhibited significantly higher levels of shared positive affect than aggressive dyads. The means and standard deviations are shown in Table 5.

Because shared positive affect during the structured block task was correlated with household income,  $r(53) = .34, p < .05$ , an ANOVA was performed to examine main and interaction effects. The results supported the hypothesis, with a significant main effect for group (aggressive vs. non-aggressive),  $F(1, 50) = 10.47, p < .01$ , and no significant main effect for household income  $F(1, 50) = 3.71, p > .05$ , or interaction effects were found. The means and standard deviations are shown in Table 5.

*Difference in shared negative affect.* The third hypothesis was that the level of shared negative affect would be lower in the non-aggressive dyads than in the aggressive dyads. An independent sample t-test was performed and the results support this hypothesis; non-aggressive dyads exhibited significantly lower levels of shared negative affect than aggressive dyads during the free play task. The means and standard deviations are shown in Table 5.

Because shared negative affect during the block task was correlated with family structure,  $r(55) = 0.31, p < .05$ , and household income,  $r(53) = -.46, p < .01$ , an ANOVA was conducted. The results do not support the hypothesis, with no significant main effects found for group (aggressive vs. non-aggressive),  $F(1, 49) = 1.69, p > .05$ , or family structure,  $F(1, 49) = 0.01, p > .05$ . However, a main effect was found for household income,  $F(1, 49) = 7.66, p < .01$ , with more shared negative affect exhibited in dyads with a lower household income. No significant interactions were found. The means and standard deviations are shown in Table 5.



*Interactional synchrony, shared positive affect, and children's social competence.*

The fourth hypothesis was that interactional synchrony and shared positive affect would be positively related to children's social competence. Prior to testing this hypothesis, the correlations between the study variables were examined for notable relations. As shown in the correlation matrix depicted in Table 3, all subscales of the SSRS were significantly correlated to the SSRS total score ( $p < .01$ ). Furthermore, the pattern of correlations between the subscales and the predictor variables was the same for the SSRS total score. Thus, the SSRS total was used as the outcome measure of children's social skills, with a significant association between SSRS total and synchrony during the play task,  $r(59) = .42, p < .01$ , synchrony during the block task,  $r(59) = .55, p < .01$ , shared positive affect during the play task,  $r(59) = .54, p < .01$ , shared positive affect during the block task  $r(59) = .51, p < .01$ , shared negative affect during the play task,  $r(59) = -.36, p < .01$ , and shared negative affect during the block task,  $r(59) = -.46, p < .01$ .

Table 3 also shows that child aggression is negatively correlated with children's social skills,  $r(59) = -.67, p < .01$ , with higher levels of child aggression being related to less well developed social skills. There were also significant correlations between SSRS total and the demographic variables of family structure,  $r(55) = -.30, p < .05$ , and household income,  $r(55) = .3, p < .05$ . Family structure was significantly correlated to household income,  $r(53) = -.56, p < .01$ , with greater household income in two-parent families than single parent families. Because family structure and household income were similarly correlated to the outcome variable, a composite of the two demographics variables, called family status, was created. The composite variable was significantly correlated to SSRS total,  $r(53) = -.27, p < .05$ .

In order to test the study hypothesis, two hierarchical regressions were conducted. In the first regression, family status was entered into the first block of the regression equation to control for this potentially confounding variable. Child aggression was entered into the second block and interactional synchrony, during both the play task and the structured task, were entered into the third block. The results support the hypothesis; as Table 6 shows, interactional synchrony accounted for a significant amount of the variance in children's social skills, over and above child aggression and family status. Thus, children in mother-child dyads that exhibited higher levels of interactional synchrony during interaction tasks tended to have higher mother-reported social skills. The unstandardized *b*-values indicate that as interactional synchrony in the free play task increased by one unit, children's social skills increased by 6.5 units. Furthermore, as interactional synchrony in the block task increased by one unit, the children's social skills increased by 8.3 units. Similarly, the standardized beta weights indicate that as interactional synchrony in the play task increased by one standard deviation, children's social skills increased by 0.22 standard deviations. In addition, as interactional synchrony in the block task increased by one standard deviation, children's social skills increased by 0.24 standard deviations. Parent-reported child aggression also accounted for a significant amount of the variance in children's social skills. The unstandardized *b*-values indicate that as child aggression increased by one unit, children's social skills decreased by 0.35 units. The standardized beta weights indicate that as child aggression increased by one standard deviation, children's social skills decreased by 0.54 standard deviations. In contrast, family status did not account for a significant amount of the variance in children's social skills ( $p = >.05$ ).

