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The present study aimed to expand the current conceptualization of hostile attribution bias (HAB) development by examining the effects of maternal parent-child aggression (PCA) and warmth on HAB development. In addition, child attentional control and latent mental structures were included as mechanisms through which experiences impact HAB, because Social Information-Processing theory and the intentionality development literature support this relation.

Four hundred and twenty seven children were assessed at 2, 5.5, 7.5- and 10.5-years on measures of PCA, maternal warmth, child latent mental structures, child attentional control, and hostile attribution bias. Structural equation modeling supported the specified indicators for the latent factors of PCA, warmth, and attentional control. Additionally, the hypothesis that PCA is related to more hostile attributions and warmth is related to less hostile attributions, was supported in an initial model. The final model included the child mechanisms and indicated that warmth continued to be directly related to decreases in HAB, while PCA was indirectly related to increases in HAB through its relation to attentional control.

This study contributes to the literature by expanding the types of hostile parenting that are related to HAB, including both warmth and PCA to predict HAB, and accounting for child mechanisms when measuring parent effects on HAB. Implications for further examination of the development of HAB include examining the contribution of maternal

HAB and child emotions, as well as determining the applicability of this research to preventative interventions.

EFFECTS OF PARENT-CHILD AGGRESSION, MATERNAL WARMTH AND CHILD PROCESSING MECHANISMS ON HOSTILE ATTRIBUTION BIAS

by

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To Jon Mason for his indescribable support, my mother for reading through text she does not understand, the rest of my family for keeping faith, and my fellow graduate students for holding each other together.

APPROVAL PAGE

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CHAPTER I

INTRODUCTION

Hostile Attribution Bias (HAB) is a tendency to attribute hostile intent in a range of situations. There are times when inferring hostile intent is correct, such as when a person is purposefully harmed. However, individuals with a hostile attribution bias infer hostile intent from not only overtly hostile actions, but also from ambiguous actions (Crick & Dodge, 1994; Dodge, 1980; Dodge & Coie, 1987). The term HAB was defined by Nasby and colleagues (Nasby, Hayden, & DePaulo, 1980) following a study that examined incarcerated youth ages 10 to 16. They found that a subgroup of these youth were more likely to assign a hostile plot to emotionally-laden photographs, than other youth of the same age. These children did not show a keen ability to identify hostile situations compared to other institutionalized boys; instead, they exhibited a pattern of over-attributing hostile intent even if the cues provided were ambiguous or benign (Nasby et al., 1980). Research conducted on a large sample by Dodge and colleagues (1995) indicates that as many as 46% of children between first and fourth grades over-attribute hostile intent. Clinically aggressive children and juvenile offenders have significantly higher levels of HAB than the normative population (Bailey, et al., 2007; Williams et al., 2003). Since studies tend to view HAB as a continuous construct, rates of HAB in these specific populations are not available. In a more general sense, HAB can function as a worldview, such that children with HAB assume that most people

behave with hostile intent; however, we know little about how or why this subset of children develops HAB.

HAB is often conceptualized within a social information-processing framework. Social information processing is thought to occur in a series of steps that happen almost simultaneously, beginning with the presentation of information and ending with a behavioral reaction (Crick & Dodge, 1994). First, relevant aspects of surrounding stimuli are encoded in the brain through sensory input. A child pays attention to some elements of a situation selectively and then chooses specific cues to encode and store those elements in short-term memory. These cues can include both internal elements (such as a child's emotional reaction) and external elements (such as a person yelling). During the second step, the child assigns meanings to these stimuli. It is at this point that hostile attributions may occur. If a hostile attribution is inaccurate and routinely overly-attributed, a child is believed to have HAB. After an interpretation is made, a goal or desired outcome is decided upon (step 3). For example, people who interpret a situation as dangerous may decide their goal is to protect themselves. During step 4, possible responses are examined, with consideration paid to a person's values, goals, moral acceptability and expected consequences. A behavior is then chosen (step 5) based on the conclusions drawn in the previous steps. Finally, the chosen behavioral response is enacted (step 6). These steps are proposed to always occur in the same order, with each step providing a foundation for the next one (Rumelhart & McClelland, 1986). If any one of the steps mentioned above is inaccurate, or biased, the subsequent steps will all be affected (Crick & Dodge, 1994). Children who endorse hostile attributions often

inaccurately carry out the steps following their negative attributions; including limited access to possible responses, not fully evaluating these possibilities and not necessarily selecting appropriate behaviors (Dodge, 1993).

Crick and Dodge (1994) propose that two factors govern a child's ability to navigate these steps: latent mental structures and online processing. Latent mental structures consist of a child's knowledge of social interactions and expectations of others behavior, gained from experiences. They include the social psychological concept of schemata, clinical psychological understanding of internal working models, and cognitive psychological concept of heuristics (Crick & Dodge, 1994). On-line processing is based on a child's cognitive ability to navigate the social information presented and relies heavily on his/her attention to specific cues. These two factors are proposed to affect each other to perpetuate specific patterns of social information-processing.

Overall, hostile attribution bias has a robust relationship with physical and relational aggressive behavior (Dodge & Coie, 1987; Godleski & Ostrov, 2010). Previous studies indicate that if a child attributes hostile intent instead of benign intent, the probability of behaving aggressively increases from .25 to .70 (Dodge, 1980). Children who are depressed also attribute hostile intent to those around them (Luebbe et al., 2010; Quiggle, Garger, Panak, & Dodge, 1992); however, they attribute the blame for others' behavior to themselves (Dodge, 1993). Hostile attributions are also linked to anxious symptoms to the extent that they overlap with an increased perception of threat (Barrett, Rapee, Dadds, & Ryan, 1996; Luebbe et al., 2010). In fact, a child's level of

anxiety is proportional to his/her likelihood of attributing hostile intent (Chorpita, Albano, Heimberg, & Barlow, 1996).

Literature examining HAB has focused primarily on subsequent child outcomes. As discussed above, this research has determined that HAB has a significant impact on child behavior and emotional well-being. Considering the serious outcomes of this style of thinking, learning more about the causes of HAB is imperative, as it can inform prevention and treatment efforts. This project proposes to examine the child and parent factors contributing to HAB development. The following section examines the normative development of accurate intent attribution with the purpose of identifying potential mechanisms that contribute to problematic attribution styles, such as HAB.

Developing the Ability to Infer Attributions of Intent

Development of the ability to infer intent begins in infancy and gradually improves throughout childhood, with some notable milestones. Two prominent themes that guide this developmental process are the importance of cognitive processing skills and social information that comprises latent mental structures, comparable to those proposed by Crick and Dodge (1994) to guide social information-processing.

Almost immediately after birth, infants are able to map adult biological motion onto their own body movements, as evidenced by their ability to imitate observed behavior as early as 12 days old (Meltzoff & Moore, 1994, 1997). With increased cognitive capacity, the ability to imitate carries over into an understanding of what it is like to enact certain behaviors (Meltzoff, 2002) and the intentionality others may possess. By the time infants are 6 months of age they are able to detect goal-directed behavior.

Studies conducted by various researchers indicate that infants at this age differentiate between intentional human behavior and other inanimate or accidental behaviors (Wellman & Phillips, 2001; Woodward, Sommerville, & Guajardo, 2001), thereby recognizing others as intentional agents (Tomasello et al., 2005). Once children reach 10-12 months of age they are able to recognize that a series of actions can be used to achieve an intended outcome and utilize previously observed actions to identify the actor's goals (Sommerville & Crane, 2009). Infants at this age look longer at scenes in which an intentional series of behaviors is interrupted than scenes in which interruptions occur after the intended outcome is achieved (Baird & Baldwin, 2001; Hamlin et al., 2008). Researchers have proposed that this early form of identifying intention is a lower form of intentionality understanding. For example, Povinelli and Giambrone (2001) put forth that, at this point in development, infants are simply detecting intentionality but are unable to identify the actual intent of the behaviors they observe. This lower-level of understanding is then built upon through gathering information from experiences (Baird & Baldwin, 2001; Sommerville & Crane, 2009). As children continue to process social interactions, they store this information and reference it when assigning functional significance to subsequent behaviors they observe (Baird & Baldwin, 2001).

By 18 months of age children have accumulated the necessary knowledge structures to successfully identify the specific intentions of others. Research by Meltzoff (1995) indicates that children at this age are able to finish an uncompleted intended action if they watch an adult fail at that action. Other studies have shown that children at this age are able to recognize a person's preferences and foci of attention, even if they are

different from the child's own preferences (Moll, Carpenter, & Tomasello, 2007; Repacholi & Gopnik, 1997). At 2-3 years of age children have the cognitive ability to explain why a person is carrying out a specific behavior and can predict how a person will feel if a hypothetical outcome occurs (i.e. sad because he/she found a bunny instead of a dog; Bartsch, Campbell, & Troseth, 2007; Bartsch & Wellman, 1989; Schult & Wellman, 1997; Wellman & Woolley, 1990); however, Astington (2001) clarifies that children at this age are unable to identify that a person behaves a certain way because he/she desires a specific outcome. Thus, these children understand the motivational aspect of intention (why a person is doing something), but not the epistemic aspect (that a person's intentions are supported by his/her outcome-oriented beliefs).

In order to achieve this level of understanding, children must have the metarepresentational ability to determine what others believe will happen when they carry out an action (Astington, 2001). By 3 years of age children are able to identify the intentions a person possesses, but show a comparatively poorer understanding of how these intentions relate to outcomes. These children frequently over-infer intentionality by thinking that all behavioral outcomes, even if involuntary, are intentional (Heider, 1958; Smith, 1978). Moreover, children at this age rely on outcomes to determine intent and frequently conclude a person is "mean" if he/she caused a negative outcome (Heyman & Gelman, 1998). Miller and Aloise (1989) posit that this early pattern of assuming intentionality is based on limited knowledge about how or why people behave a certain way and is further clarified through information gathered from experiences. Several studies examining discrepant intentions and outcomes indicate that children are better

able to recognize that intentions may differ from outcomes as they reach 5 years of age (Phillips, 1994; Schult, 1996). All children in these studies were told that a prize was present behind one of a series of targets. Children from 3 to 4 years of age reported wanting to achieve a specific target because they desired the prize they believed was underneath. If they hit a different target and achieved the desired prize, they retrospectively reported intending to hit the achieved target because it matched the desired outcome (i.e. earning the prize). Thus, these children were unable to reconcile the disparity between their intentions (to hit a specific target) and the outcome (earning the prize). Children 3 to 4 years of age concluded that since they were trying to earn the prize, their intention was to hit the achieved target, even though in actuality they intended to hit a completely different target. By 5 years of age, the children in these studies were able to accurately report their original intentions, regardless of the outcome. At this age children recognize that beliefs guide intentions and further lead to outcomes, contributing to a solid understanding that only desired outcomes are caused intentionally (Astington, 2001; Baird & Moses, 2001). As children's cognitive abilities improve, they are able to take into account an increasing number of variables and person-specific characteristics to determine intentionality (Miller & Aloise, 1989).

Thus far we have discussed the development of the ability to infer intent accurately. Little research has been conducted to examine deviance from accurate intent attributions. Children with HAB accurately attribute hostile and non-hostile intent in *obvious* situations, but have particular difficulty attributing accurate intentionality in ambiguous situations (Crick & Dodge, 1994; Dodge, 1980; Dodge & Coie, 1987).

Factors leading to the development of a pattern of attributing hostile intent in ambiguous situations are unclear; however, examination of the intentionality research discussed above indicates two accomplishments that, if not attained, could lead to inaccurate intent attribution patterns: first, developing the cognitive ability to process social information; second, acquiring a store of normative social expectations gleaned from experiences. These two mechanisms are further supported by the aforementioned social-information processing model (Crick & Dodge, 1994). As discussed previously, this model relies on child processing skills and memory store of social expectations to form conclusions about social situations. Problems in either of these two areas are likely to contribute to the development of HAB and are examined in the following sections.

Latent Mental Structures Impacting Intent Attributions

The social-information processing model specifies that while processing skills are being applied, latent mental structures from long-term memory are accessed to provide expectations and guide conclusions (Crick & Dodge, 1994). When children observe a situation they encode cues and simultaneously access relevant knowledge from past experiences to form intent attributions. The intentionality literature also emphasizes the importance of social expectations to the extent that they provide a basis for children's subsequent intent attributions (Astington, 2001).

