

# Chapter 3

## Differential susceptibility to discipline:

The moderating effect of child  
temperament on the association  
between maternal discipline and  
early childhood externalizing  
problems

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## Abstract

This study investigated the interaction of child temperament and maternal discipline in the prediction of externalizing problems in early childhood. Participants included 227 1- to 3-year-old children with high externalizing problems scores on the CBCL/1½-5. Maternal reports and observational data were obtained regarding maternal discipline, child temperament, and externalizing problems. Results indicated that children with difficult temperaments were more susceptible to negative discipline (i.e., they showed more externalizing problems), as well as more susceptible to positive discipline (i.e., showing less externalizing problems), as compared to children with relatively easy temperaments. These findings provide empirical evidence for the differential susceptibility hypothesis and suggest directions for enhancing the effectiveness of interventions aimed at reducing early childhood externalizing problems.

## Introduction

According to Belsky's differential susceptibility hypothesis (1997a), children vary in their tendency to develop externalizing problems when faced with coercive or more nurturant parenting. Children with difficult temperaments seem to be most susceptible to rearing influences (Belsky, 1997b). As Collins, Maccoby, Steinberg, Hetherington, and Bornstein (2000) argue, contemporary research should underscore the fact that "statistical interactions and moderator effects are the rule, not the exception" (p. 228). Empirical evidence for the moderating effect of child temperament on the relation between parenting and child externalizing problems is emerging. However, most research concerns school-aged children, whereas the literature shows that high levels of externalizing problems in early childhood are predictive of a variety of negative outcomes in later childhood, and that early discipline may play a role in determining whether early behavior problems continue or decrease (e.g., Campbell, Shaw, & Gilliom, 2000). In order to provide further empirical evidence for the differential susceptibility hypothesis, the aim of the present study was to investigate the interaction between difficult temperament and maternal discipline in the prediction of externalizing behavior problems in 1- to 3-year-old children, while addressing methodological limitations of previous research.

Temperament research highlights the child's contribution to its own development. Although different approaches to temperament can be adopted, child temperament is generally considered to refer to constitutionally based, individual differences in behavioral style, that are visible from early childhood (Goldsmith et al., 1987; Rothbart & Bates, 1998). There is ample evidence for the relation between temperament and child behavior problems (see for a recent review Sanson, Hemphill, & Smart, 2004). Difficult temperament, also conceptualized as negative emotionality and low effortful control, has been frequently associated with externalizing problems. Although direct relations exist, temperament seems to have its greatest impact when other risk factors are also present, such as a poor parent-child relationship (Sanson, Oberklaid, Pedlow, & Prior, 1991). As early as in 1968, Thomas, Chess, and Birch pointed out that infant characteristics interact with parenting to produce good or poor child outcomes. In his differential susceptibility theory, Belsky (1997a, 1997b) emphasizes the evolutionary rationale for a varying susceptibility to environmental influences in different children. The probabilities of passing on one's genes in a changing environment and an uncertain future will be greater with a diversification of investments, which includes bearing offspring with a differential susceptibility to that environment. Based on studies by

Crockenberg (1981), Kochanska (1993), Van den Boom (1994), and Suomi (1995), Belsky suggests that negatively emotional or difficult infants may be most affected by rearing influences (1997b). Research that does not account for the moderating effects of child temperament may both over- and underestimate environmental effects. Currently, a growing number of studies confirm the moderating role of temperament in the association between parenting and child development (e.g., Blair, 2002; Warren & Simmens, 2005).

Belsky (1997a) speculates that some children will engage in externalizing behaviors because they are born that way (i.e., have an inherited propensity to exhibit externalizing problems), while others are made that way (i.e., have an inherited propensity to be environmentally reactive); the latter referring to differential susceptibility to rearing influences. Since Belsky's formulation of a differential susceptibility hypothesis, a few studies have examined the influences of child temperament and personality on the association between parenting practices and externalizing behaviors. Colder, Lochman, and Wells (1997) found that harsh discipline predicted high levels of aggression in 4<sup>th</sup> and 5<sup>th</sup> grade boys characterized by moderate to high fear, whereas for boys characterized by high activity levels poor parental monitoring predicted high levels of aggression. Results of the study by Belsky, Hsieh, and Crnic (1998) in 3-year-old firstborn boys showed that negative mothering (i.e., intrusiveness and negative affect) contributed to the development of externalizing problems only among children high in negative emotionality. Data from Paterson and Sanson (1999) indicated an interaction between temperamental inflexibility and punitive parenting in the development of externalizing behavior problems in 5- and 6-year-olds. Lengua, Wolchik, Sandler, and West (2000) reported that parental rejection was more strongly related to conduct problems for 9- to 12-year-old children of divorce who were low in positive emotionality, whereas inconsistent discipline was more strongly related to adjustment problems for children high in impulsivity. In a sample of 4<sup>th</sup> grade boys, an interaction between the level of temper tantrums and unskilled maternal discipline in the prediction of growth in externalizing behaviors was shown by Stoolmiller (2001). Finally, Morris and colleagues (2002) pointed out that among 1<sup>st</sup> and 2<sup>nd</sup> graders high in irritable distress or with poor effortful control, maternal hostility was associated with externalizing problems. In addition, Bates, Pettit, Dodge, and Ridge (1998) tentatively concluded that the predictiveness of maternal restrictive control in the development of externalizing behaviors was slightly greater when the children, aged 7 to 11 years, were low in perceived resistance to control than when they were perceived to be high in resistance. Moreover, some studies have presented evidence that child personality moderates the relation between parenting and

