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THE ROLE OF SOCIAL INFORMATION PROCESSING IN THE RELATION BETWEEN
INTERPARENTAL CONFLICT AND CHILD AGGRESSION

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of
Philosophy at Virginia Commonwealth University

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Abstract

THE ROLE OF SOCIAL INFORMATION PROCESSING IN THE RELATION BETWEEN INTERPARENTAL CONFLICT AND CHILD AGGRESSION

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A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of
Philosophy at Virginia Commonwealth University.

Virginia Commonwealth University, 2014

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Crick and Dodge's SIP theoretical model proposes that children use previously stored memories, past experiences, and formed representations that influence six mechanisms that are in turn used in deciding how to act in social situations (Crick & Dodge, 1994). Research has demonstrated a strong link between social information processing (SIP) and child aggression. Furthermore, SIP has been shown to mediate the relation between several parenting practices and child aggression. Research has also shown a strong relation between interparental conflict and child aggression. The focus of the current study was to determine if SIP serves as a mediator between parental conflict and aggression in children.

This study conducted secondary analyses of longitudinal data from the Child Development Project. Participants were children, parents, and teachers across three sites and two

cohorts who were recruited as the child participants entered kindergarten. Data were collected across seven waves from child ages 5 through 11. Interparental Conflict was assessed using mother and father reports on the Conflict Tactics Scale and four SIP steps were measured using four paper and pencil measures. Child aggression was assessed by mothers and teachers using the aggression scales on the Child Behavior Checklist and Teacher Report Form, respectively.

Longitudinal mediation models following guidelines outlined by McKinnon (2008) were used to test SIP as a mediator between interparental conflict and aggression. Confirmatory Factor Analysis supported the creation of latent variables for SIP and child aggression. A composite score was calculated and used for interparental conflict in the SEM models. SEM revealed that interparental conflict did not predict changes in SIP or changes in child aggression. For the most part, SIP also did not predict concurrent child aggression or changes in child aggression over time. Direct effects of aggression on interparental conflict, indirect effects of aggression on SIP and of SIP on interparental conflict, and total effects in the models were not significant. The data did not support the hypothesis that SIP mediates the relation between parental conflict and child aggression. Study strengths and limitations and future research directions are discussed.

The Role of Social Information Processing in the Relation between Interparental Conflict and Child Aggression

Both the prevalence rates and negative outcomes of child aggression are alarming. Typically 10-15% of children in school samples display aggressive behavior, making it a common problem in children (Campbell, 1995). Although rates of murder committed by youth are falling, the levels of aggression in children and adolescents remain at historically high levels (Kupersmidt, Bryant, & Willoughby, 2000). Children with aggression issues and related disorders make up one-third to one-half of individuals referred to clinics for children and adolescents, further highlighting the high prevalence of this problem (Atkins et al., 1998). Additionally, children with aggression problems are often at risk for a myriad of negative short-term and long-term outcomes including externalizing behavior problems, violence, adolescent drug and alcohol use, school truancy and dropout, peer victimization, problems with peers, early teenage parenthood, loneliness, and depression (Crick & Grotpeter, 1995; Lochman, Whidby, & Fitzgerald, 2000; Loeber & Farrington, 2000). Even when delinquent behavior beginning in childhood subsides by adolescence, research has suggested that children with aggression remain more likely than their non-aggressive peers to have social, mental health, and vocational problems in adulthood (Moffit, Caspi, Harrington, & Maline, 2002). As adults they may also be at greater risk for violent romantic relationships and administering harsh punishment towards their children (Crick & Grotpeter, 1995). The importance in understanding how and why child aggression occurs becomes quite evident when considering both its high prevalence rates and negative consequences. Knowing such information will be valuable in creating and improving prevention and intervention programs for children with aggressive behavior problems.

A general definition of aggression is a behavioral act that results in hurt or harm to another person (Pettit, 1997). Such behavior is often a symptom or criterion for several childhood mental health disorders including conduct disorder, oppositional defiant disorder, and attention-deficit/hyperactivity disorder (American Psychiatric Association, 2000). An important step in understanding the development of this behavior in children is studying one of the greatest influences in a child's life – their parents. It is posited that a child's mental structures are influenced by early parent-child interactions that subsequently influence a child's relations with others (Rah & Parke, 2007). That is, children learn how to behave in social situations from their early interactions with parents. A number of parent factors have been associated with higher levels of childhood aggression including harsh disciplinary practices, poor parent-child attachment, physical abuse, and interparental conflict (Erickson, Srouffe, & Egeland, 1985; Patterson, Reid, & Dishion, 1992; Shaw & Emery, 1988; Weiss, Dodge, Bates, & Pettit, 1992). The current study focuses on the impact of interparental conflict on the development of aggressive behavior in children.

Over three decades of research have documented a strong link between interparental conflict and children's maladjustment, including a range of externalizing disorders (Grych & Fincham, 1990). For example, marital conflict has been associated with delinquency and antisocial behavior (Emery & O'Leary, 1984), conduct disorder (Jouriles, Murphy, & O'Leary, 1989), and aggression (Johnston, Gonzalez, & Campbell, 1987). However, less understood are the processes that contribute to aggression observed in children from homes with interparental conflict. Fincham (1994) pointed out the need for research to move in the direction of understanding specific familial and individual factors that lead to maladjustment for this group of children. It is likely that multiple factors impact how children adjust to interparental conflict

including children's social cognitive processes (Fincham, 1994). The current study proposes that children's social cognitions mediate the relation between interparental conflict and aggression in childhood. Specifically, Crick & Dodge's (1994) model of social information processing (SIP) was used to explain how aggression develops in children and to determine if social cognitive processes link interparental conflict and aggressive behavior.

Crick and Dodge's SIP theoretical model was designed to explain the development, maintenance, and treatment of child aggression (Crick & Dodge, 1994). The model proposes that children use a stored database of memories, formed representations, and past experiences that influence six different mechanisms when deciding how to behave in social situations. These mechanisms or steps of the SIP model have consistently been found to mediate the relation between parenting factors and aggression in children (Cassidy, Kirsh, Scolton, & Parke, 1996; Dodge, Pettit, Bates, & Valente, 1995; Gomez, Gomez, DeMellow, & Tallent, 2001; Simons, Paternite, & Shore, 2001). A growing body of literature suggests that SIP may also mediate the relation between interparental conflict and aggressive behavior in children. Establishing this mediating relationship can inform preventive and intervention efforts that focus on changing maladaptive social cognitions associated with children from homes with high interparental conflict.

The current study contributes to the existing literature on interparental conflict and child aggression in several ways. First, because the correlation between parental conflict and aggression in childhood has been well established, research focusing on why these relations exist is needed. The current study moved the literature forward by examining potential processes involved in linking parental conflict and aggressive behavior in children using a largely supported theoretical model (SIP model). Second, this study used longitudinal data to more

clearly establish the causal chain between these variables rather than the previous cross-sectional designs that have been commonly used in this area of research. Next, this study addressed limitations in the generalizability of previous research that has examined similar relations by using a large sample that included both boys and girls. Additionally, this study examined social cognitions as a mediator between interparental conflict and aggression in children whereas several other studies have examined cognitions as the link between marital conflict and adolescent's romantic relationships. Further methodological strengths of the current study included the use of multiple reporters rather than relying on single sources of data.

The following sections review relevant literature to provide a background and rationale for the current study. First, findings that have established the link between interparental conflict and child aggression are examined. Next, the social information processing model is explained and previous research demonstrating the relation between SIP mechanisms and child aggression is discussed. Research demonstrating the association between interparental conflict, social cognitions, and child aggression is also reviewed. Gaps in previous research are highlighted to provide the basis for the current study. Finally, study aims and the proposed methods for the study are outlined.

Relation between Interparental Conflict and Child Aggression

Interparental conflict has been consistently established as a parent factor influencing child aggression (Davies & Cummings, 1994). It is a better predictor of child functioning than both global marital satisfaction (Cummings, Kouros, & Papp, 2007) and global marital distress (Johnson & O'Leary, 1987). The large body of empirical research documenting the link between parental conflict and negative child outcomes dates back as early as the 1940's (Baruch & Wilcox, 1944). Early research conducted in this area first demonstrated the association between

parental divorce and child adjustment. It is now known that children from divorced families are at higher risk for a range of internalizing and externalizing behavior including problems with aggression and oppositional behaviors (Amato, 2000; Amato & Keith, 1991). It has been suggested that it is not the act of divorce alone, but the context of the child's experiences surrounding the divorce that may explain an individual's post-divorce adjustment (Hetherington & Stanley-Hagan, 1999).

The family conflict perspective is one theory proposed to explain the negative effects of divorce on children (Amato & Keith, 1991). According to this perspective, it is the conflict between the parents before, during, and after separation that leads to poor child outcomes. This conflict can create a home environment that is less than optimal for the development of the child in several ways. For example, interparental hostility may create increased stress for parents contributing to less effective parenting behaviors. Additionally, children may react with strong negative emotions such as anger, fear, and distress when exposed to interparental conflict. They may frequently become involved in conflict between the parents and feel the need to choose sides. This places greater strain on the parent-child relationship and can deteriorate family cohesiveness. Finally, the family conflict perspective also suggests that when parents model aggressive behavior towards one another, children may not learn appropriate ways for solving conflicts (Amato, 1993). It is in such ways that children's overall exposure to conflict and not merely the act of divorce lead to patterns of aggressive behavior.

Embedded within explanations of the family conflict perspective is social learning theory; this has also been examined as a model to understand how interparental conflict contributes to the development of aggressive behavior in children from divorced families. Social learning theory suggests that when children observe high levels of aggression in others, they may

learn to generate ineffective ways of solving their own problems (Bandura, 1973). Thus, children learn to act aggressively by observing hostile behavior between their parents. Because conflict tends to be high in divorcing families, it is not uncommon for children in these families to be exposed to verbal or physical aggression between their parents (Amato, 1993). These children begin to learn that fighting is an effective technique to use during disagreements; subsequently they may engage in such aggressive behaviors with parents, siblings, and peers among others. Although there may be several aspects of divorce that impact children, the family conflict perspective and social learning theory both focus on interparental conflict as the key factor leading to negative child outcomes. Since research targeted towards understanding the family conflict perspective and social learning theory has emerged, the literature has taken a shift from examining the relation between the act of divorce and child outcomes to examining interparental conflict and child outcomes.

Although divorce often results when extreme forms of marital conflict are present, other parent behaviors along the continuum of interparental conflict can influence child aggression. Children whose parents remain married but display high levels of conflict are two to four times as likely to exhibit behavior problems reaching clinical levels when compared to children from low-conflict or divorced homes (Cummings & Davies, 1994). Additionally, interparental conflict can range from daily minor disagreements to more aggressive verbal and physical arguments (Kim, Jackson, Hunter, & Conrad, 2009). Marital verbal aggression refers to insults and threats between parents. Marital physical violence involves physical harm to a partner and represents the most extreme form of parental conflict. Children who witness intense anger and physical violence between parents are at a greater risk for externalizing behavior than children who witness verbal disagreements (Grych & Fincham, 1993). Though marital physical

aggression has been clearly linked with child aggression, exposure to verbal aggression between parents can also have an impact on the development of behavior problems in children (Cummings et al., 2007). For example, Jouriles and colleagues (1996) found that children exposed to verbal aggression such as threats and insults exchanged between parents demonstrated significant externalizing behavior problems (Jouriles, Norwood, McDonald, Vincent, & Mahoney, 1996). Taken together, the link between interparental conflict and child aggression has been demonstrated across children from varying family structures (children from in-contact homes and children of divorce) and across multiple types of interparental conflict (verbal aggression and physical aggression).

Youth aggression resulting from exposure to interparental conflict may be displayed within different types of interpersonal relationships. For example, several studies have demonstrated that interparental violence is associated with children's levels of peer conflict (McCloskey & Stuewig, 2001) and with violent behavior in youth's own romantic relationships (Desol & Margolin, 2004). A single study of marital violence showed that children's exposure to interparental conflict was related to aggression in multiple relationships including peer-directed aggression, child-to-parent aggression, and aggression in dating relationships (McCloskey & Lichter, 2003).

Researchers have also examined differences in maladjustment that stem from interparental conflict for children of varying ages. Specifically, although children of all ages are likely to experience poor outcomes when exposed to interparental conflict, the form of maladjustment may differ by age. Whereas adolescents in high-conflict homes may be more likely to show internalizing symptoms and dysphoria, younger children tend to demonstrate externalizing problems such as aggressive behavior (Cummings & Davies, 2002). This relation

in younger children was confirmed in a multi-site study conducted by Litrownik and colleagues (2003) that provided evidence for the potential causal effect of interparental conflict on children. Specifically, children exposed to family violence were found to exhibit behavior problems at age six after controlling for child behavior problems at age four (Litrownik, Newton, Hunger, English, & Everson, 2003).

Overall, much progress has been made in the study of interparental conflict and child aggression. Research has moved forward to examine this relation with varying levels of interparental conflict (Grych & Fincham, 1993), with children of different age ranges (Cummings & Davies, 2002), with youth from divorced and in-contact homes (Cummings & Davies, 1994), and in children's aggressive behavior targeted towards both family and peers (McCloskey & Lichter, 2003). In addition, studies have made efforts to include both boys and girls (Grych & Fincham, 1990) as well children of different races (Lindahl & Malik, 1999), thus widening the external validity of findings. Together, this body of work has documented that across these varying factors, interparental conflict is consistently related to higher levels of aggression. This line of research demonstrating the direct link between parental conflict and child functioning has been termed as "first generation research" by researchers in the field (Fincham, 1994).

Within the past few decades, there has been a push for research that explains the processes linking parental conflict and child adjustment. This type of research, termed "second generation research" (Fincham, 1994), calls for new theories to serve as a framework to explain the relation between parental conflict and child aggression (Davies & Cummings, 1994). Although researchers have posed models such as social learning theory to explain the impact of interparental conflict on aggressive behavior in children, they have not provided a

comprehensive explanation of the processes that link these two factors. Widom pointed out the importance of better understanding the pathways through which aggression is transmitted from parent to child stating, “The goal should be to further knowledge of the processes involved...Research should be directed at understanding how these early experiences are related to later violent behavior” (Widom, 1989, p. 165). Thus, researchers studying parental factors such as interparental conflict are encouraged to discover likely pathways that lead to aggressive behavior in children.

To date, there is a paucity of second generation research examining processes involved in the relation between marital conflict and child outcomes. The limited amount of theory-guided research explaining these associations has been identified as a significant gap in the literature (David & Cummings, 1994). One exception has been Grych and Fincham’s (1990) work that used theory-driven research to address this gap. Specifically, they proposed a cognitive-conceptual model that posits that it is the child’s appraisals that mediate the association of parental conflict with child outcomes. They described the appraisal process as the child’s way to understand negative parent interactions and their impact on the family unit (Grych & Fincham, 1990). Studies have linked interparental conflict to such appraisal processes. For example, when hostility and anger during conflict is high, children are likely to experience more negative feelings, have lower self-efficacy for their expectations in the situation, and perceive greater threat (Grych & Cardoza-Fernandes, 2001). Children may also be more likely to blame themselves when conflicts between parents are hostile (Grych & Fincham, 2001).

Several studies have used the cognitive-conceptual model to show how cognitions mediate the relation between interparental conflict and internalizing problems in children. Grych, Fincham, Jouriles, and MacDonald (2000) examined children from a community sample

(ages 10-14) and a sample of children from battered women's shelters (ages 10-12). They found that self-blame and perceived threat mediated the relation between interparental conflict and children's internalizing but not externalizing problems. In a separate study examining 1,893 sixth graders, it was found that perceived threat, coping efficacy, and self-blame were relevant mediators of interparental conflict and child internalizing problems (Gerard, Buehler, Frank, & Anderson, 2005). A handful of additional studies have shown support for Grych and Fincham's model to demonstrate the role of cognitive appraisals in linking parental conflict and child internalizing problems for children of varying backgrounds (Cummings, Davies, & Simpson, 1994; Dadds, Atkinson, Turner, Blums, & Lendich, 1999; Kerig, 1998).

Grych and Cardoza-Fernandes (2001) asserted that appraisals in the cognitive-contextual framework were specifically thought to be linked to internalizing problems, and that future studies should examine whether other cognitions are associated with externalizing behavior problems. They referenced Crick and Dodge's (1994) SIP model, in particular, as a tool that may be used to better understand these relations. Thus, SIP is offered as the mechanism through which this association between marital conflict and child aggression occurs.

Review of the Social Information Processing Model

Crick and Dodge's model of SIP was created to explain the development, maintenance, and treatment of child aggression (Crick & Dodge, 1994). Specifically, their reformulated SIP model attempts to explain how children make decisions to behave in social situations by drawing upon a database of past experiences, memories, and formed schemas. Schemas are defined as the cognitive concepts that help individuals organize and interpret data in their environment. Schemas can be useful in allowing people to take mental shortcuts in order to interpret the large amount of information in the world around them. The SIP model proposes that the database

shapes a child's behavior in social situations as a function of the following steps: 1) encoding of internal and external cues; 2) interpretation of cues; 3) goal clarification and selection; 4) access or construction of possible responses; 5) response evaluation and decision; and 6) behavioral enactment of the chosen response (Crick & Dodge, 1994). Figure 1 shows the mechanisms involved in the revised SIP model.

