Early Socialization of Hostile Attribution Bias: The Roles of Parental Attributions, Parental Discipline, and Child Attributes

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Abstract

The goal of this study was to examine child and parent predictors of children's hostile attribution bias (HAB) with a particular focus on exploring the associations between parents' early attribution of child misbehavior and children's HAB in the transition to school-age. Participants were 241 children (118 girls) of middle-income families who were at risk for school-age conduct problems. Multi-method, multi-informant data were collected on maternal attributions of child misbehavior, parental use of corporal punishment, and child attributes (i.e., verbal IQ, effortful control, theory of mind, emotional understanding) at 3 years, and child HAB in ambiguous situations at 6 years. Results indicated that mothers' internal explanations for children's misconduct may either reduce or increase children's later HAB depending on the specific content of attributions, such that mothers' belief that children misbehave because of their internal state (i.e., emotional state or temperament) was associated with lower levels of child HAB, whereas attributing power-based motives (i.e., manipulative, controlling intentions) in children was associated with higher levels of HAB. The findings are discussed with respect to appreciating the complexity of parents' explanations for children's behavior, and considering parental cognition as a potential target for early identification and prevention of child HAB and related problems.

Keywords

hostile attribution bias; parental attribution; parenting; preschool

Hostile attribution bias (HAB) refers to children's tendency to attribute hostile intentions to others during social mishaps where intent is ambiguous (Dodge, 2006). HAB is known to be a key risk factor for the development of aggressive and antisocial behavior (de Castro et al., 2002). It may also block opportunities for children to learn prosocial behaviors in peer

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contexts (Dodge & Coie, 1987). Therefore, knowledge of how individual differences in child HAB emerge may be useful for the prevention of problem behavior and promotion of positive child development.

The preschool years are a formative period for growth in children's social cognitive abilities. Specifically, preschoolers begin to learn that actions and intentions might not always match (Feinfield, Lee, Flavell, Green, & Flavell, 1999), such that negative consequences may actually arise from benign (or no) intentions. It has also been suggested that children's HAB becomes stable and resistant to change with time (Dodge, 2006), highlighting early childhood as an important period for the socialization of HAB as well as an opportune window for intervention.

However, most studies have focused on older children or adolescents who may have already developed stable HAB (MacBrayer, Milich, & Hundley, 2003; MacKinnon-Lewis, Castellino, Brody, & Fincham, 2001; MacKinnon-Lewis, Lamb, Hattie, & Baradaran, 2001; Nelson & Coyne, 2009). The few exceptions that investigated early precursors of HAB typically focused on child attributes (Choe, Lane, Grabell, & Olson, 2013; McElwain, Booth-LaForce, Lansford, Wu, & Justin Dyer, 2008) or parenting behaviors (Nelson & Coyne, 2009; Weiss, Dodge, Bates, & Pettit, 1992). Although those efforts are promising, considering the complexity of interactions between the child and ecology, it may be necessary to incorporate an array of individual and social factors that may contribute to how children develop attribution tendencies. Relatedly, despite some notable exceptions (e.g., MacKinnon-Lewis, Lamb, et al., 2001), there has been relatively less work on associations between parents' and children's cognitions, and longitudinal studies of the precursors of child HAB have been extremely rare. We addressed gaps in knowledge by examining the hypothesis that children's attributions may be related, in part, to earlier patterns of maternal beliefs about the causes of children's misbehavior. In addition, our assessments of maternal beliefs about child misbehavior were based on mothers' free responses to hypothetical situations involving child misbehaviors, a novel contribution. Finally, to provide a rigorous test of the incremental contributions of parental beliefs, we simultaneously assessed a broad range of child and parenting characteristics that have been linked to child HAB in previous work. Our central aim was to provide an integrative understanding of early childhood factors that contribute to individual differences in children's later attributions following the transition to school, with a particular interest in exploring maternal attributions of child misbehavior as contributors to children's later benign vs. hostile intent attributions.

Child Predictors

Prior studies of intrachild predictors of HAB have largely focused on early social-cognitive skills such as the child's capacity to know others' internal states (i.e., theory of mind; ToM) and emotions in social contexts (i.e., emotion understanding). As ToM develops, preschoolers begin to understand other's mental states and learn that some behaviors might not be performed on purpose (Mills & Keil, 2005). Additionally, children's ability to distinguish other's emotional reactions from their own, and correctly infer other's emotions based on available information may be important for children to make accurate attributions in social interactions.

In addition to social cognition, children's verbal and self-regulation abilities have also been proposed as risk factors for child HAB. Verbal ability may contribute to lower deficits in HAB by facilitating a child's understanding of social cues, and supporting other capacities (e.g., effortful control, ToM) that lead to more accurate mental inferences in ambiguous interpersonal situations. Indeed, young children with less advanced verbal skills have been found to show higher levels of HAB than others (Choe et al., 2013; McElwain et al., 2008). Effortful control refers to a child's capacity to regulate attention and behavioral impulses (Rothbart & Bates, 2006), assisting the child to mentally slow down and think deliberately rather than involuntarily reacting to the stimulus. Children with higher effortful control abilities may be in a more favorable position to inhibit initial hostile attributions, consider different perspectives on what happened, and arrive at more accurate attributions of others' intent (Choe et al., 2013). Although attributing non-hostile or benign intent in ambiguous situations requires abilities other than effortful control, effortful control may serve as a basis for those social-cognition skills (e.g., ToM, emotion understanding) to be applied.