Table 6.

*Summary of Regression Analyses for Predicting the SSRS Total Score with Interactional Synchrony*

	<i>B</i>	<i>SE B</i>	$\beta$
Step 1			
Family Status	-0.02	0.56	-0.003
Step 2			
CBCL-Aggressive	-0.35	0.07	-0.54**
Step 3			
IS Play Task	6.50	3.07	0.22*
IS Block Task	8.30	3.82	0.24*
<hr/>			
$R = 0.75^{**}$	$R^2 = 0.56^{**}$	$\Delta R^2 = 0.11$	

To test if shared positive affect was positively correlated to children's social skills, a second hierarchical regression was conducted, with family status entered into the first block, child aggression in the second, and shared positive affect in the play and block tasks in the third block. The results partially support the hypothesis; as Table 7 shows, shared positive affect during the play task accounted for a significant amount of the variance in children's social skills, over and above child aggression and family status. Thus, children in mother-child dyads that exhibited higher levels of shared positive affect during the play interaction tended to have higher mother-reported social skills. The unstandardized *b*-values indicate that as shared positive affect in the free play task increased by one unit, children's social skills increased by 14.87 units. Furthermore, the standardized beta weights indicate that as shared positive affect in the play task increased by one standard deviation, children's social skills increased by 0.31 standard deviations. In contrast, the level of shared positive affect in the block task did not significantly predict children's social skills ( $p = > .05$ ). Again, child aggression accounted for a significant amount of the variance in children's social skills. The unstandardized *b*-values indicate that as child aggression increased by one unit, children's social skills decreased by 0.34 units. The standardized beta weights indicate that as child aggression increased by one standard deviation, children's social skills decreased by 0.52 standard deviations. Once again, family status did not account for a significant amount of the variance in children's social skills ( $p = > .05$ ).

Table 7.

*Summary of Regression Analyses for Predicting the SSRS Total Score with Shared Positive Affect*

	<i>B</i>	<i>SE B</i>	$\beta$
Step 1			
Family Status	0.12	0.02	0.02
Step 2			
CBCL-Aggressive	-0.34	0.07	-0.52**
Step 3			
SPA Play Task	14.87	5.26	0.31**
SPA Block Task	6.31	5.60	0.13
$R = 0.76^{**}$ $R^2 = 0.58^{**}$ $\Delta R^2 = 0.55$			

*Shared negative affect and children's social competence.* The fifth hypothesis was that shared negative affect would be negatively related to children's social competence. To test this hypothesis a third hierarchical regression was conducted, with family status entered into the first block, child aggression in the second, and shared negative affect during the play and block tasks in the third block. The results do not support the hypothesis; as Table 8 shows shared negative affect in both tasks did not account for a significant amount of the variance in children's social skills, nor did family status ( $p = >.05$ ). However, child aggression did account for a significant amount of the variance in children's social skills. The unstandardized  $b$ -values indicate that as child aggression increased by one unit, children's social skills decreased by 0.37 units. In addition, the standardized beta weights indicate that as child aggression increased by one standard deviation, children's social skills decreased by 0.56 standard deviations.

Table 8.

*Summary of Regression Analyses for Predicting the SSRS Total Score with Shared Negative Affect*

	<i>B</i>	<i>SE B</i>	$\beta$
Step 1			
Family Status	1.10	0.63	0.02
Step 2			
CBCL-Aggressive	-0.37	0.07	-0.56**
Step 3			
SNA Play Task	-15.83	13.86	0.12
SNA Block Task	-30.03	16.09	0.22
<hr/>			
$R = 0.70$	$R^2 = 0.50$	$\Delta R^2 = 0.46$	

*Difference in interactional synchrony and shared positive affect between two tasks.* The sixth hypothesis was that there would be greater levels of interactional synchrony and shared positive affect during the free play task than the structured block task. Paired sample t-tests were performed and the results partially support this hypothesis; significantly higher levels of shared positive affect were exhibited in the free play task than in the structured block task, however, the level of interactional synchrony exhibited did not differ significantly by task. The means and standard deviations are shown in Table 9.