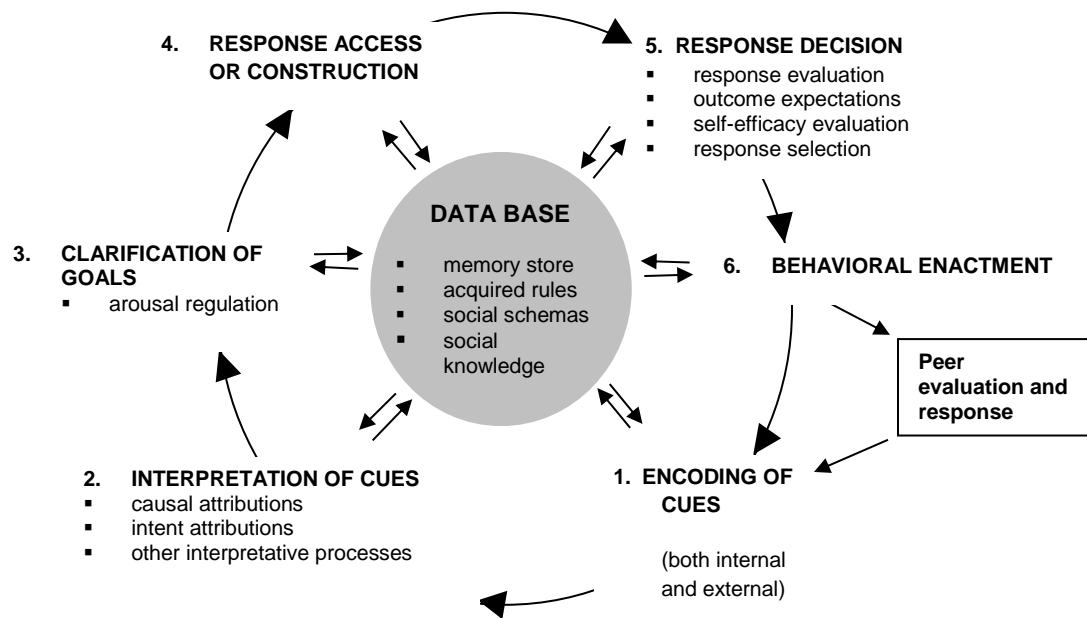


Figure 1. Reformulated Model of Social Information Processing

According to the SIP model, Step 1 involves children selectively attending to specific internal and situational cues and storing this information in short-term memory (Crick & Dodge, 1994). At Step 2, children interpret these encoded cues and may make intent and causal attributions in the situation. Thus, children form impressions of why others in their environment behaved in certain ways and why the outcome of situations happened as they did. During Step 3 of the model, children identify different desired goals or outcomes that they would like to have occur in the given situation. At Step 4, children may access potential behavioral responses from previous social situations stored in memory, or they may construct new ways of behaving in

novel situations. Next at Step 5, children evaluate each response constructed at Step 4 and choose the behavioral response that they view as likely to have the best outcome. Step 6 of the model involves the behavioral enactment of the chosen response (Crick & Dodge, 1994). The database, consisting of previous schemas and memories, is constantly being used to influence a child's decision at each stage of the model.

SIP and the relation to aggressive behavior. To date, most of the social information processing research has centered on clarifying the link between SIP mechanisms and aggressive behavior. Specifically, it has been found that aggressive and nonaggressive children differ from one another in their processing at each of the six steps in the SIP model (Camodeca & Goossens, 2008). Studies of this kind have been replicated with individuals from very early childhood up to adolescence (Arsenio, Adams, & Gold, 2009; Lansford et al., 2006).

At Step 1 of the model, aggressive children attend to fewer social cues, do not pick up on relevant cues, encode less relevant information, and attend to fewer social cues than their nonaggressive peers (Dodge & Newman, 1981; Dodge, Petit, Bates, & Valente, 1995; Dodge & Tomlin, 1987; Matthys, Cuperus, & van Engeland, 1999). Additionally, aggressive children are liable to be hypervigilant to hostile cues when they encode information in social situations (Gouze, 1987).

During the interpretation step (Step 2), aggressive children often have deficits in social reasoning and affect and social perspective-taking (Dodge, 1993). Compared to non-aggressive children, socially deviant children are also more likely to attribute hostile intent in social situations that are ambiguous in nature. This tendency has been termed "the hostile attribution bias" and has been well researched within the SIP literature (Dodge, 1993; Lochman & Dodge, 1994).

Research on the clarification of goals stage (Step 3) has shown that aggressive children tend to endorse more dominance and revenge goals (Lochman, Wayland, & White, 1993) as well as more hostile social goals than other children (Erdley & Asher, 1996). Aggressive children also find the task of managing multiple goals during this step to be especially challenging when compared to their less aggressive peers (Dodge, Asher, & Parkhurst, 1989).

At Step 4 (response access and construction), researchers have examined differences between aggressive and non-aggressive children in both the quantity and quality of behavioral responses generated in social situations. Specifically, aggressive children construct a smaller number of possible behavioral responses than non-aggressors, and they are more likely to generate verbally and physically aggressive responses instead of prosocial responses (Dodge, Petit, & McClaskey, 1986; Matthys et al., 1999). Aggressive children have also been found to be incapable of accessing different kinds of behavioral responses if their initial response is unsuccessful (Rubin, Bream, & Rose-Krasnor, 1991).

Research at Step 5 of SIP (response evaluation and decision) suggests that aggressive children also exhibit more deficits in evaluating and deciding upon responses than non-aggressive children. It has been suggested that aggressive children may not filter out irrelevant or infeasible ways of responding to social situations (Fontaine, 2007). Aggressive children also feel more confident enacting physically and verbally aggressive behaviors than the normative population (Crick & Dodge, 1994; Quiggle, Garber, Panak, & Dodge, 1992). Additionally, aggressive children tend to evaluate violent behaviors more positively than their peers. They may label such behaviors as being more “friendly”, “good”, and “kind” (Crick & Ladd, 1991; Deluty, 1983; Guerra & Slaby, 1989). They may believe that aggression will lead to positive outcomes and that prosocial behavior will lead to less positive outcomes. Aggressive children

also tend to minimize peer rejection, victim suffering, loss of self-esteem, victim retaliation, and other negative consequences of aggressive behavior (Fontaine, Burks, & Dodge, 2002).

Although fewer studies have examined the behavioral enactment step of SIP (Step 6), research has shown that aggressive children lack skills in enacting competent behaviors in social interactions (Dodge, McClaskey, & Feldman, 1985). In contrast, nonaggressive children are more skilled at enacting appropriate behavioral responses (Dodge, 1993).

A large evidence base supports the idea that aggressive children exhibit the maladaptive social cognitive skills represented in the SIP model. The flow of processing and other characteristics of the model are important factors in understanding the relation between parental conflict, SIP, and aggression.

Flow of processing. The revised SIP model proposes that SIP is an “on-line” process in which a child’s cognitive decision making occurs in the moment and in real time. It has been suggested that processing is simultaneous and that children are therefore engaging in several SIP mechanisms at the same time (e.g. they may continue to consider the intent of another person’s behavior during the access response step). Although these processes are simultaneous in nature, it is also proposed that the enactment of behavior still follows sequential steps (Crick & Dodge, 1994). Additionally, each SIP mechanism provides unique information that increases the prediction of behavior (Dodge & Price, 1994). In fact, entering several SIP steps as predictors in a multiple regression leads to better prediction of behavior than analyses using any single mechanism as a predictor. According to Crick and Dodge (1994), all six SIP mechanisms can account for more than 50% of the variance in behavioral outcomes and social adjustment for a child. This finding emphasizes the importance of examining multiple steps rather than any one

SIP mechanism in research to add to the utility of the model in understanding, predicting, and changing aggressive behavior in children.

It is also important to consider the reciprocal nature of the model when examining the flow of social information processing. Specifically, SIP can be examined as a transactional model to understand its dynamic property. A transactional model suggests that a child's development is continuously influenced by interactions between the child and their early experiences (Sameroff, 2009). Viewing SIP as a transactional model can be useful in understanding the complex link between cognitive processes and behavior in a social world that is constantly changing (Fontaine et al., 2002). This view suggests that not only are our experiences with parents and peers integrated into our representations and schemas of past events (the database), but these past events are also incorporated into the mental processes underlying our subsequent behaviors. Thus an individual's database frequently changes to integrate past behaviors into memory and to guide future behaviors (Crick & Dodge, 1994). This implies that the early environment and interactions with parents would subsequently impact the child's database. This could in turn produce social information processing deficits that are linked to aggressive behavior. The transactional nature of the SIP model supports the need to study parent factors such as interparental conflict as they influence SIP and child aggression.

Though an individual's database is continuously modified through new interactions, social-cognitive deficits within the SIP model will lead to patterns of processing that become more automatic and ingrained over time. During the earlier years of life when synaptic pathways are rapidly developing, early experiences may form the basis for neural paths. Using the same response patterns over time may lead to paths that become more rigid and efficient (Crick & Dodge, 1994). This means that early experiences in childhood in which parents play an active

role may be particularly influential in shaping a child's behavior. This supports the importance of identifying and treating maladaptive cognitions and at an early age to prevent aggression in youth.

The SIP model can also be examined to explain the role of social cognitive mechanisms in developing an internal working model for a child. Over time, children integrate experiences from their social world to create an internal working model in accord with their expectations about social situations. These expectations may guide behavior by leading the child to act in a particular way that confirms their ways of thinking about social situations (Sroufe, Egeland, Carlson, & Collins, 2009). Thus aggressive children may continue to act aggressively in new social situations to remain in accordance with their expectations. Parents are also likely to be an influential variable in the development of a child's internal working model during the early years of life, further supporting the need to study interparental conflict in relation to SIP and child aggression.

Subtypes of aggression. Within recent years, researchers have distinguished subtypes of aggressive youths. This includes differentiating proactive versus reactive aggression and overt versus relational aggression. Individuals demonstrating different subtypes of aggression may experience cognitive deficits at varying steps of the SIP model.

The dichotomous model of proactive versus reactive aggression has perhaps received the most attention in understanding SIP skills by aggression subtype. Proactive or instrumental aggression is described as "cold" blooded aggression that is planned and self-motivated and is usually enacted for instrumental reasons such as bullying or object acquisition. Reactive aggression, on the other hand, is characterized as "hot" blooded, angry aggression that is often impulsive and is usually enacted as self-defense or angry retaliation (Fontaine & Dodge, 2006;

Kempes, Matthys, de Fries, & van Engeland, 2005). Research repeatedly shows that reactive aggression is often associated with problems at earlier steps of SIP such as deficiencies in encoding and the presence of a hostile attribution bias (Crick & Dodge, 1996; Dodge et al, 1997; Fontaine, 2008; Kempes et al., 2005). In addition, reactive aggressors often generate more aggressive responses to social situations than non-reactive aggressors (Fontaine, 2008). In contrast, proactive aggression is often related to the latter stages of SIP (i.e. clarification of goals, response access, and response decision). Specifically, children with proactive aggression have been found to select instrumental as opposed to relational goals and were found to have deficiencies in accessing competent responses in social situations. These children also select aggressive responses due to the positive outcomes that they expect enacting aggression will bring (Dodge, Lochman, Harnish, Bates, & Pettit, 1997; Kempes et al., 2005).

In more recent years, researchers have examined SIP mechanisms to distinguish between overt and relational aggression in childhood (Crick, Grotpeter, & Bigbee, 2002; Crain, Finch, & Foster, 2005). Whereas overt aggression describes behaviors in which children do harm through physical damage, relational aggression involves harm through control or damage of relationships (Crick & Grotpeter, 1995). Similar to physical aggression, relational aggression is related to several adjustment problems in children such as internalizing and externalizing problems, peer rejection, and borderline personality features. Evidence for SIP differences in physical and relational subtypes is found in studies showing that relationally aggressive children attribute hostile intent in social situations that are relational in nature. This pattern is not observed in relational aggressors in situations with an instrumental focus (Crick et al., 2002). Children with these two types of aggression also differ in the goals they choose in social situations. Specifically, overt aggressors choose power and control goals while relationally aggressive

children often choose goals involving personal control, avoiding trouble, self-interest, revenge, and maintenance of current relationships in peer groups (Rose & Asher, 1999). Showing differences in cognitive deficits of SIP based on various subtypes of aggression is useful in understanding how groups of aggressive children behave the way they do.

Summary of the SIP model. Social information processing has been well studied to understand the processes that lead children to act aggressively. Children with aggression exhibit more social cognitive deficits within the SIP model than their non-aggressive peers. Assessing and analyzing a greater number of SIP mechanisms results in better prediction of child aggressive behavior. This stresses the importance of studying multiple SIP steps to better understand child aggression. From a developmental standpoint, SIP is often discussed as a transactional model and is related to the formation of an internal working model to understand how early childhood experiences influence the child's later aggressive behavior. Because parents are one of the greatest influences in a child's early life, it follows that they would also impact a child's database and SIP mechanisms as well as the internal working model that is formed over time. Social cognitive processes learned in early childhood become more ingrained over time thus supporting the need for early intervention with children and parents in preventing and treating social cognitive deficits related to childhood aggression.

Developmental Considerations of Interparental Conflict, SIP, and Aggression

There are several developmental factors that should be considered when examining processes influencing aggression in childhood. Age and developmental level may play a role in how much interaction youth tend to have with their parents and peers, how sophisticated their social cognitions may be, and the quantity and quality of aggression enacted. First, developmental level may impact how family factors such as interparental conflict influence SIP

and aggression in children. As previously noted, the child's internal working model is molded by parent-child interactions in the early years, and children may use this internal working model in subsequent interactions with peers. Children tend to spend more time with their family than with peers in the early years of life (Pettit, 1997). As youth age, they spend an increasing amount of time with their peers and less time with the family. From a developmental perspective, this suggests that children may have opportunities for exposure to interparental conflict early; these observations of parents may play a greater role in developing a child's early SIP skills while relationships with peers may play a greater role in adolescence (Pettit, 1997).

Although the impact of developmental level on SIP has not been well researched to date, there is literature suggesting that child development does indeed play a role in SIP (Arsenio, 2010). The child development literature suggests that by as early as three years old, children are able to attribute benign intent in situations with negative outcomes; however, not every child will acquire necessary skills for identifying and encoding cues to attribute benign intent. By early childhood, most individuals have developed important peer competencies including social problem solving. Those children who are developmentally delayed will have problems establishing socially savvy SIP steps (Dodge, 2006; Shultz et al., 2010).

Developmental level may also impact the type of aggression a child exhibits. Researchers have indicated that peer-directed aggression becomes evident around the age of one year old (Pettit, 1997). In the very early childhood ages, aggression in the forms of fighting with peers and having temper tantrums are quite normative and are typically not clinically significant. Occurrences of physical aggression tend to decrease as a child gets older while hostile and verbal aggression often increase. This shift in aggression may have several causes including parent factors, an increase in cognitive abilities, and the development of language in a child. During

middle childhood, aggression becomes more hostile and person-oriented as children are able to use social-perspective-taking skills to deduce intent in individuals and act revengeful towards peers. As a child enters adolescence, levels of covert aggression such as stealing, cheating, and lying, may increase (Pettit, 1997). It is clear that the presentation of aggressive behavior may differ by age of the child. An increase in age may not necessarily translate into a decrease in aggressive behavior, but rather a change in the presentation of aggression. These differences may be explained by changes in the social-cognitive abilities of children and adolescents. Understanding appropriate developmental presentations of aggression will help in identifying children for treatment who may be overly aggressive when compared with their normative peers and in providing psychoeducation to parents on their child's aggressive behavior.

SIP as a Mediator between Interparental Conflict and Child Aggression

Although the link between interparental conflict and childhood aggression has been well established, less is known about the processes through which such conflict influences children (Davies & Cummings, 1994). Just as the cognitive-contextual model has been used to examine cognitions as a mediator between parental conflict and internalizing problems in children, the SIP model may also guide research examining this relation with child aggression as the outcome of interest (Grych & Cardoza-Fernandes, 2001). If parenting factors indeed influence SIP mechanisms in the development of aggression, then alterations in both parental conflict and a child's social cognitive processes should lead to changes in child aggressive behavior. Steps of the SIP model have consistently been found to mediate the relation between various parenting factors and aggression in children. For example, SIP mediates the relation between parent-child attachment, disciplinary style, and child physical abuse with aggression in children (Cassidy et al., 1996; Dodge et al., 1995; Gomez et al., 2001; Simons et al., 2001). A body of research

supports the notion that SIP may also mediate the relation between interparental conflict and child aggression.