Experiences are generally stored as mental structures within long-term memory. This information is further organized as relational schemas that characterize different aspects of interactions (Baldwin & Dandeneau, 2005). The first type of relationship schema that children develop is through early interactions with their parents and is called

an "internal working model" (Bauer, 1997; Bowlby, 1969; Haden, Haine, & Fivush, 1997). People rely on relational schemas when faced with ambiguous situations in order to fill in the blanks of partial or unclear information and draw conclusions (Baldwin & Dandeneau, 2005; Tomkin, 1979). For example, if children hear a person yelling, but cannot make out the specific words, they will likely access their relational schema in order to determine why the person is yelling. If children have incorporated an understanding that people yell when they are upset, they may assume that the person is angry and choose to leave the situation. However, children may instead rely on an interpretation that the person is yelling because he/she is excited. Children's interpretations in this situation are heavily impacted by the information that is stored in their relational schema. Relational schemas are continuously updated through the acquisition of new information (Baldwin & Dandeneau, 2005). New information can be incorporated into the existing relational schema in the form of global structures (Lynch & Cicchetti, 1991). Global representations help interpret and guide interactions with new people or new/ambiguous situations. If these global representations consist of biased information, a child is likely to form inaccurate conclusions (Lynch & Cicchetti, 1991).

Events that are emotionally salient are stored within relational schemas, but are also incorporated into easily accessible "nuclear scripts" (Tomkin, 1979, 1992). Tomkin (1979) describes nuclear scripts as a type of global mental representation of tragic or unpleasant experiences with others. They are characterized by negative emotional content that is very salient and correspond to patterns of immediate attribution that are rigidly applied. Evolutionarily, emotionally negative experiences need to be recalled and

reacted to quickly in order to ensure survival. When children are faced with a situation that parallels a previously experienced negative event, they are likely to access a nuclear script which results in vigilant searching for similar stimuli and leads to specific conclusions (Tomkin, 1979, 1992).

The social-information processing model (Crick & Dodge, 1994) indicates that children with HAB are likely to have latent mental structures that consist of information supporting hostile conclusions. Empirical studies have found that most children who exhibit HAB have experienced negative social interactions in the past (Dodge et al., 1995; Dodge & Price, 1994). Children glean information from these negative experiences, such as cues that indicate hostility, possible hostile behaviors, and the outcomes of hostile behaviors. Further research indicates that, over time, this negative information is incorporated into a relational schema that includes many hostile cues and a global representation of others as hostile (Gomez & Gomez, 2000; Price & Glad, 2003). Studies have not examined how mental structures may differ in children with hostile attributions compared to those without. Past research has indicated, however, that aggressive children are more likely to have negative mental representations than nonaggressive (Burks, Laird, Dodge, & Pettit, 1999). Since aggressive children are also more likely to have HAB (Dodge, 1980; Dodge & Coie, 1987), it is likely that they have hostile mental structures as well.

On-Line Processing Impacting Intent Attributions

The information processing that takes place when children attribute intent is comprised of a number of cognitive and social-cognitive elements including evaluating

situational cues, forming potential intent attributions, and integrating this information to infer an intention (Molden, 2009). The processing skills most relevant to HAB have not been identified by the current body of literature. As discussed in an earlier section, it has been established that difficulty with the first step of the social information-processing model sets the stage for hostile attributions. We propose that attentional control likely contributes to HAB development to the extent that it affects this first step and contributes to biased latent mental structures.

Children's ability to focus their attention on specific cues, "attentional control", can affect both their ability to encode cues into working memory and incorporate these cues into decisions (Portas et. al., 1998). Attentional control is a type of executive control that is strongly related to various forms of self-control, including emotion regulation, behavioral inhibition, and impulse control (Schmeichel & Baumeister, 2010). The components of attentional control include selective attention, which is the act of focusing attention on one aspect of the environment while inhibiting attention toward other potentially more attention-grabbing cues, and sustained attention, which is the act of focusing attention on a stimulus for an extended period of time (Fuentes, 2004; Rueda, Posner, & Rothbart, 2005; Schmeichel & Baumeister, 2010). These abilities develop throughout the first two years of life and are the result of mylenation in the primary motor and sensory areas of the brain as well as increases in social interaction with caregivers (Posner, 2004; Rothbart, Posner, & Boylan, 1990; Vygotsky, 1962). Since attentional control is used as an early means to regulate emotional stimuli it is considered a "hot" executive function. The "hot" aspect of executive functioning refers to the ability to

respond quickly to emotional and contiditioned stimuli, which is evolutionality adaptive (i.e. faster ability to activate the fight or flight response to escape danger) (Zelazo & Muller, 2002). By two years of age, children are learning to effortfully focus of their attention to resolve conflicts among thoughts, feelings, or behaviors (Rueda et al., 2005). Children's attentional control is developed by 5 years of age, at which point their response time, sustained attention, and coordination with behavior is relatively stable prior to the declines that occur in adulthood (Ruff & Rothbart, 1996).

Current theory posits that children with HAB are more likely to attend to hostile cues and encode this information (Crick & Dodge, 1994; Dodge, 2006; Dodge & Tomlin, 1987; Dodge & Frame, 1982). Encoding information contrary to a pre-existing schema is a more cognitively demanding task and requires more time for children to complete (Davenport, 2007). In fact, recent research utilizing eye-tracking methods has identified that children with HAB take a longer time to encode non-hostile cues, remember hostile cues better, and conclude hostile intent based on the presence of potentially hostile cues (Horsley, Orbio de Castro, & Van der Schoot, 2010). Although this study did not measure attentional control, a child's cognitive ability to inhibit attention to hostile cues and encode relevant cues (i.e. attentional control) likely explains these results.

It was previously discussed that children with HAB also have hostile relational schemas. Thus, they have a confirmation bias toward hostile conclusions and are automatically drawn to make hostile attributions (Dodge, 2006). In order for these children to make accurate attributions they need to have a stronger ability to sustain their attention toward non-hostile cues, put forth the cognitive control to incorporate non-

hostile cues into their judgments, and inhibit their automatic tendency toward hostile conclusions. The construct of attentional control encompasses these elements and should provide children with the executive control necessary to navigate schema-inconsistent situations and attribute accurate intent. Children with poorer attentional control should be more likely to develop HAB because they will not be able to override existing tendencies to attribute hostile intent and fail to incorporate all relevant cues into their intent attributions.

Overall cognitive ability (intelligence) has been related to executive functioning capabilities in past research (i.e. Charlton, Barrick, Markus & Morris, 2009; McAlister & Peterson, 2007). Thus, lower child intelligence could limit the ability to carry out necessary cognitive tasks when attributing intent, which may result in biased attributions in ambiguous situations. Due to shared effects with executive functioning, child intelligence should be taken into account when examining attentional control.

HAB Stabilization

Biased latent mental structures act in conjunction with processing skills to create a pattern of hostile intent attribution over time. According to the social-information processing model (Crick & Dodge, 1994), children simultaneously process situational cues and access their relational schemas in order to attribute intent (Medin, 1989) and the way children apply their processing skills is affected by the content of their latent mental structures (Crick & Dodge, 1994). As mentioned above, if a child's latent mental structures are biased toward hostile information, then his/her processing will also be biased toward hostile cues, and ultimately they will gather information that confirms

hostile attributions (Crick & Dodge, 1994). As children continue to come to the same conclusions by accessing biased schemas, they also solidify neural pathways to that information and form a more stable HAB (Dodge, 2006). Moreover, their hostile conclusions fuel future hostile conclusions by creating more hostile experiences. Research with aggressive boys indicates that when these children attribute hostile intent they are likely to behave aggressively in retaliation, resulting in future negative experiences with peers (Dodge et al., 1986). Thus, over time hostile attributions contribute to hostile relational schemas and biased processing of situational cues, resulting in a pattern of hostile intent attributions (HAB).

Research examining HAB has not conclusively identified at what age the pattern of attributing hostile intent in ambiguous situations becomes stable. Dodge and colleagues (1995) conducted a longitudinal study examining social-information processing over time. They found evidence that HAB is relatively stable across children ages 4 to 9 years old, with significant correlations spanning each consecutive year and an overall alpha of .73 (Dodge et al., 1995). The authors concluded that early attribution biases could be identified in children at 4 years of age. HAB pervaded in only a percentage of these children and increased in stability (i.e. regularly attributed hostile intent in ambiguous situations) as they entered middle childhood (Dodge et. al., 1995). A review of HAB's influence on aggressive behavior supported that stronger effect sizes were identified for children in the 8-12 age group than children in younger age groups (de Castro et al., 2002). It is likely that the stabilization process is occurring during this time

point and that the additional processing factors and negative experiences discussed previously are necessary to create a pervasive pattern of over-attributing hostile intent.

Taken together this research highlights the importance of processing skills and latent mental structures for the development of HAB. It also alludes to the importance of experiences in the process of HAB development, to the extent that they contribute to the content of schemas and subsequent information processing. Children's experiences are largely structured by their parents, who act as primary socializing agents (i.e. Bandura, 1973 and Garcia, Restubog & Denson, 2010). Parent factors are discussed in the following sections and applied to the development of HAB through the previously introduced mechanisms.

Parent Factors Contributing to HAB

The previous sections have discussed the child factors relevant to the development of hostile attribution bias, including processing skills and latent mental structures. Children consistently develop their processing skills and add to their relational schemas by incorporating information from their experiences. Stemming from current theory of HAB development (Dodge, 2006) and the intentionality review, children need to experience a variety of situations in order to broaden their understanding of intent. This exposure gives children the opportunity to learn the various intentions may be present (Molden, 2009) and enforces the necessity to look beyond schema-based information to attribute accurate intent. Dodge (2006) proposes that if children are exposed to predominately hostile experiences, they form biased mental structures and ultimately develop HAB.

Parent-Child Aggression

A specific experience that is likely related to HAB is Parent-to-Child Aggression (PCA). PCA includes physically aggressive (i.e. hitting, slapping) and verbally aggressive (i.e. yelling, threatening) behaviors toward children. Both of these subtypes of PCA are very common among American families, occurring at least once in over 90% of homes (Giles-Sims, Straus, & Sugarman, 1995; Straus & Field, 2003; Straus & Stewart, 1999). However, these same studies indicate that the chronicity and severity of this aggression may vary between households.

Numerous studies have related child maltreatment to the development of hostile attribution bias (Dodge et al., 1995; Price & Glad, 2003; Weiss, Dodge, Bates, & Pettit, 1992), but few studies have expanded these findings to children experiencing PCA. One exception to this is a study by Weiss and colleagues (1992), which determined that parent physical aggression does not have to occur at a threshold of abuse to increase child hostile attributions. Children in their study were more likely to display hostile attributions toward peers if their parents utilized physically aggressive discipline practices (i.e. spanking, slapping; Weiss et al., 1992). In a study conducted by Dodge et al. (1995), 68% of children that were victims of parental physical aggression evidenced social information processing problems (such as HAB), whereas only 39% of non-victimized children had these problems. A more recent study by Price and Glad (2003) indicated that children exposed to physically aggressive parent behaviors, not non-aggressive maltreatment such as neglect, were more likely to have hostile attributions. This study also clarified the impact of frequency, specifying that increased frequency of

physical abuse was related to increased probability of HAB. These studies indicate that parent physical aggression contributes to increases in HAB.

One limitation of this research is the focus on parental *physical* aggression. It is clear that these acts of parental aggression have an impact on child hostile attributions, but other forms of parental aggression have been left unstudied. Some studies have identified that children exposed to verbal aggression suffer similar negative psychosocial outcomes as children exposed to physical aggression (Morimoto & Sharma, 2004). Moreover, since HAB is theorized to develop from exposure to hostile experiences in general (Dodge, 2006), the expansion of this research to include verbal aggression and physical aggression is necessary. Both forms of aggression are integrated into the construct of PCA in the following sections.

Research relating PCA to child HAB has also failed to examine the specific factors accounting for this association. One possibility is that PCA impacts HAB by affecting the type of information available in a child's long-term memory. Price and Glad (2003) were able to show that boys' attributions of their mothers' behavior mediated the pathway from maternal physical abuse to children's attributions toward others. In this study, boys who were physically abused were more likely to attribute hostile intent to their mothers, which then predicted their increased hostile intent attributions toward others, such as teachers, peers, and best friends (Price & Glad, 2003). Dodge (2006) proposes that children exposed to PCA evidence HAB because they do not learn to discern accurate intent attributions and their latent mental structures are dominated by hostile interactions. Thus, when children exposed to PCA are faced with

ambiguous situations, they rely on their biased hostile mental structures to attribute intent. There is little reason to believe that physical PCA would have a more negative effect on mental structures than verbal PCA, since both sets of actions characterize the caregiver as a hostile and harmful agent. It is likely that children who experience PCA (either physical or verbal) have a biased relational schema that includes an overwhelming amount of hostile expectations, ultimately leading children to over-attribute hostile intent.

PCA could also lead to HAB by affecting a child's ability to successfully apply the processing skills necessary to attribute accurate intent. Abused children are more likely to have difficulty controlling their attention (Thompson & Tabone, 2010), probably due to subsequent changes in their brain structure and functioning (Twardosz & Lutzker, 2010). Particular attentional control difficulties have been noted when children with a history of maltreatment are faced with hostile cues (Pollak, Cicchetti, Klorman, & Brumaghim, 1997; Pollak, Klorman, Thatcher, & Cicchetti, 2001). Research has shown that children exposed to various forms of PCA are more likely to encode danger cues and fail to incorporate other relevant cues (Pine et. al., 2005). Children who have experienced PCA likely learn to focus on hostile cues because they are continuously exposed to threatening situations and their survival is dependent on recognizing these threats. Moreover, they lack the attentional control to disengage from these stimuli or otherwise adjust to emotional cues. Thus, PCA may lead to HAB by reinforcing a child's attention toward hostile cues and limiting their ability to shift attention to relevant cues (Dodge, 2006).

