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Intent Attributions and Aggression: A Study of Children and their Parents

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Abstract This research aimed to further clarify the relationship between children's self-reported hostile intent attributions (for ambiguous instrumental or relational provocations) and peer-reported aggression (physical and relational) in 500 fourth-grade children. In addition, we examined whether parents' intent attributions might predict children's intent attributions and aggression. Both parents (mothers and fathers) in 393 families completed intent attribution questionnaires. Results showed, consistent with past research, that boys' instrumental intent attributions were related to physical aggression. Children's relational intent attributions, however, were not associated with relational aggression. Contrary to expectations, most children responded with hostile intent attributions for relational provocations. Finally, in regard to parent–child connections, maternal intent attributions correlated with children's intent attributions whereas paternal intent attributions corresponded with children's relational aggression.

Keywords Physical aggression · Relational aggression · Hostile intent attributions · Parenting · Social information processing

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Given the risks associated with childhood aggression, there is ongoing interest in discovering the factors that relate to the onset and maintenance of aggressive behavior. Individual differences in aggression are attributed to a wide range of factors, among which are harsh parenting (e.g., Nelson et al. 2006) and unique social information processing patterns such as hostile attribution bias (Crick and Dodge 1994). Most research, however, has focused on correlates of physical forms of aggression rather than alternative forms such as relational aggression (Coie and Dodge 2006; Crick et al. 1999). Relational aggression, defined by attempts to harm others by damaging or threatening to damage relationships (Crick and Grotpeter 1995), deserves attention as it is more typical of the social relationships of girls.

The current study further investigates factors associated with the development of relational and physical aggression using a social information-processing (SIP) approach. Numerous studies demonstrate the benefits of such an approach in understanding how children's physical aggression is developed and maintained (Dodge and Crick 1990; Crick and Dodge 1994). However, the limited and inconclusive findings concerning SIP and relational aggression make further research necessary. This study also adds to current research by examining parents' intent attributions as a possible influence on children's intent attributions and aggressive behaviors.

Social Information Processing and Aggression

Social information processing models maintain that individual differences in social behavior are related to unique social-cognitive styles or difficulties. Accordingly, if the thought processes behind children's aggressive behaviors can be discovered and modified, undesirable behaviors such as aggression may be diminished (Dodge et al. 1990; Guerra

and Slaby 1990; Hudley and Graham 1993). Social information processing models also propose that social cognitive patterns evolve from social interaction. As children interact with others, social schemas and social knowledge accumulate to form a database which influences future social interactions (see Crick and Dodge 1994; Dodge and Price 1994). Furthermore, this database interacts with ongoing cognitive processing of social events, which is often portrayed as a series of steps that lead to a particular response.

One prominent model proposed by Crick and Dodge (1994) posits that social information processing is composed of five steps leading up to behavior enactment. In this model, social information processing begins when the child attends to and encodes social cues and situations (e.g., registers what happened). Step 2 involves interpreting these social cues and situations (e.g., why the situation happened or why someone acted in a particular way). The child must then clarify goals for dealing with the situation at step 3 (e.g., staying out of trouble, getting even with a provocateur). Building on these goals, the child generates possible responses to the situation (either constructing new responses or accessing old ones from the database), evaluates each proposed response, and selects the most desirable response (steps 4 and 5). Finally, the child enacts the response that fits these selective criteria best.

Physically aggressive children appear to exhibit problems or limitations at every step of the model (Crick and Dodge 1994). Furthermore, of all the social information-processing steps related to physical aggression, the interpretation of cues step has received the most research attention (Crick and Dodge 1994; Orobio de Castro et al. 2002). In particular, the aspect of intent attribution (the perception of *why* another acts the way he does in any given situation) is central. Research shows that when provocative cues are clear, aggressive and nonaggressive children do not differ in their intent attributions (Dodge 1980; Dodge and Coie 1987; Dodge and Frame 1982; Dodge and Newman 1981; Milich and Dodge 1984; Steinberg and Dodge 1983). In contrast, the aggressive child tends to assume hostile intent in potentially provocative but ambiguous situations, wherein a peer's motives are unclear (e.g., Dodge 1980; Guerra and Slaby 1989). This tendency is referred to as a "hostile attributional bias" (Nasby et al. 1979), and is assessed with hypothetical vignettes (e.g., videotaped or written scenarios) in which a purposefully ambiguous situation is portrayed and the child determines whether or not the potential provocateur is acting with malice or not.

Assessment of Intent Attributions and Children's Relational Aggression: Considering Context

Relatively little research has investigated the social-cognitive processes of relationally aggressive children, such as their

intent attributions (e.g., Crick 1995; Crick et al. 2002; Crain et al. 2005). Moreover, when examining physical and relational aggression, Crick and colleagues (2002), Crick and Grotpeter 1995, have maintained that it is important to consider the nature of social situations likely to elicit hostile intent attributions. This notion is explicitly tied to demonstrated gender differences in responses to the social world. In particular, previous research has shown that boys tend to find disputes over physical dominance, territory, and material objects to be the most provocative and distressing (e.g., Leadbeater et al. 1995, 1999; Rudolph and Hammen 1999; Rudolph et al. 2000). These situations tend to be the focus of studies assessing correspondence between hostile intent attributions and physical aggression. Crick et al. (2002) have labeled these situations as "instrumental provocations," although this term has its limitations (see Bushman and Anderson 2001). Girls, in contrast, are most concerned about possible relational slights such as difficulties with friends or relational exclusion. This focus corresponds with the tendency of girls to be relationally rather than physically aggressive.