Furthermore, child aggression has been identified as a robust correlate of HAB (Dodge & Coie, 1987). Although child HAB has often been treated as a precursor for later aggression (e.g., Dodge, 2006), child aggression may also precede HAB such that child aggression may drive others to respond with counter-aggression, subsequently increasing the child's tendency to make hostile attributions even in situations where others' intent is unclear. Thus, early levels of child aggression must be considered as a predictor of later developing HAB. Moreover, as many predictors of HAB are also related to children's aggressive behavior, including early aggression in the model for HAB would allow for a more rigorous test of unique effects of early precursors of child HAB that are not accounted for by variability in children's aggression.

As reviewed, a child's capacity to cognitively process social and emotional cues, regulate impulses, and/or use verbal skills have been proposed as contributors to HAB, but relatively little is known about how they may conjointly contribute to HAB in the early years when many of those abilities develop rapidly. As a notable exception, using the current sample of preschoolers, higher levels of ToM and emotion understanding, and verbal IQ at 3 years have been found to predict lower levels of child HAB at 6 years (Choe et al., 2013). Conversely, early peer aggression was not significantly associated with HAB (Choe et al., 2013).

Parental Predictors

Another line of research on HAB has focused on parental contributions which may be especially salient in the preschool period when children are dependent on their parents and acquire developmental milestones primarily within parent-child relational contexts. In particular, harsh discipline (e.g., corporal punishment, yelling, verbal criticism) has been highlighted as a risk factor for deficits in social information processing and HAB in peer contexts (Nelson & Coyne, 2009; Weiss et al., 1992). Children's perceptions of the world are heavily influenced by their relational history with their primary caregivers (Costanzo & Dix, 1983). Those who endure harsh parenting may develop an inner working model that views others as hostile, and attribute negative intentions even in ambiguous contexts (Hart,

Ladd, & Burleson, 1990; Healy, Murray, Cooper, Hughes, & Halligan, 2015). Although such processes may be applicable to many types of adverse parenting behaviors (e.g., yelling, criticism), we focus on corporal punishment in this study as we thought that it represents one of the more salient manifestations of a parent's harshness towards the child that might also be related to compromised quality of parent-child relationship.

In contrast to how parents respond to their child's behavior, how parents *think* about a child's behavior has received much less attention in research on the development of children's intent attributions. Of particular interest in this study was the role of parents' explanation(s) of children's misbehaviors which may affect child HAB by several processes. First, parents' interpretations of the causes of child behavior may shape children's interpretations of social cues via negative parenting behaviors, a known risk factor for child HAB (Dodge, 2006; Halligan, Cooper, Healy, & Murray, 2007). Indeed, in previous reports, parental attributions predicted parenting behaviors and subsequently child HAB (MacKinnon-Lewis, Castellino, et al., 2001; Nelson & Coyne, 2009; Weiss et al., 1992). Alternatively, children may acquire HAB in discussions with their parents about social interaction or by modeling their parents' attributions of hostile intent to others (Nelson, Mitchell, & Yang, 2008). Parents may also strengthen the child's hostile attribution by neglecting benign explanations of the situation as well as reinforcing hostile interpretations (Macbrayer et al, 2003).

However, research on associations between parents' intent attributions and child HAB has generally been scarce and mixed. For example, maternal attributions of hostile intent positively predicted young children's HAB (Nelson et al., 2008), even after controlling for indirect effects of negative parenting (Healy et al., 2015). Conversely, Halligan et al. (2007) found no significant associations between parent and child attributions of hostile intent. More importantly, studies have typically focused on parents' attribution of hostility or intentionality rather than other possibilities of explaining the causes of children's misbehavior. Although attributing child behavior to power motives (e.g., to manipulate parents) may have important ramifications for children's development, there may be other ways of explaining children's misbehavior. For example, it is possible for parents to believe that their children misbehaved because they were temporarily upset, which may represent another aspect of internal attributions of child behavior which may have different implications for children's adjustment. In most studies, parental attributions have been assessed by asking parents to choose among a set of predefined responses to questions that tap into their beliefs about the nature of children's actions (Trommsdorff, Cole, & Heikamp, 2012). Specifically, parental attributions of child behavior have typically been assessed using dichotomous choices such as hostile versus benign (e.g., Halligan et al., 2007), or intentional versus unintentional (e.g., Nelson & Coyne, 2009). Although hostility or intentionality might be a key aspect of parents' suboptimal information processing that leads to negative consequences, it might also be important to examine other facets of attribution that may have implications for child outcomes. For example, if mothers are not attributing hostile intention to children's behavior, what are their alternative explanations? Additionally, even if mothers do believe that children engage in difficult behavior on purpose, the reasons for the question "for what?" may not be the same for all parents (e.g., To assert independence? To get parents?). The field has yet to find out whether such information might be useful for

building a more comprehensive model of how children's HAB develops. We thought that it might be worthwhile to explore this possibility by asking parents to freely describe their beliefs about the causes of children's misconduct rather than to respond to forced-choice questions. It has been suggested that open-ended and semi-structured questions may be a promising method to elicit parents' spontaneous responses that reflect their causal attributions of child maladaptive behavior (Trommsdorff et al., 2012).

