

ZDRAVKOVIC, ANA, M.A. Predictors of Hostile Attribution Bias: Child Emotional Reactivity and Parent-Child Hostile Experiences. (2008)
Directed by Dr. Susan P. Keane. 39 pp.

The present study aimed to expand the current conceptualized relation between hostile experiences and hostile attribution bias by examining child emotional reactivity as a moderator. In addition, the differential impact of physical and psychological aggression was examined, as well as the relevance of this process for boys and girls. One hundred and five children were assessed at 7.5- and 10.5-years on measures of parent-child hostile experiences, child emotional reactivity, and hostile attribution bias. Results indicated that emotional reactivity interacted with parent-child hostile experiences such that children with higher hostile experiences and low emotional reactivity evidenced higher hostile attributions relative to high emotionally reactive children. These findings were replicated for girls but not boys and for both psychological and physical parental aggression. Implications for further examination of the development of hostile attribution bias include examining cognitive functioning during hostile experiences and applying these results to interventions targeting victims of child abuse.

PREDICTORS OF HOSTILE ATTRIBUTION BIAS: CHILD EMOTIONAL
REACTIVITY AND PARENT-CHILD HOSTILE EXPERIENCES

by

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A Thesis Submitted to
The Faculty of The Graduate School at
The University of North Carolina at Greensboro
in Partial Fulfillment
of the Requirements for the Degree
Master of Arts

Greensboro
2008

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12/8/2008
Date of Acceptance by Committee

12/2/2008
Date of Final Oral Examination

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CHAPTER I

INTRODUCTION

Early aggressive behavior is an important social consideration due to its impact on individuals and society. Child aggression is a particular concern because it is relatively stable through adolescence and because it typically increases in severity across development (Campbell, Shaw, & Gillion, 2000; Moffitt et al, 2003). We know that chronic aggression is related to a variety of negative outcomes including school drop-out, peer problems, and adolescent delinquency (Tremblay, 2000). Moreover, In addition to these individual outcomes, child aggression is associated with high social costs due to victimization, vandalism, and corrective institution costs (Miller, Cohen, & Rossman, 1993).

Given the stability and societal costs associated with aggression, how aggression develops is an important question. Within this literature, a considerable amount of work has focused on the impact of social-information processing, specifically hostile attribution bias. According to Crick and Dodge (1994), reactive social behavior, especially aggressive behavior is due to deficits in one of the six steps involved in social information-processing: (1) encoding information from the situation, (2) interpreting this information, (3) selecting a goal that to achieve in the situation, (4) generating possible behavioral responses and outcomes for these behaviors, (5) choosing a behavioral response, and (6) carrying out the action. At each step, relevant data are gathered from

social experiences accessed through long term memory (Figure 1). A bias at any step can affect the accuracy of subsequent steps. One such example is hostile attribution bias, which is defined as inaccurately attributing hostile intent (Crick and Dodge, 1994). There are times when inferring hostile intent is correct, for example, when a person is purposefully harmed. However, individuals with a hostile attribution bias infer hostile intent from not only overtly hostile actions, but also ambiguous ones as well (Crick & Dodge, 1994; Dodge, 1980; Dodge & Coie, 1987).

A number of studies have related hostile attribution bias to aggression (Burks, Laird, Dodge, Pettit, & Bates, 1995; Dodge & Coie, 1987; Dodge & Frame, 1982). These studies conclude that hostile attributions encourage aggressive behavior by affecting subsequent social information processing steps. Crick and Dodge (1994), for example, explained that a child who believes that another is behaving with hostile intent will most likely choose an aggressive goal (step 3) such as defense or retaliation, generate aggressive solutions (step 4), and choose to behave aggressively (step 5). Studies have supported their theoretical formulation in those three areas (Richard & Dodge, 1982; Weiss, Dodge, Bates, & Pettit, 1992). Consistent with this research, other work has shown that the extent to which children are physically aggressive toward a certain peer is positively correlated with their hostile attributions of this peer's behavior (Lochman & Dodge, 1994).

At the basic level, attributing hostile intent in threatening situations is conceptualized as an evolutionarily-adaptive automatic process. Assuming hostile intent in a threatening situation triggers the fight or flight response and thus ensures attempts at

survival (Dodge, 2006; Dodge & Price, 1994). This attribution process can be affected both by characteristics of the child and by his/her experiences with others. Child temperament qualities can interfere with the cognitive processing that is necessary to attribute accurate intent. In addition, children's experiences with their parents socialize them toward certain attribution patterns. Ultimately, the combination of these two factors establishes the child's level of hostile attributions (Figure 2).