A handful of studies have demonstrated the relation between interparental conflict and distorted cognitions in youth without accounting for how this is linked to later aggressive behavior. At a basic cognitive processing level, interparental conflict has been shown to shape how memories are organized to form schemas about interpersonal relationships (O'Brien & Chin, 1998). Specifically, O'Brien and Chin (1998) sought to determine if children whose parents exhibited more conflict within the home would recall more negative cues associated with conflict expression and resolution. Participants in this study were 7 to 12 year-old Latino boys and girls. Children provided ratings of interparental conflict on two independent measures. Participating children also listened to audio taped conflict interactions and were asked questions regarding parental conflict behaviors. Later, they were presented with a series of words and asked to identify which of the words they had previously heard on the questionnaire and tape. As expected, children from higher conflict homes correctly recognized more negatively toned words and were more likely to falsely recognize negative words than their peers from lower conflict homes (O'Brien & Chin, 1998). Children's tendency to recognize negative and aggressive cues most closely taps onto the encoding of cues step (Step 1) of Crick and Dodge's (1994) SIP model. This study represented an early step in the literature towards identifying the cognitive deficits associated with high levels of interparental conflict; however, it presents with several limitations. First, the study only examined Latinos, limiting generalization of findings to this population. Additionally, children were the only reporters of parental conflict without including mother and father reports of conflict; this poses as a threat of reporter bias. This study also examined a single, specific cognitive mechanism related to the encoding of cues step of the

SIP model. It failed to examine additional SIP steps that may prove to be related to interparental disagreements.

Grych (1998) further clarified the ways parental conflict impacts SIP by examining the interpretation of cues step (Step 2) of the model. Participants in this study included 60 seven to twelve year-old boys and girls of varying ethnicities and their mothers. Mothers rated current interparental aggression in their home to establish children's levels of exposure to parental conflict. Participating children listened to audiotaped disagreements between two actors and reported cognitions associated with the interactions. They found that children who were exposed to greater levels of interparental conflict were more likely than children from low conflict homes to interpret audiotaped conflict as more hostile. In addition, they were less optimistic about their ability to cope with such disagreements within their own home (Grych,1998). This added to the O'Brien and Chin (1998) study by showing that interparental conflict is related to additional SIP mechanisms (Step 2). This study, however, was also not without limitations including single source ratings of parental conflict. In addition, the studies by both O'Brien and Chin (1998) and Grych (1998) examined cognitions as they occur in the family environment and not as they occur in social situations with peers.

An additional study conducted around the same time as that of Grych (1998) examined marital conflict as it relates to the response construction mechanism of the SIP model (Step 4) (Goodman, Barfoot, Frye, & Belli, 1999). Goodman and colleagues (1999) recruited 57 boys and girls ranging in age from 10 to 13 and their parents. Both parents rated levels of interparental conflict in the home. Children completed the Alternative Solutions Test requiring them to generate alternative solutions to hypothetical situations involving peer conflict. Overall, parent rated marital conflict was associated with more aggressive solutions generated by children. This

study showed that interparental conflict is also related to the response access construction step of the SIP model (Step 4). Additionally, it was one of the first studies to examine how marital conflict is specifically related to social cognitions experienced within the peer context, rather than those occurring in the family environment (Goodman et al., 1999).

There is also evidence that interparental conflict is linked to the response evaluation SIP mechanism (Step 5). A study by Kinsfogal and Grych (2004) examined this relation and expanded on prior studies by also showing how cognitive appraisals mediate the relation between interparental conflict and later aggression in adolescent's own romantic relationships. Appraisals are defined as "an individual's assessment of a stimulus and its significance to personal well-being" (Kim et al., 2009). It has been suggested that appraisals of a stimulus influence the individual's behavioral response by serving as a lens through which information is sorted. Thus, when an adolescent is exposed to frequent interparental conflict, they may make appraisals that such conflict is normative in romantic relationships. This in turn leads to use of similar aggressive behavior in individuals' own intimate relationships.

Kinsfogal and Grych (2004) explored this pattern of behavior by examining 391 adolescent boys and girls from ethnically diverse backgrounds. Each adolescent rated their parents' interparental conflict, aggression used in their own romantic relationships, and their beliefs about aggression. They found that boys who were exposed to higher levels of interparental conflict were more likely to approve of using aggression in their own dating relationships and had beliefs that aggression was typical in the romantic relationships of their peers. Furthermore, these cognitive influences were also linked to higher levels of physical and verbal aggression directed towards their significant others (Kinsfogal & Grych, 2004). This study represented another step forward in the second generation research by examining the

mediational role of cognitive processes in the relation between parental conflict and later aggressive behavior. This study presented with several limitations similar to that in prior studies including: collection of data from a single informant; use of a cross-sectional design limiting the ability to make causal inferences; and assessment of a single SIP mechanism to examine relations among variables.

To date, very few individual studies have examined multiple SIP mechanisms to evaluate how they impact the relation between interparental conflict and later aggressive behavior in youth. Fite and colleagues (2008) have been one of the few groups of researchers to address this limitation in the literature. Similar to Kinsfogal and Grych (2004), they examined the relation between interparental conflict and later aggression in the individual's own romantic relationships in young adulthood. SIP mechanisms were proposed as the process through which this relation occurred. The study design used a longitudinal dataset to examine these relations. A large sample of children and families were recruited for the study as the children entered kindergarten. When the children were five, mothers' and fathers' ratings of interparental conflict were gathered. Four out of the six SIP mechanisms were assessed when the children were 13 and again at age 16. Self-report of the offspring's conflict in their own romantic relationships was assessed annually from ages 18 through 21. It was found that response generation and evaluation (Steps 4 and 5) mediated the relation between interparental conflict in early childhood and aggression in romantic relationships in young adulthood (Fite et al., 2008).

There were several strengths evident in the Fite et al. (2008) study including use of a longitudinal design, examination of multiple SIP mechanisms, and inclusion of multiple reporters to gather ratings of interparental conflict. Additionally, this study used structural equation modeling (SEM) to test mediational models in examining relations among variables.

SEM is a more sophisticated way of measuring mediational effects than using regression analyses as has previously been done. Though this study greatly contributed to understanding the processes that link interparental conflict with later aggressive behavior in offspring, the study focused on aggression in later dating relationships as the outcome of interest. The mediational role of cognitive process has been less closely researched in understanding the impact of parental conflict on the development of aggressive behavior in childhood. A shift is needed from examining how marital conflict influences social cognitions in adolescents' romantic relationships to also examine how it impacts social problem solving in children's peer relationships.

Only one study was found that examined children's social cognitions as a mediator between interparental conflict and child aggression. In this study, Marcus, Lindahl, and Malik (2001) collected data from 118 seven to thirteen-year old children and their mothers and fathers. Mothers and fathers reported on their levels of interparental conflict as well as levels of aggression for their child. Teachers also rated the aggression of each participating child. Children in the study completed social cognition measures to assess the response generation and response evaluation SIP steps. Results supported a mediational model in which social-cognitive skills accounted for the relation between interparental conflict and teacher-rated, but not parent-rated aggression. This study was the first to examine a true mediation model using social cognitions to explain the relation between parental conflict and aggressive behavior in childhood; however, the study had several key limitations. First, the study primarily focused on the response generation and evaluation step of the SIP model and did not address additional SIP mechanisms that have been consistently linked to aggressive behavior in children. Such aggressive cognitions were examined together rather than separately, thus the individual impact

of each step assessed was not examined. Additionally, cross-sectional data were used making it difficult to establish causal and directional effects. Longitudinal data would enhance the confidence with which an individual could establish directionality and make causal links in relations (Marcus, Lindahl, & Malik, 2001).

Statement of the Problem

Aggression is a common behavior problem among children, and it is linked to an array of short-term and long-term problems. There is a need to understand why aggressive behavior occurs in order to improve treatment and prevention efforts targeted towards children with aggression and those at risk for such behavior. There is a large evidence base supporting the relation between interparental conflict and aggressive behavior in youth (Cummings & Davis, 1994). Less is understood about the processes linking these variables. Due to a paucity of research in this area, researchers have begun stressing the need to examine these potential processes, which has led to a shift of focus in research (Davies & Cummings, 1994). In the youth depression literature, the cognitive-contextual framework has been used to explain how cognitions may account for the relation between parental conflict and depressive symptoms in children. Similarly, it may be the case that social cognitive mechanisms also mediate the relation between parent disagreement and aggressive behavior (Grych & Cardoza-Fernandes, 2001).

The social information processing model provides a valuable framework for examining social cognitive mechanisms in this line of research. The SIP model explains how children behave aggressively as a function of their database and processes represented in six steps (Crick & Dodge, 1994). An abundant amount of research shows that the six steps of the SIP model are associated with aggressive behavior in children (Camodeca & Goossens, 2008). Additionally, whereas each step individually predicts aggression, predictability of aggressive behavior is

increased as more steps are assessed and analyzed. SIP has been examined as a mediator between several parent behaviors (e.g. parent disciplinary practices, parent-child attachment, and parent abuse towards children) and aggressive behavior in youth (Cassidy et al., 1996; Dodge et al., 1995; Gomez et al., 2001; Simons et al., 2001). It is also possible that SIP mediates the relation between interparental conflict and child aggression. A review of the literature provides support for this relation including studies linking interparental conflict and social cognitive deficits as well as more limited research that has specifically examined social cognitive processes as a mediating variable. Although these studies provide valuable information in better understanding family factors associated with child aggression, they present with several limitations and have left many questions unanswered in studying these relations.

A review of the limitations of previous studies in this area of research reveals several themes. One such theme concerns how the variables within these studies have been measured. For example, the assessment of interparental conflict has been flawed in several ways. Some of the previously discussed research has used youth report only or ratings from a single parent to assess interparental conflict (Davies & Cummings, 1994). Failing to gather information from multiple reporters causes obvious problems as one parent's ratings or single child ratings may not accurately reflect the level of interparental conflict within the home. Additionally, interparental conflict is often assessed at different points in the child's development without addressing a child's early exposure to marital disagreement.

Further problems in assessment include issues related to the measurement of SIP. Many studies have failed to assess multiple steps of the SIP model. Such studies have typically examined single SIP steps and only a few studies have measured even two SIP steps. For example, the Chin and O'Brien (1998) study was important in demonstrating how interparental

conflict is related to the encoding of cues, but it did not provide information on the other SIP steps. This limitation is particularly concerning when considering that previous studies have found that the more SIP mechanisms measured, the greater the predictability of behavior (Crick & Dodge, 1994). Additionally, measuring multiple SIP steps together within the same model within a given study can also pose a threat by making it difficult to determine which SIP mechanisms impact the relation between interparental conflict and child aggression. Researchers should consider measuring SIP mechanisms both together and within separate models to disentangle the mediational role of each.

In measuring SIP, researchers should also take into account which theoretical model of cognitive processing will guide how cognitions are assessed according to the specific outcome of interest. For example, Grych and Cardoza-Fernandes's (2001) cognitive-contextual framework has been used to examine how children's perceptions and appraisals of parental conflict are related to internalizing problems; however, cognitions as defined and assessed according to this framework have not been consistently linked to externalizing behavior problems. Perhaps this is because the cognitive-contextual model examines self-attributions such as self-blame to understand how youth make sense of their parents' conflict with one another (Grych & Cardoza-Fernandes, 2001). Such distorted cognitions about the self are commonly linked with depressive disorders. In comparison, the SIP model outlined by Crick and Dodge (1994) examines cognitions related to children's perceptions of other individuals in social situations. These cognitions are consistently predictive of aggressive behavior. Thus, the SIP model (1994) provides a better fit when examining social cognitions as a mediator between parental conflict and aggression and should be used in research examining such relations.

Current ways of measuring child outcomes within this body of literature also pose a limitation. First, studies have frequently used global measures of externalizing behavior in youth, which may present a threat to internal validity when attempting to specifically measure aggression (Davies & Cummings, 1994). When using global measures of externalizing behavior it is unclear what specific effects interparental conflict and SIP mechanisms have on youths' functioning as this may differ across domains of behavior. In addition, some previous studies have used single reports of child aggression, failing to reduce reporter bias by gathering data from multiple sources (Davies & Cummings, 1994).

In addition to assessment limitations, other methodological concerns are present within the current line of research. This includes sample limitations such as focusing exclusively on adolescents, boys or one ethnic group (Davies & Cummings, 1994). This limits generalizability of findings making it difficult to extend results of research to other populations of interest. The use of cross-sectional data also presents a limitation in establishing order effects or the stability of aggression over time. Longitudinal research is needed to better examine causality and directionality of effects. Furthermore, it can allow for hypotheses that are based on developmental level of the sample of interest.

Researchers have made several promising discoveries in better clarifying the family's impact on the development of aggression in children; however, there are numerous limitations within the current line of research resulting in great room for growth in the literature. The present study built upon previous research while addressing limitations of past studies.

The Present Study

The purpose of this study was to examine whether interparental conflict can predict children's SIP and whether SIP variables in turn mediate the relation between parental conflict

and aggression in childhood. Understanding this relation can help to explain the process through which marital conflict impacts aggressive behavior in childhood. This information may be used to improve treatments designed to decrease child aggression, particularly in families with high levels of parental conflict.

The current study explored four hypotheses. First, it was hypothesized that parent report of interparental conflict would increase a child's risk for later aggressive behavior in childhood. Secondly, it was hypothesized that interparental conflict would predict the development of SIP deficits. Specifically, it was predicted that high levels of parental conflict would be associated with greater social cognitive maladaptations in the encoding of cues (Step 1), interpretation of cues (Step 2), response access and construction (Step 4) and response evaluation and decision (Step 5) mechanisms of the SIP model. Next, it was hypothesized that maladaptive processing patterns would predict child aggressive behavior in that individuals with greater SIP deficits would also have higher levels of child aggression. Finally, it was believed that SIP would mediate the relation between interparental conflict and later child aggression.

Previously collected data from the Child Development Project (CDP) were used to examine study aims and hypotheses. The CDP is a multisite longitudinal study with core goals of identifying life experiences that influence a child's social cognitive processes and later externalizing behavior problems. This project has tracked the development of 585 children from three different sites representing two cohorts that were recruited in 1987 and 1988. The project is currently in its 25th year of data collection with annual data being gathered from child participants, parents, teachers, and others, in addition to data from school and court records.

The study aimed to address several key limitations of previous research. First, it was designed to improve upon assessment of targeted variables by including multiple reporters for

both interparental conflict and child aggression. Specifically, mother and father reports of interparental conflict were collected as well as parent and teacher ratings of aggression. This reduced confounds associated with shared method variance and rater bias and provided better measures of latent variables representing the constructs of interest. Interparental conflict was measured in the child's early years to determine how early exposure to conflict impacts children at later time points. Aggression was measured several years later to determine the impact of parental disagreement on aggressive behavior and provide a clearer test of directionality.

The study also improved upon previous research by examining multiple mechanisms of the outlined SIP model. In particular, it examined SIP steps as mediators both individually and in a combined model to better clarify specific processes that explain the well-established relation between interparental conflict and aggressive behavior. It also used Crick and Dodge's (1994) SIP model to explain this link rather than theories that have shown a better fit for understanding depressive symptoms in youth such as the cognitive-contextual framework.

This study was designed to fill important gaps within the literature. In particular, it examined child aggression as the outcome of interest in contrast to other studies that have typically examined adolescents' aggressive behavior in later romantic relationships (Fite et al., 2008; Kinsfogal & Grych, 2004). In contrast to previous studies that have examined the impact of parental conflict on aggression using global measures of a child's functioning such as externalizing problems or a combination of externalizing and internalizing problems (Davies & Cummings, 1994), this study focused more specifically on aggression. This allowed for specification of the influence of interparental conflict on aggression rather than on externalizing behavior more broadly.

Additional strengths of the current study involved the inclusion of both boys and girls in the sample. This improved generalization of study findings to a larger group of children. This study also made use of longitudinal data which provided a basis for determining the temporal order and stability of factors. Finally, the current study used advanced statistics to provide a more sophisticated examination than has previously been done in the literature. Specifically, structural equation modeling (SEM) was completed using Mplus and longitudinal mediation models were tested following guidelines of MacKinnon (2008). This presented several advantages. SEM allows for the creation of latent variables in order to study the link between constructs based off of observed behavior. Furthermore, MacKinnon's (2008) model of mediation focuses on establishing the magnitude and significance of indirect effects to test for mediation. This is advantageous because it provides a direct test of mediation.

Method

Participants

Participants and their families were part of the multisite longitudinal Child Development Project (see Dodge, Bates, & Pettit, 1990; Pettit, Bates, & Dodge, 1997). Participants were recruited from Knoxville and Nashville, Tennessee and Bloomington, Indiana across two cohorts as the child participants entered kindergarten. Children and parents were recruited by research staff who approached parents at random during pre-registration for kindergarten and invited them to participate in the study. Because approximately 15% of children attending target schools did not pre-register for kindergarten, recruitment efforts for these children took place on the first day of school. Only one child per family was eligible for participation. Around 75% of the families that were approached agreed to participate. The original sample of both cohorts included 585 families. About half (52%) of the children were boys. European Americans comprised 81% of

the child sample, 17% were African American, and 2% reported as “other”. Hollingshead (1979) socioeconomic scores were calculated based on parental occupation and education level. Hollingshead socioeconomic scores when children entered kindergarten ranged from 8 to 66 with a mean of 29.5 (SD = 14.0); thus, families ranged from the lower to upper class with most families falling in the upper-middle class range. At the first wave of data collection, around 61% of families reported that the child’s biological parents were married, 6% reported that they were married to someone other than the child’s biological parent, 2% reported that they were cohabitating with a partner, 25% reported that they were single parents, and 6% did not report their marital status. Data indicating if parents were separated or divorced at the first wave of data collection were not obtained. Participants completed annual assessments until the child age was 11 years old. Seventy seven percent of the original sample participated in this last wave of data collection; thus retention rates were good. Participants involved in the last wave did not significantly differ from the original sample by gender, race, or SES.