The Present Study

As a follow-up of a previous study using the same sample (Choe et al., 2013), our primary goal was to examine child attributes (i.e., ToM, emotion understanding, effortful control, verbal IQ, and aggressive behavior), parenting behaviors (i.e., physical punishment), and parent cognitions (i.e., attribution of intent) as early predictors of child HAB following the transition to school. In contrast to the earlier investigation that focused only on intrachild precursors of child HAB (Choe et al., 2013), we aimed for a more integrative perspective on early precursors of HAB by incorporating both child and parent risk factors. We were particularly interested in exploring more nuanced causes that parents assign to children's misbehavior, and whether such information offers additional benefits for understanding the development of child HAB. To achieve this goal, parental attributions were assessed using a new procedure in which parents were invited to freely generate their responses to open-ended questions as part of a semi-structured interview.

Based on independent lines of research on child attributes, parenting, and parental attributions in relation to child HAB, we hypothesized that higher levels of verbal IQ, effortful control, ToM, and emotional understanding at 3 years would predict lower levels of child HAB at 6 years, whereas higher levels of child aggression and parental corporal punishment at 3 years would predict higher levels of child HAB at 6 years. We did not generate specific hypotheses regarding the effects of parents' explanations for child misbehavior on children's later HAB, as our new assessment method for parent attributions was expected to tap aspects of mothers' attributions that were relatively unexplored in past research. However, it was anticipated that attributing a child's misconduct to hostility or intentionality (related to *power motives* in this study) at 3 years would be associated with higher levels of HAB three years later, above and beyond the effects of child attributes, aggressive behavior, and parents' use of corporal punishment.

Method

Participants and procedure

Two hundred and forty-one families with a 3-year-old child (118 girls) were recruited to participate in a longitudinal study on early pathways to school-age conduct problems, via newspaper advertisements, fliers at day care and preschools, and individual referrals by pediatricians and teachers (see Olson, Sameroff, Kerr, Lopez, & Wellman, 2005 for more details). Participants at greater risk for conduct problems were oversampled such that 44% of children represented the medium to high range of externalizing symptom severity ($T >$ 60) on the Child Behavior Checklist (CBCL/2–3; Achenbach, 1992). Children were primarily of European American heritage (91%) and others were African American (5.5%),

Hispanic American (2.5%), and Asian American (1%). In terms of family constellations, 91.3% were married or cohabiting, with smaller numbers of single (5.3%) and separated or divorced (3.3%). Levels of maternal education were self-reported on a 7-point scale (1 = *less than seventh grade*; 7 = *graduate or professional training*). Nineteen percent of mothers attained a high school diploma or equivalency; 46% of mothers completed four years of college; 35% of mothers received graduate or professional training. The median family income was $52,000 per year, ranging from $20,000 to over $100,000.

Families participated in laboratory and home visits when the child was about 3 ($M = 37.6$ months, $SD = 2.8$) and 6 years old ($M = 63.4$ months, $SD = 2.7$). Of the initial sample, 227 (94%) were retained at 6 years. Attrition analyses revealed that families who dropped out of the study did not differ from the rest with respect to parent education and income, or any child and parent factors of interest in this study, all *t* values = *ns*.

Laboratory assessment.—At 3 and 6 years of age, children participated in a 3-hour lab visit. After rapport building, children engaged in a series of structured activities with a graduate student examiner to evaluate their cognitive, socioemotional, and self-regulatory capacities.

Home assessment.—Age-3. The home visit was administered by a female social worker and involved a parent interview during which mothers were asked to explain why a child might misbehave in six hypothetical vignettes. The interview also included questions about parental use of corporal punishment with their child. Additionally, mothers completed a set of questionnaires about their child and family.

Measures

Child hostile attribution bias (HAB).—At 6 years, a child's tendency to attribute ambiguous social mishaps to others' hostile intentions was evaluated in the laboratory based on children's responses to four hypothetical scenarios (Webster-Stratton & Lindsay, 1999). Specifically, in each story, the identification figure (matched to the child's sex) experiences an adverse outcome in the presence of a same-sex peer. All vignettes involved potential instrumental provocations rather than relational provocations. For example, in one scenario, the child was told, "Pretend you were eating your snack quietly (child is shown plastic cup). Jane, a girl in your class, was drinking grape juice. She spilled grape juice all over you. What do you think happened?" Children were then asked a follow-up question to tap their beliefs about attributions of intent for each story. For example, "Did Jane want to get you all wet and spill it on purpose? Or did Jane spill the grape juice on you by accident?" The order of the two follow-up questions varied for participants. The child's HAB score reflected the total number of intentional (hostile) attributions made (range from 0 to 4).