Table 9.

*Comparison of Interactional Synchrony, Shared Positive Affect, and Shared Negative Affect Between Two Tasks*

	Free Play Task			Structured Block Task			<i>t</i>
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	
IS	59	2.53	0.42	59	2.46	0.38	0.98
SPA	59	0.52	0.26	59	0.40	0.27	3.54**
SNA	59	0.03	0.11	59	0.03	0.01	-0.08

\*\* Significant at  $p < .01$

*Difference in shared negative affect between two tasks.* The seventh hypothesis was that there would be greater levels of shared negative affect during the structured block task than the free play task. A paired sample t-test was performed and the results did not support this hypothesis; the level of shared negative affect exhibited did not differ significantly by task. The means and standard deviations are shown in Table 9.

*Additional analyses.* Finally, the interactional synchrony variables, including global interactional synchrony and both shared positive and shared negative affect, were examined to determine the nature of their relations. The correlations are presented in Table 3. Interactional synchrony during the play task was positively correlated to shared positive affect in the play task,  $r(59) = .49$   $p < .01$ , as well as shared positive affect during the block task,  $r(59) = .39$   $p < .01$ . Similarly, interactional synchrony during the block task was positively correlated to shared positive affect in the play task,  $r(59) = .39$   $p < .01$ , and shared positive affect during the block task,  $r(59) = .76$   $p < .01$ . These positive correlations suggest that shared positive affect is indeed a significant component of interactional synchrony.

Interestingly, shared negative affect during the play task was not significantly correlated to synchrony during the play task ( $p > .05$ ), synchrony during the block task ( $p > .05$ ), shared positive affect during the play task ( $p > .05$ ), or shared positive affect during the block task ( $p > .05$ ). On the other hand, shared negative affect during the block task was negatively correlated to both synchrony during the block task,  $r(59) = -.42$   $p < .01$ , and shared positive affect during the block task,  $r(59) = -.39$   $p < .01$ , but was not correlated to synchrony during the play task ( $p > .05$ ) or shared positive affect during the play task ( $p > .05$ ). These mixed results have important implications for measures of interactional synchrony, such as the presently used coding system (Keown & Woodward, 2002; Mize & Pettit, 1997), wherein both shared positive and shared negative affect contribute to higher interactional synchrony scores. Namely, the present findings indicate that shared negative affect may be a distinct marker of the quality of parent-child interactions. Furthermore, because of its inverse relation to many of the study variables,

the current results suggest that shared negative affect may be an indicator of poor-quality parent-child interactions.

## CHAPTER IV

### Discussion

The purpose of the present study was to expand our understanding of parent–child interactional synchrony through the comparison of the interactions between mothers and their clinically aggressive preschoolers to mothers and their non-aggressive preschoolers. Specifically, this study aimed to add to the interactional synchrony literature through the use of a clinically aggressive sample, the comparison of both global interactional synchrony and the constituent component of shared affect, and the comparison of interactions between the two different tasks. Several of the main hypotheses were supported or partially supported. Each hypothesis and the corresponding results will now be discussed in depth.

#### *Interactional Synchrony Variables and Child Aggression*

The first three hypotheses investigated the relations between the interactional synchrony variables and childhood aggression by examining differences in the interactions between mother-child dyads of clinically aggressive preschoolers and a comparison group of mother-child dyads of non-aggressive preschoolers. The first hypothesis, that the level of interactional synchrony would be greater in the non-aggressive dyads than the aggressive dyads was supported; the level of interactional synchrony during the play task was significantly greater in the non-aggressive dyads than the aggressive dyads. Thus, non-aggressive dyads were more likely to share a focus, make eye contact, share affect, take turns, and demonstrate mutual responsiveness. In contrast, aggressive dyads were more likely to exhibit behaviors characteristic of low synchrony interactions, such as split focus, interrupting, ignoring, and mismatched affect.