A gap in the current literature that has not yet been resolved is the high occurrence of PCA and significantly lower prevalence of HAB. All children who are exposed to PCA do not develop HAB. Parents are agents of socialization who engage with their children in many ways throughout their lives. Thus, in order to gain a more complete perspective of the development of HAB, other parent factors need to also be examined. Maternal warmth is a parent characteristic that has been measured concurrently with PCA and is implicated in child social-information processing outcomes.

Maternal Warmth

Maternal warmth is a construct characterized by positive feelings that a mother conveys to her child, creating an atmosphere of friendliness and affection (Deater-Deckard, Ivy, & Petrill, 2006). Warm parent-child relationships consist of shared positive affect, as well as positive communication, high relationship quality and increased knowledge of the child (Dodge, Pettit, & Bates, 1994). Research has indicated a robust relationship between maternal warmth and generally positive outcomes, including fewer externalizing problems across various socioeconomic and ethnic groups (Aluja, del Barrio, & Garcia, 2005; Dimitrovich & Bierman, 2001; Harrist & Waugh, 2002). Specifically, maternal warmth has been studied concurrently with parent physical aggression. As expected, maternal warmth is negatively correlated with parent physical aggression, but only at low levels (Deater-Deckard et al., 2006). Thus, the constructs are not collinear and can account for variation in child outcomes. These studies indicate that although corporal punishment generally leads to child externalizing problems, maternal

warmth moderates this relationship such that high maternal warmth significantly decreases or eliminates negative child behavior (McLoyd & Smith, 2002; Deater-Deckard et al., 2006).

Although the aforementioned studies indicate that there are moderating effects of maternal warmth, the literature examining the effects on HAB also indicates a direct relation. Gomez and Gomez (2000) observed maternal warmth in mother-child dyads with aggressive boys between the ages of 9 and 10 years old. They concluded that hostile attributions were significantly more likely in children with mothers that scored low in warmth and much less likely when mothers were high in warmth (Gomez & Gomez, 2000). In a study by Palmer and Hollin (2000), retrospective report of perceived maternal warmth from male participants between the ages of 13 and 21 years of age was linked to current hostile attributions. Participants were significantly less likely to endorse hostile attributions if they perceived high levels of warmth in their maternal relationship (Palmer & Hollin, 2000). These studies indicate that maternal warmth decreases the likelihood of child HAB, but fail to identify the factors accounting for this relation.

Therefore, it is likely that maternal warmth affects HAB through the same mechanisms as PCA. Maternal warmth contributes to positive mental structures, which can decrease the likelihood of HAB. The attachment literature indicates that warm parent-child interactions lead to the generation of positive relational schemas (Bauer, 1997; Bowlby, 1969; Haden, Haine, & Fivush, 1997; Main, 2000). Early parent-child interactions form Internal Working Models, which are relational schemas that children construct during the first few years of life (Bowlby, 1969; Dodge, 2007). These early

schemas set expectations for future interactions as well. If a mother is consistently sensitive to infant signals and provides warm responses, children form a positive Internal Working Model which provides similar expectations for subsequent social interactions (Bauer, 1997; Bowlby, 1969; Main, 2000). Children with these experiences are more likely to assume that others will respond to them positively and have positive intentions when interacting with them. Although these mental structures may be formed early in life as Internal Working Models, it is important to note that they are continually revised to incorporate new information (Dodge, 2006). Thus, maternal warmth may decrease the likelihood of HAB by creating positive relational schemas which are accessed to provide expectations of intent during social experiences.

Maternal warmth may also impact HAB by affecting specific processing skills. Adults shape children's attentional control through demonstration and instruction, regulation of arousal, and facilitation of gradual self-control (Ruff & Rothbart, 1996). Warm maternal behavior is likely related to these accomplishments and ultimately helps children improve their cognitive control (Eisenberg et al., 2005). When parents are positive and supportive, children are more disposed to learn from their instruction and modeling of appropriate strategies (Dix, 1991; Grusec & Goodnow, 1994). Children rely on their mothers to orient them toward important information in the environment and assist them with inhibiting attention toward distressing stimuli (Rothbart, Ziaie, & O'Boyle, 1992). Responsiveness, as an element of maternal warmth, improves attentional control by providing children with feedback and orienting them toward targets of joint attention (Derryberry & Reed, 2002). When parents are not-responsive or

intrusive toward their children as infants, children are more likely to exhibit attention deficits at age 5 (Jacobvitz & Sroufe, 1987). Thus, warm parent-child interactions encourage improvements in children's attentional control, probably to the extent necessary for accurate attributions, and thus diminish the likelihood of hostile intent attributions.

Current Study

The proposed study aims to expand the current understanding of the development of HAB by exploring contributing parent factors and child processing mechanisms across time. The intentionality and social-information processing literature indicate two child factors that could explain the development of HAB: processing skills and mental structures. When attributing intent, children are required to process social information and access stored mental representations (Molden, 2009). To the extent that children's attentional control is limited, they are expected to interpret hostile intent in ambiguous situations. Attentional control was measured at 7.5 years of age to ensure that variation in this construct at the time of maternal experiences is examined. In addition, children's mental structures are expected to increase hostile intent attributions to the extent that they are biased toward hostile expectations. Latent mental structures were measured at 2 and 7.5 years of age in order to include both internal working models and more recent mental representations of relationships. Based on the literature reviewed, this study examined HAB in middle childhood (10.5 years) in order to better assess the stabilized construct.

Maternal experiences have also been implicated as important factors in social-information processing and the development of intentionality. PCA and maternal warmth

are two factors that have been directly related to HAB (Dodge et al., 1995; Gomez & Gomez, 2000; Price & Glad, 2003; Palmer & Hollin, 2000; Weiss et al., 1992). Specifically, the frequency of PCA has been related to increased likelihood of HAB in children (Price & Glad, 2003). Thus, this study proposes to examine PCA over one year (measured at 7.5 years by asking about the previous year). Maternal warmth has been linked with lower rates of HAB through longitudinal and retrospective reports (Gomez & Gomez, 2000; Palmer & Hollin, 2000). Maternal warmth was examined at 5.5 years of age.

The specific mechanisms accounting for the impact of PCA and maternal warmth on HAB have not been clearly examined in the current literature. There is evidence, however, that these maternal factors differentially impact child processing skills and mental structures, thus accounting for HAB development. PCA has been associated with biased child processing skills as well as negative mental structures (Dodge, 2006; Hughes et. al., 1999; Pine et. al., 2005; Price & Glad, 2003). Moreover, maternal warmth has been related to improvements in child processing skills and positive mental structures (Bauer, 1997; Bowlby, 1969; Eisenberg et al., 2005; Ereky-Stevens, 2008; Haden et al., 1997). The present study proposes to examine the indirect impact of PCA and maternal warmth on HAB through child processing skills and child mental structures.

Using a sample of children between the ages of 2 and 10.5 from an ongoing longitudinal study, three hypotheses are proposed:

1. PCA at 7.5 years will lead to higher frequency of hostile attributions at 10.5 years, while maternal warmth at age 5.5 will lead to a lower frequency of hostile attributions at 10.5 years.
2. Child attentional control and mental structures across ages 2 and 7.5 will be differentially affected by PCA and maternal warmth, such that PCA will decrease attentional control and decrease positive mental structures, while warmth will improve attentional control and increase positive mental structures.
3. Child attentional control and mental structures will function as intermediate variables between the effects of PCA and maternal warmth on HAB. Thus, PCA and warmth will indirectly affect HAB to the extent that they alter attentional control and mental structures.
4. A non-linear model, that includes the interactive effects of PCA and maternal warmth, will be assessed with the expectation that high levels of maternal warmth will buffer the effects of high PCA, ultimately reducing HAB compared to the combination of high PCA and low warmth.

CHAPTER II

METHOD

Participants

The current sample utilized data from three cohorts of children who are part of an ongoing longitudinal study, the RIGHT Track project. The goal for recruitment was to obtain a sample of children who were at risk for developing future externalizing behavior problems that was representative of the surrounding community in terms of race and socioeconomic status (SES). All cohorts were recruited through child day care centers, the County Health Department, and the local Women, Infants, and Children (WIC) program. Potential participants for cohorts 1 and 2 were recruited at 2-years of age (cohort 1: 1994-1996 and cohort 2: 2000-2001) and screened using the Child Behavior Checklist (CBCL 2-3; Achenbach, 1992) completed by the mother in order to over-sample for externalizing behavior problems. Children were identified as being at risk for future externalizing behaviors if they received an externalizing T-score of 60 or above**.** Efforts were made to obtain approximately equal numbers of males and females. A total of 307 children were selected. Cohort 3 was initially recruited when infants were 6-months of age (in 1998) for their level of frustration based on laboratory observation and parent report and followed through the toddler period (See Calkins, Dedmon, Gill, Lomax, & Johnson, 2002, for more information). Children whose mother's completed the CBCL at 2-years of age were included in the current study (n = 140). Of the entire

sample (N = 447), 37% of the children were identified as being at risk for future externalizing problems. There were no significant demographic differences between cohorts with regard to gender, χ^2 (2, N = 447) = .63, p = .73, race, χ^2 (2, N = 447) = 1.13, p = .57, or 2-year SES, F (2, 444) = .53, p = .59. Cohort 3 had a significantly lower average 2-year externalizing T-score (M = 50.36) compared to cohorts 1 and 2 (M = 54.49), t (445) = -4.32, p = .00.

Of the 447 original screened participants, 6 were dropped because they did not participate in any 2 year data collection. At 4 years of age, 399 families participated. Families lost to attrition included those who could not be located, who moved out of the area, who declined participation, and who did not respond to phone and letter requests to participate. There were no significant differences between families who did and did not participate in terms of gender, χ^2 (1, N = 447) = 3.27, p = .07, race, χ^2 (1, N = 447) = .70, p = .40, 2-year SES, t (424) = .81, p = .42, or 2-year externalizing T-score, t (445) = -.36, p = .72. At 5-years of age 365 families participated including 4 that did not participate in the 4-year assessment. Again, there were no significant differences between families who did and did not participate in terms of gender, χ^2 (1, N = 447) = .76, p = .38, race, χ^2 (1, N = 447) = .17, p = .68, 2-year socioeconomic status, t (424) = 1.93, p = .06) and 2-year externalizing T-score (t (445) = -1.73, p = .09). At 7-years of age 350 families participated including 19 that did not participate in the 5-year assessment. Again, there were no significant differences between families who did and did not participate in terms of gender, χ^2 (1, N = 447) = 2.12, p = .15, race, χ^2 (3, N = 447) = .60, p = .90 and 2-year externalizing T-score (t (445) = -1.30, p = .19). Families with lower 2-year

socioeconomic status, t (432) = 2.61, p > .01) were less likely to continue participation at the 7-year assessment.

At 10-years of age 358 families participated, including 7 children that did not participate in the 7-year assessment. No significant differences are noted between families who have and have not participated in terms of race, χ 2 (3, N = 427) = 2.77, p = .43, 2-year socioeconomic status, t (413) = -.48, p = .64 or 2-year externalizing T-score, t (425) = -.98, p = .33. A significant difference was found for gender, χ2 (1, N = 427) = 4.12, p < .05, with more females than males participating in the 10-year visit

This project utilized data from cohort 1, 2 and 3 at ages 2, 5.5, 7.5, and 10.5. The full sample size was 427, with racial (67% Caucasian), economic (Hollingshead scores ranging from 14 to 66 with a mean of 39.56), and gender (242 female) diversity. 365 children had data missing from at least one time point, 109 children had data missing from at least two time points, and 78 children had data missing from three time points. It is important to note that many of the variables were combined with others to form latent factors. Thus, a missing value from one measure at one time point does not indicate a missing value for the latent factor. Missing data was accounted for by full information maximum likelihood estimation as implemented through SAS (Version 9.2).

Measures

Hostile Attribution Bias

HAB was measured at 10.5 years by child report. This age was chosen because previous findings indicate that HAB becomes a more stable bias in middle childhood (Dodge et al., 1995).