Maternal attributions of intent for child misbehavior.—As a part of age-3 home visit, mothers were interviewed using six hypothetical vignettes to elicit their beliefs about the causes of typical child misbehavior (e.g., Harwood, 1992; Lansford et al., 2014; Miller, Wang, Sandel, & Cho, 2002). Each vignette described a child engaging in an aggressive or noncompliant behavior in a relational context with the parent or another child (e.g.,

"Imagine that a child is asked to stop playing and clean up his/her toys, but s/he refuses and falls to the floor kicking and screaming," "Suppose that one child wants a toy that another child is playing with, but the other child will not share it. The first child hits the other child in the head and grabs the toy"). Mothers were asked to imagine that each situation has happened to them, and that the child in the story is the same age and sex as their own child. For each vignette, mothers were asked to respond to the question, "Why would a child behave this way?" The responses were audiotaped and transcribed verbatim for coding by a team of graduate students.

Maternal responses were first coded as follows: Negative Internal (attributing child behavior to negative internal state; e.g., "He was frustrated"), Positive Internal (attributing child behavior to positive internal state; e.g., "She was very excited)," Temperament (attributing child behavior to stable individual attributes; e.g., He is just a very cranky child"), Social (attributing child behavior to social learning or modeling; e.g., "She has seen that among her peers"), Environment (attributing child behavior to features of the environment; e.g., "There were too many toys around"), Reciprocal (attributing child behavior to social reciprocity; e.g., "The other child hurt his feelings and he got angry"), Negative Goal (attributing child behavior to negative goal to manipulate parent; e.g., She just wants to get the best of me"), Testing Limits (attributing child behavior to limit testing; e.g., "She wants to see how much she can get away with"), and Testing Independence (attributing child behavior to child's independence; e.g., "He is exerting his own will").

For each attribution code, a "1" was coded if present, and a "0" was coded if absent. If a mother's response tapped multiple types of attributions, which often occurred when mothers gave relatively lengthy answers (e.g., 2–3 sentences), then more than one code could be given. For example, "She was angry. She learned from others to behave like that when angry." would be assigned both Negative Internal and Social (i.e., Negative Internal and Social will be coded "1"s, and all other codes will be assigned "0"s). When micro coding of maternal responses for each vignette were completed, codes (0/1) for each attribution type were summed across six vignettes, which reflected how often mothers tended to explain children's misbehavior in particular ways. Inter-coder reliability for micro codes were .92 established based on 18% of the sample.

Subsequently, these codes were composited into three theoretically-derived constructs of maternal attribution: a) *child internal* (i.e., attributing child behavior to internal state; sum of Negative Internal, Positive Internal, and Temperament), b) *social learning* (i.e., attributing child behavior to social learning; sum of Social, Environment, and Reciprocal), and c) *power motives* (i.e., attributing child behavior to intentionality; sum of Negative Goal, Testing Limits, and Testing Independence).

Although we had initially attempted to create higher-order factors of parental attribution empirically using factor analysis, this turned out to be almost impossible for two reasons. First, mothers' responses were quite brief, which led to generally low frequency and variability in coded data. On average, only one code was assigned to each vignette. Furthermore, mothers tended to favor a certain type of attribution rather than reporting its variations across six vignettes. For instance, a mother who attributed a child's misbehavior

to modeling (Social) was more likely to use this reasoning consistently across various situations rather than drawing upon other similar explanations (Environment, Reciprocal). Thus it became very difficult to implement data-driven methods to derive factors based on codes that co-occurred (i.e., co-varied). As an alternative, we aggregated individual codes that were conceptually similar and created summary indices of child internal, social learning, and child power motives for subsequent analysis. A large body of theoretical and empirical work has supported the distinction between parents' internal and external attributions of children's behaviors (Dix, l993; Miller, 1995). Internal attributions reflect parents' perceptions that the child's behaviors are caused by dispositional, internal, and stable characteristics of the child. In contrast, external attributions reflect environmental causes such as features of the child's home environment and interpersonal relationships. Additionally, we also distinguished parents' internal attributions that focused on the child's power-oriented explanations (i.e., manipulative, controlling motives) versus those that referred to the child's emotional state or temperament as causes for misbehavior (Bugental, Shennum, & Shaver, l984; Bugental & Johnston, 2000). It should also be noted that our factors do not exactly map onto hostility or intentionality in previous studies. *Power motives* is probably the closest, consisting of three micro codes that commonly describe children's purposefulness in their actions albeit for different reasons (i.e., to manipulate parents, to test limits, to assert independence).

