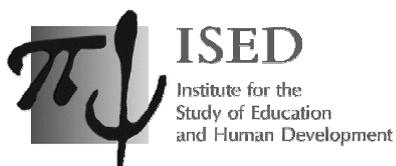


# **Externalizing Behaviors in Toddlerhood:**

**A Longitudinal Study on the Role of Child and Parental Characteristics**

Chantal van Aken



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# **Externalizing Behaviors in Toddlerhood**

A Longitudinal Study on the Role of Child and Parental Characteristics

## **Externaliserend Gedrag in de Peuterleeftijd**

Een Longitudinale Studie naar de Rol van Ouder- en Kindkenmerken

(met een samenvatting in het Nederlands)

Proefschrift

ter verkrijging van de graad van doctor aan de Universiteit Utrecht  
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ingevolge het besluit van het college voor promoties  
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op woensdag 2 april 2008 des middags te 2.30 uur

door

Adriana Antonia Ambrosia Maria van Aken

geboren op 4 oktober 1978, te 's-Hertogenbosch

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# **CHAPTER 1**

## **General Introduction**

Recent theories and models on child development emphasize that the child and his or her environment are not two separate entities, but rather form a system with continuously ongoing, bidirectional processes of interaction (Bronfenbrenner, 1986; Scaramella & Leve, 2004; Shaw & Bell, 1993). According to these theories, both *person characteristics* and *environmental characteristics* have to be taken into account in order to understand individual development. In line with these theories, the present thesis focused on the ways in which child (person) characteristics and parental (environmental) characteristics interplay in affecting an important negative outcome in toddlerhood; externalizing behaviors.

## **Background and aim of the present thesis**

Externalizing behaviors refer to problem behaviors that are directed outwards. These behaviors may take the form of aggression, non-compliance, temper tantrums, or hyperactivity. For a long time, such behaviors have been considered typical of toddlerhood and to have few long-term implications for later functioning (Campbell, Shaw, & Gilliom, 2000). As stated by Campbell and colleagues (2000, p. 468): “Parents who complained about these problems to professionals were often told that their child would outgrow the problem or that he was just a boy.”

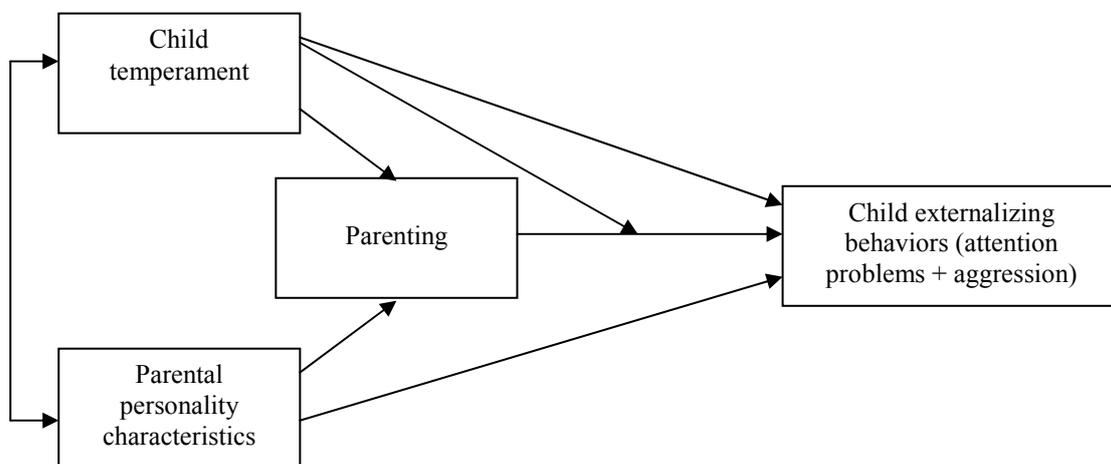
However, nowadays the interest in externalizing behaviors during toddlerhood is growing rapidly and the investigation of these behaviors in very young children is considered to be important to understand developmental pathways to adjustment. This growing interest in the early emergence, developmental course, and predictors of externalizing behaviors in children is due in part to concerns about the stability of these behaviors from early to later childhood (Broidy et al., 2003). Although most studies indicated that the *absolute* level of externalizing behaviors generally decreases from age 3 to age 5 (Campbell, 1995), studies also showed a remarkably high *relative* stability from the age of 2 years on (Broidy et al., 2003; Campbell & Ewing, 1990). In other words, although the overall or average level of these behaviors declines with age, children tend to maintain their rank order. These findings suggest that children who show very high levels of aggressive, defiant, and overactive behaviors in toddlerhood will continue to have problems at later ages. This indicates that by identifying toddlers with increased levels of externalizing behaviors and implementing preventive interventions, future escalations of these problems might be prevented. In addition to this relative stability, the rapidly growing interest in externalizing behaviors also stems from the well-established finding that early and persistent externalizing behaviors are associated with other negative outcomes in later life, including poor emotion regulation, impulsive behavior, substance abuse, unintentional injuries, school failure and school drop-out, peer problems, and adolescent delinquency (Loeber et al., 1998; Patterson, DeBaryshe, & Ramsey, 1989; Tremblay, 2000). Consequently, also these results highlight the importance of examining the predictors of externalizing behaviors as early as possible.

Therefore, the aim of the present thesis was to determine risk factors for toddlers' externalizing behaviors, with a focus on the effects of child temperament and parental characteristics such as parents' personality traits, psychopathological symptoms and parenting practices. Attention was given to main/direct effects of these characteristics, as well as to ways in which these characteristics interplay in affecting toddlers' externalizing behaviors. For instance, it was examined whether the effects of parental characteristics are stronger for children with certain temperamental characteristics (i.e., interactive/moderating effects). Additionally, we investigated whether characteristics affect children's externalizing behaviors directly or indirectly through the impact of a mediating variable (i.e., mediating effects). In addressing the key issues of this thesis, both cross-sectional and longitudinal associations were considered.

In this chapter, we first present the conceptual model underlying this thesis and we describe the key issues and main research questions addressed by the present thesis. Next, the research design of the five empirical studies presented in this thesis will be discussed. We conclude this introduction by presenting the outline of the thesis.

### Conceptual model and key issues of the present thesis

Figure 1 shows the conceptual model underlying the present thesis, with the main concepts and the associations between them.



*Figure 1.* Conceptual model of this thesis

The investigation of these associations was guided by four general key issues: (1) The relative contribution of child and parental characteristics in the prediction of toddlers' externalizing behaviors, (2) The associations between parenting and toddlers' externalizing behaviors, (3) The specificity of relations between parental/child characteristics and different negative child outcomes, and (4) The value of parental reports of toddlers' temperament.

## **The relative contribution of child and parental characteristics in the prediction of toddlers' externalizing behaviors**

The first key issue concerned the relative contribution and independent effects of child temperament and parental characteristics to toddlers' externalizing behaviors.

Temperament has been defined as individual differences in reactivity and self-regulation, which are constitutionally based and relatively stable (Rothbart & Derryberry, 1981). *Reactivity* refers to emotional, attentional, and motoric responses that are elicited by external stimuli. In contrast, *self-regulation* implies an awareness of the social and/or environmental context and reflects neural and behavioral processes functioning to modulate the underlying reactivity. Despite its biological foundation, it is acknowledged that the nature and expression of temperament is continuously modified by maturation and interaction with the environment (Rothbart & Bates, 1998).

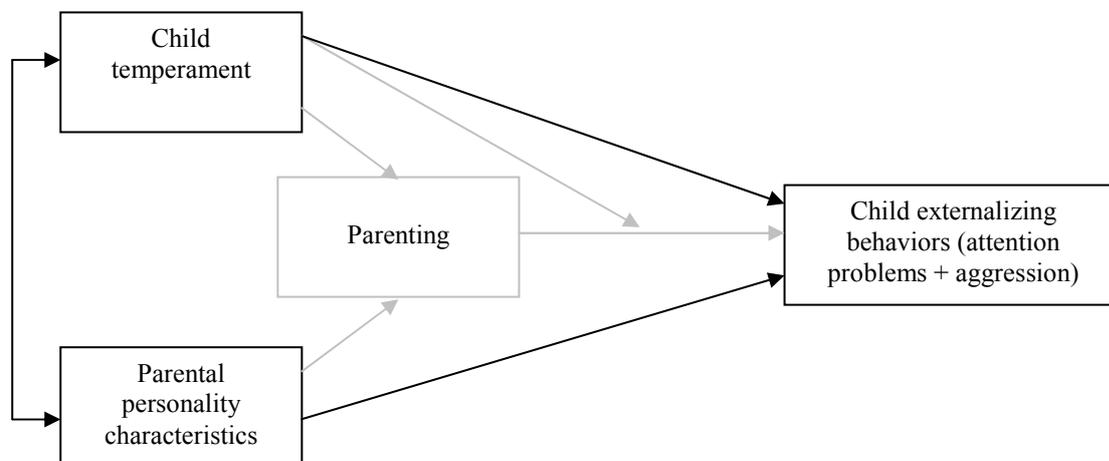
Whereas individual differences in children are conceptualized in temperamental traits, individual differences in adults are often conceptualized in personality traits. Adult personality can be considered as one of the outcomes of temperament that arises from our genes and that influences and is influenced by the experience of each individual (Rothbart, Ahadi, & Evans, 2000). Personality encompasses a broader range of individual differences in thoughts, feelings, and behavior than temperament (Caspi, Roberts, & Shiner, 2005), including skills, habits, personal values, attitudes, beliefs, and perceptions of (relations between) the self and others (Rothbart & Bates, 1998). A widely used taxonomy of personality dimensions is the Big Five. This Big-Five model comprises the following five personality traits: extraversion, agreeableness, conscientiousness, emotional stability, and openness to experience (Costa & McCrae, 1992). *Extraversion* is characterized by active engagement, assertiveness, and talkativeness. *Agreeableness* includes tender-heartedness, friendliness, and willingness to help others. *Conscientiousness* indicates the tendency to be planful, organized, persistent, and motivated during the fulfillment of goal-directed task behaviors. *Emotional Stability* or neuroticism reflects the general tendency to experience negative affects and to be prone to psychological distress or maladaptive coping responses. *Openness to Experience* includes an active imagination, intellectual curiosity, and independence of judgment.

Both children's temperamental traits and parental personality traits have been linked to children's externalizing behaviors. There is empirical evidence showing that temperamental traits like early resistance to control, low self-regulation, impulsivity, irritability, and distractibility are predictive of high levels of externalizing behaviors in children (Calkins, 1994; Caspi et al., 1995; Gartstein & Fagot, 2003). Fewer studies examined a possible relationship between parental personality traits and children's externalizing behaviors. However, these studies consistently show that high parental neuroticism is an important risk factor for children's externalizing behaviors (Nigg & Hinshaw, 1998; Prinzie et al., 2005). In

addition, some studies showed maternal lack of conscientiousness to be a significant contributor to children's externalizing behaviors (e.g. Kochanska, Clark, & Goldman, 1997). With regard to parental agreeableness results are mixed. Some studies (Kochanska et al., 1997) showed that low scores on agreeableness were predictive of increased levels of children's behavior problems. In contrast, Prinzie and colleagues (2004) unexpectedly found maternal agreeableness to be positively related to externalizing problem behaviors in elementary-school-aged children. Possibly, highly agreeable mothers are too kind and tolerant to their children, and therefore fail to effectively discipline their children.