The Intent Attributions and Feelings of Distress Measure (Crick, 1995) was created to assess the presence and emotional intensity of hostile attributions in children. The measure consists of 10 stories that describe instrumental provocation, and relational provocation. This study utilized five stories in which three depicted instrumental provocation and two depicted relational provocation (see Appendix A). The stories were read to the child during an interview conducted by a trained graduate student during the home visit. A sample premise showing instrumental provocation is "a child's radio is broken by a peer." An example of a relational provocation story is, "a child discovers that his friend is playing with someone else." After each story children are asked a series of questions related to intent attributions and distress. The two intent attribution questions were selected for the purposes of this study. Children were asked whether they believe the actions of the perpetrator were hostile (scored 1 point) or benign (scored 0 points). Next, they were asked to choose the most probable attribution from four possible answers. The latter answers were recoded to indicate a hostile attribution (scored 1 point) or a benign attribution (scored 0 points). Thus, each of the five scenario has two corresponding scores, one from each question. A composite was created by computing the mean of these ten scores, ranging from 0 to 1. The measure has demonstrated reliability with an alpha between 0.74 and 0.80 for the story subtypes (Crick, 1995). In this sample the alpha coefficient for the ten recoded attribution items was 0.76.

Parent-Child Aggression

PCA was assessed at 7.5 years through parent report and spanned the past year (from 6.5 to 7.5 years of age). This age was chosen in order to capture the levels of PCA during the time of HAB development, which is thought to be before 10 years of age (Dodge et al., 1995). Two measures are proposed in order to address the multiple facets of this construct and are later combined into a latent factor.

The Parent-Child Conflict Tactics Scale (PCCTS) was utilized to measure verbal PCA as well as extreme forms of physical PCA. This scale was adapted from the Conflict Tactics Scale (Straus, Hamby, Finkelhor, Moore & Runyan, 1998) in order to measure child maltreatment. Items ask the parent how often he/she behaves in a specific way when the child has done something wrong or made the parent angry. Item responses range from 0 to 7 (0 = this has never happened, 1 = once in the past year, 2 = twice in the past year, 3 = 3-5 times in the past year, 4 = 10 times in the past year, 5 = 11-20 times in the past year, 6 = more than 20 times in the past year, 7 = not in the past year, but it happened before). The answers are scored to indicate chronicity (how often the behavior has occurred in the past) through a process explained by Straus in his 1979 publication. The PCCTS yields 5 subscales: nonviolent discipline, psychological/verbal aggression, physical assault, neglect, and sexual abuse. This study utilized the subscales of psychological/verbal aggression and physical assault to operationalize PCA because of the threatening nature of these behaviors. The psychological/verbal aggression subscale measures verbal acts by the parent that are intended to cause psychological pain or fear in the child. Due to the fact that this scale relies on verbal forms of PCA, it will be referred

to as "verbal aggression" in this study. This subscale consists of 5 items, such as "shouted, yelled, or screamed at him/her." The physical assault subscale measures physical acts by the parent possibly intended to cause physical pain to the child. The subscale consists of 13 items, such as "slapped him/her on the hand, arm, or leg." The items assess a wide variety of parent behaviors, resulting in a moderate internal consistency of the physical assault subscale and the verbal aggression subscale (Cronbach's alpha = .58 and 0.57 respectively in this sample). Due to the community-orientation of this sample, the verbal aggression and physical assault scores indicated somewhat non-normal distributions (skewness = 1.121 and 3.181; kurtosis = 0.581 and 13.752, respectively). Thus, these scores were transformed by adding 0.05 and calculating the natural log, resulting in normal distributions (skewness = -0.688 and -0.059; kurtosis = 0.062 and -0.990, respectively).

PCA was further assessed by the Alabama Parenting Questionnaire (APQ; Shelton, Frick, & Wootton, 1996). The APQ was created to assess various elements of parenting including positive, negative, and discipline practices. The questionnaire consists of a likert response system ranging from 1 "Never" to 5 "Always." The APQ yields five factors (derivation discussed in Shelton et al., 1996): parental involvement, positive parenting, poor monitoring/supervision, inconsistent discipline, and corporal punishment. This study focused on the corporal punishment scale because it is analogous to physical PCA utilized to discipline children. This 3-item scale assesses the use of physical means to discipline children, with items such as "You spank your child with your hand when he/she has done something wrong." The value of this scale can range

from 3 to 15. Reliability for this scale is moderate for our sample (Cronbach's alpha = 0.52). This internal consistency score is comparable to the internal consistency reported by the creators of the measure (see Shelton, Frick & Wootton, 1996). It is likely that the low internal consistency is a result of the scale being comprised of only three items. Additionally, since each item describes a different form of corporal punishment (spanking, slapping, hitting with object), it is possible that the low internal consistency reflects parents' preference to use one particular type of corporal punishment.

Maternal Warmth

Maternal warmth was assessed by coding a series of lab tasks administered when children were 5.5 years of age. The literature examining observed maternal warmth indicates that the maternal behaviors comprising this construct are relatively stable from infancy through middle childhood (Feldman, 2010). As such, the age of 5.5 was chosen in order to approximate maternal warmth through the age of 6.5 and 7.5, which is concurrent with the PCA instruments discussed above. These measures were combined into a Maternal Warmth latent factor in order to incorporate various aspects of the construct.

Five observational tasks were conducted, including age-appropriate play, clean-up, and an art activity. An example play activity for children at age 5.5 is putting a puzzle together. Mother-child interactions were coded by third party observers with a reliability kappa above .75. Of interest in the current study are Maternal Positive Affect (expressing positive emotion toward the child), Maternal Responsiveness (behaviors such as engaging with the child's play), and maternal hostility (displaying angry behavior or

affect). These three factors are consistent with established coding schemes assessing maternal warmth, with maternal hostility having an inverse relationship with maternal warmth (Deater-Deckard, 2000). Maternal behavior was coded between one and four and the mean was calculated for each behavior. The positive affect values were highly related (alpha of 0.89) as was maternal responsiveness (0.805), but hostility had a low alpha (0.347). Thus, the maternal hostility mean score should be interpreted with caution.

Attentional Control

Child attentional control was measured at age 7.5 utilizing parent report, a child performance task, and teacher report to assess the different components of the construct and application across contexts. 7.5 years was chosen so that the measure assesses attentional control prior to HAB solidification and after the 6.5-7.5 (PCA) and 5.5 (warmth) maternal behavior measures. These attentional control measures were combined into an Attentional Control latent factor.

The Child Behavior Questionnaire (CBQ; Rothbart, Ahadi, Hershey, & Fisher, 2001) is a parent report of various temperament factors. Of interest in this study is the Attention Focusing subscale, which is comprised of 6 items assessing a child's ability to effortfully focus his/her attention. Parents rated each item on a 0-7 likert scale, ranging from "not applicable" to "extremely true." Sample items include "my child is easily distracted," and "my child becomes involved in tasks." Answers were recoded so that higher scores indicated a stronger attention focusing ability and the mean of these scores was calculated. Scale analysis indicated that one item did not relate to the others as

expected ("my child becomes absorbed in picture books") likely due to the specificity of the task and was thus deleted from further analyses. The final alpha coefficient within our sample was strong (Chronbach's alpha = 0.724).

The Delis-Kaplan Executive Function System (D-KEFS; Delis, Kaplan, & Kramer, 2001) was used to assess the selective attention component of the attentional control construct. This measure is comprised of a set of tasks that assess several aspects of executive control; the Color-Word Identification Task was utilized in this study. The first two trials of this task measure the child's ability to recognize colors and read color words. The third trial adds the burden of selectively attending to specific stimuli by presenting the child with a page containing the words "red," "green," and "blue" printed incongruently in red, green, or blue ink. The child is asked to say the color of the ink in which each word is printed as quickly as he/she can without making mistakes. Thus, the child is required to selectively attend to the color of the ink instead of the word itself. Performance is measured by completion time and further standardized based on a normative sample, with a mean of 10 and standard deviation of 3 (Delis et al., 2001).

The Attention Deficit/Hyperactivity Disorder Rating Scale-IV (AD/HD RS-IV; DuPaul, Power, Anastopoulos, & Reid, 1998) School Version was completed by the children's teachers to assess sustained attention in the classroom environment. The inattention subscale was utilized in this study. This scale is composed of 9 items that describe poor sustained attention, including items such as "has a short attention span" and "does not pay attention when others are talking." Each item is rated on a 4-point likert scale, ranging from 0 to 3 (0 = never or rarely, 1 = sometimes, 2 = often, 3 = very often),

on the basis of the child's behavior over the last 6 months. The items comprising the inattention subscale were highly related (Chronbach's alpha = 0.95). The 9 inattention items were reverse scored, such that higher scores indicated higher ability to sustain attention and the mean was calculated.

Child Intelligence

The Wechsler Intelligence Scale for Children-III (WISC-III) was administered to children at age 7.5. This measure was included in order to control for the effects of intelligence on attentional control, which are likely not strongly affected by the parenting variables that are measured in this study.

The WISC-III (Wechsler, 1991) is an individually administered battery of 10 subtests used as a standardized measure of intellectual abilities in young children. The 10 subtests include 5 verbal (Information, Comprehension, Arithmetic, Vocabulary, Similarities) and 5 performance tasks (Coding, Picture Arrangement, Object Assembly, Block Design, Picture Completion). Reliability of the resulting composite IQs is high (Verbal IQ .95, Performance IQ .92, and Full-Scale IQ .96).

Latent Mental Structure

Mental structures were measured at ages 2 and 7.5 utilizing parent and child report and were combined into a latent factor. This method of measurement allows for the Mental Structures factor to reflect both recent and early mental structures, which are considered to be distinctly different.

The Attachment Q-Sort (AQS; Waters & Deane, 1985) was administered at 2 years by mother report. The AQS was created to assess child attachment to a primary

caregiver through identifying the presence of relevant behaviors, ultimately indicating a positive view of the primary caregiver. Administration requires mothers to describe each child's typical attachment behaviors by sorting 90 cards with statements such as "easily comforted by me" printed on them. The cards are sorted into 9 piles ranging from "most descriptive of the child" to "least descriptive of the child" (Waters & Deane, 1985). The security score is computed by correlating the mothers' pattern of responses with the criterion sort for security based on experts' sorts of an ideal securely attached child. Thus, the range of possible scores is 1.00 to -1.00. In previous studies the reliability between reporters on the same child has been high (average .90; Waters & Deane, 1985).

Children's current mental structures of their mothers were measured by the Pictorial Scale of Perceived Competence and Social Acceptance for Young Children (Harter & Pike, 1984) during the 7.5-year assessment. This scale assessed children's perceptions of their peer acceptance, cognitive competence, physical competence, and maternal acceptance. Perceived maternal acceptance was the construct used for this study. Items for this subscale include "my mother makes my favorite meals," "my mother likes to take me places," and "my mother likes to talk to me." A trained graduate student read each item out loud to the children while showing a corresponding picture. Each item was scored on a 4-point scale. The children were asked to decide which of two descriptors (e.g., "my mother tries to do things I like" or "my mother doesn't try to do things I like") applied more to them and to indicate whether that statement was "sort of true" or "really true." The final perceived maternal acceptance score was obtained by

calculating the mean score for 6 questions pertaining to the child's perception of maternal acceptance (Cronbach's alpha = .63).

CHAPTER III

RESULTS

Data Analytic Strategy

The conceptual model (depicted in Figure 1) was evaluated using Structural Equation Modeling (SEM) with SAS software (Version 9.2). This process began with the development of a measurement model which was then incorporated into a structural equation model with additional observed variables. An assumption of the SEM approach is that the constructs (called latent factors) cannot be directly measured so they must be estimated indirectly from observed variables. The specification of these indirect variables as indicators of latent factors is called the measurement model (Kline, 2005). The initial analysis examined the correlations between the indicators of the model. SEM was then used to conduct a confirmatory factor analysis that assessed the appropriateness of using the specified indicators to represent certain factors within this dataset. A statistical consideration is that the estimating procedure for the latent constructs removes measurement error which otherwise attenuates correlations among latent constructs. Moreover, the factor score is assumed to be a more reliable and valid estimate of the latent construct than could be obtained from any of the observed variables. The common component of each latent variable is statistically removed from each of the indicator variables specified for the construct. The residual components of each indicator represent the error or misfit of the model to the data (Kline, 2005). Goodness of fit indices

provided an estimate of whether the data were consistent with the proposed model. Model fit was assessed using criteria set forth by Bentler (1990) and Hu and Bentler (1999). According to these sources, a model with adequate fit has a comparative fit index (CFI) over 0.95 (Bentler, 1990), a standardized root-mean-square residual (SRMSR) under 0.09, and root-mean-square error of approximation (RMSEA) under 0.06 (Hu & Bentler, 1999).

All factor loadings were calculated simultaneously, in order to account for shared variance as explained above. The latent construct of attentional control was developed from parent-report on the CBQ Attention Focus subscale, observed selective attention from the D-KEFS letter-word task, and sustained attention from the teacher report on the AD/HD RS inattention subscale. The latent construct of mental structures was constructed using child report on the Harter Maternal Acceptance subscale and mother report on the Q-Sort Attachment subscale. The Parent-Child Aggression construct was created with mother report on the corporal punishment subscale of the APQ, in addition to the physical aggression and verbal aggression subscale of the PCCTS. Finally, the Maternal Warmth latent variable was developed from observed maternal reciprocity, positive affect, and hostility during a mother-child interaction task.

