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Maternal sensitivity moderates the relation between negative discipline and aggression in early childhood

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Abstract

Three models regarding the relation between maternal (in-)sensitivity, negative discipline, and child physical aggression were examined in a sample of 117 mother-child pairs with high scores on child externalizing behavior: (1) Sensitivity and discipline are uniquely related to child aggression (the additive model); (2) The relation between discipline and aggression is moderated by maternal sensitivity (the moderating model); (3) The relation between sensitivity and aggression is mediated by maternal discipline (the mediating model). Parenting and child aggression were observed when the children were on average 26.71 months old (range 13.58 – 41.91 months) and again 1 year later. Results supported the moderating model. More negative discipline was related to more child aggression 1 year later, but only when mothers were insensitive. This finding supports the idea that the affective context is important for the impact of negative discipline on child development.

Introduction

Low to moderate levels of physical aggression are normative in early childhood (Alink et al., 2006b [chapter 2]; Tremblay et al., 1999). High levels of aggression at this age however, are predictive of problem behavior at later ages (Broidy et al., 2003; NICHD, 2004b). Several studies have shown that genetic and environmental influences explain roughly the same amount of variance in aggressive behaviors in children (Arsenault et al., 2003; Dionne, Tremblay, Boivin, Laplante, & Pérusse, 2003). Two important parenting factors that contribute to the environmental effect on aggression in children are parental sensitivity and discipline, which reflect the two parenting dimensions responsiveness and demandingness distinguished by Maccoby and Martin (1983). Sensitivity refers to the parental ability to adequately perceive the child's signals and to respond to them in a prompt and appropriate way (Ainsworth, Blehar, Waters, & Wall, 1978), and discipline refers to how rules and limits are imposed on the child (for a review, see Coie & Dodge, 1998). It is unclear how these aspects of parenting relate to each other in their prediction of child aggression. In addition, little is known about the effects of parenting on aggression in *early childhood*. In the current study, we investigate how maternal sensitivity and maternal discipline either uniquely or jointly (through mediating or moderating processes) predict physical aggression in 1- to 3-year-old children.

Parental sensitivity and child aggression

Several studies have shown that parental insensitivity (e.g., pointing out a child's mistakes while the child is trying to make a puzzle) is a precursor of high levels of child aggression. In the NICHD study on physical aggression from toddlerhood to middle childhood, various aggression trajectories between the ages of 2 to 9 years were identified (NICHD, 2004b). It appeared that mothers of children in the moderate- and high-aggression trajectories were less sensitive than mothers of children in the other groups. Olson, Bates, Sandy, and Lanthier (2000) showed that experiencing positive affective mother-child exchanges (playing games, smiling, engaging in playful conversation) was predictive of school-age and adolescent low rates of aggression. In addition, maternal sensitivity has been shown to be related to the broader category of externalizing behaviors (e.g., Shaw, Bell, & Gilliom, 2000).

Several mechanisms may account for the relation between (in-)sensitive or (un-)responsive care and the development of aggression. First, the effect of parental sensitivity on aggression may be mediated by its effect on affect regulation in children. In the NICHD study, lower levels of maternal sensitivity were associated with child affect dysregulation, which in turn constituted a significant risk for the children to develop problem behaviors (NICHD, 2004a). It was hypothesized that children who had less sensitive mothers received less sensitive scaffolding to help them learn to manage their negative emotions independently. As a result, the children showed higher rates and/or intensities of negative affect and problem behaviors. Second, according to Mary Ainsworth (Ainsworth, Bell, & Stayton, 1974), children naturally want to comply with their parents' rules when parents are sensitive and responsive. Londerville and Main

(1981) indeed found that 21-month-old children who were securely attached to their mothers in infancy were more cooperative and compliant than insecure children. Children who have experienced insensitive early care are less motivated to behave according to parental rules or requests. As a result, these children may act with aggressive or oppositional behavior in reaction to parental limit-setting. A third mechanism concerns the internal working models children develop based on their early experiences of parental care. When early parental care has been insensitive and unresponsive, children may develop negative working models of relationships. In social situations, they expect being rejected, being hurt, disappointed, or afraid, and as a result they approach these situations with anger, mistrust, and/or anxiety (Weinfeld, Sroufe, Egeland, & Carlson, 1999). Fourth, parental sensitivity may serve as a model of empathic behavior (Van IJzendoorn, 1997), and children who have learned to respond in a prosocial, empathic manner will be less likely to react aggressively to frustrating or anger-provoking situations (Miller & Eisenberg, 1988).

Parental discipline and child aggression

The second parenting dimension distinguished by Maccoby and Martin (1983) is demandingness or control. Several studies revealed that negative or harsh discipline (e.g., giving negative commands or spanking the child) is related to the development of aggression and antisocial behavior. The longitudinal effect of physical discipline on aggressive behavior was demonstrated by Fine, Trentacosta, Izard, Mostow, and Campbell (2004) in a sample of school-aged children. They found a direct relation between caregiver reports of physical discipline and later child aggression, indicating that children who received more physical discipline were more likely to show aggressive behavior four years later. Similar results were obtained by Knutson, DeGarmo, Koepl, and Reid (2005), who investigated the role of harsh punitive discipline in the development of aggression in a sample of 218 children aged 4 to 8 years. They found that when parents used more angry and punitive disciplinary responses, their children were more likely to show high levels of aggression.