Child Temperament

Temperament is conceptualized as having two components: emotion regulation and reactivity (Rothbart & Sheese, 2007). Emotion regulation refers to children's ability to control their arousal at a level that is appropriate for the environmental demands; whereas emotion reactivity refers to children's responses to changes in the external and internal environment. Factors that describe emotional reactivity include affective type, latency of affective response, affective intensity, and duration of affective responses. Emotional reactivity has been related to a variety of outcomes, including social problems and externalizing behavior (Spinrad et al., 2006; Valiente et al., 2003).

Although Dodge (2006) has proposed that child temperament increases the risk for hostile attributions, little research has directly studied this claim. Emotional reactivity may contribute to hostile attributions by impacting children's cognitive functioning (Fraczek, 1997; Blair, 2002; Dodge, 2006). First, the automatic nature of emotional reactivity may limit the time that is available for a child to process information. Since an emotionally reactive child automatically reacts to threatening situations with intense emotion, adequate time is not allowed for thoughtful processing of information (Zelazo &

Cunningham, 2007). Second, the high emotional intensity related to reactive temperament can limit the accuracy of cognitive processing. The emotions children feel at a specific time utilize cognitive resources and can ultimately interfere with information processing (Dolcos & McCarthy, 2006). Moreover, the limited attention emotionally aroused children have likely encourages them to accept hostile intent attributions instead of flexibly evaluating alternatives or taking the perspective of the actor (Blair, 2002).

The processes mentioned above can cumulatively affect the development of hostile attribution bias as a stable cognitive style. Children develop a cognitive style from their past experiences and subsequent interpretations of these experiences; however, these interpretations are affected by the child's temperament (Fox & Calkins, 2002). Relative to adults, children are less equipped to offset the impact of their temperamental reactions because their higher-order appraisal processes are not fully developed. Thus, children rely on temperamental qualities while executive functioning skills are still developing (Blair, 2002). When children consistently interpret situations through an emotionally-laden filter, their experiences build up a database of memory and stabilize within them a biased pattern of processing social information (Lemerise & Arsenio, 2000).

The Context: Parent-Child Experiences

Focusing on factors internal to the child only gives part of the developmental picture; the context in which the child learns is also important to consider. For example, children who are reared in poverty may be exposed to more threatening situations than they may have faced in a different socioeconomic environment (Petee, Kowalski, &

Duffield, 1994). The home environment is also a major source of experience for a child (Bandura, 1973; Bronfenbrenner, 1998). Specifically, the parent-child context provides experiences that social-information processing skills build upon. When learning to attribute intent, a child observes both the situation and the actor(s), and decides what intent attribution seems most plausible (Dodge, 2006). Children extend the information learned through their interactions with their parents to interactions in other contexts.

Dodge (2006) argues that to properly socialize children against developing a hostile attribution bias, threatening parent-child interactions that demonstrate non-hostile intentions must occur. For example, a child who becomes accidentally lost in a grocery store but is then comforted by his apologetic and loving mother can learn that not all threatening situations are caused by hostile intent. However, some families fail to create such events; instead, creating experiences that encourage hostile attribution biases. Keane, Brown and Crenshaw (1990), found that mothers and children interpreted hostile intention cues similarly and chose similar social responses. These results indicate that parents likely teach their children (directly or inadvertently) to notice hostile cues and to choose hostile responses. This provides evidence that parent-child experiences can act as an instrument for this learning to take place.

One type of parent-child interaction that has been consistently related to child hostile attribution bias is parental physical aggression. Previous studies have demonstrated that physical aggression toward children, even if deemed below the threshold of abuse, can increase hostile attributions (Weiss, Dodge, Bates, & Pettit, 1992). Most research in this area has focused on the impact of physical abuse (Dodge et

al., 1995; Price & Glad, 2003). The frequency of parental physical aggression has also been related to hostile attributions, such that more frequently abused children show greater levels of hostile attribution bias (Price & Glad, 2003).

Child outcomes associated with hostile parent environments have been shown to vary by gender, with boys more likely than girls to develop a hostile attribution bias and other negative outcomes (Price & Glad, 2003; Rothbaum & Weisz, 1994). Specifically, Price and Glad (2003) reported that boys' attributions of their mothers mediated their attributions of others in their environment. Once boys form a hostile attribution bias toward a parent, their generalization of this attribution causes them to behave more aggressively toward others, resulting in more hostile experiences (Dodge, 2006). This cycle could solidify their hostile attributions of others. Girls however, are less likely to behave aggressively (see Dodge, Coie, & Lunam, 2006, for a review); therefore, even if they are exposed to abusive situations and assume hostile intent, they have a decreased likelihood of inciting negative experiences from others that would further solidify a hostile attribution bias. Thus, girls' would fail to engage in the hostile intent-affirming cycle mentioned for boys above, resulting in a weaker impact from parental aggression.