With respect to interactional synchrony during the block task, there was a significant main effect of group (aggressive vs. non-aggressive) on the levels of interactional synchrony, however household income also played a role, with a significant interaction between group and household income. Consistent with the hypothesis, there were greater levels of interactional synchrony in the non-aggressive dyads than the aggressive dyads, and this effect was particularly true for dyads whose household income was between \$17,000 and \$30,000. These findings are consistent with previous research that has found higher levels of interactional synchrony to be related to lower levels of child aggression (e.g., Ambrose & Menna, 2009; Harrist et al., 1994; Mize & Pettit, 1997).

The second hypothesis, that the level of shared positive affect would be greater in the non-aggressive dyads than the aggressive dyads, was supported. There were significantly greater levels of shared positive affect in the non-aggressive group during both the play task and the structured block task. Thus, non-aggressive dyads were more likely to laugh together, smile, and exhibit enthusiasm and enjoyment of the interaction. These findings provide further support for the importance of shared positive affect in parent-child interactions by demonstrating that higher levels of shared positive affect are associated with lower levels of aggression, in addition to child compliance (Kochanska, 1997; Kochanska & Aksan, 1995) and self-control (Lindsey et al., 2009).

Shared negative affect, on the other hand, has been difficult to study in the past due to the infrequency of negative affect during the interactions examined (e.g., Lindsey et al., 2009; Mize & Pettit, 1997). The present study, however, used a clinically aggressive sample, and significant negativity was exhibited in the interactions (i.e., in

10.2% of play interactions and 17% of structured block interactions). This made it possible to test the third hypothesis, that the level of shared negative affect would be lower in the non-aggressive dyads than the aggressive dyads. As predicted, shared negative affect during the play task was significantly lower in the non-aggressive dyads than the aggressive dyads. Thus, aggressive dyads were more likely to argue angrily, and to exhibit mutual irritation, distress, and sadness.

In contrast, there was no main effect of group (aggressive vs. non-aggressive) for shared negative affect during the block task. In fact, the only main effect observed was for household income, with more shared negative affect exhibited in dyads with a lower household income. Therefore, the results were somewhat inconsistent with regard to the relation between shared negative affect and aggression, however, there was some congruency with previous research.

#### *Interactional Synchrony Variables and Children's Social Skills*

The fourth and fifth hypotheses, examined the relations between the interactional synchrony variables and children's social skills. The fourth hypothesis, that interactional synchrony and shared positive affect would be positively related to children's social competence, was partially supported. The level of interactional synchrony in both the free play and structure block task significantly predicted parent-rated social skills, with higher levels of interactional synchrony associated with higher levels of parent-reported social skills. These findings correspond to previous research that has linked parent-child interactional synchrony to peer acceptance and teacher-rated social competence (Lindsey et al., 1997; Mize & Pettit, 1997). However, the present study used a clinically aggressive sample and, accordingly, children's parent-rated aggression also explained a significant

amount of the variance in children's social skills; with children's social skills decreasing as aggression increased. This, also, is consistent with an abundance of previous research, which has linked childhood aggression to social skills deficits and biased social information processing (Dodge et al., 2006; Hubbard et al., 2001; Schawartz, et al., 1998). These findings are significant in light of evidence that the relation between childhood aggression and social skills is cyclical, wherein aggressive children tend to perceive neutral cues in their social interactions as threatening and hostile, which in turn justifies their negative and aggressive responses, leading to further peer rejection (Crick & Dodge, 1994).

There is a twofold explanation for the association between interactional synchrony and children's social skills: 1) synchronous interactions may provide the optimal context for social teaching, and 2) children may learn to be synchronous (i.e., take turns, be responsive, read social cues) from synchronous interactions with their parents, which in itself contributes to social success with peers (Harrist et al., 1994). The association between interactional synchrony and children's social skills also has important implications for child aggression. Research has linked children's interactions with parents to their interactions with peers (Lindsey, Mize, & Pettit, 1997) and highly negative and asynchronous parent-child interactions may inhibit children's capabilities for engaging in social appropriate interactions with peers (Scaramella & Leve, 2004).