Parental use of corporal punishment.—Using the Harshness of Discipline Scale (Dodge, Pettit, & Bates, 1994), administered during the age-3 interview, mothers reported on how frequently each parent had used physical punishment (e.g., spank, shake, grab) to discipline their child within the past 3 months on a 5-point scale (0 = *never*; 4 = *several times a day*). Dodge et al. (1994) found that this scale was reliable (test-retest = .80) and valid in relation to other measures of harsh discipline. In our study the frequency of physical discipline was relatively low in terms of maternal report of both her own use (M = 1.06, SD = .87) and the father's use (M = .69, SD = .81) of corporal punishment. About 24% of children had never been physically disciplined by either parent in the past 3 months; 7% received corporal punishment every day or several times a day by at least one parent. Following prior research using this dataset (e.g., Olson et al., 2005), this measure was adapted to construct a rank-order scale on the frequency with which the child received physical punishment from either parent. A total of 36 rankings were possible. Specifically, children who were not physically disciplined by either parent were assigned the lowest rank. The next lowest rank was given to children who received no corporal punishment by one parent, but were physically punished once per month by the other parent. Children who received physical punishment several times a day by both parents were assigned the highest rank. To validate mothers' report of corporal punishment, its correlation with fathers' report was calculated, r = .40, p < .001, n = 121. Moreover, mothers' reports of corporal punishment were stable across a three-year time span, r = .46, p < .001, n = 171.

Child verbal IQ.—At 3 years, the child's verbal IQ was measured with the Vocabulary subtest on the Wechsler Preschool and Primary Scale of Intelligence-Revised (WPPSI-R; Wechsler, 1989), a standardized test of intelligence for children aged 3 years to 7 years and 3

months. The Vocabulary subtest has been found to be highly reliable (a = .84; Wechsler, 1989).

Child effortful control.—At age-3 lab visit, child effortful control was assessed using six tasks in Kochanska's behavioral battery: Turtle and Rabbit, Tower Task, Snack Delay, Whisper Task, Tongue Task, and Lab Gift (Kochanska, Murray, Jacques, Koenig, & Vandegeest, 1996). Specifically, each task required the child to wait for turns (Tower Task), regulate their vocal or motor behavior (Turtle and Rabbit, Whisper Task), or delay gratification in the face of a reward (Snack Delay, Lab Gift; see Olson et al., 2005 for more details on procedure and coding of individual tasks). Reliability based on 15 test administrations was excellent (κ=0.95). As recommended (Kochanska et al., 1996), standardized scores of individual subtests were summed to create a single index of effortful control (a = .70).

Child ToM.—At 3 years, children's ToM was evaluated in the laboratory based on standard false-belief prediction and explanation tasks (Bartsch & Wellman, 1989), which tap children's capacity to predict and explain the behaviors of hypothetical children who have incorrect information about the location of objects. Specifically, the child was described stories in which a desired object was moved to a different location while the story protagonist was away in order to "trick" the character. For each story, the child was asked to predict where the protagonist will look for the desired object (prediction task), or why the protagonist will look in the faulty location (explanation task). A false-belief composite was calculated as the total number of stories for which the child correctly predicted or explained the protagonist child's false belief (a = .80).

Child emotion understanding.—During the age-3 lab visit, children engaged in emotion understanding tasks that examine young children's ability to label and infer the causes of others' emotional states (Denham, 1986). Specifically, children's ability to identify and label basic emotions was tested using puppets with detachable faces in the context of four stereotypical and six non-stereotypical vignettes in which puppets displayed expected (i.e., matching the child's emotion) and unexpected emotions (i.e., different from the child's emotion), respectively (r = .72, p < .001). In a prior phone interview, the mother provided information about the child's typical reactions if the child was to experience each vignette situation. Emotion labeling, stereotypical emotion understanding, and non-stereotypical emotion understanding scores were aggregated to derive a composite score of emotion understanding (a = .70). (See Choe et al., 2013 for a more detailed description of ToM and emotion understanding tasks).

Child aggressive behavior.—At 3 years, mothers provided ratings of children's aggressive behavior on the CBCL/2–3 (Achenbach, 1992), a widely-used measure of toddler's behavioral and emotional problems. We used the narrowband Aggressive Behavior scores that reflected the severity of physically and verbally aggressive behavior (a = .92).

Analysis plan

Following preliminary analyses, we examined parental and child predictors of child hostile attribution in a hierarchical regression model using SPSS Statistics 24 Software. Specifically, child HAB at 6 years was regressed onto demographic factors in step 1 (i.e., child sex and maternal education), child attributes in step 2 (i.e., verbal IQ, effortful control, ToM, emotional understanding, and aggressive behavior at 3 years), parenting behavior in step 3 (i.e., physical punishment at 3 years), and maternal attribution of child misbehavior in step 4 (i.e., child internal, social learning, and power motives at 3 years). The order of variables entered in regression reflected our goal of exploring incremental effects of parent factors above and beyond child factors that have been associated with HAB.