Accordingly, Crick et al. (2002) found that relationally aggressive children report greater distress than nonaggressive peers in reaction to relational provocations, and girls report higher levels of distress than boys. Furthermore, the Crick studies suggested that the nature of hostile intent attributions (relational or instrumental) is specific to aggression subtype. Compared to less aggressive peers, relationally aggressive boys and girls appear more likely to exhibit hostile intent attributions for relational provocation situations whereas physically aggressive boys and girls attribute hostile intent for instrumental provocation situations.

Using Crick's relational provocation scenarios, MacBrayer et al. (2003) assessed hostile attributions in 8–12 year-old children who were either diagnosed with a disruptive behavior disorder (ADHD, ODD, Bipolar) or in a normative comparison group. Results showed relational provocations to be more provocative than instrumental (overt) provocations for all children. For instrumental (overt) scenarios, clinical girls were more likely than normative girls to make hostile attributions (no difference for boys). For relational scenarios, clinical girls and boys were more likely than comparison subjects to infer hostile attributions.

In contrast with these studies, however, Crain et al. (2005) found no clear relationship between relational intent attributions and relational aggression in two normative samples of fourth- through sixth-grade girls. In one sample, there was no relationship and, in the second sample, attribution scores related *negatively* to relational aggression. The authors concluded that, although research provides substantial evidence that distortions in social information processing characterize physically aggressive boys (Crick

and Dodge 1996), caution must be exercised in applying the SIP model to relationally aggressive girls.

The inconsistent findings across these studies may be an artifact of the differences in approach. For example, the relational provocation scenarios which Crain et al. (2005) employed only partially overlapped with Crick et al.'s (2002) original scenarios. The relevant intent attribution questions across the studies also varied significantly. Crain et al. employed a scale-response format (e.g., rating how likely it was that a peer was trying to be mean, using a three-point scale) rather than the forced-choice response format used by Crick et al. (e.g., choosing whether the potential provocateur was (a) trying to be mean or (b) not trying to be mean). MacBrayer et al., in contrast, used open-ended responses which were then coded for hostile attributions. Finally, in their peer nomination assessments of aggression, Crain et al. employed all-girl samples and methodology (e.g., girls could only nominate other girls, not boys) whereas Crick et al. included both girls and boys and allowed for opposite-sex nominations. MacBrayer et al. employed no peer nomination assessments but used a diagnosis for a disruptive behavior disorder as a proxy for aggression status (with the assertion that relational aggression may be concomitant with disruptive behavior disorders; see Prinstein et al. 2001).

Thus, one of the goals of the current study was to further clarify the relationship between intent attributions (instrumental and relational) and aggression (physical and relational). We utilized Crick's original scenarios with a normative sample of boys and girls. We also tested whether the conceptual distinction between relational and instrumental provocations could be supported statistically. Results of the Crick studies suggest that children likely do discriminate, but, beyond reports of coefficient alpha for the respective scales, statistical distinctiveness of the relational and instrumental scenarios has not been directly tested. Statistically distinguishing the instrumental and relational scenarios would bolster the assertion that they should be separately considered, in addition to showing that they might be uniquely predictive of child aggression.

Relations Between Parents' and Children's Intent Attributions and Children's Aggression

Furthermore, the specific mechanisms in the development of hostile intent attributions have received little attention. Such knowledge is necessary for effective prevention and intervention. According to social learning theory, much of child behavior is vicariously gained through observation of others. This perspective suggests that children learn to attribute negative intent by observing or interacting with individuals who demonstrate a hostile attributional bias. If

this is indeed the case, one natural context where this learning could occur is in the family (Costanzo and Dix 1983; MacKinnon-Lewis et al. 1994; Pettit et al. 1988).

Research consistently shows that family factors significantly predict children's social behaviors (e.g., Burks and Parke 1996; McDowell et al. 2002; Pettit et al. 1988). Parental influence, in particular, is an important antecedent of children's social interactions (Contreras et al. 2000; Crockenberg and Lourie 1996). Social competence (e.g., peer acceptance and social status; Finnie and Russell 1988; Putallaz 1987), social problem-solving skills, and externalizing and internalizing behavior problems (Pettit et al. 1988; McFadyen-Ketchum and Dodge 1998) have all been linked to parental influence. Similarly, children may learn SIP patterns by interacting with and observing their parents, who directly or indirectly teach how to interpret the social world (Costanzo and Dix 1983; MacKinnon-Lewis et al. 1999; Burks and Parke 1996; McDowell et al. 2002). For example, a mother who perceives the world as inherently hostile may indirectly teach this notion when her children happen to overhear her negative verbal responses to the world around her. She may also directly teach hostile attributions by repeatedly informing her children that others cannot be trusted.

A limited number of studies have identified a relationship between parents' and children's social cognition patterns and social behaviors (Burks and Parke 1996; McDowell et al. 2002). For example, MacKinnon-Lewis et al. (1994) examined the extent to which mothers' and sons' hostile intent attributions (based on mother-child scenarios) and coercive behaviors towards each other related to the sons' peer interactions. Results showed that mothers' hostile intent attributions predicted peer adjustment difficulties for their 7–9 year-old sons. Also, mothers' and sons' hostile attributions related to their coerciveness with each other.

MacKinnon-Lewis et al. (2001) also examined negative attributions of fathers and their adolescent sons and daughters. Adolescent negative attributions about their father significantly contributed to the likelihood of negative interactions with their father. Furthermore, negative father-child interactions predicted adolescents' negative attributions 1 year later. Although this study did not assess peer outcomes, it nonetheless demonstrated that negative attributions are tied to behavior within the father-child relationship.

Although these studies by MacKinnon-Lewis and colleagues help establish a relationship between parents' and children's social cognition and behavior, they examine intent attributions only in the context of the parent-child relationship and not in other social contexts. This is understandable, given that the focus of these studies is to assess how social cognition affects parenting practices and children's subsequent aggressive behavior. Past research on childhood aggression, however, has predominantly focused on children's hostile attributions with peers, and it may be

that children's relationships with peers are substantially affected by what children observe parents doing in their own peer relationships (Costanzo and Dix 1983).