Procedures and Measures

Participants were recruited from two cohorts. At the first wave of data collection, participating parents and children completed interviews in their homes the summer before the child’s kindergarten year (child age 5). The Conflict Tactics Scale was administered to parents if the parent had a partner, regardless of marital status with the partner (e.g. married, cohabitating but not married); thus, the partner reported on by the target child’s parent was not always the child’s biological parent. Additional SIP interviews were conducted when children were 6, 7, and 8 years old. Mothers and teachers completed questionnaires (regarding aggression) annually when the child was between ages 5 and 11. At each wave after Wave 1, parents also indicated whether they had gotten divorced/separated or married/remarried within the last year. At each

wave, children were given small, age-appropriate toys, and parents and teachers received modest financial compensation for participation. Parents were asked to provide multiple updated forms of contact information (e.g. address, phone number). Between waves, participants were mailed newsletters, birthday cards, and other correspondence, and forwarding information was requested from the post office to facilitate tracking families' addresses over time. Participants were contacted just prior to each wave to schedule interviews at which point they were asked to contact the research team if their phone numbers had changed.

Interparental conflict.

Conflict Tactics Scale (CTS; Straus 1979). Mothers and fathers completed selected items adapted from the CTS during parent interviews conducted at Year 1. The CTS is a measure commonly used to assess conflict between partners who are dating, cohabitating, or married. Items assess indirect hostile behaviors (e.g., stomped out of the house), verbal aggression (e.g., swore, insulted, or yelled), and physical aggression (shoved, grabbed, or pushed). During the interview, mothers and fathers were separately asked how often they engaged in particular behaviors towards their spouse and how often their spouse had directed such behaviors towards them. Parents reported how often these behaviors occurred both in the past year (child approximate age 4 to 5) and in the 4 previous years (child approximate age 0 to 4). The two cohorts recruited in this study received slightly different versions of the CTS. Differences included the number of items administered with 14 items included in the version completed by Cohort 1 versus 17 items administered to Cohort 2. To provide a consistent measure across cohorts, ten items that appeared on both versions of the measure were used in the current analyses. These items were chosen because of their good psychometric properties (Straus, Hamby, Boney-McCoy, & Sugarman, 1996) and because they were used in other studies

that employed the CDP data to examine interparental conflict (Lansford et al., 2008; Yu, Pettit, Lansford, Dodge, & Bates, 2010). Most of these ten items are identical or similar to a subset of items found on the Psychological Aggression Scale and Physical Assault Scale on the Revised Conflict Tactics Scale (Straus, Hamby, Boney-McCoy, & Sugarman, 1996). The rating scales also differed by cohort. Cohort 1 rated items using a 6-point scale (0 = never, 1 = once a year, 2 = 2-3 times a year, 3 = less than once a month, 4 = once a month, 5 = more than once a month), whereas Cohort 2 used a 7-point rating scale (0 = never, 1 = less than once a month, 2 = once a month, 3 = 2-3 times a month, 4 = once a week, 5 = 2-3 times a week, 6 = almost every day). Ratings on these measures were recoded to a 4 point scale (0=never, 1 = less than once per month, 2 = about once per month, 3 = more than once per month) to provide comparable scores across cohorts. Data collected from the two cohorts were combined to comprise Wave 1 parental conflict data. Eight subscales of the CTS measure were created to serve as indicators representing mother's and father's reports of conflict behaviors directed towards their spouse and received from their spouse within the past year and the four previous years. These indicator variables were used to create a CTS latent variable. Due to poor fit of the CTS latent variable, a composite CTS score was also calculated by taking an average of all the CTS items. The range of potential scores for the CTS composite variable was 0 to 4.

Social information processing. Children were administered SIP measures in their homes during the summers prior to kindergarten and when they were in first through third grades (ages 5, 6, 7, and 8). The current study assessed four out of six SIP steps included in Crick and Dodge's (1994) revised SIP model including: Step 1) Attention to and encoding of cues, Step 2) Interpretation of cues, Step 4) Response access or construction, and Step 5) Response evaluation.

A total of four instruments was used to assess SIP, and some single steps were measured across several of these four instruments.

Video Stories: Social Information Processing. Children were presented with video stimuli consisting of 24 vignettes on a television monitor (as described in Weiss, 1992). Each vignette lasted approximately 30 seconds and included a child actor who engaged in social situations with peers that involved a negative outcome. Half of the vignettes involved a peer provocation (e.g. being hit in the back with a ball) and the other half involved being criticized during a peer entry attempt. The intent of the peer provocateur in each vignette varied as either benign, hostile, or ambiguous. Pilot testing was conducted with 10 girls and 10 boys to establish that the videos were age relevant and interesting. Additionally, 20 male and 20 female adults assessed whether the intent of the peer provocateur was clear in each vignette, with more than 75% of adults indicating this was the case. Three different sets of the 24 vignettes were constructed to avoid confounds between the actor and type of intent portrayed. The order of presentation of vignettes was block randomized within each set across type of peer intent (benign, hostile, or ambiguous) and type of situation (provocation or peer entry). When presented with each vignette, the child participant was asked to imagine being the protagonist. After the vignette ended, children were provided with a series of follow up questions to assess steps 1, 4, and 5 of the SIP model.

Attention and encoding of cues (Step 1) was assessed by asking the child to recall what happened in the story immediately after the video was stopped. The interviewer recorded these responses and scored them as fully relevant (0), partially relevant (1), or fully irrelevant (2). Responses were coded as fully relevant if the child reported cues in the video that were linked to the interpersonal exchange between characters in the story. Fully irrelevant responses involved

reporting cues that were not depicted in the story or that had no relation to the interpersonal actions of the characters. Partially relevant responses included reports of both relevant and irrelevant cues or limited reports of relevant cues. Interrater agreement in previous studies measured with this sample exceeded a kappa of .80 (Weiss et al., 1992). An encoding score was calculated by averaging response scores across the 24 vignettes (24 items).

To assess response access or construction (Step 4), children were asked how they would respond in the situation if they were the protagonist in the story for the 24 vignettes. Responses were recorded by the interviewer and later coded as either passive-inept, assertively competent, or aggressive. Responses were coded as passive-inept if they included doing nothing, running away, crying, or another passive action that would not likely lead to a good outcome.

Assertively competent responses included prosocial compliments, bargaining, verbal appeals, and other behaviors that would likely lead to a positive outcome. Aggressive responses included name calling and verbal abuse, physical violence, and statements to their teacher to punish the peer in the story. A previous study using such scoring criteria reported kappa for interrater agreement exceeding .80 (Weiss et al., 1992). A response access score was calculated by determining the proportion of aggressive responses to total responses across the 24 items and standardizing the score.

Step 5, or response evaluation of aggression, was measured by presenting children with three potential behavioral responses that were depicted by the child actors. Responses offered included passive-inept, assertively competent, and aggressive behaviors. Each child was asked to evaluate each response using a pictorial rating scale ranging from 1 (very bad) to 4 (very good). Internal consistency scores for aggressive responses across the 24 vignettes for each video version have been high in previous studies using this sample and measure (α s = .86 to .92)

(Dodge et al., 1995). A general endorsement for aggression score was calculated by dividing the endorsement score for aggressive behavior by the sum of scores for all three behavioral responses (24 items).

Home Interview with Child. Children were presented with eight hypothetical cartoon stories in which a negative outcome occurred (peer provocation and peer entry attempt stories). One such vignette reads as follows: “Pretend that you are standing on the playground playing catch with a kid named Todd/Jessica. You throw the ball to Todd/Jessica and he/she catches it. You turn around, and the next thing you realize is that Todd/Jessica has thrown the ball and hit you in the middle of your back. The ball hits you hard, and it hurts a lot.” To assess the interpretation of cues (Step 2), children were asked to report how and why the peer in the story behaved the way they did. Responses were recorded and the interviewer scored each as benign intent (0) or hostile intent (1). Past studies have documented interrater reliability as high. That is, coders agreed 98 percent of the time on whether a response was benign or hostile in intent (Dodge, Pettit, McClaskey, & Brown, 1986). A hostile attribution score was calculated by taking the proportion of hostile intent responses to the number of total responses provided regarding the peer’s intent (8 items).

Step 4 was assessed using this measure by asking each child to indicate what he or she would do if they were the protagonist in the cartoon. Responses were immediately recorded and scored on a continuum of increasing aggressiveness responses as follows: do nothing (1), ask why it happened or ask again (2), give the peer a command (3), appeal to an adult to punish the peer (4), and aggressively retaliate against the peer (5). These ratings on the Home Interview with Child have been considered as a continuum from least aggressive to most aggressive responses in previous studies with adequate ICC’s ($\alpha = .76$) (Dodge et al., 1995; Pettit, Dodge, &

Brown, 1988). An average score was calculated across the eight cartoon stories and standardized to establish a second score of response access and construction (8 items).

Social Problem Solving Measure. Children were presented with another set of eight hypothetical cartoon stories involving social problems. Each story involved a child causing a different social dilemma. For example, one dilemma is presented as follows: “Pretend that this is YOU and that this is KATHY/DANNY. KATHY/DANNY is the same age as you, _____ years old. KATHY/DANNY has been on the swing for a long, long time and doesn’t seem to want to share the swing with you. YOU would really like to play on the swing.” The child participant was asked to generate as many solutions to the story that they could (up to 8). The interviewer recorded each response and coded it as passive-inept, assertively competent, and aggressive. Interrater reliability in a previous study using this same sample was found to be high with a kappa of .84 (Dodge, Pettit, Bates, & Valente, 1995). The proportion of aggressive responses to total responses was calculated to constitute a third assessment of Step 4 (8 items).

Things That Happen to Me. The last SIP measure was adapted from Crick and Ladd (1990) to provide an additional assessment of Step 5 (response evaluation). Each child was presented with four hypothetical vignettes describing a social problem (peer provocation), and three possible responses (passive-inept, assertively competent, and aggressive) were depicted in random order. An example of a vignette on the measure is “You ask a kid you know, named Mark/Tina, to watch cartoons one Saturday morning. After about ten minutes, Mark/Tina changes the channel without asking.” Each child was asked to respond to three questions to each vignette using a four point scale. The three questions included: 1) Asking the child if their response would lead to a positive instrumental outcome (e.g. “Would the peer change the channel back?”). Responses ranged from *never* to *just about all the time*; 2) Asking how often

the response would lead to a positive interpersonal outcome (e.g., “Would the peer like you?”). Response options ranged from *not much* to *a lot*; and 3) Asking “How difficult would it be for you to do or try this response?” Responses ranged from *very hard* to *not hard at all*. An average score was calculated for responses to questions one and two across the four vignettes to determine a score for anticipated social consequences (8 items). Average responses to question three were calculated for a self-efficacy for aggressing score (4 items). Kappa values as calculated across vignettes in a previous study with this sample ranged from .69 to .77 (Dodge et al., 1995).

Scoring of SIP Measures. A SIP score was calculated at each wave (ages 5, 6, 7, and 8) for each of the four SIP steps assessed. The items and measures comprising each step were as follows: Step 1: Average of the 24 relevance items from the Video Stories: Social Information Processing measure (potential range of scores was 0 to 2). Step 2: Average of the 8 hostile attribution items from the Home Interview with Child measure (potential range of scores was 0 to 1). Step 4: The response access items from the Video Stories: Social Information Processing measure (24 items), 8 items from the Home Interview with Child measure, and the 8 items from the Social Problem Solving Measure were combined and scores were standardized ($M = 0$; $SD = 1$). Step 5: The response evaluation items from the Video Stories: Social Information Processing measure (24 items) and the 12 items from the Things That Happen to Me scale were standardized and averaged ($M = 0$; $SD = 1$).

Child aggression.

Child Behavior Checklist (CBCL; Achenbach, 1991). The CBCL is a widely used parent report measure of child behavior that assesses common internalizing and externalizing problems in children ages 4-18. Mother’s completed the CBCL at child ages 5 through 11. They

were asked to rate the child's current behavior on 113 items using a 3-point scale ranging from "not true" (0) to "very true or often true" (2). The current study used items from the 1991 version of the CBCL which has been normed with a sample comprised of 2,368 children in the U.S. ages 4 to 18 (Achenbach, 1991). The raw scale score from the Aggressive Behavior Scale of the CBCL was used to measure child aggression which allowed for changes to be seen over time, regardless of child age. The possible range of scores on the aggression raw scale score is 0 to 40. The aggression scale consists of items including the following: "Argues a lot", "Destroys his/her own things", "Disobedient at home", "Threatens people", and "Gets in many fights". The aggression scale's one-week test-retest reliability in the 1991 normative dataset was .91.

Teacher Report Form (TRF; Achenbach & Edelbrock, 1986). Kindergarten through sixth grade teachers rated participating children's behavior on 112 items from the TRF of the Child Behavior Checklist. Twenty five items comprising the Aggression Behavior Scale were used to assess teacher-rated aggression at child ages 5 through 11. Items comprising the measure include "Disobedient at school", "Temper tantrums or a hot temper", and "Cruelty, bullying, or meanness to others". This scale's one-week test-retest reliability is considered good at .90 (Achenbach & Edelbrock, 1986). Raw scale scores were used for analyses in the current study which allowed for changes to be seen over time, regardless of age. The possible range of scores on the aggression raw scale score is 0 to 50.

Analyses

Descriptive statistics were calculated to identify outliers and examine the distribution properties of each scale. A missing data analysis was conducted to determine any patterns among missing data. Correlations among the parental conflict variables, SIP scales, and aggression scales were also calculated and guided the creation of latent variables.

Mplus was used to test SIP as a mediator between interparental conflict and child aggression. Analyses were based on longitudinal mediation models following guidelines outlined by MacKinnon (2008). MacKinnon's criteria for examining mediation are in some ways similar to Baron and Kenny's (1986) basic principles of mediation. Baron and Kenny (1986) proposed that to establish full mediation, one must first demonstrate that a significant relation exists between the independent and dependent variable. In addition, the independent variable must have a significant relation with the mediating variable(s) of interest. Each mediating variable must also be significantly related to the dependent variable while controlling for the independent variable. Lastly, the relation between the independent and dependent variable should no longer reach significance when controlling for each mediator (Baron and Kenny, 1986).

MacKinnon argued that it is not necessary to establish all of the relations outlined by Baron and Kenny (1986) to demonstrate mediation. Specifically, he contended that it is not necessary to find a significant relation between an independent variable and dependent variable to test for mediation within a model. Instead, it is the magnitude and significance of the indirect effects that are essential in a mediational model (MacKinnon, 2008). Thus, the current study did not require that the relation between interparental conflict and child aggression be firmly established to determine whether SIP is a mediator within this relationship. The focus lies on the magnitude and significance of the indirect effects in the mediation models.

Prior to testing for mediation, confirmatory factor analysis (CFA) was used to test measurement models specifying relations between observed variables and constructs of interest. For example, a CFA was used to determine if each SIP step could be represented by a latent variable based on measures of that step at ages 6, 7, and 8.

A combined model with all four SIP variables of interest was run to determine the total indirect effects and to examine whether the combined SIP steps mediated the relation between interparental conflict and child aggression. Separate models were also run with each of the four individual SIP variables to evaluate the impact of each SIP step in the mediation model. Two sets of models were used to represent patterns of relations between the mediators and child levels of aggression over time (see Figure 2 and Figure 3). Model 1 (Figure 2) examined SIP steps at Time 2 as a mediator between interparental conflict at Time 1 and child aggression at Time 3 while controlling for SIP and aggression earlier in the child's life. Model 2 (Figure 3) was similar, but it examined child aggression as the outcome variable at Time 2, concurrently with the SIP variables. This model assumed that SIP variables exert a more immediate impact on child aggression as a mediating variable. Models 1 and 2 are outlined in more detail in the following section. A measurement model was analyzed in Mplus for Models 1 and 2 to determine if they were a good fit for the data. Structural models were then examined to test the direct effects, indirect effects, and total effects for each model. Paths were examined to determine if the indirect effects between CTS and SIP variables and between SIP and child aggression were significant.

The fit of each of the measurement and structural models outlined were evaluated using the comparative fit index (CFI) and root mean square error of approximation (RMSEA). Tabachnick and Fidell (2001) outline that $CFI > .95$ and $RMSEA < .08$ are considered a good fit for the model. These criteria were used in the current study to determine model fit.