Children's temperamental characteristics and parental personality traits have mostly been studied separately. However, children's temperament and parents' personality are expected to be interrelated. For instance, child temperamental characteristics will partly be inherited from the parent, as a consequence of which child temperament is not independent from parental personality. In addition, child temperament and parental personality might reciprocally influence each other. Therefore, it is necessary to examine the contributions of child temperament and parental personality simultaneously to draw conclusions regarding the relative importance of these factors.

Thus, the first main research question (see Figure 2) of this thesis was: *What is the relative contribution of risk factors on the domains of child temperament and parental characteristics in the prediction of toddlers' externalizing behaviors?*



*Figure 2.* The relative contributions of child temperament and parental characteristics (examined in Chapter 2)

In answering this question, the current thesis extended parental personality to include parental self-control. According to Gottfredson and Hirschi (1990), low self-control can reduce the ability of parents to perform their parenting role properly. However, current knowledge of the relationship between parental self-control and children's externalizing behaviors is very limited. Additionally, also the contribution of parental psychopathological symptoms was considered.

## **The associations between parenting and toddlers' externalizing behaviors**

Many years of parenting research have produced consensus regarding the important contribution of several dimensions of parenting to children's externalizing behaviors (Stormshak, Bierman, McMahon, & Lengua, 2000). The multitude of different parental behaviors can be encapsulated in terms of three broad dimensions: support/warmth, structure, and control (i.e. Darling & Steinberg, 1993; i.e. O'Connor, 2002; Slater & Power, 1987). *Support* refers to parental involvement in positive parent-child interactions and parental sensitivity and responsiveness towards the child's signals and needs. *Structure* concerns the parent's tendency to be stable and predictable in his or her parenting, for instance by being consistent in discipline. Whereas support and structure are relatively homogeneous dimensions, the dimension of parental control needs some differentiation since the various techniques that parents use to discipline their children are conceptually different and possibly uniquely related to children's behavior (Slater & Power, 1987). Three dimensions of parental control have received considerable attention in past research: positive discipline, psychological control, and physical punishment. *Positive discipline* refers to the degree to which parents reinforce good behavior of their child and make use of disciplinary techniques such as induction (i.e., giving explanations for why certain behavior is unwanted) (Feldman & Klein, 2003). *Psychological control* represents the extent to which parents make use of verbal disapproval and take away their love and affection in response to the child's misbehavior (Barber, 1996; Stormshak et al., 2000). *Physical punishment* refers to the degree to which parents use spanking as a discipline technique (Stormshak et al., 2000).

Current findings on parenting provide more sophisticated and less deterministic explanations of the parental influences on children's adjustment than did earlier theory and research on parenting (Collins et al., 2000). As proposed by several researchers (e.g. Collins et al., 2000), conclusions about the significance of parenting influences should be based primarily on research findings that incorporate both parenting and their interrelations with other factors (for instance child characteristics, social factors).

### ***The mediating role of parenting***

Although parental personality traits have a place in most ecological models of child development (Belsky, 1984; Bronfenbrenner, 1986), the exact nature of the influence of these traits is a challenging issue that continues to stimulate controversy (Collins et al., 2000).

Parental personality traits may directly be related to children's development through the genetic transfer of certain traits, as well as through the modeling of behaviors (Kochanska, Clark, & Goldman, 1997). However, the relation between parental personality and children's problem behavior might also (at least partly) be mediated by parenting behavior (Belsky, 1984; Patterson, 2002). These mediating effects have hardly been explored in previous studies (Kochanska et al., 1997; Prinzie et al., 2005). That is surprising, especially since already in

1984 Belsky proposed that parents' personality characteristics must affect parenting and children's behavioral outcomes (Belsky, 1984). From this point of view, it would be reasonable to hypothesize that parenting behaviors fully or partially mediate the effects of parental personality traits on children's externalizing behaviors. This would also be consistent with Patterson's assumptions that the impact of parental personality/psychopathology on children's adjustment is mediated by its disruptive impact on parenting practices (Patterson, Reid, & Dishion, 1992). Therefore, the present thesis aimed to determine the degree to which parenting mediates the effects of parental personality traits on children's externalizing behaviors (see Figure 3).

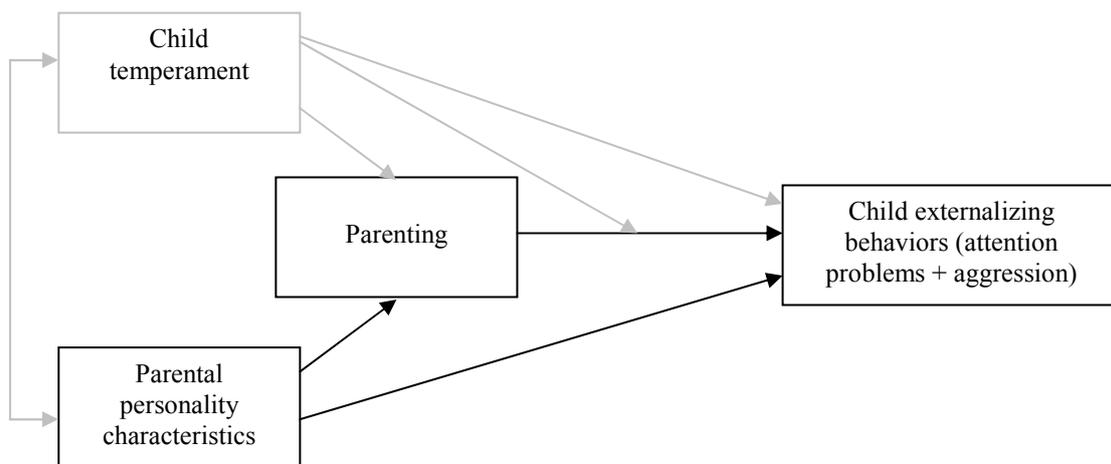


Figure 3. The mediating role of parenting (examined in Chapter 4)

### ***The interaction between parenting and child temperament***

Most contemporary theoretical explanations of the development of externalizing behaviors acknowledge that the socializing environment (i.e., parenting) and children's temperamental characteristics interact. Thomas and Chess (1977) summarized these interactive processes in terms of 'goodness of fit' between a child's temperament on one hand, and the expectations and resources of the child's environment on the other hand. Interactive models acknowledge that the effects of temperament and the social environment depend to a large extent on their interplay. These models are also in line with contextual models of child development (Bronfenbrenner, 1993), that argue that parenting or other environmental factors may vary in their developmental influence as a function of neighborhood, race, or ethnicity. Similarly, the contribution of parenting may also vary as a function of the attributes of the child (Belsky, Hsieh, & Crnic, 1998). Thus, parenting may have varying effects on children with different individual characteristics. Although this is a generally accepted idea, there has been little progress in detailing models of how specific child temperamental traits moderate the influences of parenting (Bates, Pettit, Dodge, & Ridge, 1998). Therefore, in Chapter 3 of this thesis we examined the moderating role of several child temperamental traits on the relation between parenting and toddlers' externalizing behaviors (see Figure 4).

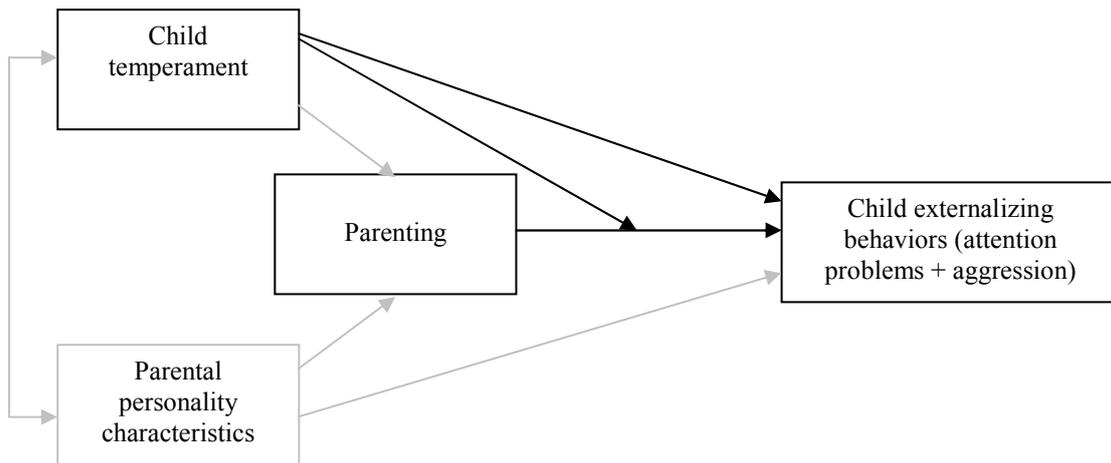


Figure 4. The interaction between parenting and child temperament (examined in Chapter 3)

### ***Longitudinal relations between parenting and externalizing behaviors***

Although there is an abundance of evidence regarding the existence of relationships between parenting and externalizing behaviors in children, we still know little about the direction of causality of these associations. In order to distinguish parenting effects from child effects, Collins and colleagues (2000) emphasize the importance of studies using short-term longitudinal designs, in which the relation between parenting at one point in time and child outcomes at some subsequent point is estimated after taking into account earlier child characteristics. Such significant longitudinal relations between parenting and child adjustment after taking into account their concurrent relation, provide indirect evidence that parenting affects child adjustment (Collins et al., 2000).

Next to this issue of causality, longitudinal designs are important because they can provide information about the interrelatedness of over-time trajectories of parenting and children's behaviors. Since several studies suggest that both children's problem behaviors and parenting behaviors are developing over time, with significant individual variability in this development (Dallaire & Weinraub, 2005; Gilliom & Shaw, 2004), it is important to incorporate changes in parenting and/or externalizing behaviors in analyses and to consider relations between over-time trajectories of both constructs. This might be especially relevant for the investigation of associations between parenting and externalizing behaviors during toddlerhood, since this period is marked by many challenges and changes for both children and their parents: the child's development is characterized by the emergence of self-awareness, goal-oriented behaviors, independence, and the accompanying frustration in the face of limits, as a consequence of which the level of children's externalizing behaviors is assumed to increase (Keenan & Wakschlag, 2000). In response to their children's increasing autonomy, and as a natural part of the socialization process, parents have to adjust their child rearing and their parenting tasks broaden.

Summarizing, important questions (see Figure 5) are: Is there evidence for systematic change and individual variability in this change in children's externalizing behaviors during

toddlerhood? Do different types of externalizing behaviors (i.e., attention problems and aggressive behaviors) follow different developmental trajectories? How do different parenting dimensions change during toddlerhood? Is parenting predictive of the subsequent changes in children's externalizing behaviors and/or do children's externalizing behaviors predict changes in parenting dimensions? And are changes in parenting and changes in children's externalizing behaviors interrelated?