According to social learning theory (Bandura, 1973), a mechanism through which children learn aggressive behavior is modeling. When parents regularly use negative discipline, children may imitate these behaviors and learn to use aversive strategies (such as aggression) instead of positive ways to express their needs or to solve problems. Another social learning mechanism, namely social reward, was proposed by Shaw, Gilliom, and Giovannelli (2000). They argued that when parents are rejecting towards their children or use negative discipline strategies, children may be reinforced in their negative behavior by the attention they get from their parents. In his coercion theory, Patterson (1976, 1982) stated that negative or coercive disciplinary interchanges between parents and children are likely to continue and cumulate over time and set the stage for the development of aggression. These interchanges start with a request done or limit set by the parent, which the child refuses to meet. In turn, the parent reacts negatively (e.g., by shouting at the child) to the child's coercive refusal. Consequently, the child's coercive behavior (e.g., aggressive behavior) escalates and ultimately the parent gives in to avoid further coercive reactions from the child. The child thus learns

that acting coercively is rewarded, and is more likely to show this behavior in the future (Snyder, Edwards, McGraw, Kilgore, & Holton, 1994; Snyder & Patterson, 1995). As a result, coercive disciplinary interaction patterns leading to the development of aggressive behavior may be established.

Sensitivity and discipline in relation to child aggression

Although both sensitivity and discipline have often been studied in relation to the development of aggressive behavior, few studies included both parenting variables. Those that did investigate both aspects of parenting generally did not specifically look at their interrelation in the prediction of aggression (e.g., Olson et al., 2000). Insensitive parenting and negative discipline may each be uniquely and independently related to child aggression. This is in line with the conclusion of Pettit and Bates (1989) that proactive parental involvement (affectively positive, educative exchanges between mother and child) and negative control are different parenting dimensions (see also Pfiffner, McBurnett, Rathouz, & Judice, 2005). However, research suggests that there are two other ways in which parental sensitivity and discipline may be related to the development of child aggression (for a review, see Coie & Dodge, 1998; Deater-Deckard & Dodge, 1997; Shaw, Keenan, & Vondra, 1994).

First, the effects of negative discipline may be *moderated* by parental sensitivity. Having a sensitive parent may buffer the child against the negative effects of (incidental) harsh discipline. Deater-Deckard and Dodge (1997) showed that harsh parenting was related to child externalizing problems in 5-year-old children. However, correlations were significantly lower in the group of children characterized by observed warm mother-child relationships than in the group of children with mothers scoring low on expressing warmth towards their children. The authors suggested that the parent-child relationship context is a crucial factor for the effect of discipline practices on child aggression. In the same vein, McLoyd and Smith (2002) reported a moderating effect of maternal emotional support on the association of spanking with problem behavior in a sample of 4- and 5-year-olds. Spanking was related to an increase in behavior problems over time, but only in the context of low levels of emotional support. The authors suggested that emotional support from the parent may influence the child's perception of the parental discipline strategies. In an unsupportive context the child may view the parent's behavior as rejecting, setting the stage for the development of aggression. The importance of the context of negative or physical discipline has also been underlined in cross-cultural studies. Deater-Deckard, Bates, Dodge, and Pettit (1996) showed that the impact of maternal physical discipline on children's externalizing behaviors depended on ethnicity. Maternal physical discipline did not increase child problem behavior in African American families, whereas it did in European American families. The authors suggested that African American parents may use harsh discipline in a warm and loving context. As a result, children may not view their parent's use of physical discipline as an indication of parental lack of warmth and concern, and therefore do not show more externalizing behaviors.

It is also possible that negative or harsh discipline *mediates* the relation between sensitivity and aggression. Ainsworth's famous Baltimore study showed

that maternal sensitivity is a highly stable parenting characteristic (Ainsworth et al., 1978). In addition, Ainsworth (1967) suggested that sensitivity is rooted in mothers' childhood experiences of their own parents' sensitivity, which in turn are related to the quality of attachment representations at a later age (Beckwith, Cohen, & Hamilton, 1999). In his meta-analysis, Van IJzendoorn (1995) showed that the quality of attachment representation is indeed related to sensitive parenting. Sensitivity may thus be a fundamental parenting characteristic that reflects a generalized trait. This suggests that from a developmental perspective, parental discipline may mediate the relation between sensitivity and child aggression. During the transition from infancy to the toddler period, insensitive mothers and their children may develop a pattern of mutual negativity and coercive discipline, possibly leading to increased levels of child behavior problems (Patterson, DeBaryshe, & Ramsey, 1989). When a parent is not responsive to the infant's signals for attention, the infant may be provoked into escalating the intensity of his demands. As a result, providing appropriate parental disciplinary responses may become more difficult, leading to an increase in coercive interactions in which negative discipline is used (Shaw et al., 1994). Londerville and Main (1981) also found that an insecure attachment relationship between mother and child (which is partly explained by maternal insensitivity; Ainsworth et al., 1978; De Wolff & Van IJzendoorn, 1997) was predictive of the mother's use of negative discipline, which in turn was related to the child's level of noncompliance. Thus, a history of (in-)sensitive parent-child interaction may precede and predict the use of (negative) discipline.