The second part of this hypothesis, pertaining to shared positive affect, was only partially supported. The level of shared positive affect during the play task significantly predicted higher levels of parent-reported social skills, with children from dyads who smiled and laughed together more often being rated higher on social skills. In contrast,



shared positive affect during the structured block task did not significantly predict children's social skills. These mixed results reflect differences in the interactions between the two tasks and will be discussed in depth in the next section. The significant findings however, add to the literature by providing some evidence, that in addition to child compliance and self control (Kochanska, 1997; Kochanska and Aksan, 1995), shared positive affect is positively associated with children's social skills. In contrast, child aggression was once again negatively associated with children's social skills, with mothers rating more aggressive children as less socially skilled. This finding provides further support for the inverse relation between aggression and social skills.

The fifth hypothesis, that shared negative affect would be negatively related to children's social competence, was not supported. Shared negative affect during both tasks did not predict children's social skills. These findings are inconsistent with previous research that has linked shared negative affect in parent-child interactions to more aggressive, unsociable and uncooperative peer interactions (Carson & Park, 1996). However, these conflicting results may reflect differences between mother-child and father-child interactions, as the previous findings involved interactions between fathers and their children. In fact, Lindsey and colleagues (2009) found differences between mother-child and father-child interactions in terms of which behaviors contributed to interactional synchrony, and moreover, differences in the pattern of correlations between synchrony and child adjustment. However, there are few studies that have examined father-child interactions. Therefore, further research is necessary to clarify how mother-child and father-child interactions differ, in and of themselves, and how these differences manifest in differences in child outcome. Although, shared

negative affect did not predict children's social skills, child aggression did account for a significant amount of the variance in mother's ratings. Once again, a significant inverse relation was observed between maternal ratings of children's social skills and child aggression. Specifically, children who were rated as more aggressive were also rated as having less developed social skills.

An additional finding was that family status did not account for a significant amount of the variance in children's social skills, indicating that factors such as mother's marital status and household income may be less consequential in the development of children's social competence than interactional synchrony, shared affect, and child aggression.

#### *Differences in the Interactional Synchrony Variables Between Tasks*

Research indicates that parenting behaviors vary between an unstructured play task and a more structured, goal-oriented task, such as the block task (Davenport et. al, 2007). The sixth and seventh hypotheses examined differences in the parent-child interactions between the two tasks. One previous study (Ambrose & Menna, 2009) investigated this effect specifically with regard to interactional synchrony and found significantly higher levels of interactional synchrony in the play task than in the structured block task. In the present study, the sixth hypothesis, that there would be greater levels of interactional synchrony and shared positive affect during the free play task than the structured block task was only partially supported. Consistent with the findings of past research, the levels of the constituent component of interactional synchrony, shared positive affect, were significantly higher in the play task than the

structure block task. However, contrary to previous findings, there was no significant difference in the levels of interactional synchrony exhibited between the two tasks.

Previous research provides two possible explanations for lower synchrony scores during the block task. First, the block task is more structured and goal oriented, therefore mothers may be more inclined to direct the child and the child may be more inclined to follow the mother's lead, thus throwing off the balance in leading and following (Ambrose & Menna, 2009). The play task, on the other hand, is unstructured and, therefore, may provide a context that encourages more balance in leading and following between partners. Second, children may dislike the structured task or find the task more frustrating and become upset, resulting in a decreased likelihood for shared affect, eye contact, mutual engagement, and balance (Davenport et al., 2008). Mothers too may find the structured task more frustrating, particularly if their child struggles with the task or becomes upset. The play task, in contrast, tends to appeal to both children's and mother's natural enjoyment of play and, thus, may provide increased opportunities for positive aspects of parent-child interaction, such as shared affect and eye contact. By investigating both interactional synchrony and the constituent component of shared affect, the present study provides support for the latter explanation with regard to shared affect. The results indicate that dyads exhibited less shared positive affect during the block task and this may be because the children became frustrated or upset with the task, resulting in fewer opportunities for shared positive affect. However, this explanation does not clarify why no task differences were observed in the levels of global interactional synchrony.