Time 1 (Wave 1)

Time 2 (Waves 2, 3, 4)

Time 3 (Waves 5, 6, 7)

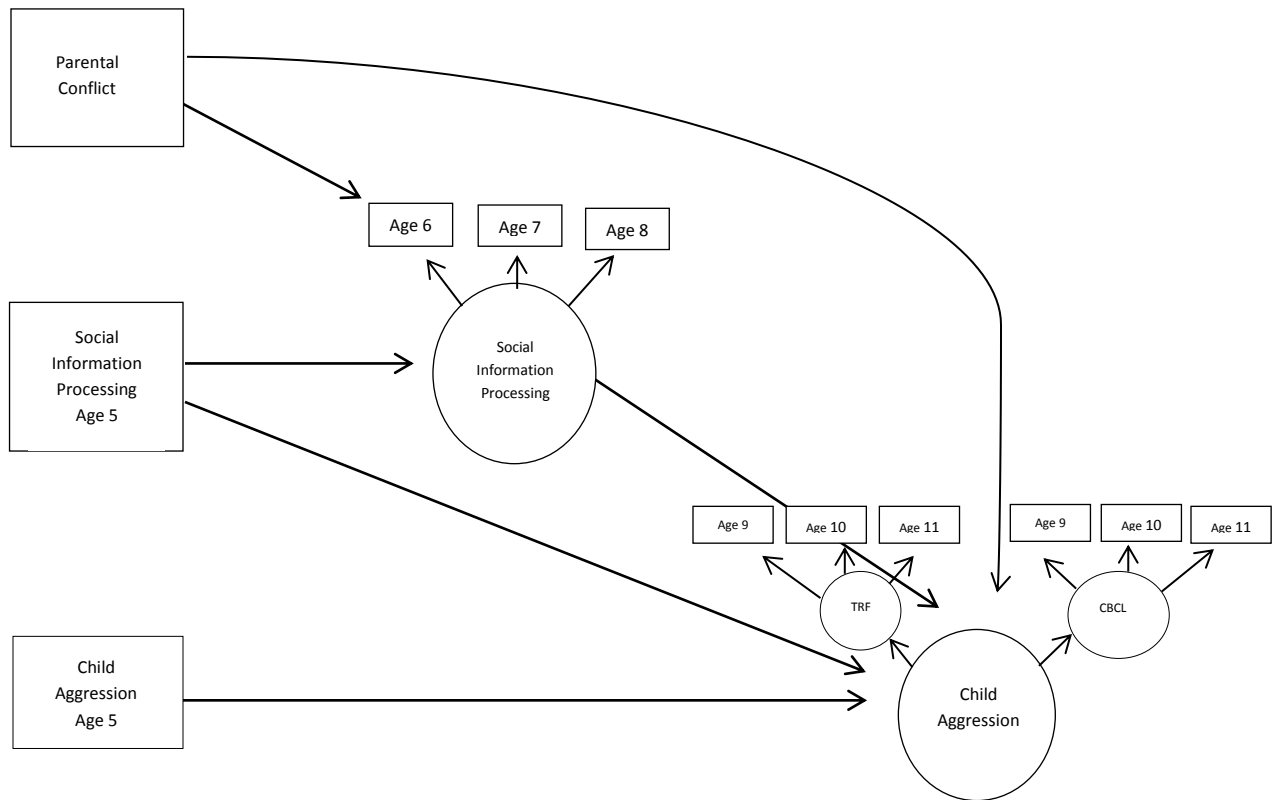


Figure 2. Longitudinal mediation model testing individual social information processing steps as a mediator between parental conflict and child aggression across three time points.

Time 1 (Wave 1)

Time 2 (Waves 2, 3, 4)

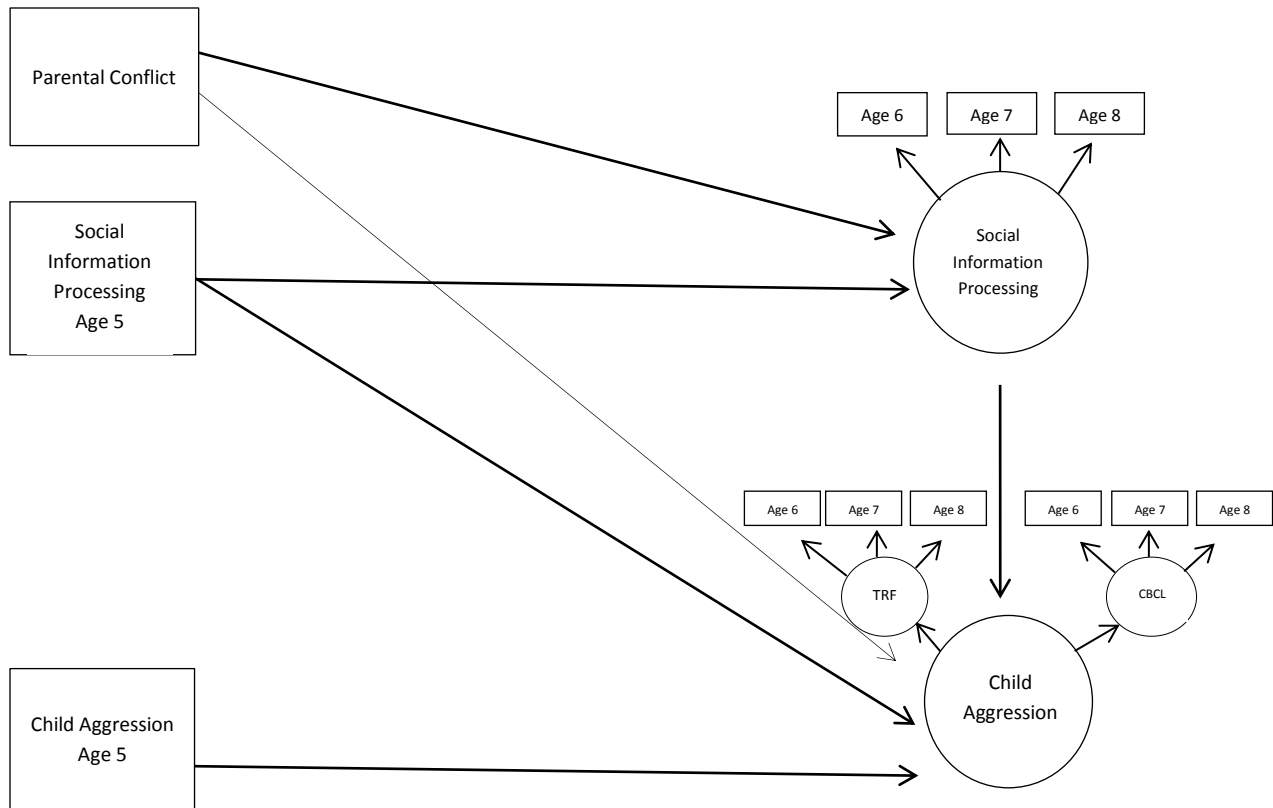


Figure 3. Longitudinal mediation model testing individual social information processing steps as a mediator between parental conflict and child aggression across two time points.

Results

Descriptive Statistics and Missing Data

Descriptive statistics were calculated to identify outliers and examine the distribution properties of each scale (see Table 1 for means and standard deviations). Z-scores for each variable were examined to identify univariate outliers. Scores were considered extreme if they were outside 3.26 standard deviations of the mean. Extreme scores were rescaled to values representing 3.26 standard deviations from the mean. Less than 0.2% of scores within the database were identified as outliers. Scores at various waves for the Conflict Tactics Scale, SIP

Table 1

Means and Standard Deviations of Variables

Variable	Age	N	M	SD
Conflict Tactics Scale				
Mother report of mother behavior	0-4	474	0.64	0.54
Mother report of father behavior	0-4	466	0.66	0.62
Mother report of mother behavior	4-5	454	0.54	0.44
Mother report of father behavior	4-5	447	0.52	0.48
Father report of mother behavior	0-4	361	0.56	0.49
Father report of father behavior	0-4	366	0.55	0.44
Father report of mother behavior	4-5	371	0.46	0.42
Father report of father behavior	4-5	374	0.48	0.41
CTS Composite	0-5	354	0.55	0.37
SIP Measures				
Encoding of cues	5	540	1.31	0.24
Encoding of cues	6	474	1.15	0.15
Encoding of cues	7	449	1.10	0.12
Encoding of cues	8	449	1.05	0.08
Interpretation of cues	5	534	0.66	0.27
Interpretation of cues	6	474	0.67	0.27
Interpretation of cues	7	448	0.68	0.25
Interpretation of cues	8	450	0.68	0.25
Response generation	5	540	0.00	0.70
Response generation	6	474	0.00	0.71
Response generation	7	449	-0.01	0.73
Response generation	8	450	0.00	0.69
Response evaluation	5	542	0.00	0.72
Response evaluation	6	474	-0.01	0.74
Response evaluation	7	448	-0.01	0.73
Response evaluation	8	450	-0.01	0.77
CBCL Aggression				
Mother reported	5	566	9.46	5.89
Mother reported	6	490	8.41	5.70
Mother reported	7	462	8.03	5.65
Mother reported	8	472	7.67	6.03
Mother reported	9	420	7.52	5.89
Mother reported	10	395	7.06	5.75
Mother reported	11	450	7.26	5.68
Teacher reported	5	573	4.66	7.05
Teacher reported	6	536	5.38	7.74
Teacher reported	7	516	5.82	8.33
Teacher reported	8	497	5.29	7.87
Teacher reported	9	467	5.35	8.04
Teacher reported	10	447	5.93	8.26
Teacher reported	11	443	6.23	8.77

measures, and aggression scales were highly skewed and kurtotic. Rather than transforming variables, which would complicate interpretation, non-normality was addressed using robust maximum likelihood estimates for non-normal data available in Mplus.

Sample sizes for each measure ranged from 354 to 573. The pattern of missing data indicated that the data were not missing completely at random (MCAR). There were significant differences in SIP deficits in children and aggression depending on whether parents had completed the reports of interparental conflict. Specifically, children whose parents did not complete the CTS were more likely to have problems with SIP and have higher aggression levels. Concordance between mother and father report on the CTS did not influence attrition rates. That is, there were no significant differences in the discrepancy scores between mother and father reports on the CTS for individuals who dropped out of the study compared to those participants who remained in the study. To account for missing data, full information maximum likelihood parameter estimation was used in Mplus. This did not require cases to be deleted or imputation of missing observations. Instead, this method uses all available data to create covariance matrices needed to test model fit (Schafer & Graham, 2002).

Correlations among Variables

Correlations among the variables were calculated to examine relations and to explore the creation of latent variables within the proposed models. First, correlations among mother's and father's report of interparental conflict were examined. Parent report of their own and each other's behavior were significantly correlated across reporters and at different time points in their child's life (see Table 2). Correlations among mothers' reports of mother and father behaviors at different time points ranged from moderate to large¹ ($r_s = .46 - .76$) while correlations among fathers' reports of mother and father behaviors were all large ($r_s = .60 - .90$). Correlations

¹ Using guidelines outlined by Cohen, 1988 where 0.1 is small, 0.3 is moderate, and 0.5 is large.

among mother reports of mother and father behaviors with father reports of mother and father behaviors ranged from small to large ($rs = .27 - .56$). Overall, mother and father reports of interparental conflict were fairly stable over time. That is, the correlation of the same measure of conflict across waves was large ($rs = .71 - .77$). Overall, these patterns of correlations suggested that an interparental conflict latent variable could be created from mother and father reports on the CTS.

Table 2

Variable	Child Age	1	2	3	4	5	6	7
Mother report of								
1. Mother behavior	0-4	---						
2. Father behavior	0-4	.69***	---					
3. Mother behavior	4-5	.76***	.46***	---				
4. Father behavior	4-5	.55***	.71***	.68***	---			
Father report of								
5. Mother behavior	0-4	.52***	.56***	.36***	.39***	---		
6. Father behavior	0-4	.29***	.51***	.34***	.53***	.70***	---	
7. Mother behavior	4-5	.34***	.35***	.47***	.48***	.77***	.71***	---
8. Father behavior	4-5	.27***	.40***	.39***	.55***	.60***	.90***	.77***

Note. $N = 497$.

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

Correlations among SIP Steps 1, 2, 4, and 5 were examined across child ages 5 through 8 (see Table 3). As a general trend, each step was significantly correlated with the same step across waves (e.g. Step 1 at age 5 was significantly correlated with Step 1 at ages 6 and 7) with most correlations small to moderate in range. This was not, however, always the case. For example, SIP Step 1 at age 5, 6, and 7 was not significantly correlated with Step 1 at age 8. Although the same step correlations of each step across waves varied in range ($rs = .02 - .53$), the general pattern supported the creation of latent variables by combining SIP steps across adjacent waves. In terms of relating across steps, Step 4 (generation of responses) was significantly correlated with several other SIP steps at various waves. Although significant, these correlations

were small. There were also small correlations among variables representing other steps (i.e. Steps 1, 2, and 5); however a clear pattern in these correlations at different child ages did not emerge.

Table 3

Correlations among SIP Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Encoding of cues, age 5	--														
2. Encoding of cues, age 6	.39***	--													
3. Encoding of cues, age 7	.30***	.29*	--												
4. Encoding of cues, age 8	.06	.14	.11	--											
5. Interpr. of cues, age 5	.00	-.01	-.03	.02	--										
6. Interpr. of cues, age 6	.12**	.00	-.01	-.02	.35***	--									
7. Interpr. of cues, age 7	.10*	.02	-.00	-.05	.25***	.35***	--								
8. Interpr. of cues, age 8	.07	.00	.01	-.04	.13**	.33***	.35***	--							
9. Resp. generation, age 5	.17***	.12*	.10*	.05	.17***	.14**	.08	.04	--						
10. Resp. generation, age 6	.22***	.15**	.12**	.02	.07	.20***	.10*	.06	.38***	--					
11. Resp. generation, age 7	.21***	.16**	.16**	.13**	.02	.11*	.15**	.01	.31***	.53***	--				
12. Resp. generation, age 8	.17**	.13*	.15**	.22***	-.05	-.02	-.03	.05	.21***	.34***	.45***	--			
13. Resp. evaluation, age 5	.12**	.11**	.03	.05	.05	-.01	.03	.04	.14**	.03	.06	.03	--		
14. Resp. evaluation, age 6	.05	.06	.07	.03	.02	.04	.03	.04	.02	.15***	.14**	.06	.12**	--	
15. Resp. evaluation, age 7	.10*	.03	.07	.08	-.08	-.07	-.01	-.01	.00	.12*	.23***	.21***	.02	.20***	--
16. Resp. evaluation, age 8	.15**	.21***	.13*	.08	.08	.02	.12*	.05	.15**	.16***	.24***	.23***	.11*	.22***	.28***

Note. $N = 544$.

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

Correlations among mother and teacher ratings of aggression were examined across ages 5 through 11 (see Table 4). Aggression scores were all significantly correlated across reporters and waves. Specifically, cross-wave correlations for mother rated aggression ranged from moderate to large ($r_s = .41 - .64$) as did correlations for teacher reports across waves ($r_s = .47 - .77$). Correlations between parent and teacher reports at the same wave were generally moderate ($r_s = .25 - .33$). Overall, this pattern of correlations justified the creation of latent variables for aggression. These correlations also suggested some stability of aggression over time.

Table 4

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
<i>Mothers' report</i>													
1. Age 5	--												
2. Age 6	.55***	--											
3. Age 7	.57***	.55***	--										
4. Age 8	.54***	.57***	.63***	--									
5. Age 9	.52***	.55***	.59***	.64***	--								
6. Age 10	.47***	.48***	.60***	.57***	.60***	--							
7. Age 11	.43***	.41***	.51***	.53***	.58***	.58***	--						
<i>Teachers' report</i>													
8. Age 5	.25***	.21***	.30***	.23***	.22***	.17***	.15***	--					
9. Age 6	.30***	.27***	.28***	.21***	.27***	.23***	.18***	.65***	--				
10. Age 7	.27***	.32***	.29***	.25***	.27***	.28***	.19***	.60***	.70***	--			
11. Age 8	.29***	.35***	.38***	.32***	.36***	.34***	.23***	.61***	.70***	.74***	--		
12. Age 9	.27***	.30***	.30***	.32***	.33***	.30***	.24***	.57***	.67***	.70***	.74***	--	
13. Age 10	.30***	.30***	.36***	.30***	.39***	.33***	.27***	.58***	.67***	.71***	.73***	.77***	--
14. Age 11	.32***	.36***	.37***	.39***	.41***	.42***	.26***	.47***	.59***	.59***	.68***	.70***	.72***

Note. $N = 582$.

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

Examination of correlations among variables when the child was age 5 was also helpful in understanding the relations among variables at Wave 1. That is, correlations among interparental conflict early in the child's life, SIP steps at child age 5, and parent and teacher rated aggression at age 5 were examined to determine if these variables were related to one another (see Table 5). This cross-sectional analysis indicated that interparental conflict measured as the average conflict rated by parents from child ages 0 to 4 and from 4 to 5 (CTS Composite described further below) was not significantly correlated with child SIP or aggression

at age 5. SIP Steps 1, 2, and 5 at age 5 showed small correlations with child aggression at age 5 ($r_s = .17$ -.27), and SIP Step 4 showed a large correlation with child aggression at age 5.

Table 5

<i>Correlations among Interparental Conflict, SIP, and Child Aggression at Age 5</i>						
Variable	1	2	3	4	5	6
1. CTS Composite	--					
2. SIP Step 1	.01	--				
3. SIP Step 2	.01	.00	--			
4. SIP Step 4	.00	.03**	.03***	--		
5. SIP Step 5	-.01	.02**	.01	.07**	--	
6. Aggression	-.12	.27*	.17	.58	.19	--

Note. $N = 583$.