In addition to hypotheses about the influence of parenting on children, several researchers suggest that parenting does not only influence child behavior, but the child's behavior may also have an effect on parental behavior. Some authors argued that externalizing child behavior may elicit poor parenting (e.g., Anderson, Lytton, & Romney, 1986). However, since results of intervention studies reveal that parenting does influence child behavior (e.g., Martinez & Forgatch, 2001; Scott, 2005; Webster-Stratton, Reid, & Hammond, 2004) and not the other way around, the crucial issue remains how parenting behaviors affect the development of aggression in young children. Yet, we do not claim that child effects are absent in the development of aggression.

The current study

In the current study we investigate the unique and combined effects of sensitivity and discipline on child aggression, using a design that addresses some of the shortcomings of studies that investigated the association of parenting with child problem behavior. Several of these studies used only questionnaires or interviews to assess parenting and/or child behavior (e.g., Chang, Dodge, Schwartz, & McBridge-Chang, 2003; McBurnett, Piffner, Capasso, Lahey, & Loeber, 1997; McLoyd & Smith, 2002). Parents may however not be very accurate in reporting their own (negative) parenting practices. When both parenting and child aggression are reported by the same person, informant effects may partially account for the association of parenting with child behavior. The use of cross-sectional data or the lack of a cross-lagged design may also limit the validity of causal interpretations (Brook, Zheng, Whiteman, & Brook, 2001; Cowan & Cowan, 2002; Fine

et al., 2004). Further, the relation between parenting and aggression has generally been studied in preschoolers and school-aged children (Deater-Deckard & Dodge, 1997; Knutson et al., 2005). Less is known about the parenting-aggression association in younger children, while knowledge about the precursors of early aggression is crucial for designing early interventions to prevent the development of serious aggressive and antisocial behavior. In addition, researchers often focused on the broad category of externalizing problems, consisting of aggressive, oppositional and overactive behaviors (e.g., Shaw et al., 1994). However, according to Tremblay (2003), "each [of these subtypes] aggregates heterogeneous types of behaviors that possibly have different causes" (p. 184). Few studies measured the effect of parenting on the development of physical aggression. From a developmental perspective, this type of aggression is relevant from an early age (Alink et al., 2006b [chapter 2]), and high levels of physical aggression early in development are predictive of problem behavior at later ages (Broidy et al., 2003; NICHD, 2004b). Therefore, physical aggression appears to be a particularly salient aspect of externalizing problem behavior that needs to be a separate focus of research regarding the contribution of parenting to child development.

In the current study, we aimed to address these issues and to answer the following question: In what way are maternal sensitivity and discipline predictive of child aggression in 1- to 3-year-old children? Based on the literature, we tested three different hypotheses: (1) The additive model: Sensitivity and discipline are uniquely related to child aggression; (2) The moderating model: The relation between discipline and aggression is moderated by maternal sensitivity; (3) The mediating model: The relation between sensitivity and aggression is mediated by maternal discipline. To test these models we investigated the effect of maternal sensitivity and discipline on child physical aggression, using observational measures to assess both parenting and child behavior at two different time points in early development.

Method

The SCRIPT study

The Dutch SCRIPT study (Screening and Intervention of Problem behavior in Toddlerhood) is a collaboration between Leiden University (Centre for Child and Family Studies) and the Vrije Universiteit Amsterdam (Department of Developmental Psychology). The study investigates the effectiveness of an early intervention program aimed at reducing externalizing problems in 1-, 2-, and 3-year-old children by enhancing parental sensitivity and discipline strategies, using a randomized case-control design. The data for the current paper was derived from the pretest (Time 1) and posttest (Time 2) laboratory sessions. Because the intervention may have affected parenting and child behavior, we focused on participants in the control condition.

Participants and procedure

During the screening phase, names and addresses of children aged 10 to 15 (12-month-olds), 22 to 27 (24-month-olds), and 33 to 40 months (36-month-olds) were drawn from municipal registers (in which all Dutch citizens are listed) of several cities and towns in the western region of the Netherlands. Because the screening phase of the SCRIPT study was designed to provide participants for the intervention study, sample homogeneity regarding cultural background (Dutch) was important. Therefore, children with both a non-Dutch surname and a non-Dutch first name were not included in the target sample. Parents of 4,615 eligible children received two booklets with questionnaires, one for each parent. Usable data were obtained from the primary parents of 2,408 children (response rate 52%). Unfortunately, we were not able to collect detailed information on non-participating families, but there were no differences between participating and non-participating families regarding child age ($p = .11$) or gender ($p = .38$). Only children for whom the primary parent was the mother (biological or otherwise) and the second caregiver (if present) was the father (biological or otherwise) were eligible for the study. This selection and the application of other exclusion criteria (twins, serious medical condition in child or mother, physical or mental disability in child or mother, no possibility of being home during working days, participation of child or siblings in other research projects at the Centre for Child and Family Studies) resulted in the exclusion of 454 cases, leaving a target selection sample of 1,954 children. Children with scores above the 75th percentile on the CBCL/1½ -5 Externalizing Problems scale (Achenbach & Rescorla, 2000; Koot, Van den Oord, Verhulst, & Boomsma, 1997) were selected for the intervention study. This selection was applied to each age group separately (1-year-olds: scores ≥ 13 ; 2-year-olds: scores ≥ 19 ; 3-year-olds: scores ≥ 20) and resulted in 438 families. Of these selected families, 237 (54%) participated in the study, from the pretest until the posttest that took place before and after the intervention.