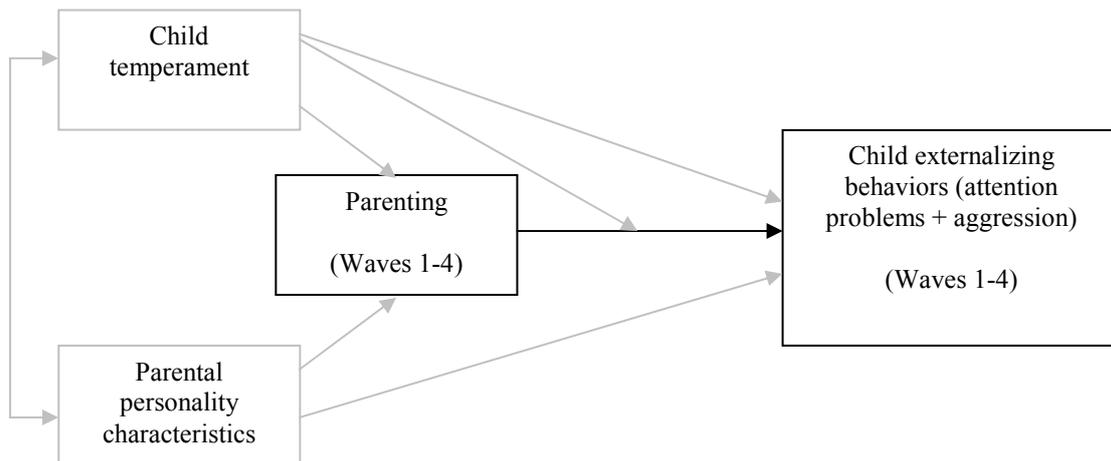


Figure 5. The longitudinal relations between parenting and externalizing behaviors (examined in Chapters 3 and 5)

### ***Differences between mothering and fathering***

Until recently, the literature on parenting has overwhelmingly focused on mothers (Lamb, 1997). This is partly because fathers are more difficult to involve in research (Mangelsdorf, 1992). Furthermore, in many families mothers are the most important caregiver (Parke, 2002). However, because of the growing number of mothers working outside the home, the pattern of parenting practices is changing, with fathers spending larger amounts of time with their children compared to the past (Bailey, 1994; Bonney, Kelley, & Levant, 1999). Because children develop strong attachments to fathers as well as mothers (Lamb, 1977) and because of the growing involvement of fathers, we might expect fathers also to play a significant role in the emergence of children's externalizing behaviors. Two meta-analyses paid attention to the relative contributions of maternal and paternal parenting to the development of children's externalizing behaviors, drawing different conclusions. A meta-analysis by Loeber and Stouthamer-Loeber (1986) found stronger effects for fathers than for mothers. However, their sample of studies focused on older children and adolescents who were clinic referred. A later meta-analysis by Rothbaum and Weisz (1994), focusing on younger and nonclinical samples, found the opposite: they concluded that mothering is more strongly associated with children's externalizing behavior than fathering.

Next to examining the relative contribution of mothers and fathers in terms of the overall

strength of the associations between parenting and children's externalizing behaviors, it is important to investigate the degree to which fathers affect children's externalizing behaviors in a different way than mothers (DeKlyen, Biernbaum, Speltz, & Greenberg, 1998). Whereas mothers provide more caregiving and nurturance (Calzada, Eyberg, Rich, & Querido, 2004; Lamb & Lamb, 1976), fathers' involvement is more characterized by playful and physically stimulating interaction (Clarke-Stewart, 1978). Fathers may therefore be particularly influential in the development of certain aspects of child behavior. For instance, during playful interactions like rough-and-tumble play involving emotional arousal, fathers may model affect regulation to their child (DeKlyen, Speltz, & Greenberg, 1998). Therefore, the present thesis examined differences in the contributions of maternal and paternal parenting to toddlers' externalizing behaviors (see Figure 6).

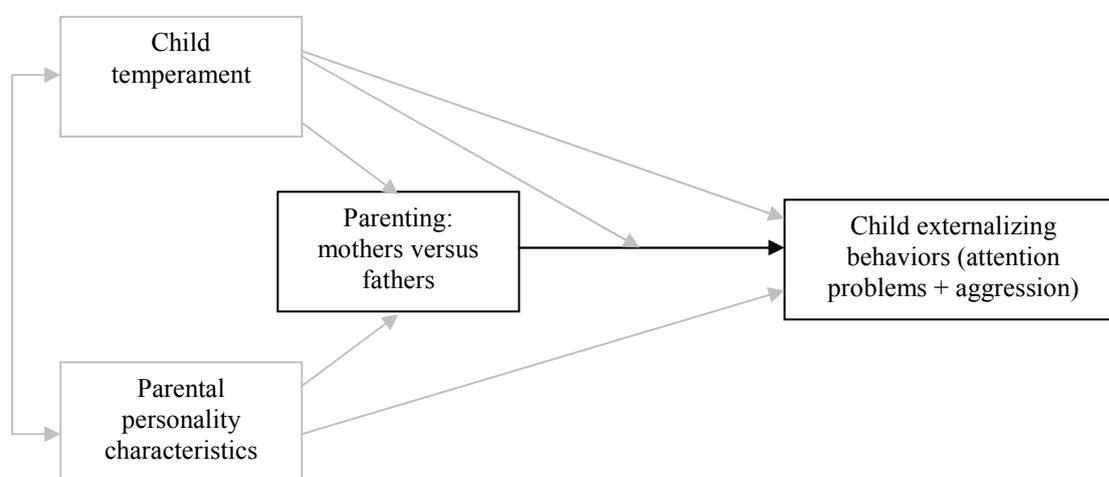


Figure 6. Differences between mothering and fathering (examined in Chapters 4 and 5)

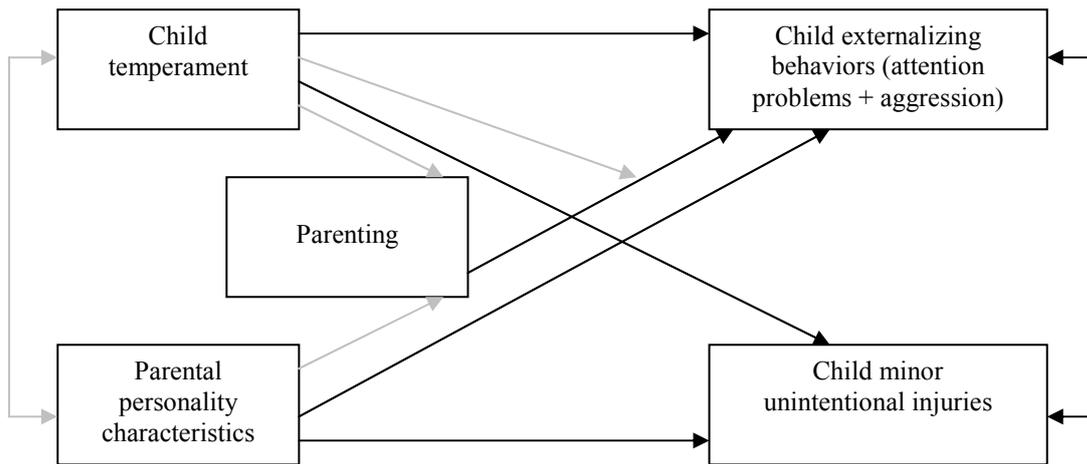
In sum, the present thesis focused on the following questions regarding the associations between parenting and toddlers' externalizing behaviors: *Does parenting mediate the effects of parental personality traits on children's externalizing behaviors? Does parenting interact with children's temperamental traits in predicting externalizing behaviors? Is the level of parenting predictive of the subsequent changes in children's externalizing behaviors and/or does the level of children's externalizing behaviors predict changes in parenting dimensions? Are changes in parenting and changes in children's externalizing behaviors interrelated? Are there differences between fathers and mothers regarding the contribution of their parenting behaviors to toddlers' externalizing behaviors?*

## **The specificity of relations between parental/child characteristics and different negative child outcomes**

An important issue in the literature concerns the controversy between proponents of general theories of human behavior and proponents of specific theories that are tailored to particular behaviors. Proponents of general theories emphasize the interrelatedness of subtypes of behavior problems as well as the interrelatedness between behavior problems and many other child and adolescent problems like unintentional injuries, depression, high-risk sexual behavior, academic failure, and tobacco and alcohol use (Biglan, Mrazek, Carnine, & Flay, 2003). Moreover, these researchers point to findings showing that a common set of social and behavioral influences contributes to the development of the entire range of problems (Biglan et al., 2003; Flay & Petraitis, 1994; Gottfredson & Hirschi, 1990).

In contrast to these general theories, adherers of specific theories presume that various forms of problem behaviors have specific or unique risk factors (Caron, Weiss, Harris, & Catron, 2006; Stroebe & Stroebe, 1995). For instance, Tremblay (2000) argues to identify different forms of expression of aggression and to differentiate them from other behavior problems (for instance hyperactivity) that are associated but different, since these different types of problem behaviors may have different etiological factors. Indeed, several studies found such *specificity* in the relation between risk factors and types of behavior problems. For instance, Nigg and Hinshaw (1998) found that parental personality traits were differently related to different subtypes of child antisocial behaviors. Additionally, Stormshak and colleagues (2000) reported that parenting practices contributed more to the prediction of oppositional and aggressive behavior problems than to hyperactive behavior problems. Similar results were found by Shaw, Lacourse and Nagin (2005) who reported that rejecting parenting differentiated children with chronic conduct problems from children with persistent low conduct problems, whereas rejecting parenting did not differentiate between children with chronic hyperactivity/attention problems and children with persistent low levels of these problems. More generally, several studies suggest that hyperactive/inattentive behaviors may be related to different etiological factors than aggressive behaviors, among which cognitive control deficits and genetic influences (Barkley, 1990; Frick et al., 1993; Rutter, Silberg, O'Connor, & Simonoff, 1999).

In order to investigate *common* and *specific* risk factors for various forms of negative outcomes in toddlerhood the present thesis compared risk factors for externalizing behaviors with risk factors for an associated negative child outcome, namely unintentional injuries. Additionally, risk factors for different subtypes of externalizing behaviors (i.e., attention problems and aggressive behaviors) were compared. Summarizing, the third main research question (see Figure 7) of the present thesis was: *What are the common and specific risk factors on the domains of child and parental characteristics for different negative child outcomes?*



*Figures 7.* The specificity of relations between parental/child characteristics and different negative child outcomes (examined in Chapters 2, 4, and 5)

### **The value of parental reports of toddlers' temperament**

Next to examining the associations between toddlers' externalizing behaviors and child and parental characteristics, the present thesis paid attention to a methodological issue, namely the value of parental reports of children's temperament. Since self-reports are unsuitable as a method of assessment in young children, researchers have relied on parental reports, teacher reports, or (more seldom) observational measures to assess children's temperament. Although parental reports are the most widely used measures of children's temperament, there is disagreement about the value of these reports (Mangelsdorf, Schoppe, & Buur, 2000).