externalizing problems (e.g., Prinzie et al., 2003; Van Leeuwen, Mervielde, Braet, & Bosmans, 2004). In sum, despite the fact that the studies varied in their strengths and limitations, sample size and characteristics, statistical analyses, and the operationalization of both temperament and parenting, the abovementioned studies provide some evidence for the moderating effect of child temperament on the association between parenting and externalizing behavior problems.

From a developmental perspective, parental discipline strategies become increasingly important for managing child behavior during the toddler years (e.g., Belsky, Woodworth, & Crnic, 1996). By the end of the first year, when children experience rapid developmental advances in cognitive, linguistic, and motor skills, parenting issues shift from primarily providing nurturance and protection to caregiving issues such as firm support, limit setting, and the use of effective control strategies (Sroufe, 1979). Several studies have shown that parental discipline is associated with externalizing problems. Negative discipline, including coercive, physical, and inconsistent discipline, is associated with higher levels of behavior problems (e.g., Gardner, 1989; Gershoff, 2002; Patterson, 1982). At the same time, positive discipline techniques, such as induction or empathy, and discipline in the context of a positive affective relationship predict lower levels of externalizing problems (Maccoby & Martin, 1983; Rothbaum & Weisz, 1994). It is therefore interesting to note that the studies examining the moderating effect of child temperament on the relation between parenting and externalizing problems mainly concentrated on the negative consequences of negative parenting for children with a vulnerable temperament, while one could argue likewise that these children will also be more positively affected by positive parenting due to their 'sensitive' temperament. In the differential susceptibility theory, it is suggested that the susceptibility to parental influence is for better, in the case of positive caregiving, or for worse, in the case of less positive or negative caregiving (Belsky, 2005). The study by Belsky et al. (1998) was the only one to separate positive and negative parenting, but they concluded that it was negative rather than positive mothering that accounted for the variance in externalizing problems. Their study was also unique in its sample of preschool children, but they did not specifically concentrate on discipline, and only boys were studied. Stoolmiller (2001) was the only one to study discipline skills (in parents of, again, boys only), but an overall coercive discipline measure was used, with no differentiation in specific discipline strategies.

Most of the studies on parenting-by-temperament interactions in the prediction of externalizing problems attempted to avoid informant effects by using parent, child, and/or teacher data. However, the majority of studies relied on questionnaire data. Belsky and colleagues (1998) and Stoolmiller (2001) were the only ones to also use observational data. Sole reliance on questionnaires increases the probability of measurement confounding or method bias, which is especially relevant when simultaneously studying temperament and externalizing behavior problems (see e.g., Lemery, Essex, & Smider, 2002; Sanson, Prior, & Kyrios, 1990). Only in the studies by Paterson and Sanson (1999) and Lengua et al. (2000) item overlap between questionnaires tapping both constructs was explicitly reduced, whereas Morris et al. (2002) partly addressed this issue.

In sum, research regarding children's differential susceptibility to specific discipline strategies, both positive and negative, in the development of externalizing problems in early childhood is limited and studies are hampered by several methodological issues. Moreover, Bates et al. (1998) and Belsky et al. (1998) stress the need for replication of temperament by environment interactions. The aim of the present study was to investigate whether the relation between positive as well as negative maternal discipline strategies and externalizing problems is moderated by child difficult temperament in 1- to 3-year-old children. A multi-method measurement strategy was used to address this question, including both questionnaire and observational data for predictor and outcome measures. In addition, efforts were made to reduce content-overlap between measures of externalizing problems and difficult temperament. Based on the available literature, children with difficult temperaments were expected to be more susceptible to the negative consequences of negative discipline strategies and also more influenced by positive discipline as compared to children with relatively easy temperaments.