In the current paper, we report on families who were in the control condition ($N = 117$; 73 boys), i.e., who received six telephone calls between Time 1 and Time 2 during which developmental issues not related to the children's CBCL externalizing scores were discussed. The mean age of these children at Time 1 was 26.71 months ($SD = 9.98$, range = 13.58 - 41.91), and at Time 2 the mean age was 39.22 months ($SD = 10.10$, range = 25.64 - 56.97). The mothers in this control condition were on average 33.14 years of age ($SD = 4.06$). In 62% of the families the educational level of one or both parents was high (Bachelor's or Master's degree). The sample included 56% firstborn children and 57% of the children in the sample had siblings. We tested whether families in the control condition differed from the other families selected for the intervention study (i.e., those in the experimental condition and those who declined to participate, $n = 321$). There were no significant differences between families in the control group and the other families selected for the intervention study regarding parental educational level ($p = .18$), child and maternal age ($p = .19$ and $p = .32$), initial level of child externalizing problems ($p = .19$), child gender ($p = .07$), presence of siblings ($p = .74$), and whether the child was firstborn ($p = .54$). Time 1 and Time 2 assessments consisted of 1½-hour laboratory sessions during which several tasks were performed by mothers and children.

Central measures

Observation of physical aggression

Physical aggression of the child was observed during the Time 1 and Time 2 laboratory sessions in three different situations in which only mother and child were present, including one neutral episode and two potentially frustrating episodes (Mesman et al., 2006 [chapter 3]). The neutral episode was the break in which mother and child were having a snack and a drink without further specific instructions (duration 5 minutes after which coding ended, even if the break was longer). The first frustrating episode consisted of a “clean-up” task in which the mother was instructed to ask her child to clean up the attractive toys that they were playing with. She was allowed to help the child with three toys and to instruct the child only during the first minute. The duration of this task was 1 to 4 minutes; the episode was ended after 4 minutes, or when the child finished the task. In the second frustration task the mother was asked to prevent the child from touching the attractive toys she put in front of the child for 2 min, after which the child was only allowed to touch the least attractive toy for another 2 minutes. For 1-year-olds, the duration was two times 1.5 minutes, instead of 2 minutes (total duration of this task: 3 or 4 minutes).

During these three episodes we observed the frequency of child acts corresponding to our definition of physical aggression: behavior that is aimed at and may cause harm to people, objects, or animals, and is not due to motor limitations, or part of age-appropriate play and exploration. Behaviors that were coded as physical aggression included hitting, kicking, biting, pinching, scratching, shaking, pushing, stamping, throwing, and physically threatening to perform any of these behaviors. These behaviors of the child could be directed at the mother or the objects in the room (e.g., toys, chair, or wall). When coding, the context of the behaviors as well as the child’s facial and verbal expressions were taken into account. Coders were unaware of other characteristics of the participants. Because the duration of the clean-up task and the attractive toys task varied, it was taken into account for further analyses. The raw frequencies were divided by the actual duration of the task and multiplied by four (the standard duration of each of the two tasks). The average intraclass correlation (single rater, absolute agreement) for intercoder reliability (for all separate pairs of coders) was .90 for 1-year-olds ($n = 15$; 2 coders), .95 for 2-year-olds (range .93 - .97; $n = 15$; 3 coders), and .91 for 3- and 4-year-olds (range .82 - .96; $n = 15$; 6 coders).

Observation of maternal sensitivity

The mother’s sensitive responsiveness to her child was assessed during a series of problem-solving tasks in the Time 1 and Time 2 laboratory sessions. Mother and child were asked to solve tasks that were somewhat difficult considering the age of the child, using different play material (same types of tasks) for each age group. Dyads were given three problem-solving tasks at Time 1 and two tasks at Time 2 consisting of a construction task (Time 1 and 2), a puzzle (Time 1 and 2), and a sorting task (only at Time 1) for 5 minutes per task. Mothers were instructed to help their children in the way they would normally do. The Erickson scales were used to rate mothers’ *Supportive presence*, *Intrusiveness*, and *Clarity of instruction* (Egeland, Erickson, Moon, Hiester, & Korfmacher, 1990; Erickson, Sroufe, &

Egeland, 1985). Supportive presence refers to the mother's positive regard and emotional support to the child by acknowledging the child's accomplishments, encouraging the child, reassuring and calming, or giving a physical sense of support while the child completed the tasks. Supportive presence was coded on a 7-point scale ranging from 1 (*completely failing to be supportive*) to 7 (*skillfully providing support*). Intrusiveness refers to the mother's lack of respect of the child's autonomy when exploring or in problem solving situations, by interfering with the child's needs, desires, interests, or behaviors. Intrusiveness was also coded on a 7-point scale, ranging from 1 (*not intrusive*) to 7 (*highly intrusive*). Clarity of instruction reflects the mother's ability to give her child instructions and feedback in a usable form, to structure the situation so that the child knows what the nature and goals of the task are, without solving the task herself. Clarity of instruction was coded on a 7-point scale, ranging from 1 (*completely failing to structure the task*) to 7 (*skillfully giving instructions and feedback*).