In most cases, the validity of parental assessments has been defined as a significant correlation between parent reports and independent ratings (i.e., observational measures) and/or as a significant association between mother and father reports. Kagan (1998) promoted the first approach, termed as 'digital validity' (Rothbart & Bates, 1998), according to which parental reports are considered either valid or not valid depending on their congruence with independent observations. According to a review on agreement between parents' and observers' ratings of child temperament, only weak-to-modest correspondence is usually found, typically ranging from .20 to .40 (Mangelsdorf, 1992). However, there is evidence of greater agreement between parents and observers with increasing child age. Also, this agreement tends to be higher on more overt dimensions such as activity, and lower on more subtle dimensions. Additionally, a number of investigations revealed that parent-observer agreement increased when multiple observations of child behavior were obtained and aggregated (Mangelsdorf, 1992). Furthermore, several studies showed that parent-observer agreement is higher if the context is clearly specified and as similar as possible in both conditions (Mangelsdorf, 1992; Mangelsdorf et al., 2000). Studies on interparental agreement

on child temperament showed that agreement between fathers and mothers is considerably higher (i.e., modest to moderate agreement) than parent-observer agreement. We have to keep in mind that interparental agreement may reflect objectively perceivable temperament as well as parents' discussions about the child's behavior, which might cause shared perception bias (Bates, 1980). Just as with the parent-observer agreement, parental agreement increases with increasing child age and also tends to be highest on more overt temperament dimensions (Mangelsdorf et al., 2000).

Various reasons for disagreement between different informants have been suggested in the literature, among which effects of informant personality factors on reports of child behaviors (Kroes, Veerman, & De Bruyn, 2005). A considerable amount of research has explicitly focused on assessing such perceptual distortion elicited by parental depression, anxiety, distress, aggression, as well as other psychopathological symptoms (Briggs-Gowan, Carter, & Schwab-Stone, 1996; Fergusson, Lynskey, & Horwood, 1993; Richters, 1992; Sawyer, Streiner, & Baghurst, 1998). Most recent studies on the influence of parental psychopathology on parental reports of children's behavior problems suggested that parental psychopathology may lead to a real increase in children's behavior problems as well as to an over-reporting of these problems (Briggs-Gowan et al., 1996; Fergusson et al., 1993). In contrast to perceptual distortion caused by parental psychopathology, very scarce attention has been given to the influence of parental personality traits on parents' reports of children's functioning (Kroes et al., 2005). Therefore, the present thesis aimed to expand research on parental perceptual distortion to a more general examination of the influence of various personality characteristics by investigating the effects of each of the Big Five personality factors. Since we had both observational measures as well as maternal and paternal reports on children's self-control, we focused on this self-regulatory temperamental dimension in determining the possible distorting effects of parental personality.

Thus, the final main research question (see Figure 8) of the present thesis was: *Are parental reports of toddlers' temperament biased by parental personality?*

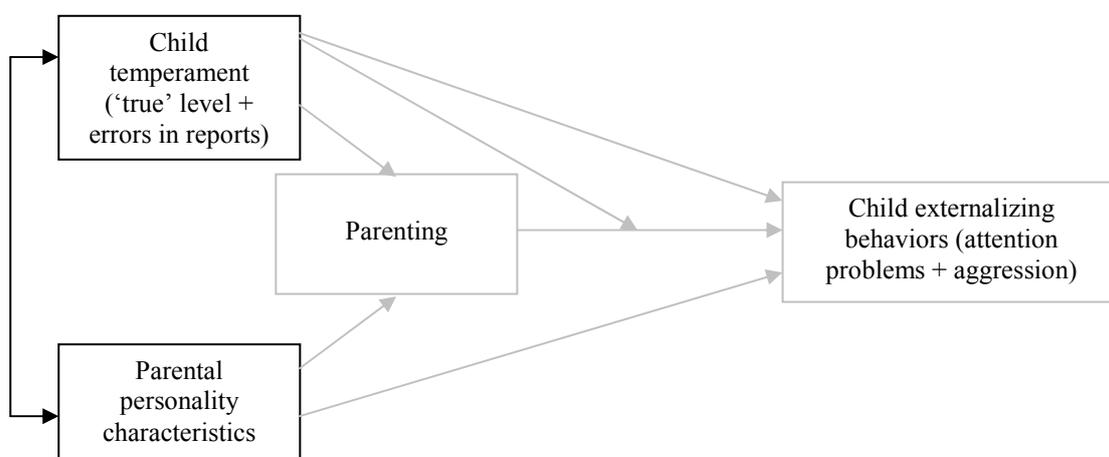


Figure 8. Parental personality as a source of rating biases in parental reports of child temperament (examined in Chapter 6)

## Research design

### *Participants*

The studies presented in this thesis are part of the broader longitudinal project “The development of physical aggression and unintentional injuries in toddlerhood” (project leaders: prof. dr. M. Junger, prof. dr. M. van Aken, and prof. dr. M. Deković), funded by the University of Amsterdam and Utrecht University. In this project, 117 boys and their parents were followed for a period of 1½ years. Data of some studies suggest that boys and girls may have different vulnerabilities to factors that impact externalizing behaviors (Rubin et al., 1998). As a consequence, when including both boys and girls, gender would have been controlled for in the analyses. However, controlling for gender effects would have limited the power of statistical analyses, especially since the size of our sample was relatively small due to the use of time-consuming observation measures. We therefore decided to focus on boys only since externalizing behaviors are more common among boys than girls and because boys displaying these behaviors are at greater risk for continued behavior problems (Alink et al., 2006; Webster-Stratton, 1996).

The families were recruited through Infant Welfare Clinics in three cities in the Netherlands, namely Gouda, Den Bosch and Utrecht. In the Netherlands, Infant Welfare Clinics follow up all children from birth up to four years of age and they systematically check the child’s growth and development. So, the sample is considered to be a community sample. A recruitment letter explaining the goals of the project was sent to all families with a son who was born between October 2002 and February 2003 ( $N = 192$  families). This letter was followed up by a telephone call. Of the 192 families, 117 (71%) agreed to participate. Frequent reasons for not participating were: failure to reach a family (approximately 25% of the non-participants), a lack of time or a lack of interest in the topic of the project. The attrition rate during the study was minimal: of the 117 families that started in the study, 112 participated in the final wave.

We followed the families from the moment the children were 17 months of age until they were 35 months old. We chose 17 months as the age at first assessment because this age marks a transition from developmental stages as children move out from infancy to toddlerhood at this age. Toddlerhood is one of the most critical periods in development with many changes for both children and their parents. In order to keep track with these changes, we used four measurement waves with 6-months intervals. As a consequence, we gathered information from these families when the child was approximately 17, 23, 29, and 35 months of age.

In order to obtain an indication of the degree to which the sample of the studies presented in this thesis is representative, we compared child externalizing behaviors, parental personality traits, and socio-demographic variables of our sample as assessed at the last measurement wave to the distribution of these variables in norm samples (Branje, van Aken,

& van Lieshout, 2004; CBS, 2003; Koot, 1993). With regard to child externalizing behaviors, the majority of children of the present study scored in the normal range of symptom severity on the subscales attention problems and aggressive behaviors of the Child Behavior Checklist 1½-5 (Achenbach & Rescorla, 2000). According to maternal reports, 3.5% of the children scored in the borderline clinical range (*t*-score between 65 and 69) and 4.3% in the clinical range (*t*-score greater than 69) on attention problems. In addition, 6.1% of the children scored in the borderline clinical range on aggressive behaviors and 3.5% in the clinical range. These results were compared with results from a study by Koot (1993), in which the prevalence of behavioral/emotional problems in the general Dutch population of children aged 2-3 years was examined using the CBCL/2-3. As shown in Table 1, according to maternal reports in that study 5.1% of the boys scored in the borderline clinical range of overactive problems, whereas 3.7% of the boys scored in the clinical range. In addition, for aggressive behaviors, 4.2% of the boys scored in the borderline clinical range and 4.2% in the clinical range. Based on these results, the prevalence of externalizing behaviors found in the present study seems to be relatively representative for the Dutch population. In order to obtain an indication of the representativeness of the sample of the present study in terms of parental personality traits, the data of our study were compared to the data of a study by Branje, van Lieshout, and van Aken (2004). In that study, the Dutch adaptation (Gerris et al., 1998) of 30-adjective Big Five markers selected from Goldberg (1992) was used to assess personality traits in a sample that was considered to be representative for the Dutch population. As can be seen in Table 1, the means on the personality traits obtained with our sample resemble the means obtained in the study by Branje, van Lieshout, and van Aken (2004). Finally, the socio-demographic variables of the sample of the present study were compared with characteristics of the general population (see Table 1). With regard to the education level of the parents, in the present study highly educated parents appear to be overrepresented: 63% of mothers and 76% of fathers had a college degree or more, while for the Dutch generation in general this appears to be approximately 30% for both men and women ([www.socialestaat.nl](http://www.socialestaat.nl)). The last variable concerns the number of intact families. In the present study, 96% of the children lived in intact families. That appears to be representative for the Dutch population since population characteristics indicate that 97% of the Dutch children between 0-3 years of age appear to live in intact families (CBS, 2003).

Table 1

*Comparison of data from the present study with Dutch population characteristics*

	Results of the present study	Norm samples
Proportions of syndrome scores (according to mothers)		
Attention problems borderline clinical range	3.5%	5.1%
Attention problems clinical range	4.3%	3.7%
Aggressive behaviors borderline clinical range	6.1%	4.2%
Aggressive behaviors clinical range	3.5%	4.2%
Mean scores on parental personality traits		
Extraversion	5.13	5.04
Agreeableness	5.70	5.74
Conscientiousness	4.99	4.94
Emotional Stability	4.97	4.64
Openness	4.83	4.67
Socio-demographic Variables		
Proportion of education level college degree or more	70%	30%
Proportion of intact families	96%	97%

***Methodological considerations***

In this thesis, each construct was measured by parent reports, with some variables also measured by home observations. Table 2 shows a scheme of the measurement of constructs across the studies of this thesis. Parents were used as the most important source of information for several reasons. First, despite the relatively low parent-observer agreement with regard to the assessment of *children's temperamental characteristics and externalizing behaviors*, evidence to date is supportive of the use of parent-report measures for these constructs (Rothbart & Bates, 1998). For instance, parents know their child better than anyone else and observe their child across a wider range of situations and across more extended periods of time than other informants (Mangelsdorf et al., 2000; Rothbart & Bates, 1998). Furthermore, some studies showed that parental assessments have superior predictive validity compared to independent assessments of temperament (Pesonen et al., 2004). With regard to measuring *parental personality traits and other personality characteristics*, there is considerable consensus that self-report measures are the most appropriate measures. Parents know themselves best and draw on a wide range of behaviors in different situations in assessing themselves. Finally, although research results are inconsistent with regard to the congruence between observed and reported *parenting* (Bornstein, Cotem, & Venuti, 2001; Kochanska, Kuczynski, & Radke-Yarrow, 1989), measuring parenting practices by self-report questionnaires has several advantages. Like in the case of reporting on children's behaviors and their own personality, parents have the widest observational base since they are able to report about their parenting behaviors in a variety of situations. Moreover, some parenting behaviors that are used infrequently are very difficult to capture with observations. Finally, a

general advantage of the use of parental reports is that they are relatively easy to administer and less expensive than observational measures. This is especially relevant in the case of studies with several measurement waves and with a focus on a broad range of constructs, like in the studies presented in this thesis.

However, since consensus about the best method of measuring is least strong for children's temperament and parents' parenting practices, these constructs were also measured by home observations. Regarding the observation of children's temperament, we focused on the self-regulatory dimension of temperament, i.e., self-control. With regard to the observation of parenting, only maternal parenting was observed, since we expected that fathers would be more difficult to involve in such time-consuming observations.