In order to validate current findings, the direct effects of PCA and Warmth on HAB were first addressed in a preliminary model, without the child mechanisms included (attentional control and early relational schemas). The substantive portion of the analyses assessed the structural equations displayed in the conceptual model (see figure 1) with hypothesized relations among the indicators tested using the estimates for the latent

variables. Since PCA and maternal warmth have a modest correlation in the current literature (Deater-Deckard et al., 2006), they were allowed to correlate so that their shared variance was excluded from the path coefficients. In addition, Child Intelligence was included as a variable impacting Processing Skills, so that the shared variance is accounted for and extracted from the main analyses. The sizes of direct and indirect effects were assessed by standardized path coefficients, which can range from -1.00 to 1.00. Standardized parameter estimates were used because the measures that are used in this study are scaled differently. The direct effects of PCA and Maternal Warmth on Attentional Control and Mental Structures, as well as the direct effects of these child variables on HAB are estimated statistically by path coefficients (parameter estimates). Temporal precedence need not be established in order to draw conclusions from indirect effects (Kline, 2005). The utility of drawing conclusions from indirect effects in research examining parent-child effects has been established in various studies (see Trivett, Dunst, & Hamby, 2010 and Sektnan, McClelland, Acock & Morrison, 2010 as examples). The indirect effects from the maternal variables (PCA and Warmth) on HAB are estimated by calculating the sum of the products of all standardized effects that lead from the parent measure to the outcome (i.e. indirect effects of PCA on HAB through impact on Attentional Control is estimated by the products of the path coefficients between PCA and Attentional Control and between Attentional Control and HAB and the sum of the other similar paths). The magnitude of these calculated effects can be compared because they are formed utilizing standardized effects (Hatcher & Stepanski, 1994). Attentional control and early schemas will be considered mediators if the path coefficients are

sizeable enough to establish that some of the influence from parent variables to HAB is at least partially working through these variables (Baron & Kenny, 1986).

A second model was tested to assess the possibility that PCA and maternal warmth interact to predict attentional control and mental structures. The generalized appended product indicators (GAPI) approach was utilized as described by Wall and Amemiya (1998). This procedure utilizes products of observed variables as indicators for the nonlinear latent factor (in this case, PCA x Warmth). In addition, the covariance matrix is constructed with no assumption of normal distributions and estimation of all original model parameters. The fit of this model can then be compared to the previously discussed linear model using a chi-square difference test, to indicate whether the model misfit statistically decreased with the addition of an interactive effect between PCA and maternal warmth.

Preliminary Analyses

Descriptive statistics of all variables are presented in Table 1. The physical and verbal aggression scores were not normally distributed, so a natural log transformation was calculated. The resulting scores and all other scores in the study are normally distributed. All mothers reported at least some corporal punishment and the mean of verbal aggression (M = 16.44) was considerably higher than the mean of physical aggression (M = 6.29). Maternal hostility had very little variability (SD = 0.06), with most scores falling at the minimum value (M = 1.02). Additionally, maternal positive affect and responsiveness were similarly distributed, with responsiveness having a slightly higher mean (Ms = 2.66 and 3.24; SDs = 0.71 and 0.58, respectively). All three

measures of attention were normally distributed. In addition, the WISC scores were slightly above average, but the distribution approximated the normative sample for this measure. Maternal expectations had a somewhat restricted range, with a mean higher than expected (M = 2.69). The range of early schema scores was also somewhat restricted, with a mean lower than expected (M = 0.36). HAB scores were distributed across the possible range, indicating that some children did not endorse any hostile attributions and other children endorsed attributions for each scenario. Additionally, the mean fell within the lower quartile of possible scores (M = 0.25).

The associations among the study's independent variables are presented in Table 2. Maternal physical aggression, verbal aggression, and corporal punishment were all correlated, supporting further examination into combining these variables as a latent construct of parent-child aggression. In addition, both maternal responsiveness and hostility correlated with maternal positive affect in the expected directions, but did not correlate with each other. These results support further exploration into combining these measures as a latent construct of maternal warmth, with specific attention paid to the loadings of responsiveness and hostility. Similarly, attention focus measured by parent report correlated with selective attention measured objectively in the lab and sustained attention measured by teacher report, but the latter measures did not correlate with each other. Thus, combining these three indicators into a latent factor is supported, but special attention should be paid to differential loadings that may indicate one variable is contributing more to the latent factor than another.

Child Full Scale IQ, which was included to control for the impact of attention variables on outcomes, was positively correlated with two of the three attention variables: attention focus and selective attention. In fact, IQ was also correlated with PCA and maternal warmth, such that higher IQ was related to less physical aggression from parents, less corporal punishment, more positive affect, more responsiveness, and less maternal hostility. On the other hand, maternal expectations did not correlate with any other variables, which is surprising considering strong relations with PCA and maternal warmth found elsewhere in the literature (Astingston, 2001; Burks et al., 1999). As a result, measurement error was assumed and the measure of maternal expectations was omitted from further analyses.

Measurement Model

The measurement model was fit with the four latent factors described above. However, Maternal Expectations did not relate to early relational schema, so the Mental Representation factor was dropped from further analyses. Instead, the measure of early relational schema was included in the structural model as a directly observed variable (not a latent factor). The final measurement model is depicted in Figure 2. The fit indices for all 3 models are reported in Table 3. The measurement model had an adequate fit, χ^2 (24) = 59.93, $p < 0.01$ RMSEA = 0.07, CFI = 0.94, SRMSR = 0.11. The variables loaded as hypothesized, with results reported in Table 4 and standardized results depicted in Figure 2. Maternal report of physical aggression, verbal aggression, and corporal punishment, all loaded positively on the PCA factor ($\lambda = 0.97$, $p < 0.01$; $\lambda = 0.65$, $p < 0.01$; $\lambda = 0.64$, $p < 0.01$, respectively). The larger loading for physical

aggression, supports that it is a stronger indicator of PCA than corporal punishment and verbal aggression. Observed scores of maternal positive affect and responsiveness loaded positively on the Maternal Warmth factor ($\lambda = 0.76$, $p < 0.01$; $\lambda = 1.00$, $p < 0.01$; respectively), while observed maternal hostility loaded negatively ($\lambda = -0.30$, $p < 0.01$). The lower factor loading for maternal hostility indicates that it is a weaker predictor of maternal warmth, compared to positive affect and responsiveness. Moreover, PCA and Warmth were negatively correlated ($r = -0.22$; $p < 0.01$), indicating that as PCA increases, Maternal Warmth tends to decrease. Maternal report of child attention focus, observed selective attention, and teacher reported sustained attention all loaded positively on the Attentional Control factor ($\lambda = 0.60$, $p < 0.01$; $\lambda = 0.34$, $p < 0.01$; $\lambda = 0.49$, $p < 0.01$, respectively). Attentional Control was negatively correlated with PCA ($r = -0.46$; $p < 0.01$) and was not related to Warmth.

Structural Models

The preliminary structural model assessed the direct effects of PCA and Warmth on HAB and is depicted in Figure 3. The model had an acceptable fit, χ^2 (7) = 38.72, $p < 0.01$, RMSEA = 0.108, CFI = 0.948, SRMSR = 0.06. The results are listed in Table 5. PCA and Warmth were negatively associated ($r = -0.22$; $p < 0.01$). PCA was related to higher HAB ($\gamma = 0.18$; $p < 0.01$) and Warmth was related to lower HAB ($\gamma = -0.17$; $p < 0.01$).

This model was expanded by adding attentional control and early relational schema as mediators between the parenting factors and HAB. Entering both of these variables into the model removes the shared variance, thus accounting for any effect they

may have on each other. The structural linear model representing direct and indirect effects is depicted in Figure 4. Maternal hostility evidenced no variability when entered into the full model, inhibiting model convergence. The measure was ultimately deleted from the model and the latent factor of warmth was indicated by positive affect and responsiveness. The model had a relatively good fit, χ^2 (35) = 95.20, $p < 0.01$, RMSEA = 0.06, CFI = 0.92, SRMSR = 0.07. The standardized and unstandardized path loadings are reported in Table 6. PCA and Warmth were negatively associated (r = -0.22; $p < 0.01$). PCA predicted attentional control (γ = -0.43; $p < 0.01$) and early relational schema (γ = -0.20; $p < 0.01$), such that higher levels of PCA were related to decreases in attentional control and less positive early relational schemas. Maternal Warmth predicted early relational schemas in the opposite way (γ = 0.18; $p < 0.01$), such that increases in warmth were associated with more positive early relational schemas. Attentional Control and Warmth were the only significant predictors of HAB (β_{AC} = -0.22; p = 0.03 and γ_{Warmth} = -0.14; p = 0.01), such that increases in these variables control were related to decreases in HAB. Indirect, direct, and total effects for parent factors on HAB are displayed in Table 7. PCA had a higher magnitude of indirect effects through attentional control and early schemas (γ_{PCA} = 0.11; γ_{Warmth} = -0.00), whereas warmth had a stronger direct effect on HAB (γ_{PCA} = 0.05; γ_{Warmth} = -0.13). Thus, HAB is expected to increase by 0.11 standard deviations for one standard deviation increase of PCA via the effect of PCA on attentional control and early schemas. In addition, the total effects of PCA were comparable to the total effects of Warmth (γ_{PCA} = 0.16; γ_{Warmth} = -0.13). This indicates that increasing PCA by one standard deviation increases HAB by 0.16 standard

deviations, and increasing warmth by one standard deviation decreases HAB by 0.13 standard deviations via all presumed direct and indirect links between these variables.

The non-linear model was specified with PCA and Warmth interacting, but errors regarding linear codependency prevented the model from being fit to the data. Thus, it was decided that an interaction model was not appropriate for this data. It is likely that this study did not have a large enough sample size to detect an interaction term due to low power.

CHAPTER IV

DISCUSSION

This study aimed to expand the current explanation of HAB development by including parent and child factors as explanatory variables. HAB is strongly linked to aggressive behavior, anxiety, and depressed mood (Barrett et al., 1996; Dodge & Coie, 1987; Quiggle et al., 1992). Expanding our understanding of the development of this style of thinking is important to further inform developmental psychopathology literature, prevention efforts, and future interventions. The current literature supports a direct relation between PCA, warmth, and HAB; however, mechanisms accounting for this relation have not been thoroughly examined (Dodge, 2006). The social information-processing model and the developmental intentionality literature, support child latent mental structures and attentional control as likely mediators. This study examined a model that included the direct effects of PCA and warmth on HAB, and included mental structures and attentional control as mediators.

The first aim of this study was to assess the measurement model, which included PCA, warmth, and attentional control as latent factors. This model supported the use of parent report of physical aggression, verbal aggression, and corporal punishment as a measure of overall PCA, observed maternal responsiveness, positive affect, and reversed hostility as a measure of maternal warmth, and parent report of attention focusing, observed selective attention, and a teacher report of sustained attention as a measure of

attentional control across contexts. Thus, our measure of PCA was broader than previous literature in this area (Dodge et al., 1995; Price & Glad, 2003; Weiss et al., 1992), because it includes both verbal and physical means, as well as parent-child aggression enacted as punishment. Our measure of maternal warmth was strictly observed, but spanned various ways in which warmth is communicated to children, including behaviors, verbalizations, and facial expressions, as suggested by Deater-Deckard and colleagues (2006). Moreover, our measure of attentional control spanned home and school contexts and included various reporters. As expected from previous findings, PCA and Warmth were inversely related to a moderate extent (Deater-Deckard et al., 2006). As PCA increased, maternal warmth tended to decrease, but not to an extent that meets collinearity criteria.

The second aim of this study was to confirm the direct effects of PCA and Warmth on HAB. The hypothesized direct effects of PCA and warmth on HAB were present in the initial structural equation model (without child mechanisms). These findings support the current literature by confirming that PCA directly increases HAB, while maternal warmth directly decreases HAB (Dodge et al., 1995; Price & Glad, 2003; Weiss et al., 1992). This was the first study of its kind to include both maternal warmth and PCA to predict HAB. Thus, the significant pathways of the direct model also confirm that the relations between these variables exist even when their shared variance is accounted for by the structural equation model, supporting that maternal warmth and PCA function independently to affect later HAB.

The third aim of the study was to create a more specific explanatory model of HAB by including child mental structures and attentional control as mediators of the effects of PCA and Warmth on HAB. As expected, this larger structural equation model evidenced improved fit compared to the preliminary direct effects model. Additionally, attentional control mediated the path from PCA to HAB, by fully accounting for the previously observed direct pathway. Thus, aggressive parenting behaviors limit a child's attentional control, which further limits a child's ability to accurately assess intent. The indirect effects of PCA contribute to the current literature in this area by identifying attentional control as a specific mechanism explaining variation in HAB. PCA likely provides a particularly difficult environment for children to learn executive control, because of the relative unpredictability and the elicitation of strong emotions (Perry, Pollard, Blakley, Baker, & Vigilante, 1995; Twardosz & Lutzker, 2010). Moreover, the results indicate that this executive deficit further impacts HAB by limiting children's ability to incorporate relevant information into their intent attributions.