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

Testing the Measurement Models

CFA's were used to test measurement models prior to testing the two proposed structural models for each hypothesis. Within these models, latent variables were created for 1) interparental conflict using mother and father retrospective report of conflict when the child was ages 0 to 4 and mother and father report of conflict when the child was ages 4 to 5; 2) SIP across three different child ages; and 3) Aggression as measured by mothers and teachers across three different child ages. Model 1 used data from seven waves to examine the relation between the three variables of interest across three constructed time points (see Figure 4). Variables were constructed and included in the model at each time point as follows: TIME 1 Variables - a)

Parental conflict at Time 1 was represented by a latent variable constructed with eight indicators of mother's and father's reports of parental conflict directed towards their spouse and their spouse's behavior towards them. Separate indicators represent ratings of these behaviors from child's birth to age 4 and from age 4 to 5. **b) Child aggression at Time 1** was calculated by summing the aggression scale score on the TRF and CBCL at child age 5 and was represented

as an observed variable. **c) Social information processing scores for each step at age five** (encoding of cues, interpretation of cues, response construction, and response evaluation) were represented as observed variables for Time 1; TIME 2 Variables – **d) Each SIP step score** (steps 1, 2, 4, and 5) was calculated by creating a latent variable with indicators representing SIP step scores at ages 6, 7, and 8; TIME 3 Variables - **e) Child aggression at Time 3** was calculated by creating a two-factor latent variable with six total indicators. Latent factor one included TRF aggression subscale scores at ages 9, 10, and 11 and latent factor two included CBCL aggression subscale scores at ages 9, 10, and 11. The overall model fit for the CFA for Model 1 did not provide an acceptable fit to the data, $\chi^2 (283, N = 577) = 1272.62, p < .001, CFI = .719, RMSEA = .078$.

Model 2 was similar to Model 1, but was based on 4 waves of data rather than 7 to examine the extent to which SIP variables serve as a mediator of parental conflict through their concurrent impact on child aggression (see Figure 5). As such, Model 2 focused on two, rather than three, constructed time points. This provided a somewhat less rigorous test of mediation, but acknowledged the fact that because SIP variables are dynamic processes they exert a more immediate impact on aggression. This model also controlled for prior levels of SIP and child aggression. The CFA for Model 2 also did not provide an adequate model fit, $\chi^2 (283, N = 581) = 1280.84, p < .001, CFI = .728, RMSEA = .078$.

Time 1 (Wave 1)

Time 2 (Waves 2, 3, 4)

Time 3 (Waves 5, 6, 7)

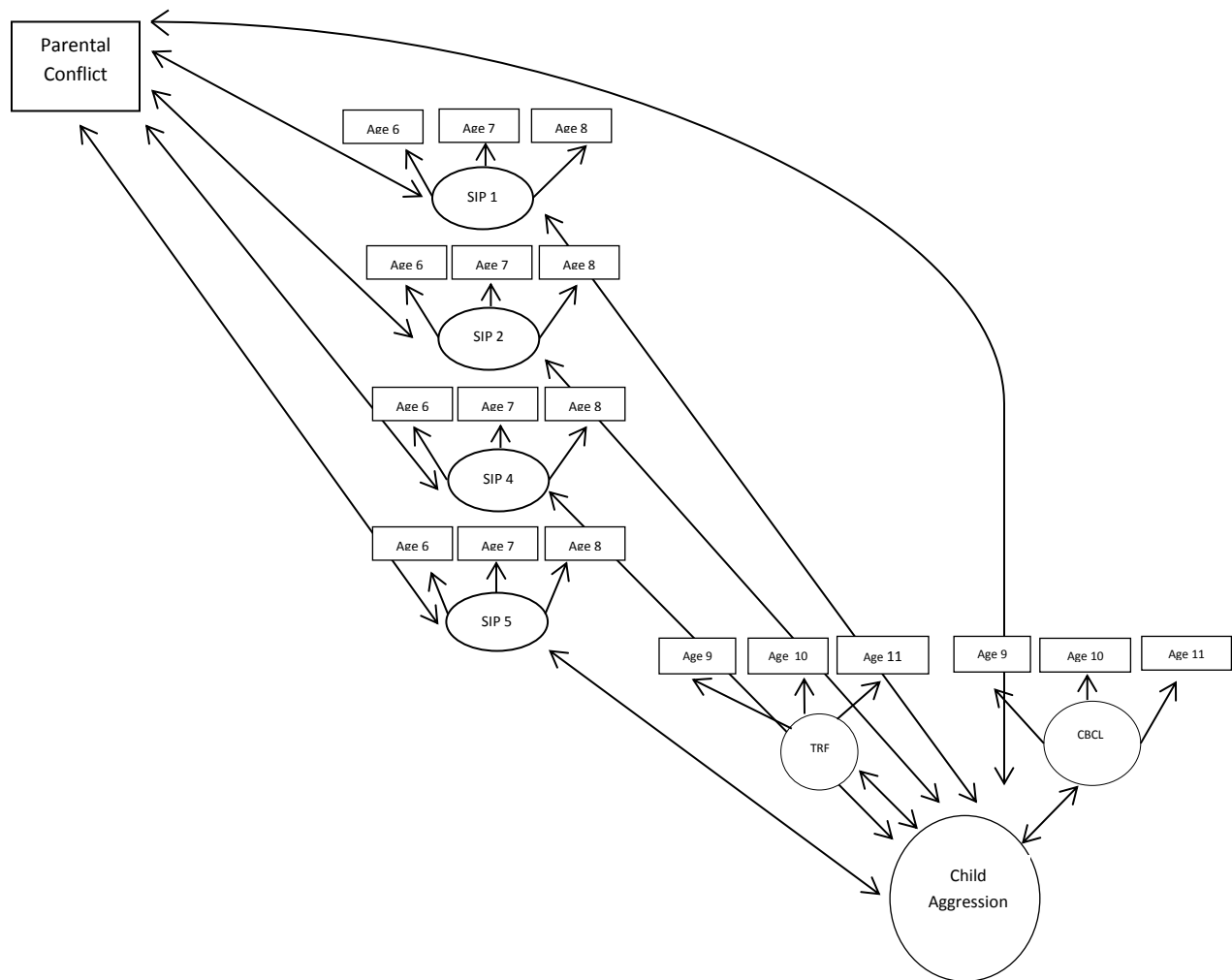


Figure 4. Confirmatory factor analysis of longitudinal mediation model testing individual social information processing steps as a mediator between parental conflict and child aggression across three time points. This figure represents the final measurement model used with parental conflict calculated as an observed variable rather than as a latent variable as described in more detail below. It is of note that each SIP step is correlated with one another in this model. The arrows showing these relations were not included in the figure in order to simplify the figure design.

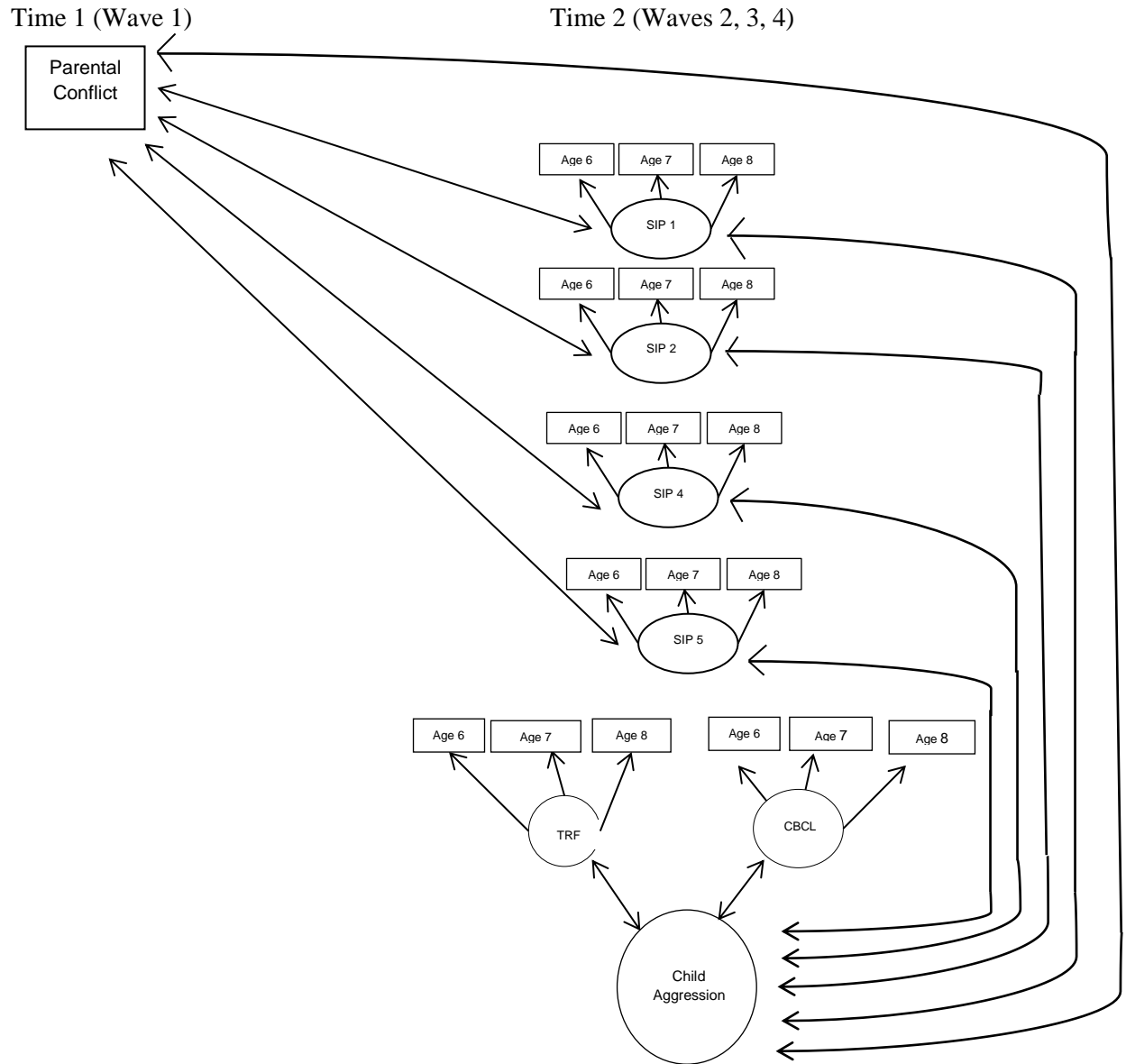


Figure 5. Confirmatory factor analysis of longitudinal mediation model testing individual social information processing steps as a mediator between parental conflict and child aggression across two time points. This figure represents the final measurement model used with parental conflict calculated as an observed variable rather than as a latent variable as described in more detail below. It is of note that each SIP step is correlated with one another in this model. The arrows showing these relations were not included in the figure in order to simplify the figure design.

Upon further examination, it appeared that the poor fit was primarily related to the interparental conflict latent variable (CTS). This was surprising given the significant correlations among CTS indicator variables (see Table 2). Although a latent variable approach would have been preferable, an alternative approach that created a composite variable was proposed. This score was calculated by taking the mean of the 10 CTS items across parents and waves. The CTS-Revised version (Straus et al., 1996) is scored by summing the number of times an individual or their spouse engaged in a particular conflict behavior over the previous year. This scoring procedure takes into account the cumulative amount of conflict behaviors occurring between spouses at any given year in the child's life. Thus, the scoring procedure used in the current study based on creating a composite score is not unlike scoring for the CTS-Revised in that it represents the cumulative effect of interparental conflict in the family regardless of what age the conflict was reported (0-4 versus ages 4-5) or which parent is reporting the behavior (mother versus father). When the CTS composite variable was used within the measurement model, the model fit was adequate for Model 1, $\chi^2(137, N = 567) = 175.66, p < .05$, CFI = .975, RMSEA = .022 and Model 2, $\chi^2(137, N = 574) = 192.18, p < .01$, CFI = .97, RMSEA = .026. Table 6 displays factor loadings for each SIP and aggression latent variable created in the final measurement model for Models 1 and 2. The high and significant values of all factor loadings supported the creation of the latent variables included in the two measurement models.

Table 6

Factor Loadings for Seven-Factor Model of SIP and Aggression Latent Variables

Scale	Factor Loadings	
	Model 1	Model 2
SIP 1 Factor		
Age 6	.56***	.55***
Age 7	.51***	.52***
Age 8	.26*	.26*
SIP 2 Factor		
Age 6	.57***	.57***
Age 7	.62***	.62***
Age 8	.56***	.56***
SIP 4 Factor		
Age 6	.64***	.64***
Age 7	.81***	.81***
Age 8	.55***	.56***
SIP 5 Factor		
Age 6	.37***	.37***
Age 7	.48***	.47***
Age 8	.59***	.60***
Teacher Rated Aggression Factor		
Age 6	a	.78***
Age 7	a	.80***
Age 8	a	.70***
Age 9	.72***	b
Age 10	.79***	b
Age 11	.79***	b
Mother Rated Aggression Factor		
Age 6	a	.81***
Age 7	a	.85***
Age 8	a	.88***
Age 9	.86***	b
Age 10	.89***	b
Age 11	.83***	b
Total Aggression		
Teacher Rated	.64***	.63***
Mother Rated	.78***	.74***

Note. $N = 573$.

Note. Factor loadings of indicator variables on each latent variable created for Models 1 and 2 are presented in the table. For Models 1 and 2, SIP scores at ages 6, 7, & 8 represent loadings onto the latent variable for each SIP step. A two-factor latent variable was created for child aggression. ^aFactor loadings for aggression variables in Model 1 are represented by teacher and parent rated aggression at ages 9, 10, & 11. ^bModel 2 is represented by aggression at ages 6, 7, & 8.

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

Correlations among Time 2 SIP latent variables were also examined within the measurement model (see Table 7). The correlations among SIP latent variables at Time 2 were very low. With one exception (i.e., $r = .07$), all were less than .02. That is, the four SIP steps as measured at ages 6 through 8 at Time 2 were not strongly correlated with one another.

Table 7

<i>Correlations among SIP Latent Variables at Constructed Time Point 2</i>				
Variable	1	2	3	4
1. SIP Step 1	--			
2. SIP Step 2	.00	--		
3. SIP Step 4	.02***	.02**	--	
4. SIP Step 5	.01**	.00	.07***	--

Note. $N = 583$.

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

Testing the Structural Models

Model 1. Model 1 represented a combined model to determine whether SIP Steps 1, 2, 4, and 5 at ages 6 to 8 mediated the relation between interparental conflict at child age 5 and child aggression at ages 9, 10, and 11. It was hypothesized that interparental conflict would predict changes in both SIP and aggressive child behavior and that SIP in turn would predict changes in child aggression. Additionally, it was believed that there would be significant indirect effects indicating that SIP mediates the relation between interparental conflict and child aggression (See Figure 6). Model 1 fit the data very well, $\chi^2(205, N = 583) = 261.95, p < .05$, CFI = .972, RMSEA = .022. With the exception of SIP Step 5 ($\beta = .13$), SIP variables were fairly stable over time (β s = .43 to .59). Child aggression was also stable over time ($\beta = .78$). Parental conflict did not significantly predict changes in any of the SIP steps, nor did it predict changes in aggression. Likewise, none of the SIP steps predicted changes in aggression.