Along these lines, Bickett et al. (1996) sought to determine whether mothers of aggressive boys shared their sons' tendencies to attribute hostile intent in ambiguous instrumental provocations. Mothers of aggressive boys (i.e., having an externalizing disorder) or nonaggressive boys were asked to interpret hypothetical scenarios with their son or a peer. The sons interpreted hypothetical instrumental provocations with their mother, a teacher, or a peer. Mothers of aggressive boys shared their sons' tendency to infer hostility in ambiguous situations, although not for the mother–peer scenarios.

MacBrayer et al. (2003) also assessed the correspondence between mother and child attributions, including the context of relational provocations. As partially described earlier, this study found children with disruptive behaviors were more likely than normative controls to attribute hostile intent in instrumental and relational scenarios (particularly girls). In addition, mothers of children in the clinical sample were more likely than mothers of controls to display a hostile attribution bias in response to scenarios involving their child (mother–child, child–classmate, or child–teacher). However, mothers' intent attributions only corresponded with their children's intent attributions in the case of daughters, and only for the instrumental scenarios.

Thus, only the MacBrayer et al. (2003) study has incorporated both instrumental and relational scenarios in assessments of intent attributions for both parents and children, and findings were limited. The study also incorporated a fairly small sample (25 boys and 25 girls in either the clinical or normative comparison groups). No study has yet addressed these connections in a normative sample of considerable size. Furthermore, no study has yet assessed whether parent intent attributions might relate directly to the relationally aggressive behavior of their children. The MacBrayer et al. (2003) study suggests that mother and child relational intent attributions may not correspond. However, a parent's tendencies to attribute hostile intent may also be manifest in the parent's own aggressive tendencies, which a child may effectively model. Fathers are also conspicuously absent from most of the above studies, and especially in any study of relational aggression. A study of potential parental influence should include fathers and allow for comparison to maternal associations with child variables.

Study Objectives and Hypotheses

In summary, the current study sought to address a number of objectives. First, we sought to replicate the findings of the Crick et al. (2002) study. In particular, we tested whether peer-nominated aggression subtypes (physical or

relational) are associated in expected ways with hostile attributions (instrumental and relational). Given a methodological approach parallel to that of Crick and colleagues (using a forced-choice response format and a normative sample), we expected similar results. Using confirmatory factor analysis (CFA), we also examined whether responses to the different provocation contexts can be statistically distinguished. We expected statistical differentiation across provocation contexts and aggression subtypes.

Next, we examined whether mothers' and fathers' intent attributions might be assessed with similar provocation scenarios and whether parents differentiated between instrumental and relational hypothetical provocations. We expected that parents, like children, would distinguish between instrumental and relational provocation contexts. It should also be noted that we expected the parent data to be skewed, given the categorical nature of the forced-choice response format for the intent attribution items (choosing whether or not a peer intended to be mean) and the expectation that adults, due to greater maturity, would be less likely to envision hostile intent in ambiguous scenarios. Parents may also be influenced by social desirability in their responses. Therefore, parents who respond with hostile attributions to ambiguous scenarios likely represent a very unique set of parents in the manner in which they process social information.

We also assessed correspondence between intent attributions of parents (mothers and fathers) and their children (with analyses conducted separately by provocation context). Consistency between parents and children's intent attribution scores would suggest that children's attribution styles might be learned from or aggravated by parents' direct teaching or modeling (MacBrayer et al. 2003). We hypothesized that parent intent attributions would be modestly associated with their children's intent attributions. We did not expect overwhelming consistency, however, given reasons cited above (i.e., greater maturity, social desirability).

Finally, we investigated whether parents' intent attributions were predictive of children's physical and relational aggression. We hypothesized that parents with higher hostile attribution scores would have more aggressive children. Furthermore, if parent intent attributions are significantly associated with children's intent attributions and aggression (and children's intent attributions are also related to aggression), mediational models may also be tested.

Methods

Research Participants

The sample consisted of 500 fourth grade children (242 boys, 258 girls) and their parents ($n=393$) from two school

districts (34 classrooms) in an urban, moderate-sized community in the Western USA. The sample was composed of the following ethnic groups: 89.3% Caucasian, 5% Latino, and a 5.7% mix of other ethnicities (Native American, Asian, Polynesian, Biracial). The smaller number of parents reflects the fact that 21.4% of fathers did not participate in the study, and we elected to analyze the data of families in which both parents participated. All 500 children, however, were included in the child-only analyses.

In regard to the families where fathers did not participate, the majority (61 families; 12.2% of the total sample) were two-parent households in which fathers were simply not willing or available (i.e., too busy) to participate in the home assessment. The remaining groups were composed of single parents due to divorce (37 families; 7.4%), single parents who had never married (5 families; 1.0%), and widowed parents and their children (4 families; 0.8%). We conducted analyses to determine whether the children in the families excluded from further analysis might significantly differ in their peer-nominated physical or relational aggression.

Accordingly, a pair of univariate analyses of variance (ANOVAs) were conducted in which the between-subjects factor was defined by the five different family groups noted above. Given an unequal n design, the analyses were based on GLM comparisons of the unweighted means (estimated marginal means). Results of the ANOVA for physical aggression showed no significant difference; $F(4, 495)=1.8, p=0.12$. In contrast, the ANOVA for relational aggression was significant; $F(4, 495)=3.7, p<0.01$. As shown in Table 1, children in single-parent families (divorced or never married) were generally considered by peers to engage in significantly higher levels of relational aggression. However, the limited cell sizes of these single-parent families in this study precludes any firm conclusions about whether family structure may serve as a risk factor for a child's greater engagement in relational aggression. In any case, the results clearly demonstrate a need for further research. For our purposes, it appears that the range of relationally aggressive behavior of children in our parent-child analyses is not fully representative.