## 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- to 3-year-old children by enhancing maternal sensitivity and adequate discipline strategies. It consists of a screening phase in a general population sample and a randomized

case-control intervention phase in a selected subsample of children with high levels of externalizing behavior problems. In the intervention phase, children from both the intervention and control group were seen in the laboratory for a pretest and two posttests (respectively one and two years later). Data for the current paper were derived from the screening and pretest phase.

### *Sample and procedure*

Participants were recruited from community records of several cities and towns in the western region of the Netherlands. Children born in a specific time period were selected in order to obtain a group of 1-, 2-, and 3-year-old children (respectively 10 – 15, 22 – 27, and 33 – 40 months old). Children were not eligible to participate in the screening phase if they had non-Dutch first names as well as non-Dutch family names (implying a possible lack of familiarity with the Dutch language and meeting exclusion criteria for the intervention phase regarding ethnic background). In the screening phase, parents of 4,615 children were sent questionnaire booklets by mail. We obtained 2,408 questionnaires from primary caregivers (response rate 52%). Unfortunately we were not able to collect detailed information on non-participating families, but there were no age or sex differences between responding and non-responding families (respectively  $p = .11$  and  $p = .38$ ). The large majority of children (95%) were living with two parents; with the biological mother as the primary caregiver and a father figure (biological or stepfather) as the second caregiver. To ensure a homogenous sample, only children living in these families were eligible for the intervention study. This selection and the application of several other exclusion criteria (e.g., twins, serious medical condition in child or mother) resulted in the exclusion of 454 cases, leaving a target selection sample of 1,954 children. For each age group, children with scores above the 75<sup>th</sup> percentile on the CBCL syndrome Externalizing Problems (age 1 year: scores  $\geq 13$ ; age 2 years: scores  $\geq 19$ ; age 3 years: scores  $\geq 20$ ) were selected for the intervention study.

Of the 438 selected families, parents of 237 children (54%) agreed to participate in the entire intervention study and were invited for a visit to the laboratory. During the 1½-hour laboratory session, mother and child completed several tasks (coded afterwards from videotapes with observational measures) and mothers were asked to fill in some questionnaires. The average time between the screening and the laboratory session was 3.85 months ( $SD = 0.96$ , range 0.83 – 6.37). There were no significant differences between selected families who agreed to participate in the entire intervention phase and those who did not regarding initial level of child externalizing problems ( $p = .99$ ), child and maternal age ( $p = .18$  and  $p = .07$ ), child

sex ( $p = .84$ ), and presence of siblings ( $p = .98$ ). The only statistically significant, but very small difference was that participating parents had a somewhat higher educational level than non-participating parents,  $F(1, 434) = 12.70$ ,  $p < .01$ , partial  $\eta^2 = .03$ .

For the present paper, only those children for whom complete data were available on all variables of interest were included. This selection resulted in a sample of 227 children (mean age = 27.40 months,  $SD = 9.90$ , range 13.58 – 41.91). Fifty-six percent of the children were boys and over half of the children had siblings (59%). Mean age of the mothers was 33 years and the majority of the parents had a high educational level (one or both parents with Bachelor's or Master's degree in 64% of the sample).

### *Instruments*

Internal consistencies of questionnaire data were assessed in the general population screening sample ( $N = 2,408$ ).

#### *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*. Because the ICQ was used in combination with the Child Behavior Checklist (CBCL/1½-5; Achenbach & Rescorla, 2000), five items in the ICQ were discarded because of content-overlap between items of both questionnaires. 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. A total score was computed by averaging item scores.

#### *Childrearing practices*

The Dutch translation of the Child Rearing Practices Report (questionnaire-form) was used in the screening phase to assess mothers' attitudes toward childrearing (CRPR; Block, 1965; Dekovic, Janssens, & Gerris, 1991). Mothers were asked to rate their values and behaviors on a 5-point scale (0 *not true* – 4 *true*). For the current study we used a subscale measuring authoritarian control described by Dekovic (1989). We had to remove 2 of the 13 items, since they were not applicable to

our age group (“I do not allow my child to say bad things about his teacher” and “I believe children should not have secrets from their parents”). A total score was computed by summing item scores; internal consistency (Cronbach’s alpha) was .68.