Results

Preliminary Analysis

Data fulfilled all of the assumptions for the ordinary linear regression (i.e., normal residuals, linearity, and homoscedasticity; see Supplemental Material). Descriptive statistics and bivariate correlates are presented in Table 1. On average, children demonstrated HAB at 6 years in 1.29 out of four ambiguous situations. Mothers attributed children's misbehavior to child internal states, social learning, and power motives in 2.64, 1.26, and 1.58 out of six vignettes, respectively. Both skewness, range $= -.14$ to 1.51, and kurtosis, range $= -.95$ to 2.16, scores indicated that all variables followed normal distributions. Bivariate correlations indicated that child HAB at 6 years was significantly associated with child individual factors, parental corporal punishment, and maternal attributions at 3 years, except for early levels of child aggression and social learning maternal attribution. Parents' physical punishment and maternal attributions were not correlated.

Hierarchical Regression Model

Results of the hierarchical regression model examining early maternal and child predictors of child HAB are presented in Table 2. Accounting for effects of demographic covariates in step 1, $R^2 = .04$, $p < .05$, child attributes at 3 years significantly predicted child HAB at 6 years in step 2, $R^2 = .14$, $p < .001$. Specifically, higher levels of child verbal IQ, $b = -.05$, $p < .01$, and emotion understanding, $b = -.34$, $p < .05$, each were associated with lower levels of child HAB. Other child factors (i.e., effortful control, ToM, and aggressive behavior) were not significantly related to child HAB. In step 3, parental use of physical punishment at 3 years did not predict child HAB three years later, $\beta = .19$, *ns*; $R^2 = .01$, *ns*. Finally, controlling for effects of demographic, child and parenting factors, maternal attributions of child misbehavior were significantly predictive of future child HAB, $R^2 = .06$, $p < .01$. Specifically, mothers' beliefs that child misbehavior was caused by children's internal states were associated with lower levels of child HAB, $b = -.14$, $p < .05$, whereas mothers' beliefs that child misbehavior was caused by power (intentional) motives were related to higher levels of child HAB, $b = .20$, $p < .05$. However, maternal attributions of child misbehavior to social learning did not predict child HAB, $b = .11$, *ns*. The final regression model explained 25% of the variance in child HAB at 6 years. Multicollinearity statistics indicated that this is an unlikely problem in the current data, all VIFs 1.35.

Discussion

The goal of this study was to specify an integrative model of child and parent factors in early childhood that may contribute to the emergence of individual differences in child HAB. Of particular interest was clarifying the link between parents' attributions of children's behavior and children's hostile attribution of others' intent. Results indicated that mothers' internal explanations for children's misconduct were associated with variations in children's later HAB such that mothers' beliefs that children misbehave because of their internal states (i.e., emotional state or temperament) were associated with lower levels of child HAB, whereas attributing power-based motives (i.e., manipulative, controlling intentions) in children was associated with higher levels of HAB. Additionally, children's verbal IQ and emotion understanding skills emerged as significant precursors of HAB, but levels of corporal punishment by parents were not associated with later HAB in young children. These findings were evident even after controlling for the effects of demographic qualities as well as early levels of child aggression.

Our findings suggest that children's tendency to attribute hostile intention to others in relatively neutral contexts may be shaped in part by their mothers' attributional styles. Our investigation expands earlier studies that have identified parental hostile attribution as a predictor of child HAB in early (Healy et al., 2015) and middle childhood (Nelson et al., 2008). We contributed novel information by examining the potential complexity of parent attributions based on mothers' spontaneous responses to open-ended questions. Additionally, we rigorously tested parental contributions to later child HAB by controlling for the effects of associated child and parenting characteristics. Moreover, early levels of aggressive behavior were also included in the model to rule out the possibility that children's HAB may primarily reflect earlier levels of aggressive behavior.

Mothers' folk theories about the causes of children's misconduct may be part of a complex matrix of risk factors that contribute to individual differences in children's HAB. Although those processes were not directly examined in this study, there may be several possibilities. For example, parents who tend to interpret children's misbehavior as intentional (related to *power motives* in this study) may respond to children using negative strategies and subsequently intensify their child's HAB (Halligan et al., 2007). Although our findings suggest that this pathway is unlikely because corporal punishment included in the model was nonsignificant, there are other forms of harsh parenting (e.g., psychological control) that may mediate parent attributions and child HAB. Additionally, mothers' beliefs that children show difficult behaviors because of psychological factors that are not related to issues of power or control were associated with children's later benign intent attributions. It may be that parents who identify children's emotional states or temperament as the causes of misconduct believe that those behaviors are transitory and unintentional, which could lead to decreased punitive responses (Dix, Ruble, & Zambarano, 1989).

Moreover, maternal attributions may be expressed via other ways that contribute to child HAB. For example, children may develop specific patterns of attribution by internalizing their parents' attitudes and behaviors in relational contexts (Costanzo & Dix, 1983; Nelson et al, 2008). In this study, we were primarily interested in how parents think about the causes

of children's difficult behavior. However, parents' interpretations of others' intent have been regarded as a distinct construct that may impact their children's attributional styles as well (Halligan et al., 2007). Therefore, a future direction might be to clarify common and unique pathways by which parent's attributions of children's versus others' behaviors contribute to HAB.