Scale scores were computed by averaging the scores for the separate tasks. Supportive presence, intrusiveness, and clarity of instruction were coded by six raters, each coding one scale for either the pretest or posttest. Coders were unaware of other data concerning the participants. The mean intraclass correlation (single rater, absolute agreement) for intercoder reliability (for all separate pairs of coders for the specific scale and of each coder with the expert) for supportive presence was .78 (range = .75 - .80, $n = 60$, including all age groups), for intrusiveness .76 (range = .73 - .78, $n = 60$), and for clarity of instruction .72 (range = .71 - .73, $n = 60$). For the analyses, intrusiveness was reversed to reflect the level of nonintrusiveness. A principal component analysis to investigate whether the different scales could be integrated in a single sensitivity scale revealed that the component loadings of these scales were high (.79 for supportive presence, .72 for nonintrusiveness, and .82 for clarity of instruction). The three scale scores were averaged to reflect overall level of sensitivity and, because the three subscales were not equally distributed, subscale scores were standardized before they were summed to form the overall scale.

Observation of maternal discipline

Specific maternal discipline strategies were observed during a laboratory clean-up task at Time 1 and Time 2. After playing with attractive toys, the mother was asked to instruct her child to clean up the toys. This clean-up session was different from the clean-up task in which we coded aggression. The mother was allowed to help her child with three toys. Coding procedures were based on Kuczynski, Kochanska, Radke-Yarrow, and Girnius-Brown (1987) and Van der Mark, Van IJzendoorn, and Bakermans-Kranenburg (2002). The following maternal discipline strategies were observed: *Commanding*, *Positive feedback*, and *Physical interference*. *Commanding* was coded when mothers gave their child instructions to clean up in an authoritarian manner. *Positive feedback* involved giving compliments and making positive remarks when the child was cleaning up, and responding to what the child said (e.g., "Is the duck going to sleep?"). When the mother used physical force to constrain the child from playing with the toys or to make the child clean up the toys, we coded this as *Physical interference*. The episode was ended after 4 minutes, or earlier in case the child had cleaned up all the toys. The

number of times the mother had used a specific category was divided by the time of the episode.

All five coders were blind to other data concerning the participants. The average intraclass correlations (single rater, absolute agreement) for intercoder reliability (for all separate pairs of coders) were .83 (range = .71 - .93, $n = 20$, including all age groups) for commanding, .90 (range = .72 - .79, $n = 20$) for positive feedback, and .85 (range = .69 - .94, $n = 20$) for physical interference. Factor analyses showed that the three strategies had the highest loadings on one discipline factor (component loadings were .80 for commanding, -.64 for positive feedback, and .72 for physical interference). We combined the three separate scales by summing the scores on commanding and physical interference, and subtracting the score on positive feedback into one overall scale score representing level of negative discipline.

Aggression, sensitivity, and discipline at Time 1 and Time 2 were all coded by independent observers. Every coder observed each child only once, and was blind to the other codings.

Control variables

Maternal psychopathology

An abbreviated version of the Young Adult Self Report (YASR; Achenbach, 1991) was used to measure level of maternal psychopathology. The questionnaire consisted of 29 items, scored on a 3-point Likert scale (0 = not true, 1 = somewhat or sometimes true, 2 = very true or often true). Mothers completed this questionnaire at the end of the laboratory session at Time 1. Items reflect level of internalizing and depressive symptoms. A total score was computed by summing the item scores. Internal consistency (Cronbach's alpha) for this scale was .88.

Child difficult temperament

Child temperament (as perceived by the mother) was measured during the screening phase with the Infant Characteristics Questionnaire (ICQ; Bates, Freeland, & Lounsbury, 1979). The ICQ was translated into Dutch and found reliable by Kohnstamm (1984). The Dutch ICQ contains 33 items, describing concrete behaviors in well-defined situations. The items were rated on a 5-point scale, ranging from 0 (not true) to 4 (true). Five items in the ICQ were discarded, because of content-overlap with items of the CBCL (for details, see Van Zeijl et al., in press). Next, a one-component analysis was carried out in each age group to derive an overall difficultness factor. The difficultness factor consisted of 14 items in 1-year-old children, 18 items in 2-year-olds, and 16 items in 3-year-old children. Internal consistencies (Cronbach's alphas) were .68, .76, and .75, respectively. Scale scores were computed by averaging item scores.

Child gender, age, presence of siblings, and parental educational level

Part of the screening questionnaire for mothers consisted of some background questions regarding the age and gender of the child, the number of children in the family, and the parents' education. The educational level of mothers and fathers was rated on a scale ranging from 1 (only elementary school) to 5 (Master's

degree). The parental educational level represented the score of the parent with the highest level of education.