## **Outline of the thesis**

In the following chapters, five empirical studies addressing the key issues of this thesis are presented. *Chapter 2* concerns a study on the (relative) contributions of child and parental characteristics to toddlers' externalizing behaviors and unintentional injuries at 17 months of age. It was examined whether common risk factors for these two negative child outcomes can be identified. *Chapter 3* presents a study on the moderating effects of child temperamental traits on the relation between observed maternal parenting and mother-reported toddlers' externalizing behaviors. These effects were examined concurrently, when the child was 17 months old, and longitudinally, at 23 months of age. *Chapter 4* focuses on the mediating role of maternal and paternal parenting in the relation between parental personality traits and toddlers' externalizing behaviors at 35 months of age. Effects were investigated for toddlers' attention problems and aggressive behaviors separately. *Chapter 5* presents a study on the normative developmental trajectories of toddlers' attention problems and aggressive behaviors and several maternal and paternal parenting dimensions. Associations between these over-time trajectories of toddlers' attention problems/aggressive behaviors and parenting dimensions were investigated. In this study, all four measurement waves were included. Finally, *Chapter 6* concerns a study on the question whether parental reports of toddlers' self-control are biased by parental personality traits. In the analyses, both parent reports and observational measures of children's self-control were included. The presentation of these empirical studies will be followed by a general discussion of the findings of these studies in *Chapter 7*.

Table 2

*The assessment of concepts in this thesis*

Concept	Measures / variables	Method	Instrument	Wave	Informant	Chapter
Child temperament	Inhibitory Control, Frustration, Activity Level, Soothability, Shyness	Questionnaire	ECBQ (Putnam et al., 2006)	1, 2, 3, 4	Mothers (Waves 1-4), fathers (Waves 3 and 4)	2, 3, 6
	Self-control	Home observation	Delay-of-gratification tasks (Vaughn et al., 1984)	1, 4	Observer	6
Parental personality	Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Openness to Experience	Questionnaire	Dutch adaptation (Gerris et al., 1998) of 30 adjective Big Five markers selected from Goldberg (1992)	1, 4	Mothers, fathers	2, 4, 6
	Self-control	Questionnaire	Questionnaire developed by Grasmick, et al. (1993)	1, 4	Mothers, fathers	2
Parental psychopathological symptoms	Externalizing symptoms, Anxious/depressed symptoms	Questionnaire	ASR (Achenbach & Rescorla, 2003)	1, 4	Mothers, fathers	2
Parenting	Support, Positive Discipline, Psychological Control, Lack of Structure, Physical Punishment	Questionnaires	NOV (Gerris et al., 1993), PPS (Strayhorn & Weidman, 1988), APQ (Frick, 1991), PBC (Fox, 1994), PS (Irvine et al., 1999)	1, 2, 3, 4	Mothers, fathers	4, 5
	Negative Control, Lack of Sensitivity (for mothers only)	Home observation	Erickson-scales (Erickson et al., 1984)	1, 4	Observer	3
Child externalizing behaviors	Attention problems, Aggressive behaviors	Questionnaire	CBCL (Achenbach & Rescorla, 2000)	1, 2, 3, 4	Mothers (Waves 1-4), fathers (Waves 3 and 4)	2, 3, 4, 5
Child injuries	Minor unintentional injuries	Questionnaire	Self-constructed	1, 2, 3, 4	Mothers	2

## CHAPTER 2

### **Externalizing Behaviors and Minor Unintentional Injuries in Toddlers: Common Risk Factors?\***

#### **Abstract**

The aim of the present study was to examine predictors for externalizing behaviors and minor unintentional injuries in toddlers and to examine whether common risk factors can be identified. Linear regression models were used to investigate the contributions of predictors belonging to the domains of child characteristics and parental characteristics. Participants were 117 boys ( $M = 16.9$  months) and their parents. Two common risk factors for externalizing behaviors and minor injuries were identified: maternal low conscientiousness and paternal low self-control. In addition, children's inhibitory control and dispositional frustration as well as maternal externalizing symptoms contributed independently to children's externalizing behaviors. Results supply some evidence for the interrelatedness of negative outcomes and the existence of common risk factors. Interventions could aim to address these common risk factors in order to pursue a number of goals at the same time instead of focusing on only one type of negative outcome.

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\* van Aken, C., Junger, M., Verhoeven, M., van Aken, M.A.G., & Deković, M. (2007). *Journal of Pediatric Psychology*, 23, 230-244.

## Introduction

Both externalizing behaviors and unintentional injuries are acknowledged to be serious threats to children's health. With regard to externalizing behaviors identified in the preschool years, a growing body of evidence indicates that these problems often persist and tend to be moderately stable (Broidy et al., 2003; Campbell & Ewing, 1990). Furthermore, early externalizing behaviors are associated with a wide range of other co-morbid negative outcomes in later life, including substance abuse, depression, unemployment, suicide, and injuries (Tremblay, 2002). Childhood injuries are among the leading causes of pediatric morbidity and mortality in the world and constitute a global health problem (Schwebel & Brezaussek, 2004). According to official statistics in the Netherlands, the injury mortality rate in the Netherlands among children aged 1-4 years is approximately 8.4 per 100,000 children (Ellsaber & Berfenstam, 2000). Furthermore, a far larger group of children will survive their injuries and require medical attention or have their activity restricted because of their injuries.

A number of previous studies have reported that young children with increased levels of externalizing behaviors are also at increased risk for unintentional injuries. In 1987, Davidson published a critical analysis of the literature on the relationship between hyperactivity, antisocial behavior, and injuries in children. He concluded that there was general agreement on the existence of at the very least a modest positive relationship between disruptive behaviors (like aggression) and unintentional injuries, with more inconsistent results regarding the link between unintentional injuries and behaviors like hyperactivity and impulsivity (Davidson, 1987). As Schwebel et al. (2002b) note, studies since Davidson's analysis have to a large extent replicated Davidson's conclusions: also more recent studies have consistently found a positive association between aggressive behaviors and unintentional injuries (Davidson, Hughes & O' Connor, 1988; Rowe, 2004). Results are still mixed with regard to the relationship between hyperactivity or ADHD and injuries. Some studies found hyperactivity and injuries not to be related (Byrne et al., 2003; Davidson et al., 1988; Davidson et al., 1992; Schwebel et al., 2002b). In contrast, other studies found that hyperactivity was related to injuries (Barkley et al., 1996; DiScala et al., 1998).

The findings that externalizing behaviors and unintentional injuries are interrelated point to the possibility that they are (at least partly) the results of common risk factors. Here we come to an important issue in the literature, namely the controversy between proponents of general theories of human behavior and proponents of specific theories that are tailored to particular behaviors. The field of health psychology tends to be dominated by specific theories (Stroebe & Stroebe, 1995). These specific theories presume that various forms of health-endangering behaviors have specific risk factors. Preventive measures based on this theoretical approach are also risk-specific. Examples include mass-media campaigns and school programs pointing out the risks associated with smoking and others underscoring the risks of driving under the influence of alcohol (Stroebe & Stroebe, 1995).

In contrast, some more general theories have attempted to identify common risk factors for many different health-endangering behaviors (Jessor & Jessor, 1977). In line with these general theories, prevention programs should be broad and pursue a number of goals at the same time instead of focusing on only one type of behavior or negative outcome (Biglan et al., 2003). Similarly, Durlak (1997) has argued that policymakers should consider programs that address problems as they usually present themselves, namely in combination with each other, experienced by the same individuals, and concentrated within the same families.

Following the same line of reasoning, if externalizing behaviors and injuries are indeed the results of common risk factors, preventive interventions related to children's externalizing behaviors and preventive interventions related to children's injuries might be of mutual benefit and might even be combined. Such combined interventions may be very efficient since they may succeed in reducing externalizing behaviors and injury rates at the same time (Olds et al., 1999; Olds et al., 1998). Therefore, the aim of this article is to investigate the predictors for externalizing behaviors and minor injuries in toddlers and to examine whether some of their respective risk factors are identical, suggesting a common etiology for both outcomes. For that purpose, a number of possible risk factors belonging to the domains of child characteristics and parental (both maternal and paternal) characteristics are considered.

Several risk factors for externalizing behaviors and unintentional injuries have already been documented.

### ***Child Characteristics***

There is ample empirical evidence showing that difficult temperament is related to externalizing behaviors in children (Rothbart & Bates, 1998; Sanson et al., 2004). Of all temperamental characteristics, a lack of ability to regulate behavior and emotions, often referred to as self-regulation, inhibitory control or self-control, is found to be a particularly important contributor to externalizing behaviors (Calkins, 1994; Gartstein & Fagot, 2003). Results with regard to the relationship between temperament and injuries are inconsistent. Some studies that used one single, aggregated measure of temperament found temperament to be unrelated to children's injury risk (Morrongiello et al., 2004; Schwebel & Brezaussek, 2004). In contrast, most studies that measured specific temperamental traits did find temperament to be a risk factor for injuries. For instance, low self-control has consistently been found to be a risk factor for unintentional injuries. An older study by Manheimer and Mellinger (1967) found that children who were frequently involved in accidents relatively often had low self-control (i.e., were characterized by high impulsivity, low frustration tolerance, and frequent mood changes). A later study by Schwebel and Plumert (1999) showed the same pattern: preschool children scoring low on inhibitory control had significantly more lifetime injuries requiring medical attention at age 6. Other studies reported injuries to be also predicted by children's impulsiveness, activity level and sensation-seeking (Jaquess & Finney, 1994; Langley et al., 1983).

### ***Parental Characteristics***

Maternal and paternal depressive symptoms have consistently been found to be associated with higher levels of externalizing behaviors in their children (DeKlyen et al., 1998; Gartstein & Fagot, 2003). Other studies (e.g., Bradbury et al., 1999; e.g., Russell, 1998) reported maternal depression and anxiety also to increase children's injury risk. Furthermore, antisocial behaviors on the part of fathers and mothers are reported to significantly predict high levels of externalizing behaviors in their children (Phares, 1996). Parental externalizing behaviors have, to our knowledge, not yet been investigated in relation to children's injuries.

Few studies examined a possible relationship between dimensions of parental personality and children's externalizing behaviors and injuries. These studies consistently show that high paternal and maternal neuroticism as well as paternal and maternal lack of agreeableness are risk factors for children's externalizing behaviors (Nigg & Hinshaw, 1998; Prinzie et al., 2004). In addition, one study showed maternal lack of conscientiousness to be a significant contributor to children's externalizing behaviors (Nigg & Hinshaw, 1998). Studies of the relationship between parental personality and children's unintentional injuries are very scarce. A study by Matheny (1986) found that children whose mothers were less emotionally stable, were at increased risk for injuries. In contrast, Schwebel and Brezaussek (2004) reported that none of the three personality markers (i.e., neuroticism, extraversion and agreeableness) in fathers and mothers were significantly associated with injury risk. Finally, a study by Morrongiello and House (2004) found that parents who scored high on conscientiousness had children who sustained fewer injuries. The current study extends parental personality to include parental self-control. According to Gottfredson and Hirschi (1990), low self-control can reduce the ability of parents to perform their parenting role properly. However, current knowledge of the relationship between parental self-control and children's externalizing behaviors and injuries is very limited.

Despite the growing body of knowledge about risk factors, there are still several shortcomings and gaps in most of previous studies searching for predictors for externalizing behaviors and injuries in young children.