A unique feature of this study was an innovative measurement of maternal attributions. By using open-ended interview questions and hypothetical vignettes describing typical problem behaviors in young children, we attempted to detect more complex views that parents may have about children's behavior. Although previous research has primarily focused on the dimension of hostility or intentionality, we believed that there could be other aspects of mother's beliefs that may affect child HAB. Our findings also converge with some studies that have tried to broaden the scope of research on parent attribution by considering multiple dimensions (e.g., disposition, stability: Cheah & Robin, 2004; parent-causal, child-responsible: Snarr, Slep, & Grande, 2009). Although the specific defining characteristics of parental attributions differ across studies, together they represent efforts to measure parent attributions within more nuanced and multidimensional frameworks.

Regarding the attribution interview, we note that the vignettes that we used to elicit maternal attributions did not all involve interpersonal provocations (e.g., hitting peer vs. temper tantrum). Although we focused on assessing parental attributions in a range of daily situations, parents may make different attributions in response to interpersonal versus non-interpersonal provocations and/or parental attributions in heterogeneous circumstances may impact children by different pathways. Those possibilities await future exploration.

Unexpectedly, there was no association between maternal attributions and corporal punishment, and also between corporal punishment and child HAB. The discrepancy between our findings and those of other researchers (MacKinnon-Lewis, Castellino, et al., 2001; Nelson & Coyne, 2009; Weiss et al., 1992) may reflect differences in sample composition. The majority of parents in our study were well educated and reported relatively low frequencies of corporal punishment. Thus, it is possible that the association between corporal punishment and child HAB emerges only for children who receive severe levels of harsh parenting. Moreover, we asked mothers to provide information about both parents' use of physical punishment. As such, the data in this study may reflect variability in maternal parenting more than paternal parenting, or at least mothers' subjective perception of both parents' behavior. Alternatively, it is possible that harsh parenting contributes to child HAB indirectly by compromising more foundational skills (e.g., effortful control) that support the development of benign attributions. In addition, maternal attributions may be associated with other forms of harsh parenting that were not incorporated in this study, and/or variability in positive parenting that could influence how a child interprets others' intentions.

Interestingly, previous studies of the same sample have revealed significant associations between parents' corporal punishment and children's peer aggression (Olson, Lopez-Duran, Lunkenheimer, Chang, & Sameroff, 2011) and externalizing behaviors (Chang, Olson, Sameroff, & Sexton, 2011; Olson et al., 2005). Given that the way children interpret information in relational context is a powerful predictor of child's problem behavior (de

Castro et al., 2002), it is surprising that physical punishment predicted problem behavior in earlier studies, but not HAB in the current study. Similarly, Healy et al. (2015) found that negative parenting mediated the association between maternal HAB and child externalizing problems, but did not predict child HAB.

Furthermore, although associations between early aggression and later HAB were nonsignificant, controlling for the possibility that children may learn to attribute hostile intent in others from their previous negative interaction is a notable strength of this study. Early aggression was also not associated with any variables except for concurrent physical punishment. This may be due to the fact that children's aggression changes in form and function rapidly over the preschool period. Specifically, young children's aggression tends to be more physical and reactive which becomes more relational and proactive as they grow. Thus, the null finding regarding child aggression may be pointing to the need to incorporate developmental changes that occur rather than implying that early aggression does not matter. As a whole, our pattern of findings suggests that child externalizing behaviors and HAB are distinct but interrelated constructs that may reflect multi-final risk pathways.

Our findings have implications for early prevention of child HAB and related outcomes (e.g., externalizing problems). The majority of preventive programs primarily focus on improving parenting behavior. However, if the finding that parents' interpretations of child misbehavior uniquely contribute to child HAB is replicated, then parental attributions may become a promising target for intervention. Relatedly, we have yet to test whether increasing parenting skills leads to changes in parents' attributions of children's behavior even if parent cognition is not directly addressed in treatment. Such knowledge will facilitate understanding of how parents' cognition and behavior conjointly shape HAB.

Limitations, Future Directions, and Conclusions

Some caveats should be noted for this study. First, the generalizability of our findings may be limited for clinical populations or children of more diverse sociodemographic backgrounds. Second, parallel to the measurement of parental attributions, previous studies of child attribution have also predominantly focused on the dimension of hostility (and hence the term, HAB). We also highlighted this construct. Although hostility may be important especially in relation to externalizing behavior, there may be other aspects of attribution that may have implications for children's adjustment.