#### *Maternal discipline*

Specific maternal discipline strategies were observed during the laboratory session, in a 10-minute ‘don’t’ task. The child was shown a treat, which was subsequently given to the mother with the (written) instruction to refrain from giving the treat to the child until the end of the session, 10 minutes later. During this task, the mother was asked to fill in a questionnaire, while the child was offered no toys for the first 5 minutes and was allowed to play with toys available in the room for the last 5 minutes. All maternal discipline strategies were coded, whether or not they concerned the forbidden treat (e.g., they could also concern the toys). Coding procedures were based on Kuczynski, Kochanska, Radke-Yarrow, and Girnius-Brown (1987), and Van der Mark, Van IJendoorn, and Bakermans-Kranenburg (2002). The following maternal discipline strategies were observed: Distraction, Reinforcing alternative activities, Induction, Understanding (positive strategies), Prohibition, Physical obstruction, and Giving in (negative strategies). *Distraction* was coded when mothers redirected the child’s attention by giving an alternative to the present situation or the child’s behavior. When *Reinforcing alternative activities*, mothers gave an encouraging response to the child’s initiative not concerning the treat, in order to keep the child distracted. *Induction* referred to mothers’ explanations of why the child was not allowed to do something or of the consequences of the child’s behavior. *Understanding* was coded when mothers displayed interest in or understanding of the child’s feelings or thoughts. *Prohibition* concerned any prohibition, command, or disapproval with respect to the child’s behavior. *Physical obstruction* was coded when mothers in any way physically obstructed the child from getting the treat. Finally, *Giving in* was coded when mothers did not follow through on (part of) a prohibition, either by actively or passively giving in. Coding was ended before the intended 10-minute duration if mothers completely gave in by handing the child the treat. For 1-year-old children, the duration of this task was, beforehand, set at 8 minutes, because of the fatiguing length of the laboratory session for children in this age group. Therefore, the exact duration of the ‘don’t’ task varied from 4 to 10 minutes and all frequencies were recomputed to a standard 10-minute duration. The average intraclass correlation (single rater, absolute agreement) for intercoder reliability (for all separate pairs of five coders) was .85 (range .61 – .95;  $n = 30$ ).

### *Externalizing problems*

The Child Behavior Checklist for 1½- to 5-year-old children (CBCL/1½-5; Achenbach & Rescorla, 2000) was used to measure externalizing problems, and was completed by the mother during the laboratory session. Mothers indicated whether their child displayed any of the 100 behavioral descriptions in the last 2 months on a 3-point scale (0 *not true*, 1 *somewhat or sometimes true*, and 2 *very true or often true*). Using confirmatory factor analysis, Van Zeijl et al. (in press; see chapter 2) found that the broadband Externalizing Problems syndrome reported for 2- and 3-year-olds by Koot, Van den Oord, Verhulst and Boomsma (1997) was also applicable to 1-year-old children. The internal consistency (Cronbach's alpha) for mother-reported externalizing problems was .91. Scale scores were computed by summing item scores.

### *Physical aggression*

Physical aggression was measured during the laboratory session on a 5-point rating scale, accounting for both the frequency and intensity of aggressive acts during 3 different episodes: a break (mother and child having a snack and a drink without further specific instructions), a cleaning-up task, and a task in which the child was not allowed to touch several attractive toys (Mesman et al., 2005). Behaviors that were coded as aggression included hitting, kicking, biting, pinching, scratching, shaking, pushing, stamping, throwing, and physically threatening to perform any of these behaviors. The context of the behavior, as well as the child's facial and verbal expressions, was also taken into account. In this paper, the mean score of the ratings for mother-directed aggression and object-directed aggression was used ( $r = .37, p < .01$ ), which was significantly correlated with the CBCL Externalizing Problems syndrome ( $r = .22, p < .01$ ). The average intraclass correlation (single rater, absolute agreement) for intercoder reliability (for all separate pairs of seven coders) was .85 (range .73 – .93;  $n = 45$ ).

### *Statistical analyses*

To test for moderator effects, Holmbeck (1997) recommends using variables in their continuous forms in multiple regression techniques. In the regression equation, predictor and moderator are entered first, followed by the interaction of the predictor and moderator. All variables were 'centered' (i.e., sample means were subtracted from individual scores) to avoid problems of multicollinearity. We tested all main and interactions effects together in one multivariate analysis, in order to prevent capitalization on chance findings and to select variables for further analyses.

For the interpretation of significant interactions, regression lines were plotted for high and low moderator values, as recommended by Aiken and West (1991). The sample was split in a group of temperamentally difficult children and a group of children with relatively easy temperaments. An a priori split was made on the 82.7<sup>th</sup> percentile in the general population sample, in accordance with the commonly used borderline/clinical cut-off for the CBCL/1½-5 (see also Klein Velderman, Bakermans-Kranenburg, Juffer, & Van IJzendoorn, in press). Because the three age groups differed in their temperament levels, splits were made separately in each age group. There were no differences between groups of children with relatively easy or difficult temperaments on any of the sociodemographic variables ( $ps > .10$ ).

When univariate outliers ( $z > |3.29|$ ) were Winsorized (i.e., “moved in close to the good data”; Hampel, Ronchetti, & Rousseeuw, 1986, p. 69) by replacing all outlying scores ( $n = 20$ ) with the next highest value (with a  $z < |3.29|$ ) in the distribution, results were similar.