Finally, each child had active parental consent for the peer nomination assessment and each child assented to

participate in one or both parts of the study. The average consent rate for the aggression assessment was 84.8%. The average consent rate for the intent attribution assessments, conducted in the context of individual home interviews, was 70.8%.

Procedure

Consent forms were distributed to all fourth-grade classrooms and asked parents to give consent for their children to participate in a classroom activity (composed of a sociometric and behavior nomination procedure) as well as a family interview. Sociometric and behavior nomination procedures were conducted within all classrooms in which consent reached the targeted threshold. Data from these classroom assessments provided peer acceptance information as well as nominations of physically aggressive, relationally aggressive, and prosocial behavior (the latter behavior is not considered in this study). All children in the classroom, regardless of whether they participated or not, were rewarded with a special pencil and eraser for allowing us to work with their classroom.

All families from classrooms that reached the consent threshold for family interviews were invited to participate in individual home interviews, wherein the social cognition measures were administered. These interviews lasted approximately 1 hour, and included other measures which are not a part of the current study. Families received \$5 for child participation and \$10 for the participation of each parent (i.e., a two-parent family received \$25).

Instrumentation

Assessment of Relationally and Physically Aggressive Behavior A peer nomination instrument developed in past research was adapted and used in the current research. An expanded version of the Children's Social Behavior Scale–Peer Report, (CSBS-P) was used to assess subtypes of aggressive behavior and prosocial behavior (Crick 1995; Crick and Grotpeter 1995; Grotpeter and Crick 1996). See Table 2 for representative items. Relying on class rosters, children nominated up to three of their classmates for each

Table 1 Estimated marginal means and standard deviations for children in the family status groups

	Family status group				
	Married, both parents participated	Married, one parent participated	Separated or divorced	Widowed	Never married
Relational aggression (SD)	−0.13 ^a (0.83)	−0.03 ^{ab} (0.83)	0.29 ^{bc} (0.83)	−0.53 ^{ab} (0.83)	0.75 ^c (0.83)
<i>N</i>	393	61	37	4	5

Means with different superscripts differ significantly at $p<0.05$ by the Fisher least significant difference test.

Table 2 Standardized factor loadings of the child aggression and intent attribution constructs

Items	Loadings	
	Boys	Girls
Physical aggression		
1. Who hits, kicks, or punches other kids at school?	0.91	0.69
2. Who pushes and shoves other kids?*	0.99	0.73
3. Who tells others that they will beat them up unless the kids do what they say?	0.98	0.82
Relational aggression		
1. Who tries to make another kid not like a certain person by spreading rumors about them or talking behind their backs?	0.83	0.86
2. Who, when they are mad at a person, get even by keeping that person from being in their group of friends?	0.86	0.86
3. Who, when they are mad at a person, ignores the person or stops talking to them?	0.61	0.79
4. Who tells their friends that they will stop liking them unless the friends do what they say?	0.87	0.84
5. Who tries to keep certain people from being in their group when it's time to play or do an activity?	0.82	0.76
Instrumental situations		
1. Radio Story	0.77	0.61
2. Milk Story	0.67	0.68
3. Shoes Story	0.76	0.85
4. Paint Story	0.84	0.82
5. Race Story	0.73	0.74
Relational situations		
1. Laugh Story	0.79	0.70
2. Invite Story	0.73	0.72
3. Walk Story	0.64	0.88
4. Lunch Story	0.69	0.85
5. Sleepover Story	0.49	0.47

* Single variant item in the CFA for the aggression items.

item. Nominations were summed and standardized within each classroom for each item, and the multiple items relevant to each scale were summed to produce continuous aggression subscale scores for each child. This peer-nomination measure of aggressive behavior has had favorable psychometric properties in past research (Crick and Grotpeter 1995; Grotpeter and Crick 1996).

Assessment of Intent Attributions for Ambiguous Provocation Situations The hypothetical provocations used in this study are based on instruments developed and reliably used in past research (Crick 1995; Fitzgerald and Asher 1987; Bickett et al. 1996). The child instrument (Crick 1995) is composed of stories describing a provocation situation in which the intent of the provocateur is ambiguous. Half of the stories focus on relational provocations (e.g., the subject finds a friend playing with someone the subject dislikes), whereas the other half focus on instrumental provocations (e.g., a peer's basketball rolls under the subject's feet and causes him to fall during a race). Crick's original instrument contains five relational and five instrumental scenarios. We added two relational and two instrumental stories in order to ensure that we had sufficient items for planned analyses (given that these measures had never been factor-analyzed and some items may not load appropriately).

Hypothetical ambiguous provocations for parents were also divided by context (instrumental versus relational) and were also followed by the same three questions used in the children's stories. Appropriate provocations from the work of Bickett et al. (1996) and Crick and colleagues were included. However, the majority of these scenarios (especially the relational scenarios) were created specifically for this study and thus essentially constitute a new measure of parent intent attributions. Accordingly, the scenarios represent an item bank which we intended to hone for best use in this study (i.e., to hopefully establish latent constructs for parents that are at least roughly parallel in number of items to that established for the corresponding children's constructs). To ensure that sufficient items existed for our purposes, a total of 20 scenarios were presented to parents (10 instrumental, 10 relational).