Firstly, research on unintentional injuries has focused almost exclusively on 'severe' injuries or injuries requiring professional medical attention. However, medically attended injuries are a low base-rate phenomenon (Damashek et al., 2005). Furthermore, after considering whether or not to seek medical help for a child's injury, some parents eventually will decide to call in professional help and others will decide not to. This decision might be affected by several factors that are not necessarily related to the severity of the injury, such as practical and financial issues. For this reason, it is doubtful whether medically attended injuries are consistently more serious than non-medically attended injuries (Peterson et al., 2002). In addition, the degree of seriousness of an injury will be at least partly random. It may not therefore be so important to understanding the determinants of injury risk. Support for the relevance of studying minor injuries was supplied by Morrongiello et al. (2004). They

reported a high positive correlation ( $r = .67$ ) between children's minor injuries reported by the mother during the study and more serious injuries experienced in the 6 months preceding the study. So children who experience more minor injuries are also more frequently involved in serious injuries. This finding implies that studying the development and determinants of minor injuries occurring at a higher base-rate could contribute to our understanding of more severe injuries.

A second gap is that most previous work on temperament and injury risk has been conducted with older children (Schwebel et al., 2004). However, since injury etiology might be affected by developmental change, the relative weight of parental personality characteristics and child factors might be different for very young children in comparison with older children. For instance, since very young children are less involved in situations where their parents are absent, the role of parental characteristics might be more important for injury risk of young children than for injury risk of older children. Consequently, the relative weight of child factors might be less important for very young children.

Thirdly, despite growing evidence of the interrelatedness of externalizing behaviors and injuries, studies focused on predicting either externalizing behaviors or unintentional injuries. So it remains unclear to what extent the risk factors for these two negative child outcomes are the same.

Furthermore, in previous work most attention has been paid to the role of mothers in externalizing behaviors and injuries in children, with only very incidental attention to the role of fathers. As a consequence, very little is known about the role of fathers in the development of children's externalizing behaviors and injuries.

Finally, there is a lack of research into the role of parental personality and parental self-control in children's externalizing behaviors and injuries.

The present study makes an effort to fill these gaps. In order to identify common risk factors for externalizing behaviors and minor injuries in young children, two predictor domains are considered: child characteristics and parental (maternal and paternal) characteristics. We expect child temperamental characteristics to be related to toddlers' externalizing behaviors as well as minor injuries. Regarding parental characteristics, we expect that parental psychopathology characteristics and personality traits will be predictive of both toddlers' externalizing behaviors and minor injuries. Finally, we hypothesize that paternal and maternal characteristics will yield a similar pattern of findings.

## **Method**

### ***Sample and Procedure***

Only boys were included in this study because both externalizing behaviors and unintentional injuries are more common among boys than girls (Rowe et al., 2004). The sample for this study was drawn from Infant and Toddler Clinics in three cities in the

Netherlands. A recruitment letter explaining the goals of the project was sent to 192 families, and followed up by a telephone call. Of these 192 families, 117 (61%) agreed to participate. Lack of time was the most prevalent reason for not participating. The age of the children ranged from 16 to 19 months, with a mean age of 16.9 months ( $SD = .58$  months). About half of the children ( $N = 57$ ) were the firstborn child. The parents' sample consisted of 117 mothers and 115 fathers. The mean age of the mothers was 32.9 years ( $SD = 4.0$  years) and of the fathers 34.9 years ( $SD = 5.0$  years). The level of education ranged from low (elementary school) to high (college degree or more), with 63% of mothers and 66% of fathers having a college degree or more. Most of the families (97%) were intact families.

### ***Instruments***

All instruments that were originally produced in English and of which no standard translation into Dutch was available were translated into Dutch by means of a back-translation procedure.

### ***Outcomes***

*Child Externalizing Behaviors.* To measure externalizing behaviors, we used the Child Behavior Checklist 1½-5 (Achenbach & Rescorla, 2000). Mothers were asked to indicate from 0 (*never*) to 2 (*often*) whether items were indicative of the child's behavior. The broad externalizing scale consisted of the two subscales attention problems ( $N = 5$  items) and aggressive behavior ( $N = 19$  items). Cronbach's alpha for the broad externalizing scale was .88, and for the subscales attention problems and aggressive behavior .64 and .86. The majority (78.5%) of children scored in the normal range of externalizing symptom severity on the Child Behavior Checklist 1½-5 (Achenbach & Rescorla, 2000), while 9.5% scored in the borderline clinical range ( $t$ -score between 60 and 63) and 12% in the clinical range ( $t$ -score greater than 63).

*Child Minor Injuries.* Minor injuries were measured by an injury history interview during a home visit, in which mothers were asked to report every injury that their child had sustained in the previous six months. Injuries were defined as any result that could be seen by the parents (e.g., a swelling) or felt by the child (e.g., a sprained muscle). To rule out more severe or medically attended injuries, we asked the mothers to indicate for each injury whether they had called in professional medical help or at least had considered doing so. Those injuries were subsequently excluded from the analyses (mean = .15; range = .00 - 2.00). In order to assist the mothers in the recollection of their children's injuries, we used a list of 13 different causes of injuries, rather than asking them to make a general estimate of the total number of injuries suffered by their children. Causes of injuries in this list included: falling, but not from a height (for example stumbling); falling from a height; bumping against an object; having

fingers/toes get stuck between something; getting (unintentionally) injured by weapons; cutting themselves on something; being struck with an object; suffering animal bites; sticking a sharp object in the skin/eyes/nose; burns; getting injured while cycling; being involved in a road accident, and getting injured in a fire in or around the house. All minor injuries reported by mothers were summed to create a single measure of all minor injuries experienced by the child in the last 6 months.

### *Predictors*

*Child Temperament.* Five temperamental features, i.e., Inhibitory control, Frustration, Activity level, Soothability, and Shyness, were measured by the Early Childhood Behavior Questionnaire (Putnam et al., 2006). Mothers were asked to report on a 7-point Likert scale to which extent each of the 55 items applied to their child (1 = *never* to 7 = *always*). *Inhibitory control* ( $N = 14$  items) refers to the extent to which the child is able to stop, moderate, or refrain from a behavior on instruction (e.g., “When asked not to, how often did your child touch an attractive item anyway?”). *Frustration* ( $N = 9$  items) indicates how often a child shows negative affect in situations where ongoing tasks are interrupted or goals blocked (e.g., “When it was time for bed or a nap and your child did not want to go, how often did s/he physically resist or struggle?”). *Activity level* ( $N = 7$  items) refers to the level of gross motor activity, including rate and extent of locomotion (e.g., “How often during the last two weeks has your child played games which involved running around, banging, or dumping out toys?”). *Soothability* ( $N = 14$  items) assesses rate of recovery from peak distress, excitement, or general arousal (e.g., “Following an exciting event, how often did your child calm down quickly?”). *Shyness* ( $N = 11$  items) indicates the extent to which the child is slow or inhibited in approach or shows discomfort in social situations involving novelty or uncertainty (e.g., “When your child was approached by a stranger when you and he were out, how often did your child show distress or cry?”). Cronbach’s alphas for inhibitory control, frustration, activity level, soothability, and shyness were .90, .72, .66, .84 and .74 respectively.

*Parental Externalizing Behaviors.* The Adult Self Report (ASR) for ages 18-59 (Achenbach & Rescorla, 2003) was used to measure externalizing behaviors. All 35 items of the broad-band Externalizing Behavior scale were rated on a 3-point scale where 0 indicates responses of *not true*, 1 *somewhat or sometimes true* and 2 *very true or often true*. Cronbach’s alpha was .65 for fathers and .69 for mothers.

*Parental Anxious/Depressed Symptoms.* Anxious/Depressed symptoms were also measured with the Adult Self Report (ASR) for ages 18-59 (Achenbach & Rescorla, 2003). Fathers and mothers were asked to indicate on a 3-point Likert scale to which extent each of

the 18 items of the scale Anxious/Depressed Problems applied to them. Cronbach's alpha was .91 for fathers and .89 for mothers.

*Parental Personality Traits.* The Big Five personality traits (Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Openness to Experience) were assessed by a Dutch adaptation (Gerris et al., 1998) of 30 adjective Big Five markers selected from Goldberg (1992). Fathers and mothers were asked to judge their own personality by indicating on a 7-point Likert scale how much they agreed with each adjective, 1 = *very untrue* to 7 = *very true*. *Extraversion* is characterized by active engagement, assertiveness and talkativeness. Facets of *Agreeableness* include tender-heartedness, friendliness and willingness to help others. *Conscientiousness* assesses punctuality, order and degree of organization in goal-directed task behaviors. *Emotional Stability* is characterized by the extent to which the person is emotionally stable or vulnerable to distressing emotions. *Openness to Experience* includes openness of a person to fantasy, esthetics and ideas. Cronbach's alphas for extraversion, agreeableness, conscientiousness, emotional stability, and openness to experience were .85, .87, .88, .82 and .82 respectively for fathers and .90, .82, .91, .81 and .82 respectively for mothers.

*Parental Self-control.* Self-control was measured by a questionnaire developed by Grasmick, Tittle, Bursik and Arneklev (1993). This questionnaire consists of 24 items. Fathers and mothers were asked to report to which extent each of the items applied to them. The items were rated on a 4-point Likert scale, ranging from 1 = *strongly disagree* to 4 = *strongly agree*. Persons scoring low on self-control are characterized by impulsivity, a preference for simple and physical activities, risk-seeking behavior, self-centeredness and a hot temper (e.g., "I like to test myself every now and then by doing something a little risky", "I often act on the spur of the moment", "I frequently try to avoid things that I know will be difficult"). Cronbach's alpha for fathers was .80, for mothers .81.

### *Control Variables*

Mothers were asked to indicate the *number of hours spent by the child in day-care* and the number of children living at home (*family size*). To classify the family's *socioeconomic status* (SES), we used the education and occupation of both parents according to the four-factor index developed by Brandis & Henderson (1970).

## **Plan of Analysis**

In order to identify risk factors for toddlers' externalizing behaviors and minor injuries, hierarchical regression models were used. Two domains of predictor variables were included: child characteristics and parental characteristics. Paternal and maternal characteristics were

analyzed in separate models. The predictors were entered into the equation in three steps. In the first step, socioeconomic status, hours spent by the child in day-care, and family size were entered to control for the effects of these variables. In the second step, child temperamental characteristics were entered, followed by parental psychopathology and personality in Step 3. Finally, in a separate Anova, we followed a risk-factor approach by investigating whether the number of risk factors present in a child predicts the outcomes in a linear way.

## Results

### *Preliminary Analyses*

First, the presence of outliers for the dependent and independent variables was assessed, followed by the elimination of two fathers who scored extremely high (standardized residual  $> 2$ ) on externalizing behaviors and anxious/depressed symptoms and five children who scored extremely high (standardized residual  $> 2$ ) on minor injuries. After eliminating these outliers, only the scale for children's minor injuries appeared to be somewhat skewed. A square root transformation was performed for this scale. After this transformation, the injuries scale was normally distributed (skewness = .72; kurtosis = .03). The transformed scores were used in the analyses.

Correlational analyses showed that children's attention problems and aggressive behavior were highly correlated ( $r = .65$ ;  $p < .001$ ). Furthermore, both types of externalizing behavior were similarly associated with minor injuries ( $r = .29$ ). Because of these results, we decided to focus on the broad externalizing scale. The correlation between children's externalizing behaviors and minor injuries was  $.31$  ( $p < .01$ ).