## Results

### *Preliminary analyses*

In Table 3.1 (see next page) means and standard deviations for all variables of interest are presented, as well as group differences between children with relatively easy ( $< P82.7$ ) and difficult temperaments ( $> P82.7$ ) on each variable. The use of maternal discipline strategies was similar in both temperament groups. The only significant group differences were on externalizing problems (partial  $\eta^2 = .13$ ) and physical aggression (partial  $\eta^2 = .04$ ); scores were lower in children with relatively easy temperaments as compared to temperamentally difficult children.

There was one significant correlation among the main predictor variables (see Table 3.2, on page 58). Authoritarian control was significantly and negatively correlated with the observed discipline strategy understanding ( $r = -.14, p < .05$ ). The highest correlation among observed maternal discipline strategies was .50 ( $p < .01$ ), for prohibition and physical obstruction. It should be noted that positive discipline strategies were not necessarily negatively correlated with negative strategies. In fact, this was only true for reinforcing alternative activities and physical obstruction ( $r = -.20, p < .01$ ).

**Table 3.1:** Descriptive statistics and differences between temperament groups

	Total sample (N = 227)		Easy children (n = 129)		Difficult children (n = 98)		Differences	
	Mean	SD	Mean	SD	Mean	SD	t-value	
Difficult temperament	1.88	0.53	1.53	0.28	2.35	0.39	-17.98	** easy < difficult
Mother-reported externalizing problems	25.21	8.33	22.62	6.51	28.62	9.23	-5.49	** easy < difficult
Observed physical aggression	0.59	0.72	0.46	0.55	0.76	0.88	-3.02	** easy < difficult
Mother-reported authoritarian control	22.25	5.39	22.41	5.65	22.04	5.04	0.50	ns
<b>Observed discipline strategies</b>								
Distraction	4.87	5.31	4.93	5.56	4.80	5.00	0.17	ns
Reinforcing alternatives	9.80	7.51	10.05	7.64	9.47	7.35	0.57	ns
Induction	2.91	2.63	2.79	2.40	3.07	2.91	-0.82	ns
Understanding	4.40	5.08	4.64	5.07	4.06	5.10	0.85	ns
Prohibition	8.58	6.41	8.41	6.17	8.79	6.74	-0.44	ns
Physical obstruction	5.95	6.28	5.87	6.05	6.06	6.59	-0.23	ns
Giving in	0.57	1.02	0.61	1.15	0.52	0.83	0.72	ns

Note: \*\*  $p < .01$ . ns = non-significant.

**Table 3.2:** Correlations between all predictor variables

N = 227	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Child difficult temperament	-								
2. Authoritarian control	-.05	-							
<b>Observed discipline strategies</b>									
3. Distraction	.09	-.11	-						
4. Reinforcing alternative activities	-.11	-.00	-.01	-					
5. Induction	.04	.06	.21**	.12	-				
6. Understanding	.05	-.14*	.39**	.06	.20**	-			
7. Prohibition	.02	.00	.31**	-.06	.30**	.03	-		
8. Physical obstruction	.10	-.07	.38**	-.20**	.28**	.12	.50**	-	
9. Giving in	-.03	-.05	.14*	.00	.01	.14*	.21**	.09	-

Note: \*  $p < .05$ . \*\*  $p < .01$ .

### Moderator effects

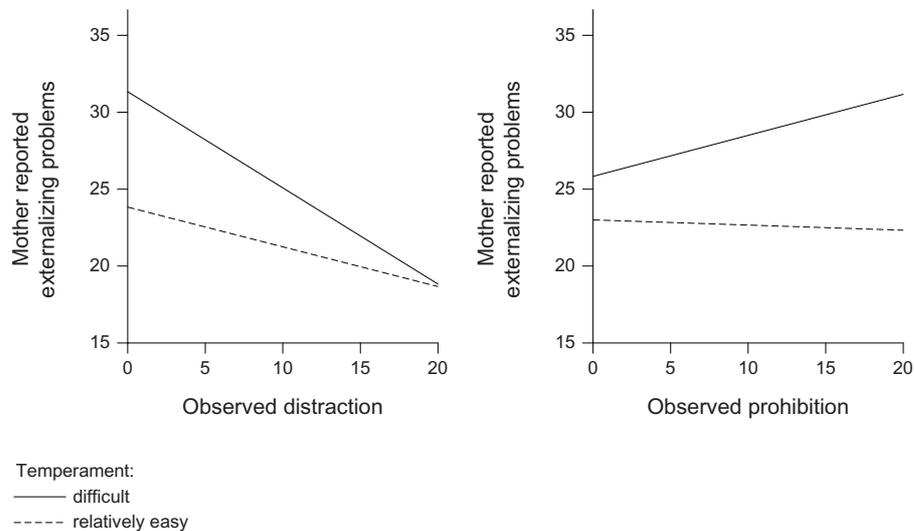
To select those variables that significantly predicted externalizing problems, we performed one multiple regression analysis (forced entry) including child sex, child temperament, authoritarian childrearing practices, and all observed maternal discipline strategies, as well as all discipline-by-temperament interactions as predictor variables. Results are presented in Table 3.3. A significant regression model was found ( $R^2 = .29$ ,  $F [18, 208] = 4.71$ ,  $p < .01$ ). Difficult temperament, distraction, and prohibition showed a main effect in the prediction of externalizing problems. The interactions of temperament with the observed discipline strategies distraction and prohibition were also significant predictors of externalizing problems. All significant associations were in the expected directions.