Maternal warmth, on the other hand, continued to have a direct effect on HAB after the mediators were considered. These effects were particularly surprising, because other studies have identified a relation between maternal warmth and attentional control (Derryberry & Reed, 2002; Ruff & Rothbart, 1996). It is possible that warmth impacts HAB development through different mechanisms than were specified in this model. Current relationship schemas were not included due to measurement error and may, in fact, account for the impact of maternal warmth on HAB identified in previous studies (Gomez & Gomez, 2000; Palmer & Hollin, 2000). Maternal warmth may also send

direct messages to the child through improved communication and teaching moments, which contribute to the child making more positive assessments of others overall.

Additionally, both PCA and Warmth affected early relational schemas, but this relational information failed to predict HAB. This is in direct contrast to the attachment literature, which specifies that early relationship schemas should negatively affect a child's attributions (Bauer, 1997; Dodge, 2006). It is possible that current relational schemas are more important in determining HAB development. Additionally, it is possible that, in contrast to the SIP model's description that latent mental structures guide children toward hostile attributions (Crick & Dodge, 1994), they may indirectly contribute to HAB by biasing children's processing toward hostile cues.

Attempts were made to calculate an interaction between PCA and Warmth, but the model did not converge, likely due to limited power to detect these complex relations. Overall, the results indicate that parent-child aggression limits children's attentional control, which is ultimately related to higher HAB. Maternal warmth offsets this relation somewhat, by directly protecting against the development of HAB. Ultimately, the results did not support that PCA affects HAB at different levels of maternal warmth. These results go against compensatory models that posit the negative effects of PCA can be buffered by improvements in warmth (Deater-Deckard et al., 2006; McLoyd & Smith, 2002). It is likely that limitations in this study may have negatively impacted the assessment of this hypothesis.

The results of the larger model support the importance of attentional control in predicting HAB, but not early relational schemas. These findings may support a bottom-

up processing approach to explaining the development of HAB. According to this approach, selective attention to details within the environment leads the application of relational schemas. A recent study by Horsley and colleagues indicated that children with HAB spend more time assessing benign cues because the information is inconsistent with their pre-existing hostile schemas (Horsley, deCastro, & der Schoot, 2010). Thus, interpreting hostile situations is streamlined for children with HAB, but interpreting situations that are not overtly hostile requires more cognitive effort from these children. A child with deficits in attentional control likely has increased difficulty navigating environmental cues, especially when extra cognitive effort is necessary to assimilate schematically-inconsistent information.

Limitations

A major limitation of the model assessed in this study is that current latent mental structures were not included due to measurement error. Thus, the shared aspect of current relational schema and executive control was not able to be examined. Current literature posits a strong interactive effect between these two factors, such that attentional control affects the schema-information that is being accessed and schemas affect the environmental-information that is encoded (Dodge, 2006). Moreover, there is a debate within the current literature between the impact of top-down processing (schema-driven assessment) and bottom-up processing (cue-driven) as relating to hostile attributions (Horsley et al., 2010). Thus, examining the differential contributions of executive control and relationship schemas are especially important when identifying particular mechanisms contributing to HAB. The measure of current relational schemas did not

relate to any of the measured variables, indicating that it was not an appropriate measure. In fact, this scale has been validated for children from first to second grade (Harter & Pike, 1984) and may have been too limited for the children aged 7.5 years in this study. Future studies should include a measure of current relationship schemas for two reasons: to partial out the shared variance of current relational schemas when identifying the impact of attentional control on HAB and to examine the particular contribution of these current schemas.

One statistical limitation to this study is contained in the measurement model. The measurement model aimed to designate three factors: PCA, Warmth, Attentional Control. Latent factors were created with the aim of measuring facets of these larger constructs. In the case of Attentional Control, the latent factor also aimed to account for attentional control displayed in the lab, at home, and at school. The measurement model fit the data moderately well. The SRMSR, RMSEA, and CFI were close to the cut-offs proposed by Bentler (1990) and Hu and Bentler (1999), but not within the ranges indicating strong fit. These statistics indicate some model mis-fit, though it is unclear what is contributing to this. In fact, Millsap (2007) argued that it is unclear how goodness of fit values actually reflect a model's specification, as they do not indicate what forms of misspecification are possible in the model.

Clues to model misspecification can be identified from standardized residuals and factor loadings. It is possible to calculate a residual matrix by subtracting each element of the predicted model matrix from the corresponding element of the original covariance matrix. If the model provides a good fit to the obtained data, each element in the residual

matrix should be near or equal to zero (Hatcher, 1995). Hatcher (1995) states that large values (identified as greater than 2) may indicate a specification error in the theoretical model. The residual matrix for the measurement model in our study indicated a residual of -2.71 for the measure of observed selective attention. This variable was specified to load on the larger factor of Attentional Control along with parent report of attention focus and teacher report of sustained attention. The residual values indicate that observed selective attention does not fit well with the measurement model as specified.

Factor loadings estimate the direct effects of factors on indicators. Unstandardized loadings are interpreted as regression coefficients and standardized factor loadings are estimated correlations between the indicator and its factor (Kline, 2011). Standardized factor loadings above 0.7 are generally considered high, values below 0.3 are considered low, and values in between are considered moderate (Shevlin & Miles, 1998). There is considerable variability between the factor loadings in this study's measurement model. Within the PCA factor, physical aggression has a high loading, while corporal punishment and verbal aggression have moderate loadings. The Warmth factor consists of high loadings from responsivity and positivity, and a low negative loading from hostility. The Attentional Control factor is comprised of a moderate loading from parent reported attention focusing and teacher reported sustained attention, as well as a low loading from observed selective attention. Thus, the two weak factor loadings noted above (observed maternal hostility and observed selective attention) are likely the sources of misfit.

Low factor loadings such as those discussed above may cause goodness of fit statistics to be less accurate. Shevlin and Miles (1998) conducted a Monte Carlo design to determine the ability of fit statistics to distinguish between correct, approximate, and misspecified CFA models. When the models had high factor loadings, the fit statistics accurately differentiated the misspecified model from the others. However, when the model had low factor loadings, the fit statistics were unable to differentiate the correct, approximate, or misspecified model. This result for low factor loadings was observed regardless of sample size. Since the ability of goodness of fit statistics to distinguish misspecified models is related to the magnitude of the factor loadings, misspecified models may fail to be rejected when factor loadings are low (Shevlin & Miles, 1998). The authors of this paper recommend identifying more conservative cut-off values when working with models that have low factor loadings, irrespective of sample size (Shevlin & Miles, 1998). In regards to our study, the low factor loadings from observed maternal hostility and observed selective attention may be inflating the goodness of fit statistics, indicating that the CFA model could be more misspecified than concluded initially.

Examination of the residual matrix and the factor loadings indicates that observed selective attention was likely inappropriately specified in the measurement model. Grouping this measure with parent reported attention focus and teacher reported sustained attention likely did not fit the data well. This measure correlates weakly with teacher reported sustained attention and relatively strongly with parent report of attention focus. Examination of the covariance matrix and predicted covariance matrix reveals that the stronger of these two correlations (observed selective attention and parent reported

attention focus) was not accurately specified by the measurement model. Thus, grouping these three variables together to define a latent factor did not fit the data well. Since parents and teachers reported on the other two measures comprising this latent factor, and were well correlated, it is possible that attentional control observed by adults is somewhat different that attentional control during a standardized lab task. Additionally, the parent and teacher reported aspects of attention were likely related to the severity of AD/HD symptoms in the child, while the lab task is more relevant to distinguishing details. Although this study attempted to identify the shared aspects of these three indicators, the effort was perhaps too ambitious.

Maternal hostility also had a low factor loading in the measurement model. This measure was specified to load negatively onto a maternal warmth factor along with parent positive affect and parent responsiveness. The descriptive statistics of this measure evidenced a restricted range and low variability. It is likely that the limited variability in this measure was fully accounted for by the other two measures loading on the factor. Although the construct of maternal warmth is defined by these indicators, it is probable that positive affect and responsiveness mutually exclude maternal hostility.

The measurement model specified in this study could be improved in a number of ways. The observed selective attention measure should be omitted so that the indicators of attentional control can be limited to questionnaires. Additionally, the indicators could be comprised of observational measures, such as the working memory tasks of the WISC (Wechsler, 1991). Confining the indicators to a particular type of information (reporter or lab-observed) would simplify the attentional control factor and increase the overlap

between indicators. Additionally, the maternal warmth factor could also be calculated without the hostility component. Since this indicator did not differentially load on the warmth factor after the other two indicators were added, it does not improve the model. Using alternative codes that are more directly related to maternal warmth, such as positive statements made by mother, would likely help improve fit for this part of the model. This study attempted to define the constructs of attentional control and maternal warmth in specific ways based on the current literature; however, alternative indicators that limit the differences between types of measures and aim to directly assess the constructs would improve this study further.

Limitations of the current study also include a low power to detect significant results related to missing data and the high number of parameters that were estimated in the model. Although Full Information Maximum Likelihood estimation was utilized, the results should be interpreted with caution. Moreover, the ages at which measures were administered were not developmentally optimal for the constructs being assessed. In order to establish temporal precedence of parent behaviors as they impact early mental structures, PCA and warmth could have been measured at an earlier age. However, findings examining effects of these types of parent factors suggest that they are relatively stable through childhood (Feldman, 2010). In addition, executive functions have been shown to differ when measured in emotional situations as compared to non-emotional tasks (Ruff & Rothbart, 1996). The current study utilized largely non-emotional measures, assessing daily and lab-based cognitive use of attentional control. However,

HAB is generally applied to emotionally-arousing situations. Thus, measuring attentional control in emotional situations may be most relevant when predicting HAB.

Future Directions

One element that is particularly important but was not directly assessed in this study is the potential impact of maternal HAB, which is strongly related to PCA (Mammen, Kolko, & Pilkonis, 2003). Bandura (1973) concluded that parents who have hostile beliefs frequently encourage their children to adopt these beliefs. For example, parents with a HAB may encourage their children to assume others are going to take advantage of them and that they must fight back. It is important to note that parents with HAB are also more likely to have children with HAB (Bickett, Milich, & Brown, 1996; Keane, Brown, & Crenshaw, 1990; Nelson, Mitchell, & Yang., 2008). Keane, Brown, and Crenshaw (1990) evaluated groups of mothers and children based on sociometric status. Results indicated that mothers attributed intent in ways that were similar to their children, such that parents who were more likely to attribute hostile intent raised children who had the same tendencies. Parents with HAB might reinforce these beliefs within their children by directly teaching them to make hostile attributions, agreeing with their mis-attributions, and/or providing attention or praise for hostile attributions. Thus, parents who engage in PCA may also model HAB through repeated interactions and teaching experiences, such that children gain information that supports HAB and store it in their relational schemas.

An additional important factor that was beyond the scope of the current study was the impact of child emotions on the specified model. In their revision of the social

information-processing model, Lemerise and Arsenio (2000) speculated that a child's ability to regulate his/her reaction to emotional stimuli (such as the negative situations used to assess HAB) is likely to impact his/her social information-processing. In fact, current studies support that emotions affect attentional control specifically (Ruff & Rothbart 1996), largely because emotionality utilizes cognitive resources that could be otherwise allocated toward encoding relevant cues and accessing relevant information (Blair, 2002; Zelazo & Cunningham, 2007). Thus, if a child is faced with a particularly negative social situation, his/her ability to focus attention on cues relevant to intent, and assimilate this information into existing schemas, is relatively limited. Subsequently, a child's ability to regulate his/her emotions during these experiences is imperative in order to attribution accurate intent. Higher attentional control has been related to improvements in emotion regulation, allowing the child to orient toward calming stimuli and disengage from distressing stimuli (Eisenberg et al., 2005). The parenting behaviors examined in this study also have direct effects on emotionality, likely resulting in subsequent changes in HAB. The nature of PCA provides children with particularly distressing stimuli and children exposed to this environment are more likely to orient toward these negative cues in an effort to remain alert to danger (Pollack & Tolley-Schell, 2004). However, this orientation is directly opposed to the act of regulating their emotions through attention and may, in fact, increase distress, limit encoding of relevant cues, and build negative relationship schemas. Additionally, warm and responsive parenting can teach children how to regulate their emotions by selectively shifting their

attention away from distressing stimuli (Derryberry & Reed, 2002) and ultimately improve their attentional control, positive schemas, and accurate attributions.