We know little about the differential impact of different types of parental aggression on child outcome. Results of parenting behaviors affecting children's attributions are limited to one type of hostile interaction- physical aggression. However, the most common type of child maltreatment is verbal aggression (also referred to as psychological aggression), defined by the type of negative statements made by parents toward their children, examples of which include belittling, threatening, teasing, and

shouting (Morimoto & Sharma, 2004; Hart & Brassard, 1990). Verbal aggression is estimated to occur in over 90% of American families, with 11-26% deemed severe verbal abuse (Straus & Field, 2003; Vissing, Straus, Gelles, & Harrop, 1991).

Verbal/Psychological aggression may even contribute more strongly to negative psychological outcomes than physical aggression, because this aggression is often more pervasive and characteristic of daily family functioning (Straus & Field, 2003). Potential negative outcomes of verbal abuse parallel those of physical abuse, including child aggression, delinquency and internalizing problems (McGee, Wolfe, & Wilson, 1997). Thus, research focused on child outcomes should examine both verbal and physical aggression

Parent aggressive acts, whether physically or psychologically aggressive, teach a child that hostile intent attributions are more appropriate than alternative attributions, because within these experiences attributions of hostile intent are likely accurate. However, once hostile attributions are formed toward the parent, they may generalize to other individuals in the child's environment (Price & Glad, 2003), even if attributions of hostile intent are inaccurate. From a socialization perspective, under abusive circumstances a child never learns that a threatening situation can be caused accidentally, without mal-intent, and instead develops a hostile attribution bias that generalizes from the parent to other individuals (Dodge, 2006).

The Effects of Both Parent-Child Experiences and Child Temperament

Developmental research has demonstrated the importance of examining interactive models that include child and environment factors (Bronfenbrenner & Morris,

1998). Collectively, these studies demonstrate that although a child's temperament may be a risk factor for a negative outcome, parents have the ability to either counteract or exacerbate this risk (Bates, Pettit, Dodge, & Ridge, 1998; Belsky, Hsieh, Crnic, 1998). However, to date, little work has focused specifically on the effects of temperament by environment interactions on subsequent *cognitive* outcomes, especially with regard to cognitive biases. The available research has focused on the development of negative cognitive style. Negative cognitive style can include hostile attributions as well as anticipating negative events and inferring negative personal characteristics. Abramson and colleagues found that children with negative temperaments were more likely to develop a negative cognitive style when they also experienced negative life events (Mezulis, Hyde, & Abramson, 2006).

Applying this work to hostile attributions, it is likely that the impact of temperament on hostile attribution bias is qualified by parent child interactions. Thus, although children with an emotionally reactive temperament may be less likely to make accurate attributions, the experiences parents provide can impact whether they form a hostile attribution bias. For example, a child's reactive temperament may affect the development of a hostile attribution bias to a lesser extent if raised in the context of positive parent-child interactions. Furthermore, this same emotionally reactive child, when in a context rich with hostile experiences, should have further affirmation of his/her hostile attributions.

The Current Study

The current study addressed the impact of child temperament and parent-child experiences on the formation of hostile attribution bias. Building on the literature, differential patterns of emotional reactivity and parental aggression were examined in relation to subsequent hostile attributions.

Since hostile attributions are theorized to solidify into a stable attribution pattern during the end of middle childhood, this study assessed hostile attributions at 10.5 years and assessed parent-child aggression and child emotional reactivity at 7.5 years. The 7.5-year time point was chosen with the understanding that even though authoritarian parenting behaviors are relatively stable, they can be affected by numerous changing factors, such as life stress and child age (see Holden & Miller, 1999 for a review). In order to best assess the impact of relevant parent-child experiences while still allowing ample time for attributions to stabilize, parental aggression was assessed 3 years prior to the outcome. Child temperament, although generally a stable construct, has been found to vary, with less than 33% of children retaining the same temperamental profile from ages 2 to 8 years (Janson & Mathiesen, 2008). Due to this moderate variability, we decided to measure child temperament at the time that parent-child aggression was assessed. This measurement method ensures that we are assessing the present interaction between child temperament and parent-child hostile experiences, and not artifacts of past temperament or parent behavior. Using a sample of children between the ages of 7.5 and 10.5 from an ongoing longitudinal study, three hypotheses were tested:

1. It was expected that at 7.5 years, children with higher emotional reactivity and with more exposure to parent hostile actions would display higher hostile attributions at 10.5 years relative to children with low levels in both emotional reactivity and hostile experiences.
2. It was expected that boys would be affected by levels of emotional reactivity and hostile experiences as mentioned above, more so than girls.
3. Psychological aggression and physical aggression were expected to interact with emotional reactivity, such that high exposure to either of these experiences in combination with high emotional reactivity, would predict higher hostile attributions at 10.5 years.