Third, as elaborated earlier, a factor analysis of parents' attributions was not possible as mothers tended to adopt certain types of attribution across vignettes rather than to draw upon a menu of similar attributions. Thus, we constructed attribution factors based on theoretical rationale. The resulting factors should be replicated using mixed methods paradigms. For example, parental attributions may be assessed using diverse procedures (e.g., observation, questionnaire), and convergence across methods may be analyzed. Continued efforts are needed to create data-driven factors of parental attributions. As a major reason for the inability to empirically form higher-order factors was the low frequency in data, future studies might consider eliciting more detailed responses such that the likelihood of interrelated micro codes across vignettes is increased. Fourth, differential pathways that might underlie multiple types of aggression (e.g., physical vs. relational) or hostile

attribution (e.g., relational vs. instrumental) were not addressed. Such knowledge would be beneficial particularly during a period when forms and functions of child aggression undergo rapid changes. This approach would be in accord with recent trends in social information processing research as well.

Lastly, we cannot make conclusions about direction of causality. Although we were primarily interested in parent effects on children, it is also possible that variability in parental attribution is itself a consequence of child behavior (MacKinnon-Lewis, Castellino, et al., 2001). Furthermore, many of the predictors in this study are related to each other theoretically and empirically (e.g., child attributes – harsh parenting). It is hoped that future studies would incorporate complicated relations between the variables to improve the current model for predicting children's HAB.

In conclusion, our study represents an initial attempt to investigate early child and parent factors that may contribute to the emergence of child HAB following the transition from preschool to school. Our investigation was innovative in that we aimed for a more ecologically valid and refined understanding of parental attributions by using open-ended interview format. Pending replication, our findings highlight the importance of appreciating the complexity of parents' attributions because mothers' internal explanations for children's misconduct may either reduce or increase children's later HAB depending on the specific content of attributions. Furthermore, this study highlights the need for intervention targeting maternal cognition for early identification and prevention of child HAB and related problems.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

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Table 1

Descriptive statistics and bivariate correlations

	Variables	M	SD	1 Child sex	2 Mom Edu	3 Child IQ	4 Child EC	5 Child ToM	6 Child Emo	7 Child Agg	8 Parent Punish	9 Mom Internal	10 Mom Social	11 Mom Power
Demographic factors at 3 years														
1.	Child sex	--	--	--										
2.	Maternal education	6.15	0.85	.00	--									
Child factors at 3 years														
3.	Verbal IQ	12.49	5.54	.04	.07	--								
4.	Effortful control	.00	.55	.26**	.16*	.23**	--							
5.	Theory of mind	.96	1.46	.16*	.06	.29**	.31**	--						
6.	Emotion understanding	.00	.76	.03	.14*	.41**	.33**	.34**	--					
7.	Aggressive behavior	8.49	5.32	-.02	.03	-.11	-.12	-.11	-.06	--				
Parenting at 3 years														
8.	Physical punishment	6.30	6.85	-.15*	-.20**	-.16*	-.20*	-.20*	-.11	.24**	--			
Maternal attribution at 3 years														
9.	Child internal state	2.64	1.49	-.03	.07	.07	.06	.06	.12	-.02	.00	--		
10.	Social learning	1.26	1.06	-.03	-.02	.00	.05	-.02	-.01	-.09	.01	-.03	--	
11.	Child power motives	1.58	1.14	-.07	.06	-.02	-.01	.01	.05	.04	.01	-.16*	-.15*	--
Child attribution at 6 years														
12.	Child HAB	1.29	1.36	-.11	-.14	-.32**	-.19**	-.25**	-.29**	.03	.17*	-.21**	.07	.17*

Note. Mom edu = maternal education (range = 3 – 7), IQ = verbal IQ (3 – 27), EC = effortful control (−2.34 – 1.50), ToM = theory of mind (0 – 4), Emo = emotion understanding (−2.64 – .98), Agg = aggressive behavior (0 – 26), Punish = physical punishment (0 – 34), Mom internal = maternal attribution of child internal state (0 – 7), Mom social = maternal attribution of social learning (0 – 4), Mom power = maternal attribution of child power motives (0 – 4), child HAB = child hostile attribution bias (0 – 4). For child sex, 0 = *boy*, 1 = *girl*.

*
p < .05,

**
p < .01

Table 2

Results of hierarchical regression model examining maternal and child predictors of child hostile attribution

Model	Predictors (age 3)	Child hostile attribution (age 6)			
		b	*SE*	*β*	*R²* (*R²*)
Step 1	Child sex	−.19	.19	−.07	.04*
	Maternal education	−.17	.11	−.10	
Step 2	Verbal IQ	−.05	.02	−.20**	.18(.14***)
	Effortful control	−.07	.19	−.03	
	Theory of mind	−.07	.07	−.08	
	Emotion understanding	−.34	.14	−.18*	
	Aggressive behavior	−.01	.02	−.05	
Step 3	Parental physical punishment	.02	.01	.10	.19 (.01)
Step 4	Maternal attribution of child internal state	−.14	.06	−.16*	.25 (.06**)
	Maternal attribution of social learning	.11	.09	.09	
	Maternal attribution of child power motives	.20	.08	.17*	

Note. Estimates of the final model are presented. For child sex, 0 = *boy*, 1 = *girl*.

*
p < .05,

**
p < .01,

***
p < .001