Analytic approach

First, we tested for outliers and missing data. Next, Pearson correlations were computed to explore relations between the dependent and independent variables, within and across time points. To test the additive model, we performed a linear regression analysis on Time 2 aggression with Time 1 aggression and Time 2 sensitivity and discipline in step 1 to control for variance attributable to concurrent relations between the variables and longitudinal stability of parenting, and Time 1 sensitivity and discipline in step 2. The moderating model (the relation between discipline and aggression is moderated by sensitivity) was tested with a linear regression analysis predicting aggression at Time 2 with the interaction between Time 1 sensitivity and discipline after controlling for the effects of Time 1 aggression and Time 1 and Time 2 sensitivity and discipline. Before computing the interaction term, the predictors were centered in order to reduce possible multicollinearity between the independent variables and the interaction term, and to facilitate the interpretation of the interaction effect (Cohen, Cohen, West, & Aiken, 2003). Third, the mediating model, assuming that the relation between sensitivity and aggression would be mediated by discipline, was tested. We investigated Baron and Kenny's (1986) four conditions that must be met in order to consider a variable as a mediator: (1) The predictor (Time 1 sensitivity) must be significantly related to the hypothesized mediator (Time 1 discipline), (2) the predictor (Time 1 sensitivity) must be significantly associated with the dependent variable (Time 2 aggression), (3) the mediator (Time 1 discipline) must be significantly associated with the dependent variable (Time 2 aggression), and (4) the impact of the predictor (Time 1 sensitivity) on the dependent measure (Time 2 aggression) diminishes after adding the mediator (Time 1 discipline).

Results

Preliminary analyses

Zero to three outliers ($|z| > 3.29$) were identified on each of the variables. As recommended by Keppel and Wickens (2004), outliers were included in the dataset. However, additional analyses revealed no differences in results when univariate outliers were winsorized (Hampel, Ronchetti, & Rousseeuw, 1986). In addition, there was one missing score (on Time 2 discipline). This missing score was substituted with the mean score of children matched on gender, age, and parental educational level.

Descriptive analyses

Correlations between Time 1 and Time 2 child aggression, maternal sensitivity, and discipline are presented in Table 4.1. Sensitivity was stable over time, $r(117) = .43, p < .01$, and was significantly negatively related to discipline at both time points, $r(117) = -.33, p < .01$ and $r(117) = -.23, p = .01$, and across time, $r(117) = -.19, p = .04$ and $r(117) = -.28, p < .01$. The correlation between Time 1 and Time 2 discipline was not significant, $r(117) = -.16, p = .10$, indicating that this parenting behavior was not stable across 1 year. Aggression was not related to sensitivity or discipline at either time of assessment.

Table 4.1

Pearson correlations among Time 1 and Time 2 aggression, sensitivity, and negative discipline (N = 117)

		Time 1			Time 2		
		Aggression	Sensitivity	Negative discipline	Aggression	Sensitivity	Negative discipline
Time 1	Aggression	-					
	Sensitivity	-.15	-				
	Negative discipline	.02	-.33**	-			
Time 2	Aggression	-.01	-.17	.15	-		
	Sensitivity	.10	.43**	-.28**	-.15	-	
	Negative discipline	-.02	-.19*	.16	.15	-.23*	-

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

Testing the three models

To test whether the additive model applied to the relation between sensitivity, discipline, and aggression, a linear regression analysis was performed on Time 2 aggression with Time 1 aggression and Time 2 sensitivity and discipline in step 1, and Time 1 sensitivity and discipline in step 2. Adding Time 1 sensitivity and discipline did not significantly improve the model, $R^2_{\text{change}} = .02$, $F_{\text{change}}(2, 111) = 1.06, p = .35$. The betas for Time 1 sensitivity and discipline were not significant, $\beta = -.10, p = .34$, and $\beta = .08, p = .40$, respectively. Time 1 sensitivity and discipline did not predict aggression at Time 2, either uniquely, or combined. Therefore, our data did not support the additive model.

Second, in order to test the moderating model we performed a linear regression analysis predicting aggression at Time 2 with the interaction term between Time 1 sensitivity and discipline after controlling for the main effects of the predictors. Adding the interaction term significantly improved the model, $R^2_{\text{change}} = .08$, $F_{\text{change}}(1, 110) = 10.58, p < .01$ (Table 4.2). To test the direction of the interaction effect, a median split was applied to Time 1 maternal sensitivity. Correlations between Time 1 discipline and Time 2 aggression were computed for children with mothers scoring above the median on sensitivity and for children with mothers scoring below the median. In Figure 4.1 the regression lines for these two groups are depicted. The correlation between discipline and aggression was significant for children of mothers scoring low on sensitivity, $r(59) = .28, p = .03$, but not for children of mothers scoring high on sensitivity, $r(58) = -.10$,

$p = .46$. These correlations differed significantly ($Z_{diff} = 2.05, p = .04$). Maternal sensitivity reduced the impact of using negative discipline strategies on the development of child aggression, confirming the moderating model.

Table 4.2

Results of a linear regression analysis predicting Time 2 aggression from Time 1 sensitivity and negative discipline, and their interaction (N = 117)

		β	t
Block 1 ($R^2 = .04$)	Time 1 aggression	-.02	-0.19
	Time 2 sensitivity	-.01	-0.10
	Time 2 negative discipline	.10	1.05
Block 2 ($\Delta R^2 = .02$)	Time 1 sensitivity	-.10	-0.98
	Time 1 negative discipline	.00	0.00
Block 3 ($\Delta R^2 = .08^{**}$)	Interaction between Time 1 sensitivity and negative discipline	-.31	-3.25**

Note. Betas and t -values are derived from the third block of the regression analysis and are slightly different from those of the regression analysis testing the additive model because of the inclusion of the interaction term.