CHAPTER II

METHOD

Participants

The current study utilized data from three cohorts of children who are part of an ongoing longitudinal study. 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, $\chi^2(2, N = 447) = .63, p = .73$, race, $\chi^2(2, N = 447) = 1.13, p = .57$, 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 ($M = 54.49$), $t(445) = -4.32, p = .001$.

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, $\chi^2(1, N = 447) = 3.27, p = .07$, race, $\chi^2(1, N = 447) = .70, p = .40$, 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, $\chi^2(1, N = 447) = .76, p = .38$, race, $\chi^2(1, N = 447) = .17, p = .68$, 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, $\chi^2(1, N = 447) = 2.12, p = .15$, race, $\chi^2(3, N = 447) = .60, p = .90$ 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.

This project utilized data from cohorts 1, 2 and 3 at ages 2.5, 7.5, and 10.5. The final sample, with complete data from 7.5-year school and laboratory assessments and 10.5-year home assessment, included 105 children.

Procedures

Data were collected at multiple assessment points and from multiple reporters, over the span of 6 years.

7.5-year Assessment. Families were re-contacted for follow-up data collection. Parent consent was obtained in order to collect behavioral ratings from each child's second grade teacher. Upon consent, teachers were given a battery of questionnaires regarding the target child's social, emotional, and academic behavior. Also at this time, parents were requested to complete questionnaires regarding their parenting practices and other aspects of their family life. Parents filled out the questionnaires as their child was being assessed in the next room.

10.5-year Assessment. At 10.5 years, families were re-contacted for follow-up data collection. A home visit was conducted during which self-report questionnaires were administered to the child. Children verbally reported their attributions to an experimenter in their home environment.

Measures

Child Temperament. Teacher report of emotional reactivity was obtained using the lability/negativity subscale of the Emotion Regulation Checklist (ERC; Shields &

Cicchetti, 1995). The ERC is a 24 item measure that assesses several aspects of emotion regulation and reactivity, including affective lability, intensity, valence, flexibility, and situation appropriateness. The Lability/Negativity subscale consists of 15 items that specifically assesses a lack of flexibility, mood lability, and dysregulated negative affect. A representative item is “exhibits wide mood swings” and “is prone to angry outbursts.” Children are rated on a 4-point Likert scale, ranging from 1 “Never” to 4 “Always.” Scores are averaged to yield an overall lability/negativity score where higher scores reflect higher levels of reactivity. Reliability for this subscale has been established (Cronbach’s alpha =.96).

Parent-Child Hostile Experiences. Parent hostile behavior was assessed using parent report on the Parent-Child Conflict Tactics Scale (P-CCTS; Straus, 1979). The P-CCTS is a 26-item measure that assess the prevalence and chronicity of specific parenting behaviors that occur after a child has done something wrong or made the parent angry. Items are scored on a likert scale ranging 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). This measure yields 5 subscales: nonviolent discipline, psychological aggression, physical assault, neglect, and sexual abuse. This study will utilize the psychological aggression and physical assault subscales to assess the constructs of psychological aggression and physical aggression within the parent-child relationship. The psychological aggression subscale contains 5-items (Cronbach’s alpha=.56) that refer to the parent’s tendency to

utilize verbal aggression, such as threatening or yelling at their child. The physical assault subscale consists of 13 items (Cronbach's $\alpha=.56$) that measures physical acts by the parent possibly intended to cause physical pain to the child (slapped him/her on the hand, arm, or leg). The subscale scores for psychological aggression ranged from 0 to 65 and the subscale scores for physical assault ranged from 0 to 67. A composite hostile experiences score will be calculated by summing the chronicity score on these two scales. The scales will also be utilized individually to evaluate their differential impact on predicting hostile attribution bias.

Hostile Attribution Bias. Children's hostile attributions were assessed by self-report on the Intent Attributions and Feelings of Distress Measure (Crick, 1995). The original measure consists of 10 stories that describe instrumental provocation, and relational provocation. In this study we utilized five stories, in which three depicted instrumental provocation and two depicted relational provocation (a child's radio is broken by a peer; a child discovers that his friend is playing with someone else). The stories were read to the child during an interview conducted by a trained graduate student during a home visit. After each story was read children were asked whether they believed the actions of the perpetrator were hostile (scored 1 point) or benign (scored 0 points) and why the perpetrator had done the action (four options coded 1 for hostile and 0 for benign). Questions about the child's hypothetical distress level were also asked; however, the scores from these items were not utilized in this study. A hostile attribution score was calculated by averaging the hostile/benign responses. The measure has demonstrated reliability with an alpha between .74 and .80 for the story subtypes (Crick,

1995). The inter-item reliability between the scenarios in our sample was moderate ($\alpha=.75$). However, one scenario was omitted for the present analyses due to inconsistent focus (“you find your friend playing with someone else during recess”), resulting in adequate inter-item reliability ($\alpha=.78$).