Study participants answered three questions following each story, two of which probe for their attributions of the provocateur's intent and one that samples feelings of distress for the given situation. The feelings of distress item (item 3) is not included in the present study. The first of the intent attribution assessment items (item 1) presents four possible reasons for the behavior of the supposed provocateur(s), two of which are intended to reflect hostile intent (e.g., the classmate was mad at you) and two that are

intended to reflect benign intent (e.g., it was an accident). The second question (item 2) directly asks whether the provocateur(s) intended to be mean (i.e., attribution of hostile intent) or not (i.e., attribution of benign intent). Exploratory correlational analyses showed that items 1 and 2 did not correspond very well for mother and fathers (e.g., participants may have selected a hostile attribution for item 1 but chose a benign attribution in item 2). In particular, items 1 and 2 correlated, on average, at 0.46 for fathers and 0.53 for mothers. In contrast, children's scenarios correlated 0.82 on average. Accordingly, we elected to use only item 2 in our statistical analyses in order to prevent misinterpretation of the parents' attributions (to be consistent, we also focused on item 2 in forming the child intent attribution latent variables).

Analyses

The analyses in this study follow two steps. First, several sets of confirmatory factor analysis (CFA) were conducted to separately examine the quality of measurement of the primary constructs in this study (child aggression, child intent attributions, and parent intent attributions). These measurement models were conducted with the Mplus statistical program, using categorical analysis of the intent attribution data (Muthén and Muthén 2001). Mplus was considered most suitable for analysis of the social cognitive binary variables (especially for the skewed parent variables). In each of these measurement models, factorial invariance across groups (boys vs. girls, mothers vs. fathers) was also assessed (Widaman and Reise 1997). When the constructs are measured similarly across groups, as suggested by invariance (similar factor loadings), the relationships among the latent constructs are most directly comparable across groups (Horn and McArdle 1992). Although full measurement invariance is desired, partial measurement invariance, in which the majority of factor loadings are found to be invariant, is appropriate (Byrne et al. 1989; Vandenberg and Lance 2000). Furthermore, these measurement models also allow for testing of statistical distinctiveness of highly correlated latent variables (e.g., physical and relational aggression) and gender differences.

In regard to reliability of measurement, it should be noted that coefficient alpha is not typically reported for latent variables in confirmatory factor analysis as latent variables are not summed multiple-item scales and alpha values therefore cannot be calculated. In addition, coefficient alpha is considered to be a questionable indicator of reliability (Komaroff 1997; Schmitt 1996). Instead, standardized factor loadings of 0.40 and above of the observed variables are considered evidence of reliability for latent constructs in SEM (for samples of 150 or more; Stevens

1996), and these factor loadings are provided in tables described below.

Second, with appropriate measurement of the latent variables established, the different sets of variables are merged in additional confirmatory factor analyses for the express purpose of illustrating the latent correlations between study variables. Accordingly, a larger CFA which includes both child aggression and intent attributions follows the successful measurement models for each. In addition, following successful execution of the parent measurement model, the parent intent attribution latent variables are then combined with the child latent variables (aggression, intent attributions) in a final CFA which allows for assessment of latent correlations between the parent and child constructs.

Results

Measurement Model of Child Aggression Subtypes

In the two-group (boys and girls) confirmatory factor analysis of child aggression, the baseline measurement model (unconstrained two-factor model) of the aggression constructs fit the data satisfactorily; $\chi^2=66.05$, $df=28$, $p<0.001$, CFI=0.99, TLI=0.98, and RMSEA=0.07. Furthermore, invariance testing showed all but one item to be invariant across child gender ($\chi^2_{diff}=6.09$, $df_{diff}=5$, $p>0.05$). The one variant item, denoted by an asterisk in Table 2, represents a dimension of physical aggression ($\chi^2_{diff}=6.37$, $df_{diff}=1$, $p<0.05$). Thus, mostly invariant measurement of the aggression constructs was obtained for boys and girls. Table 2 shows the standardized factor loadings of the baseline model for both boys and girls.

Due to the expected high latent correlation of the relational and physical aggression constructs ($\varphi\approx 0.82$ in boys and 0.58 in girls); an additional model using similar indicators to reflect one aggression construct was compared with the baseline (two-construct) model. This comparison was conducted for boys and girls together. The chi-square difference test showed that the original two-construct model fit the data much better than the one-construct model; $\chi^2_{diff}=313.83$, $df_{diff}=3$, $p<0.001$. Thus, the two constructs (physical and relational aggression) were statistically distinguished, though they are highly correlated. Furthermore, in order to foster comparison with the results of previous non-SEM (traditional statistics) research, Pearson's correlations between the summed scales of the aggression constructs were computed separately. These correlations ($r_s=0.78$ and 0.52 for boys and girls, respectively) were similar to values reported in prior research regarding physical and relational aggression, which represent different manifestations of the overall construct of

aggression (Crick et al. 1999; McNeilly-Choque et al. 1996; Nelson et al. 2005).

Measurement Model of Child Intent Attributions

Regarding measurement of children's intent attributions, it should first be noted that five of the original seven items were included in each attribution construct, with two items dropped from each construct in preliminary analyses due to low loadings or negative correlations with parent items. Of the remaining items, nine of ten are Crick's original items. The one exception is the sleepover item for the relational intent attribution construct, as one of the Crick items—the best friend scenario—was dropped due to a low loading. The baseline measurement model of the two-group confirmatory factor analysis (unconstrained model wherein instrumental and relational situations are considered statistically distinct) fit the data satisfactorily; $\chi^2=76.53$, $df=46$, $p<0.01$, CFI=.97, TLI=0.97, and RMSEA=0.05. The invariance test showed all items to be invariant across child gender ($\chi^2_{diff}=6.54$, $df_{diff}=6$, $p>0.05$). Therefore, full invariant measurement of the intent attribution constructs (instrumental and relational scenarios) was obtained for boys and girls. The standardized factor loadings of the baseline model for both boys and girls are also represented in Table 2.