**Table 3.3:** Multiple regression analysis predicting externalizing problems from all predictor variables and discipline-by-temperament interactions

Prediction of externalizing problems ( $N = 227$ ) $R = .54$ , $R^2 = .29$ , $F = 4.71^{**}$	<i>B</i>	$\beta$	<i>t</i> -value
Child sex	-0.73	-.04	-0.70
Child difficult temperament	5.75	.36	6.00 **
Authoritarian control	-0.10	-.06	-0.99
Distraction	-0.47	-.30	-4.23 **
Reinforcing alternative activities	-0.02	-.02	-0.33
Induction	0.11	.03	0.50
Understanding	-0.09	-.05	-0.78
Prohibition	0.25	.19	2.65 **
Physical obstruction	-0.07	-.02	-0.33
Giving in	0.68	.08	1.35
Authoritarian control * temperament	-0.07	-.02	-0.32
Distraction * temperament	-0.67	-.21	-2.79 **
Reinforcing alternative activities * temperament	-0.27	-.13	-1.90
Induction * temperament	0.31	.06	0.73
Understanding * temperament	-0.00	.00	-0.01
Prohibition * temperament	0.69	.24	3.13 **
Physical obstruction * temperament	-0.18	-.07	-0.82
Giving in * temperament	0.51	.03	0.47

Note: \*\*  $p < .01$ .

Subsequently, we tested the maternal discipline variables showing a significant interaction with temperament more extensively in separate hierarchical multiple regression analyses (forced entry). Controlling for main effects, the addition of the interaction effect significantly improved the prediction of externalizing problems for distraction ( $R^2_{\text{change}} = .03, F_{\text{change}} [1, 222] = 7.91, p < .01$ ) and prohibition ( $R^2_{\text{change}} = .02, F_{\text{change}} [1, 222] = 4.89, p < .05$ ). The interpretation of significant interaction effects can be inferred from the plotted regression lines for children with relatively easy versus difficult temperaments (see Figure 3.1). The simple slope of distraction was significant in both relatively easy children ( $B = -0.22, \beta = -.18, p < .05$ ) and in difficult children ( $B = -0.62, \beta = -.33, p < .01$ ). The simple slope of prohibition approached significance in children with difficult temperaments ( $B = 0.25, \beta = .19, p = .07$ ), but was far from significant in children with relatively easy temperaments ( $B = 0.00, \beta = .00, p = 1.00$ ). Children with difficult temperaments were more positively influenced by the positive discipline strategy distraction and more negatively affected by the negative discipline strategy prohibition as compared to children with relatively easy temperaments. It should be noted that the plotted regression lines for authoritarian control and the discipline strategies reinforcing alternative activities, understanding and giving in showed similar, albeit non-significant interactions in the expected directions.



**Figure 3.1:** Regression lines for significant moderator effects of temperament on the relations between maternal discipline and child externalizing problems

When the analyses were repeated for observed physical aggression as child outcome measure, there was a main effect for difficult temperament and the discipline strategy distraction, as well as a distraction-by-temperament interaction (see Table 3.4). A significant regression model was found ( $R^2 = .15$ ,  $F [18, 208] = 2.02$ ,  $p < .05$ ).