CHAPTER III

RESULTS

Table 1 shows descriptive information for independent and dependent variables. Table 2 lists bivariate correlations for all variables. As a result of these analyses, early externalizing and socioeconomic status was included in subsequent analysis as control variables. Additionally, because both physical and psychological aggression were strongly related, each was controlled for within subsequent analyses examining physical and psychological aggression. Furthermore, because there were significant differences in emotional reactivity across gender ($t=3.580, p<.001$), subsequent analyses were conducted separately for boys and girls.

To examine the effects of overall hostile experiences and emotional reactivity on hostile attributions a hierarchical linear regression was conducted. In the first step, child externalizing behavior and socioeconomic status at age 2 were entered; in the second step, emotional reactivity and hostile experiences at age 7 were entered to test for main effects; in the third step, the interaction between emotional reactivity and hostile experiences was entered. Results are presented in Table 3. As expected, results were significant for the interaction between Emotional Reactivity and Hostile Experiences ($\beta = -.255, p<.05$). Follow up analyses were conducted according to the guidelines set by Aiken and West (1991). Results suggested that children with lower hostile experiences and high emotional reactivity demonstrated higher levels of hostile attributions relative to

those with low reactivity ($p < .05$) (Figure 3). In contrast, children with higher hostile experiences and low emotional reactivity evidenced higher hostile attributions compared to those with high emotional reactivity ($p < .01$).

To examine gender differences in the association between emotional reactivity and hostile experiences and subsequent hostile attributions, a series of hierarchical linear regressions were conducted for boys and girls separately. The steps were identical to those outlined above. Table 4 shows beta weights and significance for each analysis. Contrary to predictions, neither emotional reactivity nor hostile experiences had a significant effect on hostile attributions for boys. However, for girls, the interaction between hostile experiences and emotional reactivity was significant ($\beta = -.314, p < .01$) and followed a pattern similar to the overall sample (Figure 4).

Finally, to examine the separate effects of parental psychological aggression and parent physical aggression a series of hierarchical linear regressions were conducted for each type of aggression separately, using the overall sample. The steps were similar to those used in the previous analyses; however, order to assess the shared variance of the types of aggression, the alternative form of parental aggression was entered into step 1 of the equation. Results are presented in Table 5. As expected, the interaction between psychological aggression and emotional reactivity was significant, even when physical aggression was present in the equation. The interaction followed a pattern similar to the overall sample. The same was true for physical aggression.

CHAPTER IV

DISCUSSION

The current study sought to replicate previous findings related to hostile attributions and extend the current knowledge of the relationship between negative temperament, hostile experiences and subsequent hostile attributions. Consistent with hypotheses, results indicated that emotional reactivity and hostile experiences interact to predict outcomes such that children with lower hostile experiences and high emotional reactivity demonstrated higher levels of hostile attributions than low emotionally reactive children, and children with higher hostile experiences and low emotional reactivity evidenced higher hostile attributions relative to high emotionally reactive children.

Contrary to our expectations, as hostile experiences increased, children low in reactivity demonstrated higher levels of hostile attributions than highly reactive children. Although unexpected, this pattern is consistent with past research linking emotionality with decreased cognitive accuracy (Dolcos and McCarthy, 2006; Zelazo & Cunningham, 2007). We expected this association to increase a child's likelihood of developing inaccurate hostile attributions. However, it is also possible that children who are *low* in emotional reactivity have a *higher* level of cognitive functioning when in a distressing situation. In application to the current pattern of results, when faced with hostile experiences low emotionally reactive children may be able to pay better attention to the situation, remember details of an event, and form lasting impressions. This pattern

suggests that lower levels of emotional reactivity allow for increased cognitive functioning during hostile situations that promotes the formation of hostile attribution.

As expected, the results indicated that highly emotionally reactive children were more likely to have hostile attributions without being exposed to hostile experiences. This is consistent with previous literature showing emotionally reactive children to be more reactively aggressive (Carrasco Ortiz & del Barrio, 2006; Vitaro, Brendgen, & Tremblay, 2002), and thus, more likely to have high hostile attributions as well. In fact, in our sample emotional reactivity was highly correlated with externalizing behavior at 7.5 years ($r = .304, p < .01$), similar to other samples in studies relating emotional reactivity and aggression (Carrasco Ortiz & del Barrio, 2006; Vitaro, Brendgen, & Tremblay, 2002). However, it is puzzling that hostile experiences did not increase hostile attributions in this group of children, as it did in the low emotionally reactive children. Since our study did not differentiate reactive from proactive aggression, it is unclear whether emotional reactivity was associated only with reactive aggression, as in previous studies. It is possible that early temperament and parent hostile experiences lay the foundation for hostile attributions above and beyond later measures of temperament and home experiences. Indeed, the studies mentioned above measured temperament between the ages of 17 months and 2 years. In addition, it is likely other factors exist that could increase hostile attributions in highly emotionally reactive children. For example, these children have been found to have poor social competence (Spinrad et al., 2006), which increases their likelihood of experiencing hostile interactions with peers. Similar to our

conceptualization of parent aggression, these peer experiences would continually affirm hostile attributions, resulting in a stable bias.