Due to the moderately high latent correlation of the two intent attribution constructs ($\phi\approx 0.60$ in boys and 0.71 in girls), an additional model using similar indicators to a single intent attribution construct (instrumental and relational scenarios combined) was compared with the baseline (two-construct) model. This comparison was conducted for boys and girls together. The chi-square difference test showed that the original two-construct model (instrumental and relational scenarios considered separately) fit the data better than the one-construct model; $\chi^2_{diff}=6.82$, $df_{diff}=3$,

$p<0.001$. Accordingly, the two constructs were statistically distinguished, though they are substantially correlated.

Latent Mean Differences in Child Aggression and Intent Attributions

In each of the above measurement models for child aggression and intent attributions, it was possible to assess latent mean differences by gender of child. Only one significant gender difference was obtained in mean levels for aggression. Boys were shown to be significantly more physically aggressive than girls (mean difference=2.20, $z=9.22$, $p<0.001$). In contrast, no gender difference was obtained for relational aggression. In regard to latent mean differences in responses to instrumental or relational hypothetical scenarios, boys and girls did not differ significantly. However, boys were marginally more likely to respond to the instrumental scenarios with a hostile attribution (mean difference=0.22, $z=1.74$, $p=0.09$).

Latent Correlations between Child Intent Attributions and Child Aggression

Given satisfactory measurement of the two domains of child constructs, an additional two-group CFA was conducted in order to assess latent correlations between child aggression and child intent attributions by child gender (both sets of latent variables included in the same model). In this CFA, the baseline measurement model fit the data satisfactorily; $\chi^2=96.06$, $df=66$, $p=0.01$, CFI=0.96, TLI=0.98, and RMSEA=0.04. Table 3 shows the factor correlations of the four constructs. As the results show, greater engagement in physical aggression was correlated with greater attributions of hostile intent for instrumental scenarios, but for boys only. Relational aggression was unassociated with hostile intent attributions for relational scenarios.

Table 3 Estimated latent variable (ϕ) and Pearson's (r) correlations of child aggression and intent attribution constructs

	Relational aggression	Physical aggression	Instrumental intent attribution	Relational intent attribution
Relational aggression	—	0.82*** (0.78***)	0.14 (0.10)	0.03 (0.01)
Physical aggression	0.58*** (0.52***)	—	0.21* (0.16*)	0.02 (0.00)
Instrumental intent attribution	0.04 (0.05)	−0.04 (−0.03)	—	0.60*** (0.38***)
Relational intent attribution	−0.00 (−0.01)	−0.09 (−0.06)	0.71*** (0.47***)	—

Upper diagonal: correlations for boys; lower diagonal: girls. Correlations in parentheses are Pearson's r s (provided for comparison).

* $p<0.05$

** $p<0.01$

*** $p<0.001$

Measurement Model of Parent Intent Attributions

Next, in the single-group CFA measurement model of parent intent attributions, it must first be noted that the model would not converge when we attempted to keep relational and instrumental scenarios separate. For both parents, the latent correlation between parent relational and instrumental latent factors exceeded 0.90. The high latent correlation suggests that parents may not differentially perceive relational and instrumental scenarios. Accordingly, the scenarios had to be merged into a unified intent attribution construct.

The parent data, as expected, was also highly skewed. For most scenarios, an average of about 4–5% of parents responded with a hostile attribution (as noted earlier, this is a unique set of parents). A few items were more provocative (with up to 15% of parents responding with a hostile attribution). Preliminary analyses showed, however, that the more provocative the item (the greater the number of parents who responded with a hostile attribution), the less predictive it was of child variables. Thus, the more heavily skewed items were the most consistently correlated with child outcomes and also loaded together best in the CFA. There was also the challenge of composing latent variables which loaded together well for both mothers and fathers in our effort to establish measurement invariance. Not all variables were perceived in the same manner by both parents. Accordingly, we honed the parent items to a set equivalent in number with those used for each of the child intent attribution constructs (five items). These five chosen items present a unified parent intent attribution construct that is nearly evenly representative of both instrumental and relational contexts. These items captured hostile attributions, on average, for 3–4% of parents (they were a bit more skewed than the average item).

Thus, a single-group CFA of mothers' and fathers' intent attributions was conducted with the five parent items (the full text of the scenarios and attendant items is available from the authors upon request). The baseline (unconstrained) model fit the data very well; $\chi^2=9.44$, $df=8$, $p=0.31$, CFI=0.98, TLI=0.97, and RMSEA=0.02. Furthermore, the constrained model (equality constraints imposed on the factor loadings across parents) showed no significant change in the model fit, $\chi^2_{diff}=6.82$, $df_{diff}=3$, $p>0.05$, implying that the factor loadings were invariant across gender of parent. Therefore, full measurement invariance was obtained for the parent intent attributions. Table 4 shows the standardized factor loadings of the parent attribution baseline model. Mothers' and fathers' intent attribution latent variables were moderately correlated ($\phi\approx 0.42$), and did not significantly differ in mean level (mean difference=0.24, $z=1.63$, $p=0.10$).

Table 4 Standardized factor loadings of parents' intent attribution constructs

Items	Loadings	
	Mothers	Fathers
1. Car Story (I)	0.48	0.72
2. CD Story (I)	0.54	0.86
3. Book Story (I)	0.95	0.64
4. Play Story (R)	0.83	0.61
5. Break Story (R)	0.44	0.86

All items are invariant across gender of parent. (I) denotes an instrumental scenario, (R) denotes a relational scenario.