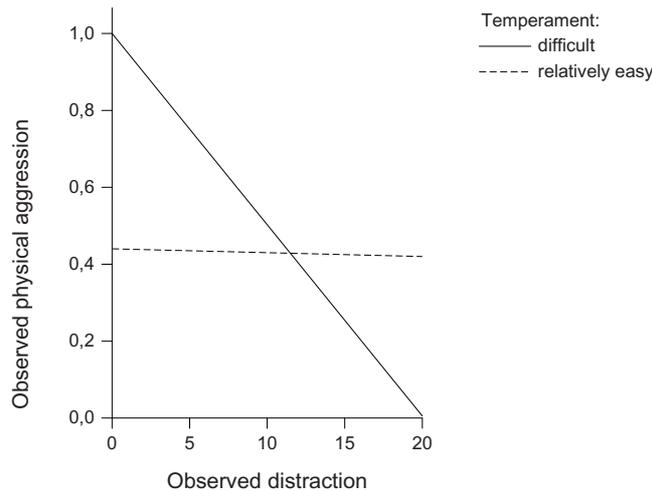
**Table 3.4:** Multiple regression analysis predicting physical aggression from all predictor variables and discipline-by-temperament interactions

Prediction of physical aggression ( $N = 227$ ) $R = .39$ , $R^2 = .15$ , $F = 2.02^*$	$B$	$\beta$	$t$ -value
Child sex	-0.18	-.12	-1.78
Child difficult temperament	0.24	.17	2.62 *
Authoritarian control	0.01	.07	1.06
Distraction	-0.03	-.18	-2.37 *
Reinforcing alternative activities	-0.01	-.09	-1.36
Induction	0.03	.11	1.54
Understanding	0.01	.04	0.48
Prohibition	0.01	.06	0.69
Physical obstruction	0.00	.01	0.09
Giving in	0.05	.07	1.09
Authoritarian control * temperament	0.03	.11	1.51
Distraction * temperament	-0.06	-.22	-2.67 **
Reinforcing alternative activities * temperament	0.00	.01	0.17
Induction * temperament	-0.07	-.14	-1.64
Understanding * temperament	0.00	.01	0.14
Prohibition * temperament	0.02	.08	0.91
Physical obstruction * temperament	0.02	.10	1.11
Giving in * temperament	0.06	.04	0.54

Note: \*  $p < .05$ . \*\*  $p < .01$ .

Controlling for main effects, the addition of the interaction effect significantly improved the prediction of observed aggression for distraction ( $R^2_{\text{change}} = .04$ ,  $F_{\text{change}} [1, 222] = 8.84$ ,  $p < .01$ ). The simple slope of distraction was significant in children with difficult temperaments ( $B = -0.05$ ,  $\beta = -.28$ ,  $p < .01$ ), but not in children with relatively easy temperaments ( $B = 0.00$ ,  $\beta = .02$ ,  $p = .83$ ). Children with difficult temperaments were positively influenced by the positive discipline strategy

distraction, whereas distraction was unrelated to physical aggression in children with relatively easy temperaments (see Figure 3.2). The plotted regression lines for authoritarian control and the discipline strategies understanding, prohibition, and giving in showed similar albeit non-significant interactions in the expected directions.



**Figure 3.2:** Regression lines for significant moderator effect of temperament on the relation between maternal discipline and child physical aggression

## Discussion and conclusion

This study showed that maternal discipline strategies are related to early childhood externalizing problems, but also that the effects of these strategies are dependent on the child's temperament. Results of the present study provide empirical evidence for the differential susceptibility hypothesis (Belsky, 1997a, 1997b). Our findings showed that children with difficult temperaments (i.e., highly negatively emotional) were more vulnerable to the negative discipline strategy prohibition as compared to children with relatively easy temperaments. The former group showed more mother-reported externalizing behavior problems in the context of maternal prohibitions. As an important additional finding, children with difficult temperaments were also more influenced by the positive discipline strategy distraction than children with relatively easy temperaments. The difficult children showed less mother-reported externalizing behavior and observed physical aggression when mothers frequently distracted their children. Interactions between temperament and most of the other maternal discipline strategies (i.e., authoritarian control, reinforcing alternative activities, understanding, and giving in) showed non-significant trends in the expected directions.

Because of the cross-sectional nature of this study, directionality cannot be established with certainty and possible cause-effect sequences cannot be disentangled. Previous studies indicated a complex model of the relation between parenting, child temperament, and their mutual role in the development of child externalizing behaviors (Lengua & Kovacs, 2005). Children with difficult temperaments may evoke maladaptive caregiving and these caregiving behaviors in their turn increase difficultness. However, in our sample of 1- to 3-year-old children, no differences in maternal discipline strategies were found between children with difficult temperaments and relatively easy children. This finding may be caused by the fact that transactional interaction patterns have taken place for a relatively short period of time, as compared to, for example, school-aged children.

It should be noted that our sample consisted only of children with high initial levels of mother-reported externalizing problems and parents with low educational levels as well as families from non-Dutch ethnic backgrounds were underrepresented. Moderator effects are most difficult to detect statistically in homogeneous samples characterized by reductions in range of variances of the moderator and predictor variables (McClelland & Judd, 1993). Therefore, interactions that were non-significant but showed trends in the expected directions might be considered as potential evidence in favor of the differential susceptibility hypothesis. The fact that physical obstruction did not differentially relate to externalizing problems in temperamentally difficult and relatively easy children may be ascribed to the direct link with the maternal discipline task (taking away the treat), in contrast to the other discipline strategies that are more common in (other) daily life situations. Why our results failed to support the hypothesized temperamentally moderated influence of induction remains an open issue, but might be related to the children's young age and associated cognitive abilities.