Another important aim of this investigation was to expand the current literature by examining differential impacts of physical and psychological hostile experiences. As expected, physical and psychological aggression both moderately predicted hostile attributions. Regardless of whether the experiences were physically or psychologically aggressive, highly emotionally reactive children remained unaffected by hostile experiences, while children with low emotional reactivity were moderately affected by both types of aggressive experiences. Although the current literature focuses on physical aggression predicting hostile attributions, these findings support the importance of studying psychological aggression as well. Given the high prevalence of psychological aggression within families (Straus & Field, 2003), these results have important implications for further study.

The third aim of this investigation was to separately assess gender differences within the association between emotional reactivity and hostile experiences. In contrast to our hypothesis that boys would be more affected by hostile experience than girls, results showed a main effect for hostile experiences for girls, but not for boys. However, this finding should be interpreted with caution as boys in our sample had higher levels of emotional reactivity relative to the girls in our sample. Since our analyses indicated that high emotional reactivity did not interact with levels of hostile experience, the group of boys in our sample may not have had enough low emotional reactivity to detect

significant differences. In addition, it is possible that the significant results for girls are an artifact of their lower emotional reactivity.

There were several limitations to this study. First, the somewhat small sample size likely limits the generalizability of these findings, especially regarding gender differences. Further analyses should include a larger number of boys and girls with a broader range of emotional reactivity. In addition, the accuracy of the parent-child hostile experiences measure should be questioned because it was by parent report. Parents are likely to limit their report of violent behavior due to social desirability. However, the variability in the data for this measure, especially for psychological aggression, supports the reliability of parent report in this context. Future research should include child and father report of hostile experiences to limit error and underreporting. Finally, we did not measure cognitive functioning at the moment hostile actions were occurring. Assessing cognitions in this context could help clarify the association between reactivity and hostile experiences. Although highly emotionally reactive children have stronger emotional responses to provocative situations, they may react quickly with little time to evaluate the situation. This impulsivity may adversely affect their ability to form stable attribution styles. In contrast, since a child without strong emotional reactions remembers details of a situation, he/she is more likely to incorporate these details into a stable attribution style. Currently, it is only theoretically speculated whether emotional reactivity is directly related to this type of immediate cognitive processing. Further investigation relating biological measures of reactivity and cognitive functioning in real time is an important next step to clarifying this question.

Despite these limitations, the findings outlined in this study raise important considerations for treating children from abusive home environments. First, abusive experiences that can increase hostile attributions are not only physical in nature, but psychological as well. This finding puts the onerous on clinicians to expand their assessment of parental abuse to include verbal/psychological aggression. Second, the cognitive effect of abusive experiences varies according to children's level of emotional reactivity. We found more frequent hostile attributions in low emotionally reactive children exposed to hostile experiences. It is probable that high emotionally reactive children have alternative negative outcomes as a result of exposure to parent aggression, such as overt behavior problems. Third, interventions for children who come from hostile parent environments should target cognitive re-structuring of negative social cognitions, especially if the child is low in emotional reactivity. In cases which the child must continue to live in a hostile home environment, treatment can include coping strategies congruent with the child's temperament. For example, a child with low emotional reactivity may benefit from self-directed distraction during times of parent aggression, whereas a high emotionally reactive child could benefit from general emotion regulation skills. With this expansion to the existent literature we can improve our conceptualization of parent-child factors in contributing to the formation of hostile attribution bias and focus interventions to better treat children from abusive environments.

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Appendix. Tables and Figures

Table 1. Descriptive statistics for independent and dependent variables.

	Mean	SD	Min	Max
1. SES	39.40	11.42	5.00	66.00
2. Early Externalizing	53.19	9.68	30.00	91.00
3. Gender	1.52	.50	1.00	2.00
4. Emotional Reactivity	1.63	.51	1.00	3.67
5. Total Hostile Experiences	22.73	22.1	.00	126.00
6. Psych Aggression	6.28	9.26	.00	65.00
7. Physical Aggression	16.44	15.21	.00	67.00
8. Hostile Attributions	.30	.25	.00	1.00

Table 2. Correlation coefficients for independent and dependent variables.