Overall $F(6, 110) = 2.91, p = .01$.

** $p < .01$.

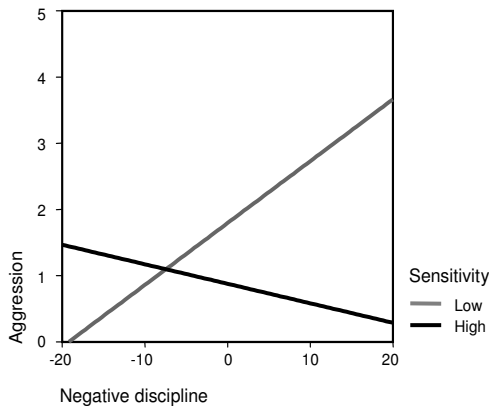


Figure 4.1

Discipline at Time 1 predicting child aggression at Time 2 for high and low sensitive mothers

Third, the mediating model was tested using Baron and Kenny's (1986) conditions. From the results presented in Table 4.1 it is clear that the first condition was met: Time 1 sensitivity and discipline were significantly correlated. However, Time 1 sensitivity and discipline were not correlated with Time 2 aggression (see Table 4.1) and there was no significant association of Time 1 sensitivity and discipline with Time 2 aggression controlling for the effects of Time 1 aggression and Time 2 sensitivity and discipline, respectively ($\beta = -.14, p = .19$, and $\beta = .13, p = .17$; conditions 2 and 3). Therefore, the mediating model did not apply to the relation between sensitivity, discipline, and aggression.

Follow-up analyses

To test the robustness of the findings, subsequent analyses were conducted. First, analyses were repeated using the total group ($N = 237$, including intervention families), controlling for the effect of experimental condition (coded 0, 1). These analyses revealed comparable results. No evidence was found for the additive and the mediating models, and the moderating model was confirmed. The interaction effect of sensitivity with discipline was again significant, $R^2_{\text{change}} = .06$, $F_{\text{change}}(1, 229) = 16.94$, $p < .01$.

Second, we tested whether adding maternal psychopathology, parental educational level, child temperament, the presence of siblings, gender, and age of the children changed the results. These variables may be related to the parenting variables as well as child aggression, and therefore may (partly) account for the relation between parenting and child behavior. Again, results with these covariates were highly similar (no evidence for the additive and mediating models, and confirmation of the moderating effect). The interaction effect was also significant when the control variables were added in the first step of the regression analysis, $R^2_{\text{change}} = .08$, $F_{\text{change}}(1, 105) = 9.91$, $p < .01$.

Discussion

In the current study we investigated the longitudinal relation between maternal sensitivity and discipline strategies and child aggressive behavior. Results revealed that maternal sensitivity moderated the relation between maternal negative discipline and child physical aggression. When mothers frequently used negative discipline strategies, their children were more likely to be aggressive 1 year later, but only in the group of less sensitive mothers. Our findings are in line with results of other studies (Deater-Deckard & Dodge, 1997; McLoyd & Smith, 2002), but also extend those results. Previous research generally focused on harsh *physical* discipline (e.g., spanking) and on aggression in older children. The current study showed that the moderator effect of sensitivity also occurs in the relation between general negative discipline strategies and aggression in early childhood.

In our study, maternal sensitivity and maternal discipline did not univariately predict child aggression. These outcomes do not correspond with results from several previous studies (e.g., Knutson et al., 2005; NICHD, 2004b), and are indeed somewhat puzzling. The special nature of our sample - the rather unusual combination of high levels of externalizing child behavior and high levels of parental education - may partly explain these unexpected findings.

Interpreting the moderating effect

Our findings suggest that the affective context is an important determinant of the impact of negative discipline on child development. Maternal sensitivity may influence the meaning children attribute to negative discipline (McLoyd & Smith, 2002). When mothers are generally sensitive in the interactions with their child, the child may feel secure and interpret commands or physical interference in a

discipline situation differently compared to a child who is used to insensitive care. The latter child may view the negative parental discipline techniques as unjust or rejecting, while the first child does not, or to a lesser extent. Research has shown that children's perception of parental discipline as rejecting is indeed associated with their psychological maladjustment (Rohner, Bourque, & Elordi, 1996). In the same vein, Dodge, Laird, Lochman, and Zelli (2002) showed that hostile attributions of social information may provoke aggressive behaviors, and in Gomez, Gomez, DeMello, and Tallent (2001) the development of aggressive behavior in school-aged children was affected by hostile social information processing, which in turn was predicted by the interaction between maternal control and support. Low levels of perceived maternal support (e.g., guidance, affection) increased the effects of perceived maternal control (discipline strategies) on hostile social information processing.