Harrist and Waugh (2002) proposed that interactional synchrony may occur during intervals of non-shared positive affect, such as when one partner expresses negative

emotion and the other responds in a neutral or positive way (Harrist & Waugh, 2002). Thus, shared positive affect may be an important component of interactional synchrony that is indicative of highly synchronous interactions, but is a less adept measure of low or moderate levels of synchrony.

The seventh, and final, hypothesis was that there would be greater levels of shared negative affect during the structured block task than the free play task. This hypothesis was not supported, with no difference observed in the levels of shared negative affect exhibited between tasks. This may seem counterintuitive in light of the results of the third hypothesis, which demonstrate a different pattern of findings between the two tasks. However, an examination of the shared negative affect means for the aggressive and non-aggressive groups reveals a similar pattern of shared negative affect across tasks (i.e., aggressive dyads exhibited more shared negative affect than non-aggressive dyads to a similar degree across tasks) and it was the control of a nuisance variable for shared negative affect during the block task that contributed to the differing results between tasks. One significant implication of the present findings is that shared negative affect may be an aspect of parent-child interaction that is consistent across interaction contexts. Because shared negative affect has been linked to negative child outcome, including child aggression (e.g., Carson & Park, 1996), this consistency across interaction contexts may make shared negative affect particularly detrimental to child adjustment.

#### *Additional Findings*

One of the main objectives of the present study was to expand our understanding of parent-child interactional synchrony through the examination of both global interactional synchrony and the constituent component of shared affect. Thus, the final

analyses involved the examination of the associations between the interactional synchrony variables. Global interactional synchrony was positively correlated with shared positive affect, providing support for shared positive affect as an important aspect of synchrony. However, as previously mentioned, synchrony in mother-child interactions occurred regardless of whether there were high or low levels of shared positive affect, suggesting that shared positive affect may be an important indicator of highly synchronous interactions, but synchrony can occur without the presence of shared affect, as Harrist and Waugh (2002) have suggested. Thus, shared positive affect may not be a strong indicator of moderate or low levels of interactional synchrony.

In contrast, there were mixed findings with regard to shared negative affect. Shared negative affect during the block task was negatively correlated to both interactional synchrony and shared positive affect during the block. On the other hand, shared negative affect during the play task was not correlated to interactional synchrony or shared positive affect for either task. Thus, lower levels of interactional synchrony and shared positive affect, do not necessarily equate to increased levels of shared negative affect or vice versa. Presently, the association between shared negative affect and interactional synchrony is unclear, however there is some evidence that shared negative affect may be a distinct component of parent-child interaction that captures the negative aspects of the interaction that synchrony does not account for. As previously mentioned, aspects of synchrony, such as shared eye contact, turn-taking, mutual engagement and responsiveness, and even shared positive affect, can compensate for negativity during interactions, however these positive interactional qualities may mask some of the negative aspects of parent-child interactions. Moreover, the present findings have

important implications for researchers using measures of interactional synchrony, such as the measure used in the present study (Keown & Woodward, 2002; Mize & Pettit, 1997), wherein the valence of shared affect is unspecified. When valence is not specified, both shared positive and shared negative affect contribute to higher interactional synchrony scores, despite their differing relations to child outcome. Furthermore, not only may shared negative affect be a distinct marker of the quality of parent-child interaction, but it may be an indicator of poor-quality interactions, as indicated by its relation to childhood aggression.

#### *Limitations and Implications for Future Research*

There are several limitations of the current study that should be noted. First, only mother-child, but not father-child, interactions were examined. Despite the original researchers' best efforts, recruiting fathers to participate in the study was unsuccessful. The lack of father-child research is a pervasive problem in the parent-child interaction literature and there have been numerous calls for increased father-child research (e.g., Ambrose & Menna, 2009; Landy & Menna, 2006). This dearth in the literature is of particular concern in light of the fact that the few studies that have managed to recruit fathers have found some evidence that mother-child and father-child interactions differ (e.g., Lindsey et al., 2009). Thus, further research is still needed to determine if interactional synchrony, shared positive affect, and shared negative affect manifest in a similar manner in father-child interactions as in mother-child interactions. As fathers continue to play an increasing role in parenting, examining how fathers contribute to childhood aggression becomes more essential in understanding aggression in early childhood.