	2	3	4	5	6	7	8
1. SES	-.170*	-.038	-.043	-.056	-.052	-.049	-.145*
2. Early Externalizing		-.050	.232**	.237*	.216**	.210**	.146*
3. Gender			-.216	-.038	-.061	.010	.057
4. Emotional Reactivity				.221*	.209**	.182**	.155
5. Total Hostile Experiences					.943**	.838**	.257**
6. Psych Aggression						.609**	.223**
7. Physical Aggression							.243**
8. Hostile Attributions							

Note. * $p < .05$, ** $p < .01$.

Table 3. 7.5 year emotional reactivity and hostile experiences regressed onto 10.5 year hostile attributions.

Regression	ΔR^2	β
<i>Step 1</i>	.051	
SES		-.050
Early Externalizing		.144
<i>Step 2</i>	.036	
Emotional Reactivity		-.017
Hostile Experiences		.210*
<i>Step 3</i>	.056*	
Interaction: ER X HE		-.255*
Total R ²	.144	

Note. * $p < .05$, ** $p < .01$.

Table 4. Regression analysis for boys and girls separately regressed onto hostile attributions.

Regression	Boys		Girls	
	ΔR^2	β	ΔR^2	β
<i>Step 1</i>	.132		.025	
SES		-.016		.039
Early Externalizing		.332		.037
<i>Step 2</i>	.007		.098*	
Emotional Reactivity		.020		-.035
Hostile Experiences		-.009		.382**
<i>Step 3</i>	.040		.088**	
Interaction: ER X HE		-.220		-.314**
Total R^2	.180		.211	

Note. * $p < .05$, ** $p < .01$.

Table 5. Regression analysis separating physical and psychological aggression regressed onto hostile attributions.

Regression					
Physical Aggression				Psychological Aggression	
	ΔR^2	β		ΔR^2	β
<i>Step 1</i>	.051		<i>Step 1</i>	.051	
SES		-.034	SES		-.044
Early Externalizing		.153	Early Externalizing		.163
<i>Step 2</i>	.025		<i>Step 2</i>	.032	
Psych Aggression		.050	Physical Aggression		.200
<i>Step 3</i>	.012		<i>Step 3</i>	.006	
Emotional Reactivity		.010	Emotional Reactivity		-.041
Physical Aggression		.220	Psych Aggression		.015
<i>Step 4</i>	.059*		<i>Step 4</i>	.051*	
Interaction:		-.262*	Interaction:		-.254*
ER X Physical Agg.			ER X Psych Agg.		
Total R ²	.147		Total R ²	.139	

Note. * $p < .05$, ** $p < .01$.

Figure 1. Social Information-Processing Model proposed by Crick & Dodge, 1994.