In contrast to the study by Belsky et al. (1998), we found that both positive and negative maternal discipline strategies were related to mother-reported externalizing problems, and both were moderated by child temperament. This may be attributed to differences in sample characteristics, such as including both boys and girls in our sample versus a sample consisting only of boys in Belsky's study. Our findings support the notion from the differential susceptibility hypothesis that parental influences act in two ways: more positively in the context of positive caregiving and more negatively when parenting is less positive (Belsky, 2005).

In the present study, significant temperament-by-maternal-discipline interactions accounted for 2 to 4% of the variance of in externalizing behavior problems, beyond that accounted for by the main effects. This effect size is consistent with

results from other studies investigating parenting-by-temperament interactions in the development of externalizing problems. Only the studies by Colder et al. (1997) and Morris et al. (2002) presented interactions accounting for 13 to 15% of the total variance. Nevertheless, because of the difficulties in detecting moderator effects, Evans (1985) stated that even those moderator effects explaining as little as 1% of the total variance should be considered important.

The present study addressed several limitations of previous research. First, a multi-method measurement strategy was used by combining mother-reported and observational data. Therefore, significant interactions that were found cannot be ascribed to informer or method bias. In fact, results showed that it was not mother-reported authoritarian control, but rather the observed maternal discipline techniques that interacted with mother-reported temperament in the prediction of mother-reported externalizing behavior problems. Moreover, the interaction of observed distraction and mother-reported temperament was replicated for observed physical aggression. Unfortunately, we did not have an observational supplement to mother-reported temperament. However, mothers reported on their child's temperament on average 4 months before they reported on their child's externalizing problems and before physical aggression and maternal discipline techniques were observed, reducing the probability of informer or method bias. Second, we used a measure of difficult temperament, which Belsky (1997b) indicated to be the temperament dimension most likely to cause differential susceptibility. Other studies used a variety of temperament dimensions, ranging from impulsivity to fearfulness. Our temperament measure was also decontaminated for confounding with the externalizing problems measure. While conceptual overlap may remain an issue in this research area, item overlap is not likely to have influenced our results. Third, both positive and negative maternal discipline strategies were assessed and both turned out to have a more pronounced influence in children with difficult temperaments as compared to children with relatively easy temperaments. Finally, the present paper's sample size was relatively large, consisted of very young children, and included boys as well as girls.

Despite these strengths and the fact that this study was the first to provide empirical evidence of young children's differential susceptibility to specific maternal discipline strategies in the development of externalizing behavior problems, there were some limitations. The first regards our sample's characteristics, which possibly restrict the generalizability of the study. Future studies should ideally include more representative samples. A second limitation is the fact that, in general, measures

were concurrently assessed; only child temperament and maternal authoritarian control were assessed 1 to 6 months before the other measures. Therefore, firm inferences about the direction of effects cannot be made. Future research should examine the effect of discipline in the development of externalizing behavior problems controlling for children's initial temperament in longitudinal studies as well as in intervention studies (Collins et al., 2000). The third limitation concerns the fact that only mothers were involved in this study. Further tests of the differential susceptibility hypothesis should also include father data.

The current findings suggest that the assessment of child difficult temperament may serve as an important screening tool to identify children at risk for developing externalizing problems. Since children with difficult temperaments are especially vulnerable to maladaptive caregiving, parents of these children are in particular need of being supported in maintaining or developing effective discipline strategies. Indeed, research suggests that children with difficult temperaments benefit most from intervention efforts (Blair, 2002; Klein Velderman et al., in press; Van den Boom, 1994). Nevertheless, a question that arises from the present findings and that was also raised by Maziade (1989) concerns the developmental prognosis of children with relatively easy temperaments who show externalizing problems (in this paper's sample about 15% of the children). If maternal discipline is not associated with externalizing problems in this group, it is important to know if and how levels of externalizing behavior problems can be reduced, and where intervention efforts should be targeted at in this specific group.

In conclusion, this paper provides empirical evidence for the children's differential susceptibility to parenting hypothesis. More specifically, our results confirmed the hypothesis that children with difficult temperaments are more susceptible to maternal discipline, for better and for worse: compared to children with relatively easy temperament they showed fewer externalizing problems in the context of positive discipline, whereas they showed more problems when exposed to negative discipline. Future research may provide further empirical evidence for the applicability of the differential susceptibility hypothesis regarding maternal discipline in an intervention context.