Latent Correlations of Parent and Child Constructs

Finally, the correlations of parental intent attributions with child aggression and intent attributions were examined with a single-group CFA of all the constructs in the study (child physical and relational aggression, child instrumental and relational intent attributions, maternal and paternal intent attributions). This analysis was conducted with boys and girls combined. This model fit the data well; $\chi^2=79.18$, $df=49$, $p<0.01$, CFI=0.95, TLI=0.96, RMSEA=0.04. Mothers' intent attributions were found to be significantly associated with child instrumental intent attributions ($\phi=0.45$, $z=3.05$, $p<0.01$) and relational intent attributions ($\phi=0.22$, $z=4.01$, $p<0.01$), but not with either relational aggression ($\phi=-0.16$, $z=-1.56$, ns) or physical aggression ($\phi=-0.14$, $z=-0.97$, ns). In contrast, fathers' intent attributions were found to be significantly associated with child relational aggression ($\phi=0.22$, $z=2.09$, $p<0.05$), but not with physical aggression ($\phi=0.09$, $z=0.92$, ns) or either form of child intent attributions ($\phi=0.14$, $z=1.22$, ns and $\phi=-0.03$, $z=-0.30$, ns for instrumental and relational intent attributions, respectively).

Discussion

The main purpose of this study was to further understand the development of children's aggression by examining how boys' and girls' relational and physical aggression relates to their patterns of intent attributions and to their parents' intent attribution styles. The validity of the conceptual distinction between relational and instrumental scenarios, and the relevance of this distinction for predicting children's physical and relational aggression, were also examined. Results of this study, first of all, show that the distinction between relational and instrumental scenarios is relevant for children but perhaps not for adults. In particular, we found that children distinguish between relational and instrumental provocation situations. While

Crick and colleagues asserted that this distinction was conceptually meaningful on the basis of inter-item consistency (using Cronbach alphas), we statistically tested and confirmed this assertion via confirmatory factor analysis. Parents, however, did not appear to distinguish between relational and instrumental scenarios. It may be that, as development proceeds, all provocation situations take on a relational tone regardless of whether a relationship or an object is at stake. In other words, a friend who apparently fails to care for an object on loan may be perceived as untrustworthy or insensitive—aspects which directly tie to perceptions of relationships.

Our results partially parallel Crick and colleagues' assertions (Crick 1995; Crick et al. 2002) that provocation type matters when examining aggression in children, at least for physical aggression. Physical aggression was associated with instrumental intent attributions, but for boys only. These results are consistent with previous research (Crick and Dodge 1994; Orobio de Castro et al. 2002). This is notable because most studies utilize an extreme-groups approach (comparing highly aggressive or clinical samples and non-aggressive counterparts). Our results help establish a normative link between hostile intent attributions and physical aggression in boys. Relational aggression, in contrast, was not predicted by relational intent attributions.

These results appear to contradict Crick and colleagues' findings for relational aggression with normative samples (Crick 1995; Crick et al. 2002). We wondered, however, if the lack of consistent findings might be an artifact of our analysis strategy. We did not employ a categorical (extreme-groups) approach as Crick and colleagues did in their studies. Perhaps a marked increase in attributional bias is most evident at the extreme end of the aggression distribution. Accordingly, we explored this possibility by conducting post-hoc categorical analyses (ANOVAs like those conducted by Crick and colleagues), but no significant results emerged.

Our results instead parallel Crain et al.'s (2005) findings, wherein no clear relationship was found between girls' intent attributions and their relational aggression. Furthermore, the mean differences in the intent attribution scores (between highly aggressive and less aggressive children) in Crick's studies, though statistically significant, may represent small differences that are less significant in practical terms. Thus, we may not be surprised to find a difference in one study and no difference in the next, given a mean difference of relatively small magnitude. A similar argument has been made for inconsistent gender difference findings for relational aggression (cf., Archer 2004; Underwood 2003).

The lack of correspondence between intent attributions and relational aggression might also find a parallel in

critiques of Dollard's Frustration–Aggression Hypothesis (Dollard et al. 1939). This theory posited that frustration always leads to aggression. However, feelings of frustration do not always lead to aggression and aggression can be enacted without attendant feelings of frustration. Thus, although the theory intuitively makes sense, it is far too simplistic. Similarly, the relation between hostile intent attributions and relationally aggressive behavior may not be very direct. Many children in our sample who find hostility in ambiguous relational scenarios are not engaging in high levels of relational aggression.

In particular, in three of the five relationally provocative scenarios used in this study (all original Crick items), the majority of children in our sample (58–70%) attributed hostile intent. In contrast, only 20–30% of children responded with hostile attributions to most instrumental scenarios. Since only a minority of children engage in high levels of relational aggression, many non-aggressive children attribute hostile intent in relational scenarios. Accordingly, many of Crick's relational provocation situations appear too provocative, especially if relational altercations are frequent and therefore more salient in the lives of children. Moreover, given the more subtle nature of relational aggression, it may be difficult to differentiate actual provocations from harmless situations that otherwise look provocative. There may also be something unique about this particular sample of children which renders a greater number of them susceptible to attribution difficulties with these scenarios. In any case, it may be difficult to design hypothetical situation measures that are appropriately ambiguous for relational provocations.

Gender differences found in physical aggression support substantial research showing that boys tend to be more physically aggressive than girls (Coie and Dodge 2006). No difference between boys' and girls' relational aggression scores also accentuates that this form of aggression is typical among both boys and girls, and the gender difference may be small. Boys and girls may also engage in relational aggression in different ways, which may hamper gender comparisons across studies that utilize different items. For example, recent research (Bacon and Nelson 2005) suggests that girls are more likely to use covert forms of relational aggression whereas boys may focus on the more overt relationally aggressive strategies. Further research is needed to discern how girls and boys may differentially express relational aggression.

The results of this study also provide further evidence that the way parents respond to ambiguous provocation situations may be associated with their children's way of thinking and aggressive behavior. Interestingly, the findings tied to parent attributions appeared to vary by gender of parent, consistent with studies which suggest that mothers and fathers may contribute to their children's development

in unique ways (Hart et al. 1992; Hart et al. 1998). In this study, mothers' but not fathers' social cognition was associated with children's intent attributions. Fathers' intent attributions, however, was associated with children's use of relational aggression. If we assume that the direction of influence is from parent to child, the challenge is to identify the mechanisms by which mothers and fathers may differentially impact their children's social cognition and aggressive behavior.