Table 1 presents means and standard deviations for child outcome measures, control variables, child characteristics, and parental characteristics. As can be seen, mothers in this sample scored significantly higher on anxious/depressive symptoms, extraversion, and self-control and lower on emotional stability than fathers.

To examine the independency of the predictors, bivariate correlations were computed for fathers and mothers separately to assess the degree of relatedness among the predictors (Table 2). To reduce risk of Type I error given the number of correlations in this table, an alpha-level of  $p < .01$  was used. The median correlation coefficient was  $.11$ , with absolute values of the coefficients between  $.00$  and  $.55$  (with the exception of a correlation of  $.64$  between paternal externalizing and anxious/depressive symptoms), suggesting acceptable levels of independency between the predictors.

Correlations among predictors and the children's outcome measures are also shown in Table 2. As can be seen in this table, predictors belonging to the domains of child characteristics and maternal characteristics correlated significantly with children's externalizing behaviors, while only one predictor (i.e., conscientiousness) belonging to the domain of maternal characteristics correlated significantly with children's injuries.

Table 1

*Means and Standard Deviations for Child Outcome Measures, Control Variables, Child Temperamental Characteristics, Parental Psychopathology, and Parental Personality Traits*

	Mothers ( <i>N</i> = 117)		Fathers ( <i>N</i> = 115)		<i>t</i> -value (Paired)
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Child Outcome Measures					
Externalizing Behaviors	.62	.31			
Minor Injuries (Transformed)	3.83	2.27			
Control Variables					
SES	11.06	2.01			
Hours spend in Day-care (weekly)	13.22	10.63			
Family Size	1.70	.91			
Child Characteristics					
Inhibitory Control	3.67	.93			
Frustration	3.42	.86			
Activity Level	3.90	.90			
Soothability	5.85	.63			
Shyness	3.31	.81			
Parental Characteristics					
Externalizing Behaviors	.16	.14	.17	.15	-.35
Anxious/Depressed Symptoms	.25	.27	.18	.21	2.61*
Extraversion	5.33	1.05	4.83	1.10	3.80**
Agreeableness	5.74	.55	5.71	.65	.47
Conscientiousness	4.94	1.11	4.86	1.11	.62
Emotional Stability	4.76	1.01	5.03	.96	-2.06*
Openness	4.77	1.02	4.96	.97	-1.47
Self-control	3.05	.30	2.93	.32	3.27**

\*  $p < .05$ ; \*\*  $p < .001$

Table 2

*Correlations among Predictors and Outcome Measures (N = 117 children; N = 117 mothers; N = 115 fathers)*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Outcome Measures																		
1. Externalizing Behaviors		.31	-.14	-.03	.02	-.44**	.40**	.26*	-.30*	.07	.10	.09	-.17	-.10	-.03	-.08	-.15	-.22
2. Minor Injuries			.02	-.05	.06	-.12	.11	.08	-.19	.12	.18	.10	-.14	-.21	.01	-.16	-.06	-.21
Control Variables																		
3. SES				.30*	.09	.06	.02	-.06	.21	.10	-.19	-.08	.11	.00	.11	.25*	.09	.13
4. Hours in Day-care					-.30*	-.04	-.02	.03	.14	.05	-.15	-.16	.30*	.00	.11	.19	-.06	.02
5. Family Size						-.08	.23	.02	-.03	.06	-.01	.08	-.03	-.17	-.12	-.07	.06	-.09
Child Characteristics																		
6. Inhibitory Control							-.34**	-.15	.11	-.19	-.05	.04	.13	.16	.16	.10	.20	.18
7. Frustration								.18	-.38**	.24*	.00	.04	-.09	-.09	.06	-.06	-.05	-.02
8. Activity Level									-.11	.02	-.10	-.04	-.04	-.10	.00	.05	-.04	-.10
9. Soothability										-.02	-.03	.06	-.04	.01	.03	.07	.04	-.09
10. Shyness											.01	.05	-.27*	-.12	.02	-.08	-.10	-.15
Parental Characteristics																		
11. Externalizing Behaviors	.39**	.22	.04	-.06	.03	-.24*	.19	.19	-.04	.17		.64**	-.08	-.34**	-.16	-.41**	-.04	-.36**
12. Anxious/Depressed	.26*	.05	.02	-.19	-.14	-.16	.12	-.04	-.17	.13	.43**		-.27*	-.30*	.08	-.52**	.06	-.21
13. Extraversion	-.15	-.10	.18	.30*	-.03	.04	-.21	-.02	.36**	-.19	.04	-.35**		.36**	-.11	.30*	.24*	.14
14. Agreeableness	-.11	-.13	.05	.00	-.17	.13	-.09	-.02	.26*	-.08	-.22	-.18	.29*		.09	.35**	.41**	.28*
15. Conscientiousness	-.29*	-.30*	.15	.11	-.12	.18	-.03	-.12	.11	.06	-.22	-.11	-.06	.03		.13	.01	.28*
16. Emotional Stability	-.29*	-.04	.12	.19	-.07	.15	-.30*	-.11	.24*	-.30*	-.32**	-.55**	.51**	.22	-.17		.07	.27*
17. Openness	-.03	-.02	.10	-.06	.06	.07	-.02	.11	.07	.03	.10	-.01	.19	.07	-.13	.10		.16
18. Self-control	-.34**	-.21	.12	.02	-.09	.29*	-.21	.01	.16	-.10	-.41**	-.16	.02	.21	.32*	.12	-.21	

*Note.* Correlations for mothers are below diagonal; correlations for fathers are above diagonal.

\*  $p < .01$ ; \*\*  $p < .001$

## ***Regression Analyses predicting Children's Externalizing Behaviors and Minor Injuries***

### *Externalizing Behaviors*

Table 3 shows the results of the maternal and paternal model predicting toddler's externalizing behaviors. The control variables entered in the first step were not significantly related to externalizing behaviors (Step 1:  $R^2 = .02$ ,  $F(3,113) = .73$  in the maternal model;  $R^2 = .02$ ,  $F(3,111) = .02$  in the paternal model). The addition of the child characteristics in the second step resulted in an increment in  $R^2$  of .31,  $F(5,108) = 10.02$  in the maternal model and in an increment in  $R^2$  of .31,  $F(5,106) = 9.95$  in the paternal model. In this step, children's inhibitory control and children's dispositional frustration emerged as significant predictors of externalizing behaviors. The addition of the parental characteristics in the third step resulted in an increment in  $R^2$  of .12,  $F(8,100) = 2.59$  in the maternal model and in an increment in  $R^2$  of .05,  $F(8,98) = 1.03$  in the paternal model. In this step, maternal externalizing behaviors appeared to be related to increased levels of externalizing behaviors in children, whereas maternal conscientiousness appeared to be related to decreased levels of externalizing behaviors in children. Despite the non-significant overall model including paternal characteristics, we tentatively see that paternal self-control also appears to be related to decreased levels of externalizing behaviors in children. In addition, in the maternal model, the effect of children's inhibitory control remained significant, whereas the effect of children's dispositional frustration decreased somewhat and was no longer significant. In the paternal model, the effects of both children's inhibitory control and children's dispositional frustrations remained significant.

In additional analyses, entering toddlers' minor injuries as a final step in the maternal regression model did not significantly increase the explained variance ( $\Delta R^2 = .02$ ,  $F(1,88) = 3.29$ ,  $p > .05$ ;  $\beta = .15$ ,  $p > .05$ ). This indicates that minor injuries do not add to predicting toddlers' externalizing behaviors above the other predictors. However, entering toddlers' minor injuries as a final step in the paternal regression did significantly increase the explained variance ( $\Delta R^2 = .03$ ,  $F(1,86) = 4.52$ ,  $p < .05$ ;  $\beta = .18$ ,  $p < .05$ ), indicating that minor injuries do add to predicting toddlers' externalizing behaviors above the other predictors.

### *Minor Injuries*

Table 4 shows the results of the maternal and paternal model predicting toddler's minor injuries. The control variables entered in the first step were not significantly related to minor injuries (Step 1:  $\Delta R^2 = .01$ ,  $F(3,102) = .19$  in the maternal model;  $R^2 = .00$ ,  $F(3,100) = .14$  in the paternal model). The addition of the child characteristics in the second step resulted in an increment in  $R^2$  of .06,  $F(5,97) = 1.19$  in the maternal model and in an increment in  $R^2$  of .07,  $F(5,95) = 1.39$  in the paternal model. None of the child characteristics were significant predictors. The addition of the parental characteristics in the third step resulted in an increment in  $R^2$  of .11,  $F(8,89) = 1.43$  in the maternal model and in an increment in  $R^2$  of .10,

$F(8,87) = .98$  in the paternal model. In the maternal model maternal conscientiousness appeared to contribute significantly negatively to children's minor injuries, whereas in the paternal model paternal self-control appeared to contribute significantly negatively to children's minor injuries.

In additional analyses, entering toddlers' externalizing behaviors as a final step in the maternal model did not significantly increase the explained variance ( $\Delta R^2 = .03$ ,  $F(1,88) = 3.29$ ,  $p > .05$ ;  $\beta = .16$ ,  $p > .05$ ). This indicates that externalizing behaviors do not add to predicting toddlers' minor injuries above the other predictors. However, entering toddlers' externalizing behaviors as a final step in the paternal regression model did significantly increase the explained variance ( $\Delta R^2 = .04$ ,  $F(1,86) = 4.52$ ,  $p < .05$ ;  $\beta = .19$ ,  $p < .05$ ), indicating that externalizing behaviors do add to predicting toddlers' minor injuries above the other predictors.