Since HAB has been determined a risk factor for various childhood problems, identifying the contributing factors can suggest targets for prevention and treatment efforts. Interventions targeting the reduction of HAB have been successful in reducing aggression (Dodge, Coie & Lynam, 2006) and various CBT approaches that target reframing hostile interpretations are successful for reducing anxiety and depression (Association for Behavioral and Cognitive Therapies, 2010). The results of this study suggest that improving attentional control to include encoding of all relevant cues may also be a useful approach for reducing HAB. Moreover, the findings of this study indicate that verbal and physical PCA should be considered harmful experiences for children and should both be targeted by prevention programs. Further exploration into the parent and child factors and processes contributing to HAB development is necessary to improve our ability to treat and possibly prevent the development of this negative worldview.

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APPENDIX A

TABLES AND FIGURES

Table 1

Descriptive Statistics

	Mean	SD	Min	Max	Possible Range
1. Physical Aggression	6.29	9.26	0.00	67.00	0-325.00
2. Verbal Aggression	16.44	15.21	0.00	65.00	0-75.00
3. Physical Ag Transformed	1.15	1.31	-0.69	4.21	-0.69-5.79
4. Verbal Ag Transformed	2.32	1.16	-0.69	4.18	-0.69-4.32
5. Corporal Punishment	4.65	1.52	3.00	10.00	3.00-15.00
6. Positive Affect	2.66	0.71	1.00	4.00	1.00-4.00
7. Responsiveness	3.24	0.58	1.60	4.00	1.00-4.00
8. Hostility	1.02	0.06	1.00	1.50	1.00-4.00
9. Attention Focus	4.83	0.95	2.00	7.00	1.00-7.00
10. Selective Attention	8.59	3.41	1.00	16.00	0.00-MAX
11. Sustained Attention	2.80	0.55	0.00	3.00	0.00-3.00
12. Full Scale IQ	108.49	14.68	63.00	139.00	0.00-165.00
13. Maternal Expectations	2.69	0.55	0.67	4.00	0.00-4.00
14. Early Schemas	0.36	0.21	-0.38	0.79	-1.00-1.00
15. Hostile Attributions	0.26	0.20	0.00	1.00	0.00-1.00

Table 2

Correlation Coefficients

	2	3	4	5	6	7	8	9	10	11	12	13
1. Physical Aggression	0.61*	0.61*	-0.09	-0.18*	0.10	-0.29*	-0.14*	-0.10	-0.22*	-0.04	-0.20*	0.19*
2. Verbal Aggression	---	0.34*	0.03	-0.16	0.06	-0.29*	-0.16*	-0.09	-0.09	-0.02	-0.16*	0.18*
3. Corporal Punishment		---	-0.23*	-0.36*	0.17*	-0.14*	-0.14	-0.10	-0.35*	0.07	-0.25*	0.23*
4. Positive Affect			---	0.77*	-0.23*	-0.02	-0.01	-0.01	0.15*	0.10	0.16*	-0.17*
5. Responsiveness				---	-0.29*	0.06	0.09	0.01	0.26*	-0.01	0.27*	-0.24*
6. Hostility					---	-0.05	0.05	0.06	-0.21*	-0.04	-0.20*	0.02
7. Attention Focus						---	0.17*	0.23*	0.24*	0.10	0.20*	-0.11
8. Selective Attention							---	0.09	0.29*	-0.06	0.08	-0.19*
9. Sustained Attention								---	0.12	-0.10	0.24	0.06
10. Full Scale IQ									---	0.04	0.24*	-0.19*
11. Maternal Expectations										---	-0.01	0.06
12. Early Schemas											---	-0.17*
13. Hostile Attributions												---

Note. * $p<.05$

Table 3

Model Fit Statistics

Model	Chi-square (df)	*p*-value	CFI	RMSEA	SRMSR
Measurement	59.93 (24)	< 0.0001	0.94	0.07	0.11
Initial Structural	38.72 (7)	< 0.0001	0.95	0.11	0.06
Complete Structural	90.66 (38)	< 0.0001	0.93	0.06	0.07

Table 4

Measurement Model Results

Factor/Indicator	Unstandardized	t-value	SE	Standardized
PCA				
Physical Aggression	1.306	16.108	0.081	0.971
Verbal Aggression	0.765	10.406	0.074	0.646
Corporal Punishment	0.983	10.779	0.091	0.639
Maternal Warmth				
Positive Affect	0.539	11.151	0.048	0.764
Responsiveness	0.595	13.299	0.045	1.007
Hostility	-0.019	-5.109	0.004	-0.303
Attentional Control				
Attention Focusing	0.566	4.596	0.123	0.602
Selective Attention	1.146	3.096	0.370	0.340
Sustained Attention	0.285	2.939	0.097	0.490
Cov PCA & Warmth	-0.217	-3.420	0.064	-0.217
Cov PCA & Attention	-0.463	-4.301	0.108	-0.463
Cov Warmth & Attention	0.088	0.956	0.093	0.088

Table 5

Initial Structural Model Results

	Unstandardized	t-value	SE	Standardized
PCA → HAB	0.04	2.79	0.01	0.18
Warmth → HAB	-0.05	-2.49	0.02	-0.17
Cov PCA & Warmth	-0.14	-3.70	0.14	-0.22

Table 6

Structural Model Results

	Unstandardized	t-value	SE	Standardized
IQ → Attentional Control	0.00	2.29	0.00	0.53
PCA → HAB	0.01	0.60	0.02	0.06
PCA → Attentional Control	-0.08	-2.10	0.04	-0.43
PCA → Early Schemas	-0.04	-2.68	0.02	-0.20
Warmth → HAB	-0.04	-2.26	0.02	-0.14
Warmth → Attentional Control	-0.01	-0.53	0.03	-0.05
Warmth → Early Schemas	0.06	2.72	0.02	0.18
Attentional Control → HAB	-0.24	-1.59	0.15	-0.22
Early Schemas → HAB	-0.06	-0.92	0.07	-0.06
Cov PCA & Warmth	-0.15	-3.75	0.04	-0.22

Table 7

Standardized Direct and Indirect Effects on HAB Calculated from Structural Model

	PCA	Warmth
Direct Effect	**0.05**	**-0.13**
Indirect Effect	**0.11**	**-0.00**
Indirect Through Attentional Control	0.10	0.01
Indirect Through Early Schema	0.01	-0.01
Total Effect (Direct + Indirect)	**0.16**	**-0.13**

Note: Bolded lines indicate the complete direct, indirect, and total effects for each parenting predictor. As described in the results section, these effects are interpreted as standardized path coefficients.

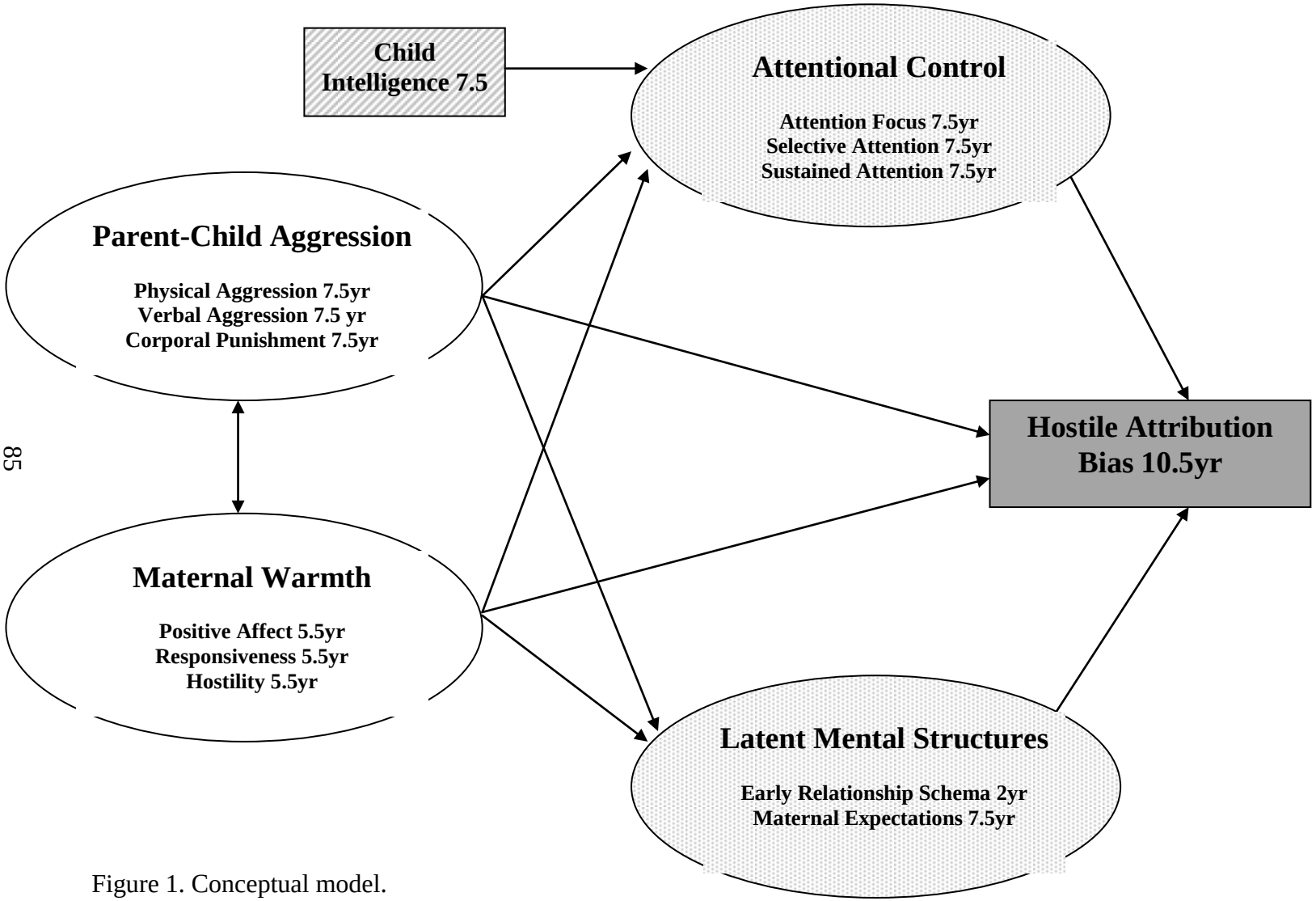

Figure 1. Conceptual model.

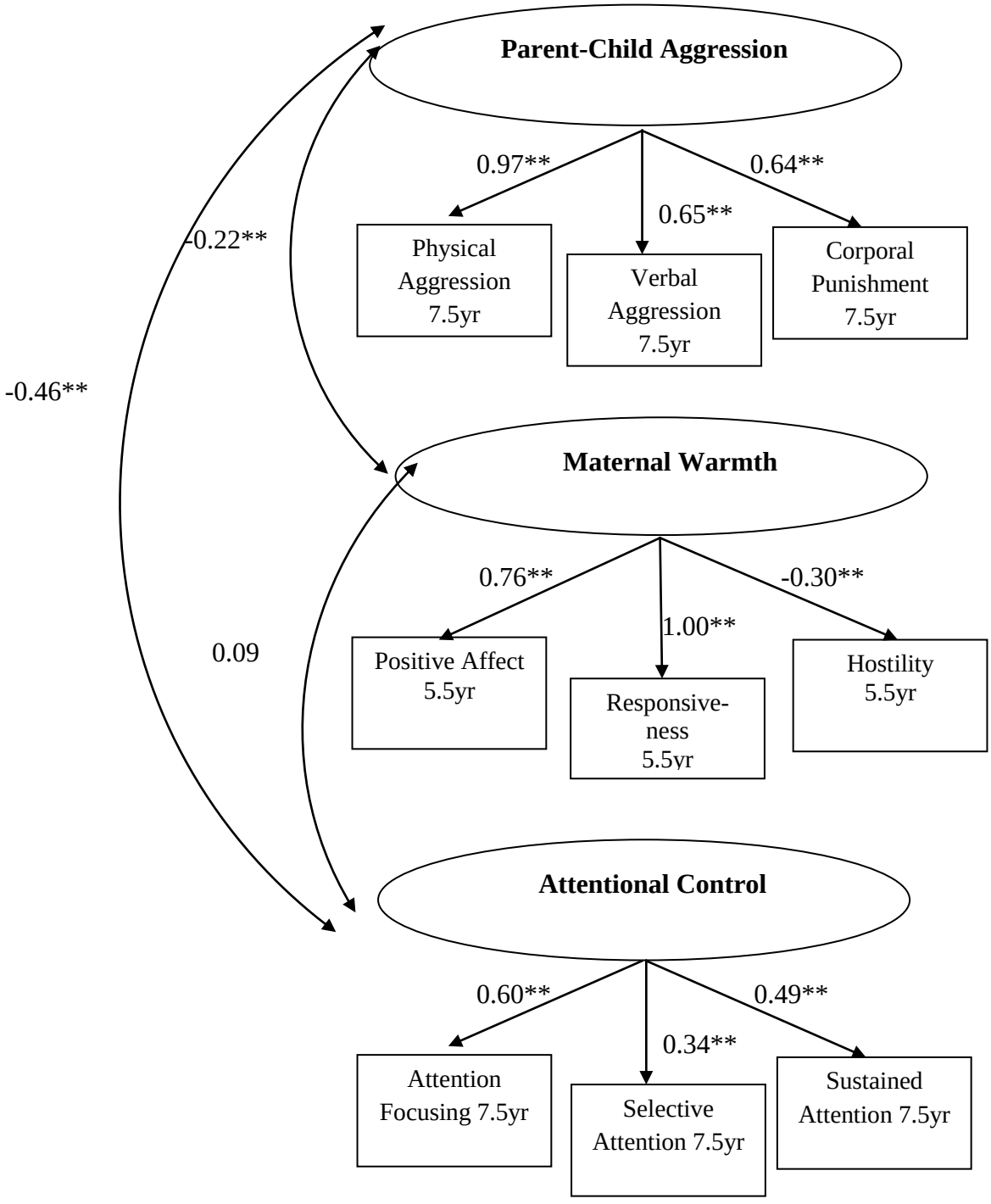

Figure 2. Measurement model assessing latent factors with standardized paths reported.
* $p<.05$