Time 1 (Wave 1)

Time 2 (Waves 2, 3, 4)

Time 3 (Waves 5, 6, 7)

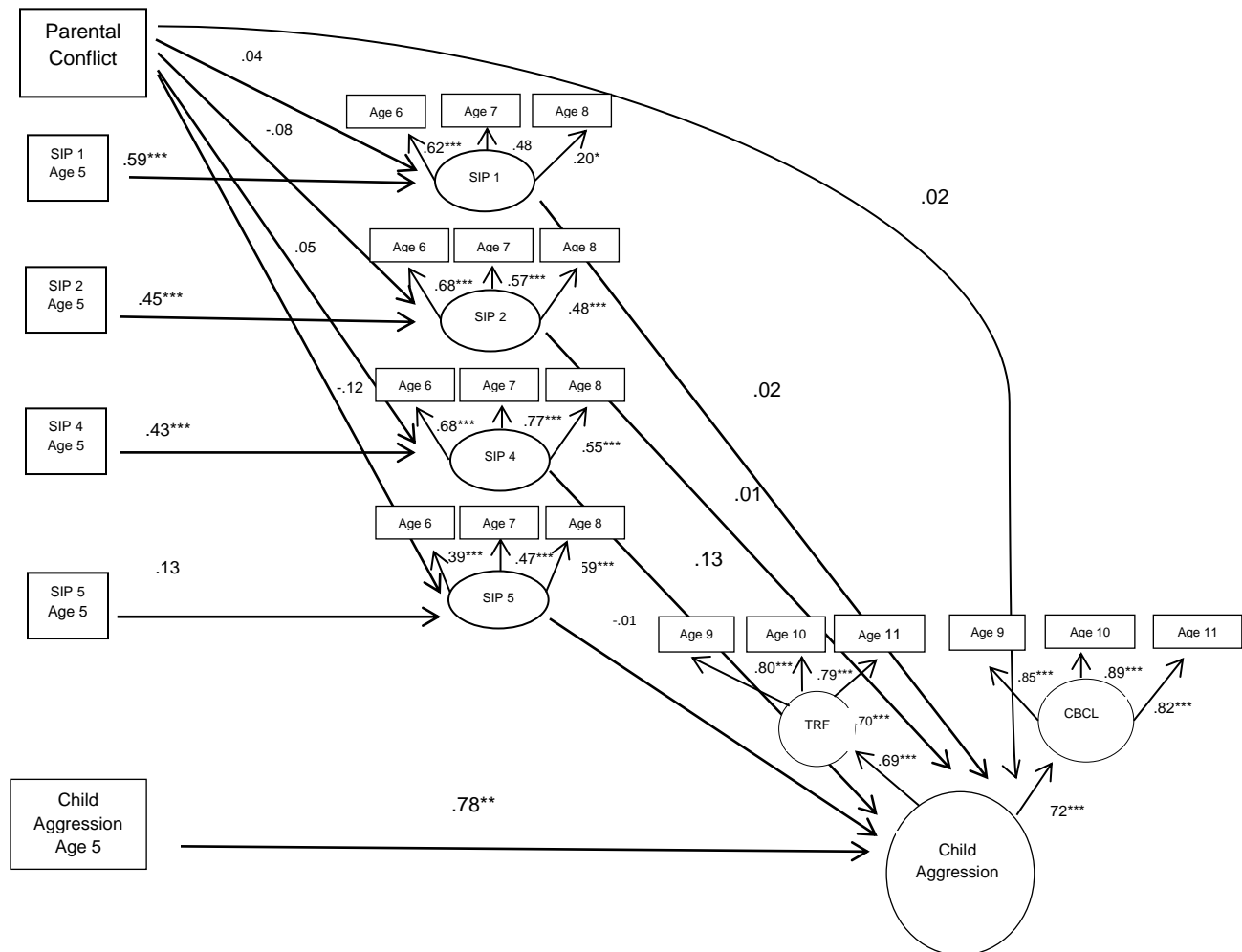


Figure 6. Longitudinal mediation model testing SIP as a mediator between parental conflict and child aggression at ages 9, 10, and 11 (Model 1). Values in the model represent standardized parameter estimates. The labels of SIP 1, SIP 2 etc. as used throughout the figures represent SIP Step 1, SIP Step 2, and so on.

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

Table 8 further summarizes the direct effects in addition to outlining the indirect and total effects within Model 1. As previously noted, the direct effect of interparental conflict and aggression in children was not significant. Support was also not found for combined SIP variables mediating the relation between SIP and child aggression (see Table 8); that is, the total

indirect effects were not significant. Examination of indirect effects of each SIP variable did not indicate that any one particular SIP step mediated the relation between interparental conflict and child aggression. Not surprisingly given the overall pattern, the total effects estimate was also not significant.

Table 8

Model 1 Standardized Estimates of Direct (Aggression on Interparental Conflict), Indirect (Aggression on SIP & SIP on Interparental Conflict), and Total Effects

	Estimate	SE
Direct	0.02	0.06
Total Indirect	0.01	0.02
Specific Indirect		
SIP 1	0.00	0.01
SIP 2	0.00	0.01
SIP 4	0.01	0.01
SIP 5	0.00	0.01
Total	0.03	0.06

Note. $N = 583$.

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

Model 2. Model 2 was tested using an approach similar to Model 1 except that aggression was examined at ages 6, 7, and 8 in Model 2 (See Figure 7). Model 2 fit the data very well, $\chi^2 (205, N = 583) = 297.06, p < .05$, CFI = .961, RMSEA = .028. Overall, the results were similar to those observed with Model 1. SIP variables were fairly stable over time (β s = .43 to .59) with the exception of SIP step 5 ($\beta = .13$). Child aggression was also very stable over time ($\beta = .96$). Parental conflict did not significantly predict changes in any of the SIP steps or changes in aggression. None of the SIP steps significantly predicted changes in aggression.

Time 1 (Wave 1)

Time 2 (Waves 2, 3, 4)

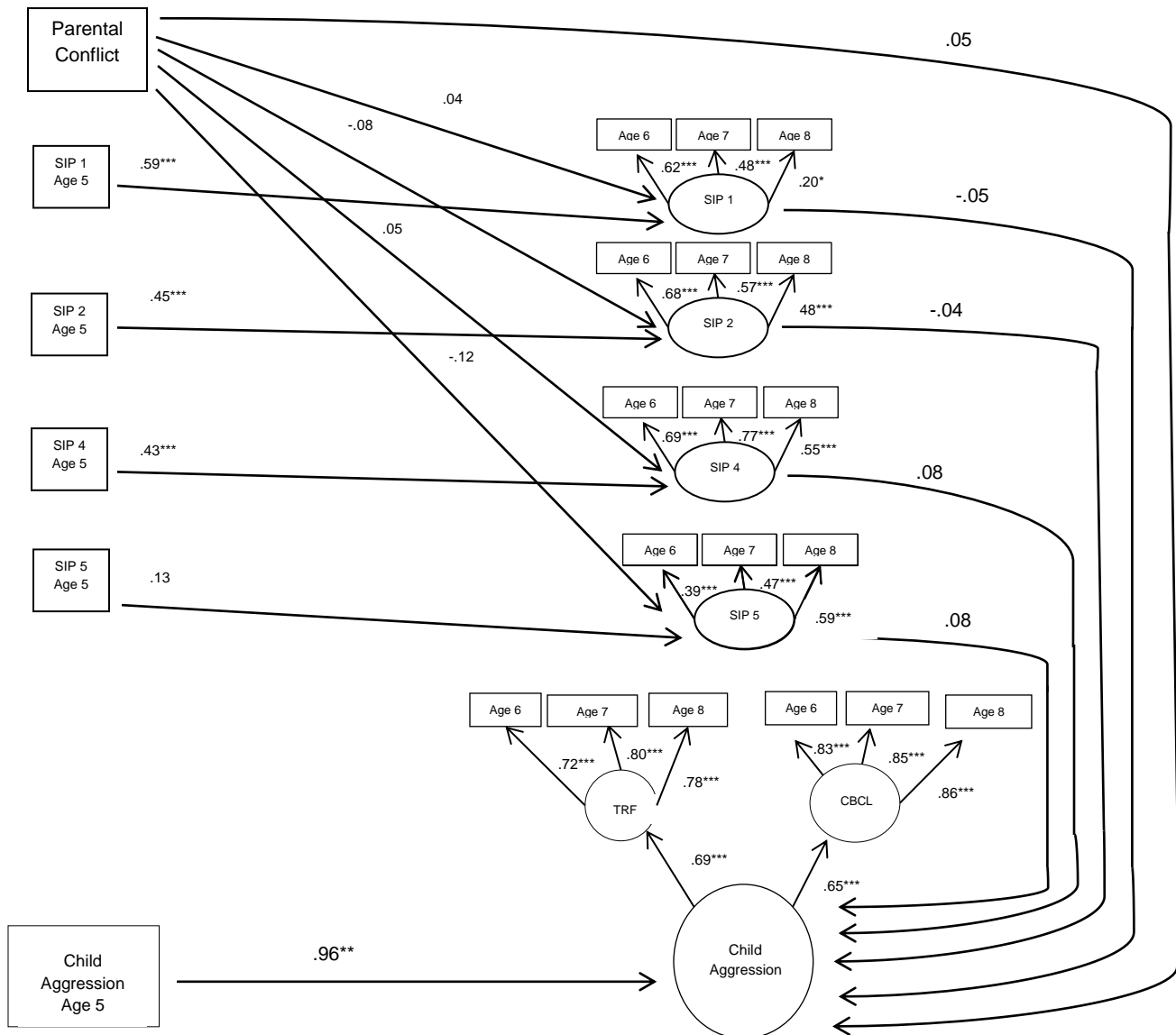


Figure 7. Longitudinal mediation model testing SIP as a mediator between parental conflict and child aggression at ages 6, 7, and 8 (Model 2). The labels of SIP 1, SIP 2 etc. as used throughout the figures represent SIP Step 1, SIP Step 2, and so on.

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

Results of testing the direct, indirect, and total effects in Model 2 are provided in Table 9.

Similar to Model 1, the direct effect of aggression in children on interparental conflict was not

significant. The total indirect effect was also not significant indicating that the combined SIP variables did not mediate the relation between SIP and child aggression. Examination of indirect effects of each SIP variable demonstrated that no single SIP step mediated the relation between interparental conflict and child aggression in the combined model. The total effects estimate for Model 2 was also not significant.

Table 9

Model 2 Standardized Estimates of Direct (Aggression on Interparental Conflict), Indirect (Aggression on SIP & SIP on Interparental Conflict), and Total Effects

	Estimate	SE
Direct	0.051	0.060
Total Indirect	-0.004	0.022
Specific Indirect		
SIP 1	-0.002	0.007
SIP 2	0.003	0.006
SIP 4	0.004	0.007
SIP 5	-0.010	0.014
Total	0.047	0.052

Note. $N = 583$.

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

The role of individual SIP steps. Separate analyses were conducted to examine each SIP variable as a mediator of the relation between interparental conflict and child aggression. Each of these models fit the data well (see Table 10). Table 11 summarizes the standardized path coefficients between the variables of interest for each step. Examining each SIP step individually, interparental conflict at Time 1 did not predict a change in SIP Steps 1, 2, 4, or 5 at Time 2 for Model 1 or 2 (see Table 11). Additionally, SIP Steps 1, 2, and, 5 at Time 2 did not predict changes in aggression at Time 2 (Model 2) or Time 3 (Model 1). Analyses of SIP Step 4 as a mediator indicated that Step 4 at Time 2 predicted changes in child aggression at Time 3 (Model 1: $\beta = .17$, $p = .02$), but did not predict concurrent aggression levels (Model 2). Overall,

indirect effects for Models 1 and 2 were not significant and SIP Steps 1, 2, 4, and 5 were not found to mediate the relation between interparental conflict and child aggression for Models 1 or 2.

Table 10

Fit Indices for Models with Individual SIP Steps

Model	χ^2	df	CFI	RMSEA
Model 1				
SIP Step 1	53.11	45	.99	.02
SIP Step 2	68.71	45	.98	.03
SIP Step 4	51.94	45	.99	.02
SIP Step 5	59.88	45	.99	.02
Model 2				
SIP Step 1	62.36	45	.99	.03
SIP Step 2	79.87	45	.98	.04
SIP Step 4	84.46	45	.98	.04
SIP Step 5	70.98	45	.98	.03

Note. $N = 583$.

Note. χ^2 = Chi-square; CFI = comparative fit index; RMSEA = root mean square error of approximation; Good model fit is CFI > .95, and RMSEA < .08.

Table 11

Path Coefficients for Models 1 and 2 with Individual SIP Steps

Path Coefficients	Model 1		Model 2	
	β	p	β	p
SIP Step 1				
Interparental Conflict on SIP Step 1	.03	.69	.03	.68
Aggression on SIP Step 1	.05	.74	.00	.99
Aggression on Interparental Conflict	.04	.49	.06	.30
SIP Step 2				
Interparental Conflict on SIP Step 2	-.05	.44	-.05	.44
Aggression on SIP Step 2	.06	.43	.07	.29
Aggression on Interparental Conflict	.04	.46	.06	.27
SIP Step 4				
Interparental Conflict on SIP Step 4	.07	.22	.07	.23
Aggression on SIP Step 4	.17	.02*	.12	.08
Aggression on Interparental Conflict	.04	.51	.05	.32
SIP Step 5				
Interparental Conflict on SIP Step 5	-.11	.24	-.11	.22
Aggression on SIP Step 5	.08	.32	.12	.09
Aggression on Interparental Conflict	.06	.34	.07	.20

Note. $N = 583$.

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

Gender Differences. Analyses of Model 1 were conducted separately for boys and girls to determine if there were any gender differences in the patterns of relations. Model 1 fit the data quite well for girls, $\chi^2(205, N = 280) = 221.27, p = .207$, CFI = .98, RMSEA = .017. For boys, Model 1 fit the data well based on the RMSEA but was slightly below the cutoff for the CFI, $\chi^2(205, N = 302) = 268.89, p < .01$, CFI = .94, RMSEA = .032. There were no significant indirect, direct, or total effects in the models for boys or girls (see Table 12). Specifically, interparental conflict did not predict SIP steps at ages 6 through 8 or child aggression at ages 9 through 11. There was also no significant relation between SIP steps and later child aggression.

Table 12

Boys Only and Girls Only Models for Model 1: Direct (Aggression on Interparental Conflict), Indirect (Aggression on SIP & SIP on Interparental Conflict), and Total Effects

	Boys Only		Girls Only	
	Estimate	SE	Estimate	SE
Direct	0.44	1.34	-0.05	0.10
Total Indirect	0.42	0.77	0.02	0.04
Specific Indirect				
SIP 1	0.00	0.05	0.00	0.01
SIP 2	0.13	0.29	-0.01	0.01
SIP 4	0.14	0.27	0.00	0.02
SIP 5	0.15	0.47	0.02	0.03
Total	0.86	1.12	-0.03	0.09

Note. $N = 302$ (Boys only model); $N = 280$ (Girls only model).

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

Analyses were also conducted separately for boys and girls for Model 2. Similar to Model 1, Model 2 fit the data quite well for girls, $\chi^2(261, N = 280) = 1450.61, p < .001$, CFI = .97, RMSEA = .024. For boys, Model 2 was slightly below the cutoff for the CFI although it fit the data well based on the RMSEA, $\chi^2(261, N = 302) = 1461.43, p < .001$, CFI = .94, RMSEA =

.035. There were no significant indirect or direct effects in the models for boys or girls (see Table 13). That is, interparental conflict did not predict SIP steps or child aggression at ages 6 through 8, and there was also no significant relation between SIP steps and concurrent child aggression. Interestingly, the total effect was significant for the boys model but not for the girls model.

Table 13

Boys Only and Girls Only Models for Model 2: Direct (Aggression on Interparental Conflict), Indirect (Aggression on SIP & SIP on Interparental Conflict), and Total Effects

	Boys Only		Girls Only	
	Estimate	SE	Estimate	SE
Direct	2.02	1.11	-0.05	0.10
Total Indirect	-0.09	0.60	0.02	0.04
Specific Indirect				
SIP 1	0.02	0.18	0.00	0.01
SIP 2	-0.04	0.19	-0.01	0.01
SIP 4	-0.03	0.20	0.00	0.02
SIP 5	-0.04	0.34	0.02	0.03
Total	1.93*	0.84	-0.03	0.09

Note. $N = 302$ (Boys only model); $N = 280$ (Girls only model).

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

Discussion

The current study is a longitudinal examination of whether social information processing at ages 6, 7, and 8 mediates the relation between interparental conflict from ages 0 to 5 and later reports of child aggression (ages 9-11 in Model 1 and ages 6-8 in Model 2). This focus was suggested by the findings of several previous studies. Research has indicated that high conflict between mothers and fathers can have negative impacts on children, including increasing their levels of aggression (Cummings et al., 2007; Davies & Cummings, 1994). There is also strong support for social information processing theory which posits that the way children think about their social worlds influences how aggressive they are in interactions with others (Arsenio et al.,

2009; Crick & Dodge, 1994; Lansford et al., 2006). Specifically, social cognitive deficits have been found to lead to higher levels of aggressive behavior. There is also evidence that SIP mediates the relation between several parenting factors (e.g. parent disciplinary practices, parent-child attachment, parent abuse towards children, etc.) and aggression in children (Cassidy et al., 1996; Dodge et al., 1995; Gomez et al., 2001; Simons et al., 2001). Taken together, this literature suggested that SIP may also mediate the link between interparental conflict and child aggression.

The present study did not, however, support the hypothesis that SIP mediates the relation between parental discord and aggressive behavior in children. There was no evidence for either direct or indirect effects in the mediational model testing this relation. More specifically, in a combined model that included all four SIP steps, interparental conflict did not predict changes in SIP steps nor did it predict changes in aggression in children. Furthermore, SIP deficits did not predict changes in aggression levels in children. When examining separate models of each SIP step, only Step 4 (response generation) predicted later levels of aggression. No other paths in the models were significant.

The current findings were unexpected and contrary to the findings of previous studies that have reported that interparental conflict predicts both maladaptive SIP cognitions and child aggression. There are several possibilities as to why these relations were not found in this study. First, the impact of child development should be considered. For example, it could be that interparental conflict during a child's first five years is not as influential on child SIP cognitions as the impact of interparental conflict in later childhood years. The handful of studies that have examined the link between interparental conflict and social cognitive processes in offspring have often examined social cognitions in children at older age ranges than in the current study.