One possibility is that mothers may spend more time than fathers with children in directly teaching and modeling interpretation processes. This perspective appears consistent with previous studies which suggest that mothers, as compared to fathers, carry the weight of influence when it comes to reasoning and helping children think about the consequences of their actions (Hart et al. 1992, 1998). Thus, children may follow their mothers in interpreting the intent of others. Furthermore, given that children's intent attributions were generally unrelated to their aggression scores in this study, the results suggest that children may be learning from their mothers to attribute intent, regardless of whether these attributions are tied to engagement in aggressive behavior or not. Accordingly, if intent attributions are transmitted from mothers to children, these attributions may not always promote negative interactions with peers. It may well be that other motivational or peer group pressure factors help override hostile intent attributions, thus mitigating tendencies to enact aggressive behavior with peers. This reasoning might explain in part why mothers' thought processes correlated with their children's hostile attributions, but not with their children's behavior.

The significant correlation between fathers' intent attributions and their children's relational aggression provides additional evidence that fathers uniquely contribute to the development of children's peer relationships (see Parke et al. 2002, for a review). This finding also suggests that fathers may translate their intent attributions more readily than mothers into relationally aggressive strategies. In particular, fathers may be more likely to break off relationships in response to perceived hostility. Mothers, in contrast, may be more hesitant to act on perceived hostility and engage in either direct or indirect forms of aggression against others. This finding for fathers also corresponds with other research which shows paternal parenting styles to correlate with their children's levels of relational aggression. In particular, paternal psychological control is consistently predictive of more relational aggression in daughters across cultural contexts (i.e., USA and China; Nelson and Crick 2002; Nelson et al. 2006).

Speaking of parenting styles, mediation models seem an appropriate avenue for exploration, despite the fact that only limited support has been provided for the mediating

hypothesis in previous studies (Mize et al. 2000). Mediation was not evident for variables included in this study, however, since father and child intent attributions were unrelated and child intent attributions were unrelated to relational aggression. However, other variables (not included in this study) may be at work. For example, the link between child aggression and paternal intent attributions may be mediated by paternal parenting practices. For example, a father who is more likely to attribute hostile intent may also be more coercive or psychologically controlling in his parenting (consistent, perhaps, with maladaptive intent attributions in the parent–child relationship), and this negative parenting may coincide with child aggression.

Study Limitations and Future Directions

Several limitations must be considered when interpreting the findings of this study. First, the skewed nature of our parent data appears problematic, and suggests that a forced-choice response format may heighten social desirability bias and inflate measurement error. In this study, we anticipated the skewness and tried to compensate with a relatively large sample. In contrast, an open-response format to these ambiguous hypothetical provocation situations might be more helpful in assessing and understanding the way parents interpret ambiguous provocations (Bickett et al. 1996; MacBrayer et al. 2003).

The lack of variability in the parent intent attribution scores may also suggest that the scenarios are not provocative enough. However, no clear standards exist as to what percentage of responses should be hostile in order for an item to be considered a sufficiently sensitive measure of hostile attribution bias. As noted earlier, the more provocative the parent scenario, the less predictive it was of child variables. Thus, the more heavily skewed items were generally the most predictive of child outcomes, which may suggest that limited variability actually indicates an appropriately sensitive item. Accordingly, the skewness may represent parents who have distinct hostile attributional biases that set them apart from the normative population of parents. Identifying these particular parents might be most useful for therapy and other interventions.

Another limitation is the relatively homogeneous nature of our sample. Perhaps a more ethnically diverse sample would not yield such heavily skewed results and tell a different story altogether. For example, Crain et al. (2005) found that Hispanics viewed ambiguous provocateurs' behavior as more hostile than Caucasians. The study of Crick et al. (2002) included samples that were more diverse (62%–72% Caucasian), although they did not analyze ethnic differences. It is possible that the correspondence between relational intent attributions and relationally

aggressive behavior is more pronounced in one ethnic group versus another. Thus, ethnicity and culture might influence the interpretation and use of relational aggression, and inconsistent findings across studies may be in part due to composition of samples.

Our sample was also limited to fourth-grade children. The connection between the variables of interest may be different in younger or older age groups. However, focusing on a middle-childhood sample is consistent with the Crick studies that we were seeking to replicate. In addition, effect sizes for the connection between children's intent attributions and their social behavior are more pronounced in this age group (i.e., 8–12 year-old children; Orobio de Castro et al. 2002). Accordingly, a large sample of fourth-grade children should have maximized our chances of finding the hypothesized connections. Yet only for boys did we obtain findings, and only for instrumental intent attributions and physical aggression.

Given problems cited earlier with the overly provocative nature of the child relational provocations, it may also be that the connection between relational intent attributions and relational aggression may be more accurately assessed with a different methodological approach. Compared to presentation of hypothetical situations, staging actual social interactions engenders larger effects between intent attributions and aggression, at least in previous research regarding physical aggression (see Orobio de Castro et al. 2002). Accordingly, further study is needed to determine whether measurement approach might attenuate the true relation between relational intent attributions and relational aggression.

Clearly, compared to the relatively large literature covering intent attributions and physical aggression, there is much we need to learn about the nuances of intent attributions as they correspond with enactment of relational aggression. Nonetheless, this study also suggests that parental influence is likely important to consider when prevention and intervention programs are designed to diminish hostile intent attributions and relational aggression in children. Parents should be aware that their cognitive style might carry over to their children. Teaching parents how to model and teach benign attributions might therefore diminish their children's tendency to attribute hostile intent or to engage in relational aggression (Nelson and Crick 1999). Accordingly, their children may be more likely to engage in appropriate behavior and succeed in their peer interactions.

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