In addition, the study of interactional synchrony would benefit from the study of interactions between children and other family members, such as grandparents or siblings. This is an aspect of interactional synchrony that has not yet been explored to the best of the present researcher's knowledge. Further research in this area is needed because synchronous interactions with family members, aside from the child's mother, may act as a protective factor when a child lacks synchronous mother-child interactions.

A second limitation is the overrepresentation of Caucasian families in the study sample, which limits the generalizability of the findings to individuals of different ethnicities. Other cultures may place differing emphasis on aspects of parent-child interaction, such as expression of affect, eye contact, and balance in engagement. In fact, Deter-Deckard and colleagues (2004) found differences in the level of dyadic mutuality (i.e., mutually responsive and emotionally warm parent-child interactions) between Caucasian English dyads and dyads of Indian origin who practiced Hindu religion. Mutuality was higher in both mother-child and father-child interactions of Caucasian dyads and this effect was related in part by acculturation (i.e., years since immigration, native language use, traditional native cultural attitudes). In light of such findings, the study of interactional synchrony and its constituent components would benefit from future research with a more diverse sample in order to aid in the generalizability of the results.

A third limitation is that the study depended solely on maternal ratings of child aggression in order to dichotomize the children into aggressive and non-aggressive groups. Future research on child aggression would benefit from multiple raters across a variety of contexts, such as teacher, peers, or other caregivers.

A final limitation is the nature of the research design. The study was cross-sectional and examined correlations between interactional synchrony, shared affect, child aggression, and social skills. Therefore, the findings are limited in terms of their generalizability and interpretations of causality cannot be made. Longitudinal research could help shed light on the relations of these variables by observing potential changes over time, particularly during times of transition in the parent-child relationship.

#### *Implications for the Treatment of Clinical Aggression*

The results of the present study indicate that clinicians working with a preschool population would benefit from knowledge regarding interactional synchrony and shared positive and shared negative affect in parent-child interactions, as well as the associations of these aspects of parent-child interaction to development of childhood aggression and social skills.

There is growing evidence that parent-child interaction is one of the strongest influences shaping children's problematic behaviors (Davenport & Bourgeois, 2008; Menna & Landy, 2001). Therefore, critically examining parent-child interaction may uncover aspects of the parent-child relationship that may be contributing to children's aggression behavior and poor social skills. For example, a child may present with high levels of aggression and poorly developed social skills, despite parental disciplinary and reinforcement efforts. If a clinician has knowledge of interactional synchrony and the components of synchrony, it might be noted that parent and child often interrupt each other, rarely sustain eye contact when conversing, and often respond to their partner's negative affect with negative affect in turn. These aspects of the parent-child relationship may contribute to the aggressive behavior as a cyclical pattern of negative parent-child



interaction (Scaramella & Leve, 2004). Such a pattern of interaction during early childhood could develop into internal working model and may generalize to interactions with peers outside the family of origin (Lindsey & Mize, 2001; Scaramella & Leve, 2004). This in turn could place the child at increased risk for externalizing problems throughout childhood (Scaramella & Leve, 2004). On the other hand, these aspects of parent-child interaction could provide important targets for intervention. For example, a mother could be coached in ways to improve her interactions with her child, such as taking turns in conversation, making and sustaining eye contact, and learning to modulate her own, as well as her child's, negative emotions. In fact, there is growing evidence that interventions that target parent-child interaction are the most successful (Landy & Menna, 2006; Landy, Menna, & Sockett-Dimarco, 1997).

### *Conclusion*

The findings of the present study provide evidence for the importance of parent-child interaction in the development of childhood aggression and social competence. Specifically, non-aggressive dyads exhibited more interactional synchrony, shared positive affect, and less shared negative affect, than aggressive dyads. In addition, the levels of interactional synchrony, shared positive affect, and child aggression in mother-child interactions predicted children's social skills. Thus, the findings of the present study highlight the importance of markers of the *quality* of parent-child interaction, such as eye contact, shared positive affect, shared focus, and mutual engagement and responsiveness, in child development. Future research should examine child interactions longitudinally, with additional family members (e.g., fathers, grandparents, and siblings) and more culturally diverse populations.

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