Specifically participant ages in past studies have ranged from 7 to 16 (Fite et al., 2008; Grych, 1998; Obrien & Chin, 1998) with several studies examining these cognitive processes only in later childhood and adolescence (Fite et al., 2008; Goodman et al., 1999; Kinsfogal & Grych, 2004). The current study examined SIP steps when children were ages 6 to 8. Furthermore, previous studies have generally examined interparental conflict in the later childhood years in comparison to the current study that examined parental conflict from ages 0 to 5 (Goodman et al., 1999; Grych, 1998; Kinsfogal & Grych, 2004; Obrien & Chin, 1998). Although the developmental research shows that children begin to form SIP cognitions such as intent attribution by as early as three years of age (Dodge, 2006; Shultz et al., 2010), younger children may not have yet acquired the language skills necessary to form sophisticated schemas and SIP cognitions associated with interparental conflict or to label parent conflict that they witness. Data from the current study suggests this may be the case because interparental conflict at ages 0 to 5 was not significantly correlated with SIP steps at age 5. Additionally, there were mostly moderate correlations between SIP steps from age 5 to ages 6, 7, and 8 suggesting relative stability of social cognitions over time in early childhood. Unfortunately, the impact of developmental level on SIP has not been well researched to date, and future studies are needed to address these gaps in the literature (Arsenio, 2010).

The impact of child development on the enactment of aggressive behavior should also be considered. Although aggression tends to be stable over time, the developmental literature suggests that youth tend to differ in their presentation of aggressive behavior as they age (Pettit, 1997). Indeed, younger children are more likely to demonstrate physical aggression whereas adolescents are more likely to enact covert aggressive behavior (Pettit, 1997). In the current study, forms of child aggression were not differentiated. It could be, however, that interparental

conflict impacted physical aggression levels more prominently in early childhood while having a greater impact on covert aggression in the later childhood years. Because subtypes of aggression were not measured for this study, it could not be determined whether there was a shift in the type of aggressive behavior over childhood. If future studies examining SIP as a mediator between parental conflict and aggression separated out aggression by subtype at different ages, clear links between interparental conflict and child aggression may be found. Specifically, interparental conflict may be significantly related with physical (but not covert) aggression measured at child ages 5, 6, 7, and 8, while conflict may be significantly linked with covert (but not physical) aggression at ages 9, 10, and 11.

Another hypothesis about the mediational models tested is that they may vary by gender. There are several reasons to believe that this may be the case based on previous research on the impact of gender on child aggression. First, children may gravitate towards same-sex parents in learning aggressive behaviors (Deater-Deckard, & Dodge, 1997). Thus, when interparental conflict is present, girls may tend to model their mother's behavior during the conflict while boys may model their father's behavior. In addition to these socialization practices, the type of aggression enacted may differ for boys and girls. Particularly, girls are rated as having higher levels of relational aggression while boys tend to be rated as exhibiting higher levels of physical and overt aggression (Crick, Grotpeter, & Bigbee, 2002; Crain, Finch, & Foster, 2005). Differences in mediational models by gender were not supported in the current study in that separate models did not support SIP as a mediator of the relation between interparental conflict and child aggression for girls or boys.

The way in which interparental conflict was measured in the current study may also explain the results found. The study used an adapted version of the Conflict Tactics Scale

(Straus, 1979) that differed from the widely used version in the number and types of questions included, the scaling of the measure, and scoring procedures. This change could result in differences in the psychometric properties and may have ultimately affected the relation examined between interparental conflict and other variables of interest. However, at least one other study that used a version of the CTS similar to the one used in the current study (Fite et al., 2008) found modest correlations between reports of interparental conflict (assessed at child ages 0 to 5) and later romantic aggression (assessed at ages 18 to 21) in the adolescents of participating parents. Furthermore, in that study, SIP Steps 4 and 5 (assessed at ages 13 and 16) were shown to mediate the relation between interparental conflict and later romantic aggression in adolescents when using the CTS as the measure of interparental conflict. Within these models, the direct path between interparental conflict and later romantic aggression was significant (Fite et al., 2008).

The use of the adapted version of the CTS in a previous study that showed significant outcomes suggests that the non-significant outcomes found in the current study are not simply due to the version of the CTS used. Instead, the findings of the Fite et al. (2008) study suggest that conflict between parents is more likely to lead to romantic conflict in their offspring than to childhood aggressive behavior in the home and school setting. That is, the type of aggression modeled by parents may be salient in the type of aggression seen in offspring. Following this logic would suggest that childhood aggression with peers, teachers, and other family members may be more influenced by parents' aggression with others outside of the romantic dyad than parents' aggression with one another.

Additionally, the study findings should be interpreted within the context of the time for which the data was collected. The first wave of data in the current study was collected in the late

1980's continuing into the 1990's. In the United States, divorce rates reached an all-time high in the 1980's and began slowly declining into the 21st century (Beaulieu & Messner, 2010). Thus, it may likely be that biological parents of offspring in the present study were already divorced at the time of data collection. Additionally, research has suggested that the timing of when a separation or divorce has occurred may influence the child's adjustment to divorce and parental conflict (e.g. child maladjustment may be at its worst soon before and during separation or divorce because of the high level of conflict around that time) (Grych & Fincham, 1990). For some families, the time period after the divorce may actually lead to lower levels of interparental conflict and thus better adjustment for children. Although the current study did not focus on divorce, it is clear how divorce may be linked to the levels of interparental conflict and child adjustment. It is unknown if families in the current study were far removed from divorce, but if this were the case, then both parental conflict and child aggression may have been lower as a result.

The current study's findings suggest that social information processing at ages 6 through 8 does not play a role in the relation between interparental conflict very early in the child's life and later child aggression. Although the results of this study are not consistent with the background literature and theories supporting the role of SIP as a mediator of interparental conflict and aggression in childhood, it should be noted that the present study employed a more rigorous methodology than several previous studies examining the relations among these variables. For example, the current study used multiple reporters of interparental conflict (i.e. mother and father) and child aggression (i.e. mother and teacher). This is a stronger design than previous studies showing the relation between interparental conflict and child aggression that have typically relied solely on youth report or on ratings from a single parent to measure

interparental conflict (Davies & Cummings, 1994; Grych, 1998; O'Brien & Chin, 1998). A review of the literature by Davies and Cummings (1994) also showed that some previous studies have used single reports of child aggression, failing to reduce reporter bias by gathering data from multiple sources.

The current study design is also more rigorous than previous studies in how SIP steps were measured and examined. Specifically, the current study involved the assessment of four SIP steps. Models of mediation were examined with SIP steps entered together within the same model and tested separately to examine the role of each SIP step. This provided a more complete picture than previous studies that have examined single SIP steps in isolation (Goodman et al., 1999; Grych, 1998; Kinsfogal & Grych, 2004; O'Brien & Chin, 1998).

Previous studies have also been limited in the demographics (i.e. ethnicity and gender) of the population studied. For example, O'Brien and Chin (1998) included Latino children only in a key study showing that interparental conflict is related to children's encoding of cues in conflict situations. Results of the study may not generalize to other ethnic groups. Additionally, some studies have included only boys in their sample to examine relations between parental conflict, social cognitions, and/or child aggression (Davies & Cummings, 1994). For example O'Brien and colleagues' (1991) study only included boys to determine differences in the way children from maritally violent versus nonviolent homes deal with and adjust to conflict (O'Brien, Margolin, John, & Krueger, 1991). Another study included only boys in their sample to examine the link between marital conflict and child externalizing problems (Jouriles et al., 1991). The current study included a broader demographic sample than previous studies in that it included individuals from multiple racial groups as well as boys and girls.

Another strength of the current study design is that longitudinal data were used to

investigate causality and directionality of effects within models. Previous studies examining relations between interparental conflict, SIP, and/or child aggression have generally employed cross-sectional data (Grych, 1998; Kinsfogal & Grych, 2004). In fact, the only other identified study that has examined social cognitions as a mediator between parental conflict and aggression in children used a cross-sectional design (Marcus et al., 2001).

Overall, there are several strengths of the research design and methods used in the current study. A mediational model was not supported in this study, and these results should not simply be dismissed given the rigorous design and methodological features of the study.

Limitations and Future Directions

The current study had several limitations that should be examined to help guide future research. These included several problems related to measurement issues. The first issue concerns the methods used to assess SIP steps. The lack of reliable and valid assessment tools to measure SIP is perhaps one of the greatest challenges for studies of the SIP model. Most SIP assessment tools, including the ones used in the current study, present children with hypothetical vignettes involving peer provocations. Children are then asked a series of follow-up questions designed to assess deficits in different stages of the SIP model (Crick & Dodge, 1996; Lochman, Wayland, & White, 1993). This measurement strategy presents several concerns including the generalizability of SIP skills from hypothetical to real-life situations. To address this issue, Webster-Stratton and Lindsay (1999) emphasized the need for incorporating observations of social interactions between peers in natural settings in order to assess social cognitive processes in children. Thus, future research should aim to assess SIP of children in their everyday environment. An additional concern for using pencil and paper SIP assessments is that children's responses may be impacted by their verbal and reading ability. It has been suggested

that researchers use standardized video-recorded stimuli in order to decrease the likelihood that responses will be biased by the respondent's verbal ability (Dodge, Murphy, & Buchsbaum, 1984).

Another limitation in the current study concerns the inconsistency in how SIP steps were assessed. Specifically, some SIP steps were assessed using multiple measures (i.e. SIP steps 4 and 5) whereas others used a single measure and score to assess SIP steps (i.e. SIP steps 1 and 2). Using single measures to assess variables of interest poses threats to the internal validity of findings (Kazdin, 2003).

There was also measurement limitations in the procedures used to assess child aggression. More specifically, the CBCL and TRF do not differentiate between subtypes of aggression using these measures, and thus does not make it possible to determine how SIP steps may differ for individuals demonstrating various types of aggression. This is concerning given that previous research has demonstrated that differing SIP steps are related to specific subtypes of aggression (Crick et al., 2002; Rose & Asher, 1999). For example, differences in SIP are notable in children with relational aggression compared to those with physical aggression. Specifically, children who display relational aggression tend to have more hostile intent in social situations that are more relational in nature than children who engage in physical aggression (Crick et al., 2002). Additionally, differences in SIP have been found for individuals enacting reactive versus proactive types of aggression. Reactive aggression is associated with deficits in processes that occur earlier in the SIP model such as encoding and interpretation of cues (Crick & Dodge, 1996; Fontaine, 2008). Proactive aggression is linked to later SIP steps including clarification of goals, response access, and response decision (Dodge et al., 1997; Kempes et al., 2005).

Steps should be taken in research to assess subtypes of aggression to establish the link between specific types of aggressive behavior and individual SIP steps. For example, measures that differentiate between aggression subtypes may be used in research to allow for examination of different mediational models by aggression subtype. Based on previous research, it may be expected that SIP Steps 1 and 2 serve as mediators between interparental conflict and child aggression for children exhibiting reactive aggression, and that SIP steps 4 and 5 are mediators for children exhibiting proactive aggression. This would imply that different interventions for aggressive children from high conflict homes may be needed depending on whether the child is exhibiting reactive or proactive aggression.

Future research should also consider whether differences occur with SIP as a mediator depending on the type of aggression demonstrated between parents. That is, researchers may examine whether interparental conflict that is overt in nature has a different impact on SIP or child aggression than marital conflict that is covert in nature. There is currently evidence in the literature that supports the notion that the various types and content of interparental conflict may matter in the psychological adjustment of children (Cummings et al., 2004; Cummings et al., 2007; Davies & Cummings, 1994). In a review of child adjustment to interparental conflict, Davies and Cummings (1994) found that physical aggression between parents predicted child maladjustment more than other forms of marital conflict. When specifically comparing physical and verbal aggression, it has been found that children who witness intense anger and physical violence between parents are at a greater risk for externalizing behavior than children who witness verbal disagreements (Grych & Fincham, 1993).

There are additional ways to differentiate types of parental conflict to determine best methods for studying SIP as a mediator between interparental conflict and child adjustment. For

example, children may have varying levels of maladjustment to parental conflict depending on the content or topics of conflict (Cummings et al., 2004; Davies & Cummings, 1994). Children may be more likely to exhibit aggressive behavior after exposure to conflicts about the child or marital relationship when compared to exposure to less relationship threatening conflict such as disagreements about work or social problems (Cummings et al., 2004). The current study did not differentiate between types or content of marital conflict. Future studies should examine if the content of marital conflict may have differential impacts on child social cognitions and subsequently on child aggression. For example, if the current study had measured the content of marital conflict, there may have been a significant association between marital conflict about the child with child aggression when compared to marital conflict regarding topics that are less salient for the child.

The current study also had limits of external validity in that it was limited to the sample for whom data were collected. The current sample included individuals from particular regions of the U.S. and included those with higher than average SES, and thus, the findings of the current study cannot be generalized beyond this sample of the general population. Indeed, conflict may look different in those from lower SES backgrounds. Compared to individuals with higher incomes, low SES families experience more problems related to social and economic issues such as drug use and problems with money (Trail & Karney, 2012). This may lead to differences in frequency and type of conflict between parents of low SES backgrounds when compared to their high SES counterparts. In the current sample, it could be that the relatively high SES of the participants helps to better understand the low levels of parental conflict and non-significant link between parental conflict and child aggression. Whether this is the case or not, it cannot be assumed that the findings from this study can be generalized to other individuals of lower SES.

Future studies may consider examining SES as a moderating variable between interparental conflict and child maladjustment to determine the role of SES in the level and type of marital conflict.

Another future research direction would be to consider the impact of conflict within the home between family members other than parents. It could be that higher levels of aggression in children are related to domestic conflict that occurs outside of the parental dyad. Just as parents may model interparental conflict in the home, differing forms of conflict may be modeled between siblings, other adults in the home, and additional dyads depending on the family structure and individuals living in the same household as the child. Future research should examine conflict between other dyads of those living in the home as well as overall family conflict when examining such relations. The current study was limited in that demographic information was not available on who was living in the home during the waves of data collection used nor was conflict between those living in the home outside of the parental dyad assessed.

Future research may also help to understand the non-significant link between interparental conflict and child aggression in the current study. One explanation that may account for the lack of a direct relation between interparental conflict and aggression in children was that interparental conflict had a more immediate impact on child aggression instead of predicting aggression at later ages. One study supported this idea and found that children's exposure to aggressive interparental conflict has an immediate impact on children's externalizing problems in other contexts (Cummings et al., 2004). This hypothesis was not however supported with the data in the current study. Specifically, parent rated interparental conflict at child ages zero to five was not correlated with mother and teacher rated child aggression at age five. Another reason for the current study findings may be due to the strong stability of overall

aggression levels over waves of data collection from ages 5 through 11 ($\beta = .78$). Controlling for prior levels of aggression may have left limited variance left to predict in later waves. Using interparental conflict to predict aggression may be difficult given the limited change in aggression over time.

Another possibility why interparental conflict did not predict concurrent or future aggression levels in the current study is due to the low overall levels of aggression for children included in the sample. Emery (1982) was one of the first researchers to demonstrate a stronger link between interparental conflict and externalizing behavior in children who displayed clinically significant maladaptive behavior in comparison to children from normative samples. Given this established finding (Grych & Fincham, 1990), future studies may focus on studying SIP as a mediator between parental conflict and child aggression in samples of children that are clinically-referred for aggressive behavior.

A narrow range of interparental conflict scores may also be responsible for the lack of relation between conflict and child aggression, particularly if there is a threshold for how parental conflict may impact child aggression. Indeed, parental conflict in the current dataset was skewed such that both mothers and fathers rated parental conflict as low. Unfortunately, there is a lack of research and understanding on whether various levels of interparental conflict are differentially related to aggressive child behavior. A thorough review by Grych and Fincham (1990) indicated that although most published studies demonstrated a significant link between interparental conflict and child aggression, there are a handful of studies that do not show a strong relation between these two variables. Grych and Fincham have suggested that a lack of this relation is due to a restricted variance (i.e. low levels) of marital conflict measured in these

studies. Future studies should consider including parents with higher levels of parental conflict to determine if there are threshold effects in how parental conflict impacts later child aggression.

It is also possible that the mother and father reports of interparental conflict were not accurate due to social desirability and the sensitivity of some of the questions asked (i.e. physical and emotional abuse). Future studies should consider including reporters outside of the parental dyad for measures of parental conflict. For example, parental conflict can be assessed from the child's perspective on measures such as the parental conflict scale of the Co-parenting Behavior Questionnaire (CBQ; Mullet & Stolberg, 1999). The CBQ has been used in previous studies to demonstrate the link between parenting behaviors and various child outcomes including acting out and antisocial behavior (Macie & Stolberg, 2003). Using child ratings assumes that it is the child's perception of parenting behaviors such as parental conflict that impacts the child's emotional and behavioral functioning over and beyond the parents' rating of their own behavior.

Conclusion

The current study represents an important first step in understanding the possible role of social information processing in the link between interparental conflict and child aggression. This study did not support predicted hypotheses that social cognitions mediate the relation between parental conflict and aggressive behavior in children. This is surprising given that SIP has been found to mediate the relation between other parenting variables and child aggression in past studies. It is possible that the methodological design and other testable factors led to the current study's findings. Further investigation may help to clarify these questions using suggestions of future research outlined above. Future research will also clarify treatment implications as this information may be helpful to clinicians when treating children with aggression problems. That is, they may better understand effective treatment targets in children

from high conflict homes who are presenting with aggressive behavior. If SIP is shown to mediate the relation between interparental conflict and child aggression in future studies under different circumstances, it may be that clinicians should target social cognitions in children of families with high parental conflict. The current findings, however, suggest that social information processing may not play a role in the relation between interparental conflict and child aggression.

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Vita

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