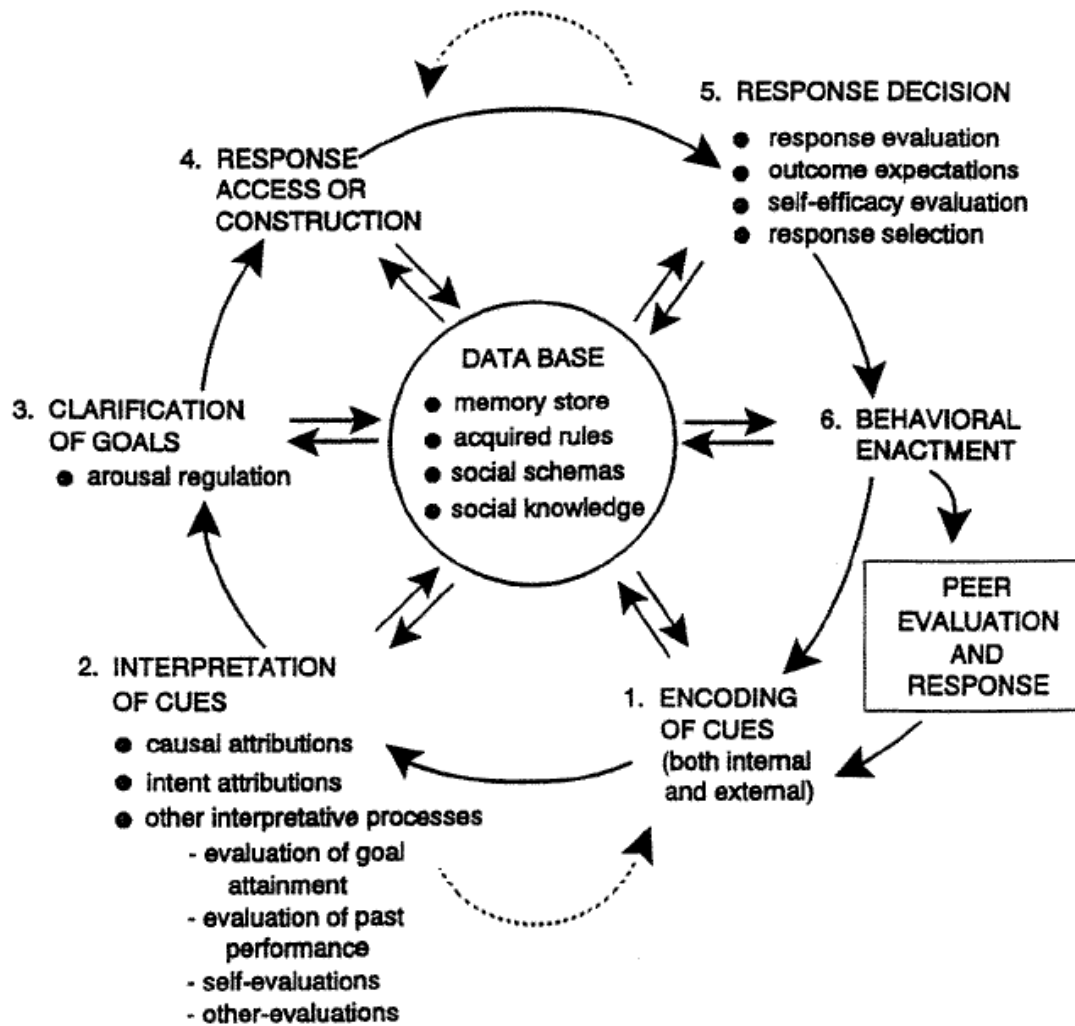


Figure 2. Model of the development of hostile attribution bias.

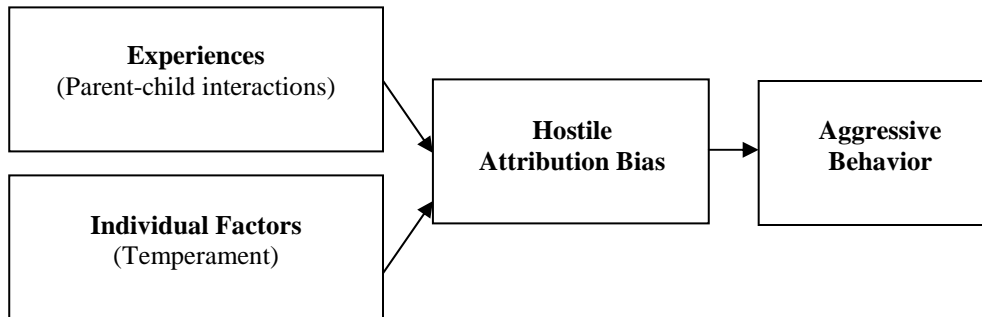


Figure 3. Interaction between emotional reactivity and hostile experiences predicting hostile attributions.

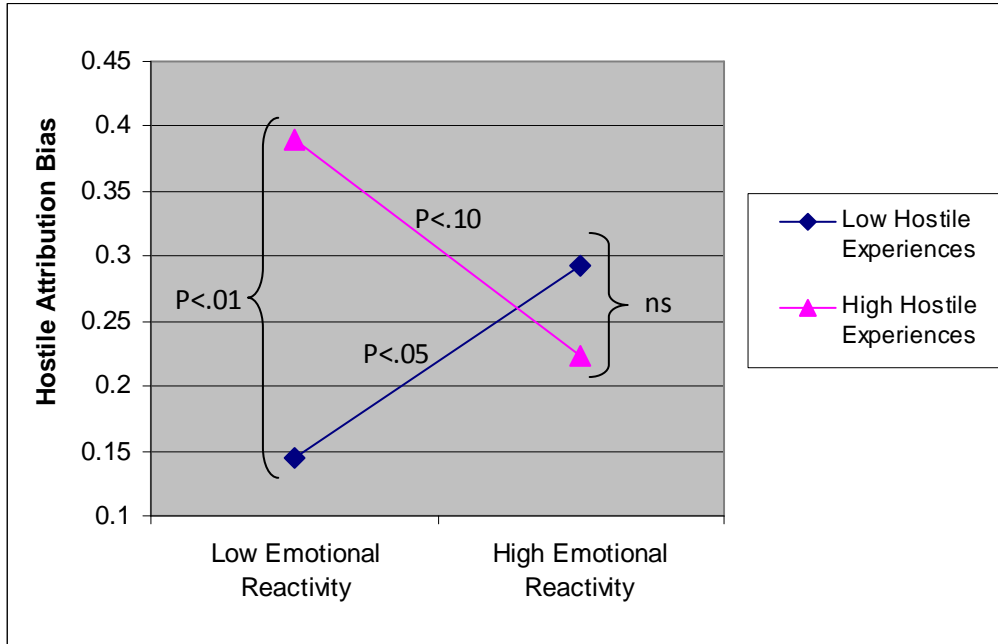


Figure 4. Interaction between emotional reactivity and hostile experiences for girls predicting hostile attributions.