As early as in the first year of life, children develop skills that help them regulate social interaction. Results from studies using the still-face procedure have shown that when social expectations of an infant are violated, the infant will try to repair this disruption (Tronick & Cohn, 1989). Weinberg and Tronick (1996) argued that the infant's reaction to the reunion episode may reflect the dyadic regulatory processes that take place in the mother-infant interaction. When mothers are insensitive and unresponsive, the dyad's capacity for interactive repair declines (Reck et al., 2004; Rosenblum, McDonough, Muzik, Miller, & Sameroff, 2002). Children of insensitive or unresponsive mothers may thus learn that a "conflict" will not be easily resolved and this experience may color their expectations of future conflicts or disagreements, whereas positive interaction experiences in daily life (such as parental sensitivity) may foster the ability to overcome the effects of difficult situations (i.e., negative discipline situations). This is in line with the organizational perspective stressing the continuing transactions between developing persons and their environments. From this point of view, Sroufe and colleagues (Carlson, Sroufe, & Egeland, 2004; Sroufe, Egeland, Carlson, & Collins, 2005) argued that experience on the one hand and expectations and interpretations of events on the other influence each other in a progressive fashion. Early social experience creates expectations of future events and influences the interpretation of events. In turn, these expectations and interpretations shape behavior and experience. Maternal supportive and sensitive care early in life may determine the child's expectations and interpretations of later social interactions (see also Ainsworth, 1985). These transactional processes have mainly been investigated in samples consisting of older (preschool- and school-aged) children. Our results suggest that a similar mechanism is operating in younger children.

A second mechanism underlying the moderating effect of maternal sensitivity may involve the development of emotion regulation. Insensitive care early in development may impede the development of adequate emotion regulation (Cassidy, 1994; Sroufe et al., 2005). As a result, children who received insensitive care may not be able to regulate their anger and frustration effectively. Frequent use of negative discipline may evoke anger in the child, which in turn may provoke aggressive behavior (Arsenio, Cooperman, & Lover, 2000; Berkowitz, 1989; Sroufe, 1995), but only in children who are unable to regulate their anger. As a result, children who have poor emotion regulation skills that

are insufficiently scaffolded by their insensitive parent may be more likely to act aggressively in reaction to their mothers' negative discipline.

Thus, expectations and interpretations of maternal discipline on the one hand, and emotion regulation on the other hand may explain the moderating effect of early maternal sensitivity on the prediction of aggression by later use of negative discipline. In our research design however, maternal discipline and sensitivity were assessed contemporaneously, and as a result we cannot test the mechanisms of early (in-)sensitivity influencing the interpretation of subsequent discipline and/or modifying the effect of negative discipline by influencing emotion regulation skills. However, maternal sensitivity is rather stable (in the current study the 1-year stability was .43) and a salient aspect of the mother-child relationship from birth onwards (Sroufe et al., 2005), whereas discipline is relevant at a later age (Shaw et al., 2000), which argues for the plausibility of the proposed mechanisms. Further research is needed to carefully investigate the *process* underlying the moderating role of early maternal sensitivity in the effect of later negative discipline on child aggression.

Limitations and recommendations

The children in the current study were selected based on their high levels of externalizing behavior. Although the aggression rates of these children were not extremely high (the majority of the children showed zero, one, or two aggressive acts during the episodes with a total time of 13 minutes), the sample is not representative of the general population.

In the current study, we did not assess the genetic influence on parenting and child aggression. One might argue that at least part of the covariance between parent and child behavior is due to genetic similarities. It is plausible that the genes that mothers and children share partly account for adverse parenting as well as child aggression (Jaffee, Caspi, Moffitt, & Taylor, 2004). Nevertheless, in our study negative discipline was related to child aggression only in the case of less sensitive mothers. It was not simply the combination of insensitivity and negative discipline that predicted child aggression. Therefore, a singular genetic explanation of the reported association of parenting with aggression seems unlikely. In addition, we accounted for the effects of child temperament, maternal psychopathology, and maternal educational level. Of course, these variables are not equivalent to genetic characteristics of both mothers and children. However, the fact that the interaction effect of sensitivity and discipline was still significant after adding these variables to the model also indicates that an explanation in only genetic terms is unlikely. Furthermore, previous behavioral genetic research has shown that a relatively large part of the variance in problem behavior is due to environmental influences (Jaffee et al., 2004). Nevertheless, genetic factors may interact with environmental influences in predicting child aggression.

It is also possible that children elicit parenting behavior more than parents influence their children. Although in the current study it was not possible to indisputably establish the direction of effects, the cross-lagged research design, controlling for concurrent relations between parenting and child aggression, contributes to the hypothesis that parenting at Time 1 influences child behavior at Time 2. In addition, controlling for the effect of child temperament assessed

about half a year before Time 1 did not change our results. The interaction effect of sensitivity and discipline was independent of the temperament of the child. The direction of the interaction effect may be tested in an intervention study, improving the discipline techniques of more sensitive versus less sensitive mothers. The outcomes of the current study provide a clear hypothesis regarding the effect of parenting on child aggression. Our expectation would be that a decline in the rate of negative discipline strategies of less sensitive mothers will result in a reduction of aggressive behavior in their children, whereas a change in discipline of sensitive mothers will not, or to a lesser extent.

Conclusion

Results of the current study revealed that being exposed to maternal negative discipline predicted aggressive behavior in children when their mothers were less sensitive, whereas children of more sensitive mothers were not negatively affected by their mothers' use of negative discipline. Apparently, maternal sensitivity acted as a buffer against the influence of negative discipline. This result underlines the importance of considering both aspects of parenting in research on child aggression and in developing interventions to prevent development of chronic aggressive and antisocial behavior.