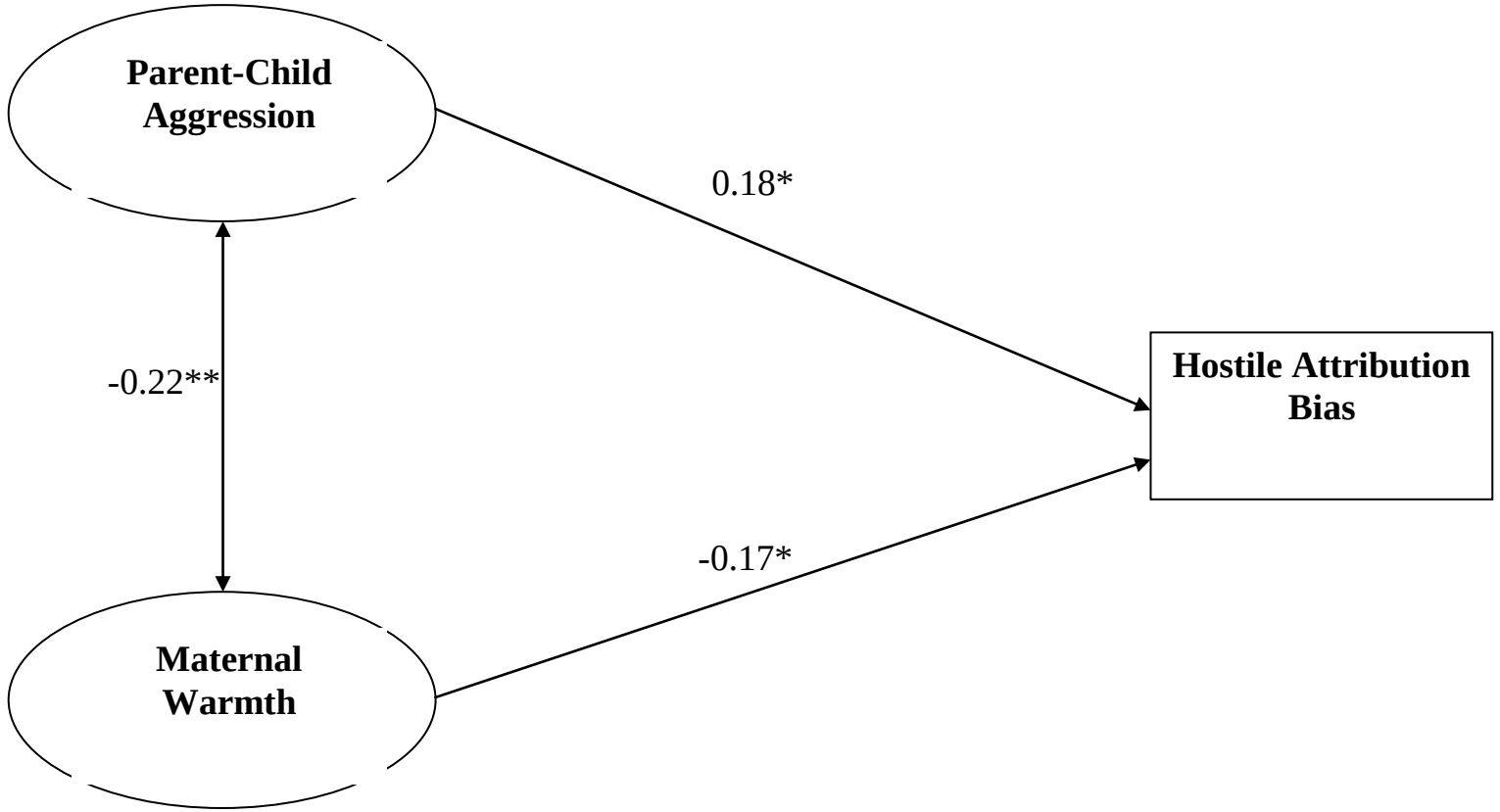

Figure 3. Structural model assessing direct effects with standardized paths reported. * $p < 0.05$; ** $p < 0.01$

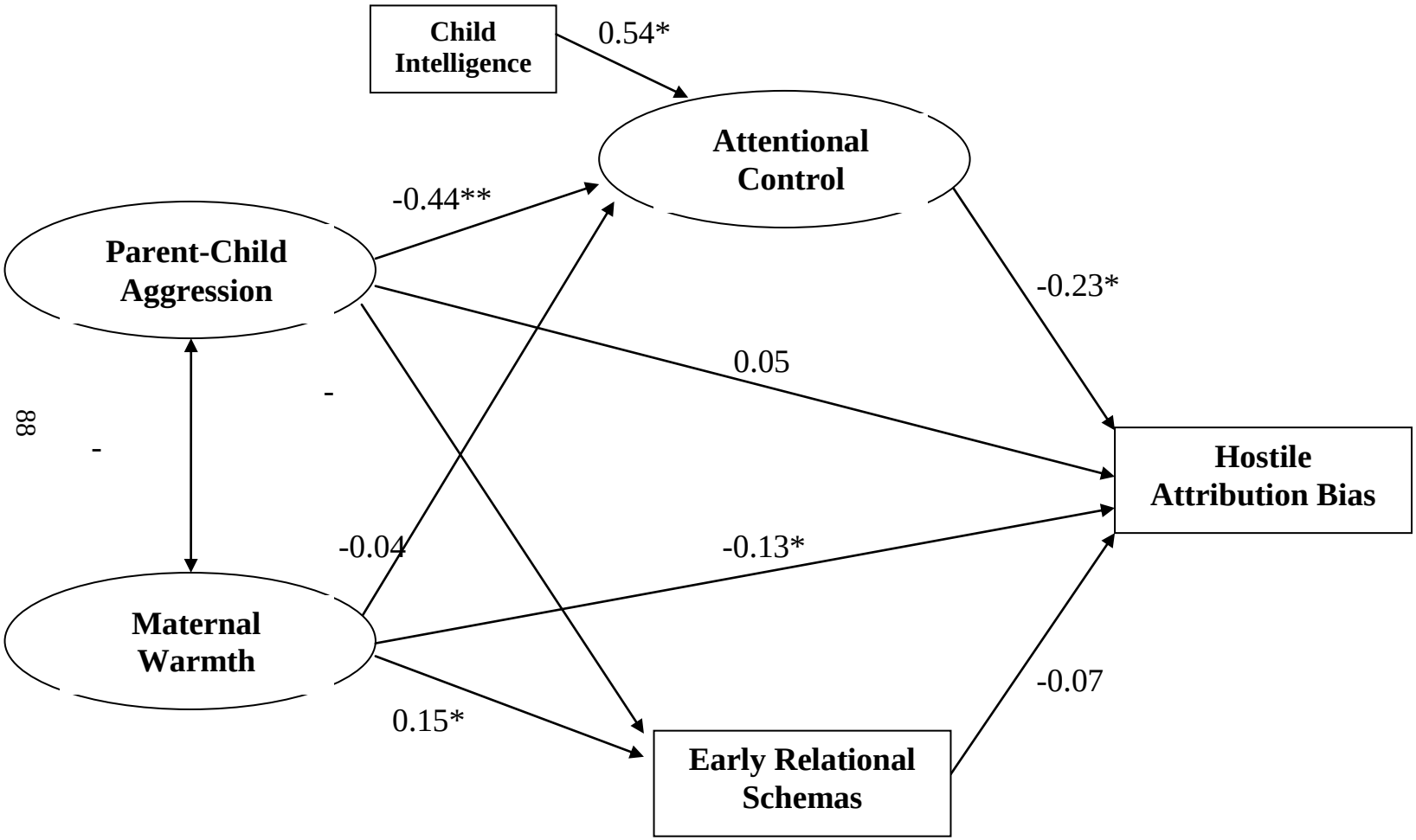

Figure 4. Structural model assessing direct and indirect effects with standardized paths reported. * $p < 0.05$; ** $p < 0.01$

APPENDIX B

WHY KIDS DO THINGS 10 YR

STORY 1: RADIO STORY

Imagine that you brought your new radio to school today. You saved up your allowance to buy the radio and you want to show it to the other kids at school. You let another kid play with it for a few minutes while you go get a drink of water. When you get back, you realize that the kid has broken your radio.

1. Why did the kid break your radio?
   A. The radio wasn't well made.
   B. It was an accident.
   C. The kid was mad at you.
   D. The kid was jealous of you.
2. In this story, do you think the kid was
   A. Trying to be mean.
   B. Not trying to be mean?
3. How upset would you be if the things in this story really happened to you?
   A. Not upset at all.
   B. A little upset.
   C. Very upset.
4. How mad would you be if the things in this story really happened to you?
   A. Not mad at all.
   B. A little mad.
   C. Very mad.

STORY 2: PLAYGROUND STORY

Imagine that you are looking for your friend on the playground. You can't wait to find your friend because you have an important secret to share. By the time you find your friend, your friend is already playing with someone else—a kid that you don't like very much.

1. Why did your friend play with someone else instead of you?
   A. Your friend was mad at you.
   B. Your friend didn't know that you wanted to play with (him/her).
   C. Your friend wanted to get back at you for something.
   D. Your friend didn't see you on the playground.
2. In this story, do you think your friend was
   A. Trying to be mean.
   B. Not trying to be mean.
3. How upset would you be if the things in this story really happened to you?
   A. Not upset at all
   B. A little upset.

C. Very upset.

4. How mad would you be if the things in this story really happened to you?
   A. Not mad at all.
   B. A little mad.
   C. Very mad

STORY 3: MILK STORY

Imagine that you are sitting at the lunch table at school, eating lunch. You look up and see another kid coming over to your table with a carton of milk. You turn around to eat your lunch, and the next thing that happens is that the kid spills milk all over your back. The milk gets your shirt all wet.

1. Why did the kid spill milk all over your back?
   A. The kid slipped on something.
   B. The kid just does stupid things like that to you.
   C. The kid wanted to make fun of you.
   D. The kid wasn't looking where (he/she) was going.
2. In this story, do you think the kid was
   A. Trying to be mean.
   B. Not trying to be mean.
3. How upset would you be if the things in this story really happened to you?
   A. Not upset at all.
   B. A little upset.
   C. Very upset.
4. How mad would you be if the things in this story really happened to you?
   A. Not mad at all.
   B. A little mad.
   C. Very mad.

STORY 4: HALLWAY STORY

Imagine that you are standing in the hallway one morning at school. As you are standing there, two kids from your class walk by. As they walk by you, the two kids look at you, whisper something to each other, and then they laugh.

1. Why did the two kids laugh when they walked by you?
   A. The kids were making fun of you.
   B. The kids were laughing at a joke that one of them told.
   C. The kids were just having fun.
   D. The kids were trying to make you mad.
2. In this story, do you think the kids were
   A. Trying to be mean.
   B. Not trying to be mean.
3. How upset would you be if the things in this story really happened to you?

A. Not upset at all.
B. A little upset.
C. Very upset.

4. How mad would you be if the things in this story really happened to you?
   A. Not mad at all.
   B. A little mad.
   C. Very mad.

STORY 5: SHOES STORY

Imagine that you are walking to school and you're wearing your new shoes. You really like your new shoes and this is the first day you have worn them. Suddenly, you are bumped from behind by another kid. You stumble and fall into a mud puddle and your new shoes get muddy.

1. Why did the kid bump you from behind?
   A. The kid was being mean.
   B. The kid was fooling around and pushed too hard by accident.
   C. The kid was running down the street and didn't see you.
   D. The kid was trying to push you down.
2. In this story, do you think the kid was
   A. Trying to be mean.
   B. Not trying to be mean.
3. How upset would you be if the things in this story really happened to you?
   A. Not upset.
   B. A little upset.
   C. Very upset.
4. How mad would you be if the things in this story really happened to you?
   A. Not mad at all.
   B. A little mad.
   D. Very mad