Table 3

*Summary of Hierarchical Regression Analysis for Variables Predicting Externalizing Behaviors (N = 116 in the maternal model; N = 114 in the paternal model)*

Variable	Maternal Model			Paternal Model		
	B	SE B	$\beta$	B	SE B	$\beta$
Step 1 : Control variables added						
SES	-.02	.01	-.14	-.02	.01	-.13
Hours spent in Day-care	.00	.00	-.01	.00	.00	.01
Family size	.00	.03	.01	.01	.03	.02
Step 2: Child characteristics added						
SES	-.01	.01	-.09	-.01	.01	-.08
Hours spent in Day-care	.00	.00	-.03	.00	.00	-.01
Family size	-.02	.03	-.07	-.02	.03	-.06
Inhibitory Control	-.11	.03	-.33***	-.11	.03	-.33***
Frustration	.08	.03	.22*	.08	.03	.24*
Activity Level	.05	.03	.15	.05	.03	.15
Soothability	-.08	.04	-.16	-.07	.04	-.14
Shyness	-.02	.03	-.05	-.01	.03	-.04
Step 3: Parental characteristics added						
SES	-.02	.01	-.11	-.02	.01	-.10
Hours spent in Day-care	.00	.00	.04	.00	.00	.06
Family size	-.01	.03	-.02	-.01	.03	-.02
Inhibitory Control	-.08	.03	-.24*	-.10	.03	-.30**
Frustration	.06	.03	.16	.08	.04	.22*
Activity Level	.04	.03	.11	.05	.03	.14
Soothability	-.07	.04	-.14	-.09	.05	-.18
Shyness	-.04	.03	-.10	-.04	.03	-.09
Externalizing Behaviors	.44	.11	.21*	.09	.14	.05
Anxious/Depressed	.02	.09	.02	.02	.15	.02
Extraversion	-.01	.03	-.05	-.04	.03	-.16
Agreeableness	.05	.05	.08	.06	.05	.12
Conscientiousness	-.04	.02	-.18*	.01	.02	.04
Emotional Stability	-.04	.03	-.12	.01	.03	.04
Openness	-.02	.02	-.05	-.02	.03	-.05
Self-control	-.10	.09	-.10	-.09	.09	-.19*

Note. For the maternal model,  $R^2 = .02$  ( $p > .05$ ) for Step 1;  $\Delta R^2 = .31$  ( $p < .001$ ) for Step 2;  $\Delta R^2 = .12$  ( $p < .01$ ) for Step 3. For the paternal model,  $R^2 = .02$  ( $p > .05$ ) for Step 1;  $\Delta R^2 = .31$  ( $p < .001$ ) for Step 2;  $\Delta R^2 = .05$  for Step 3 ( $p > .05$ ). \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

Table 4

*Summary of Hierarchical Regression Analysis for Variables Predicting Minor Injuries (N = 105 in the maternal model; N = 103 in the paternal model)*

Variable	Maternal Model			Paternal Model		
	B	SE B	$\beta$	B	SE B	$\beta$
Step 1 : Control variables added						
SES	.01	.02	.03	.01	.02	.03
Hours spent in Day-care	-.02	.00	-.04	-.02	.00	-.02
Family size	.02	.04	.05	.02	.04	.05
Step 2: Child characteristics added						
SES	.02	.02	.04	.02	.02	.05
Hours spent in Day-care	-.02	.00	-.04	-.02	.00	-.02
Family size	.02	.04	.05	.02	.04	.04
Inhibitory Control	-.04	.04	-.09	-.04	.04	-.11
Frustration	-.01	.05	-.03	-.02	.06	.00
Activity Level	.02	.04	.05	.02	.03	.04
Soothability	-.04	.06	-.18	-.05	.07	-.16
Shyness	.09	.04	.10	.09	.05	.13
Step 3: Parental characteristics added						
SES	.02	.02	.05	.07	.02	.09
Hours spent in Day-care	.00	.00	-.02	.00	.01	.00
Family size	.02	.04	.05	.00	.04	.02
Inhibitory Control	-.01	.04	-.01	-.04	.04	-.08
Frustration	.00	.05	-.03	.00	.06	-.01
Activity Level	.00	.04	.01	.00	.04	.03
Soothability	-.11	.07	-.13	-.05	.07	-.18
Shyness	.31	.04	.11	.03	.05	.07
Externalizing Behaviors	.19	.15	.16	.15	.19	.12
Anxious/Depressed	-.15	.12	-.11	-.12	.20	-.05
Extraversion	-.05	.04	-.09	-.03	.04	-.07
Agreeableness	-.01	.07	-.03	-.09	.07	-.13
Conscientiousness	-.23	.03	-.25*	.07	.03	.11
Emotional Stability	.00	.04	.03	.00	.04	-.02
Openness	-.04	.03	-.06	.05	.05	.09
Self-control	-.09	.13	-.06	-.22	.13	-.19*

*Note.* For the maternal model,  $R^2 = .01$  ( $p > .05$ ) for Step 1;  $\Delta R^2 = .06$  ( $p > .05$ ) for Step 2;  $\Delta R^2 = .11$  ( $p > .05$ ) for Step 3. For the paternal model,  $R^2 = .00$  ( $p > .05$ ) for Step 1;  $\Delta R^2 = .07$  ( $p > .05$ ) for Step 2;  $\Delta R^2 = .10$  for Step 3 ( $p > .05$ ). \*  $p < .05$

### ***Risk factor-analyses***

Since previous studies indicated that the accumulation of risk factors may be more important than the presence of a single risk factor in predicting negative outcomes (Atzaba-Poria et al., 2004), we subsequently explored the role of the number of risk factors. Only risk factors that were found significant in the regression models were considered. For predicting toddlers' externalizing behaviors, the following risk factors were considered: child low inhibitory control, child high frustration, maternal high externalizing behaviors, maternal low conscientiousness, and paternal low self-control. For predicting toddlers' minor injuries, maternal low conscientiousness and paternal low self-control were considered. The scores on each risk factor were dichotomized to represent the presence or absence of that risk factor (the extreme 20% of scores on each risk factor). For the prediction of both externalizing behaviors and minor injuries, families were divided into three groups, according to whether none, one,

or more than one risk factor was present. Figure 1 shows the mean z-scores on externalizing behaviors and minor injuries by number of risk factors. ANOVAs showed that for both toddlers' externalizing behaviors ( $F(2,114) = 12.70, p < .001$ ) and minor injuries ( $F(2,103) = 4.72, p < .05$ ), there was a significant effect of the number of risk factors. In addition, employing Bonferroni post hoc tests, significant differences were found for externalizing behaviors between children without risk factors and children with more than one risk factor (mean difference = 1.02;  $p < .001$ ) and between children with one risk factor and children with more than one risk factor (mean difference = .62;  $p < .05$ ). Similarly, significant differences were found for minor injuries between children without risk factors and children with two risk factors (mean difference = 1.34;  $p < .01$ ) and between children with one risk factor and children with two risk factors (mean difference = 1.12;  $p < .05$ ). There were no significant differences for externalizing behaviors (mean difference = .40;  $p > .05$ ) and minor injuries (mean difference = .22;  $p > .05$ ) between children without risk factors and children with one risk factor.

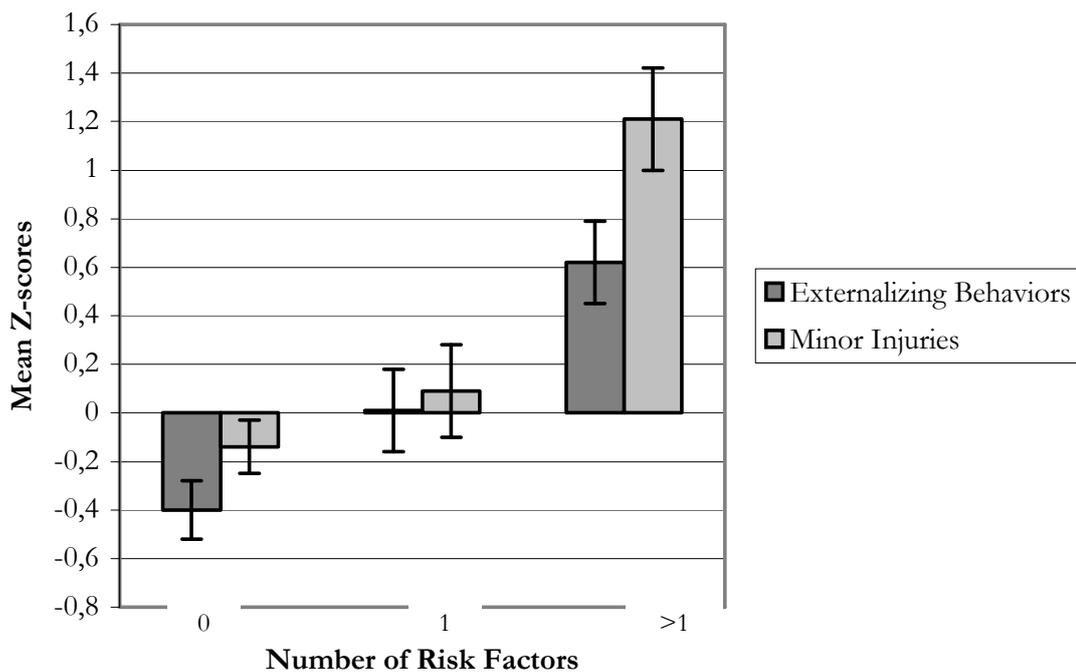


Figure 1. Mean Z-scores (+ SE) for Externalizing Behaviors ( $N = 117$ ) and Minor Injuries ( $N = 106$ ) by Number of Risk Factors

## Discussion

The aim of this article was to investigate risk factors belonging to the domains of child characteristics and parental characteristics for toddlers' externalizing behaviors and minor injuries and to determine whether common risk factors can be identified for these externalizing behaviors and minor injuries. The domain of child characteristics appeared to be the most important domain for predicting toddlers' externalizing behaviors, while the domain of parental characteristics appeared to be the most important domain for predicting toddlers' minor injuries. The results of the present study showed two common risk factors: maternal low conscientiousness and paternal low self-control. In addition, children's inhibitory control and dispositional frustration (in the paternal model) as well as maternal externalizing symptoms contributed independently to children's externalizing behaviors.

In considering possible explanations for the association between these parental personality traits and children's externalizing behaviors, several pathways can be considered. First, this association might be mediated by the parent-child relationship. Personality characteristics and psychopathological characteristics in parents have indeed been shown to hamper parenting processes and thereby increase externalizing problems in children (e.g., Kochanska et al., 1997). Second, there may be a direct relationship between parental personality characteristics and children's externalizing problems, for example through modeling behaviors or through genetic transfer.

For the association between parental personality traits and children's minor injuries, we also offer two possible pathways. First, mothers who are more conscientious and fathers who have more self-control might take more safety measures in and around the home, and thus protect their child from injuries. With regard to a second pathway, previous research has shown that parental supervision is one of the strongest predictors of children's injuries (Dal Santo et al., 2004; Morrongiello & House, 2004). Consequently, we might assume that inadequate parental supervision mediates the association between maternal low conscientiousness as well as paternal low self-control and children's injuries. For instance, the quality and quantity of supervision by less conscientious mothers or by fathers who score low on self-control might not be adequate. Consequently, these parents might not intervene promptly when their children engage in dangerous activities and thus might place their children at increased risk of injury. A study by Morrongiello and Dawber (2000) indeed showed that children of parents who intervene promptly experience fewer injuries.

Although this study replicated some relationships reported in previous research and confirmed most of our expectations, a few unexpected results were also found. First, this study partly failed to replicate the relatively strong association found between parental psychopathology and children's externalizing behaviors as well as injuries in earlier studies (DeKlyen et al., 1998; Russell, 1998). These results might be due to the sample of the present study and to the relatively low reliability scores for the measures of parental externalizing

behaviors.

Another unanticipated finding was that children's temperamental characteristics failed to significantly predict children's injuries. This is in contrast to literature that provided empirical evidence for a link between difficult temperament and injuries in children (e.g., Plumert & Schwebel, 1997). However, this nonfinding is consistent with results reported by Schwebel, Brezausek, Ramey and Ramey (2004) in a study on very young children. These authors argue that most previous work on temperament and injury risk has been conducted with older children and that this nonfinding might be explained by developmental change. We support this line of thought and in addition we suggest that injuries to young children might be more strongly influenced by parental supervision and parents intervening in dangerous situations (Morrongiello et al., 2004) than injuries to older children, since children will gradually become more involved in situations where their parents are absent as they grow older. So as children grow older, the role of supervision might decrease and the role of temperament increase.

Not only the failure to find a relationship between temperament and injuries, but also all other results have to be considered in the light of the very young age of the participants in this study and we have to keep in mind that the contribution of the specific predictors may change over time. For example, it is possible that the role of parental personality characteristics declines with age, since the relative weight of child factors might increase as children grow older. Besides, since caregiving by fathers is reported to increase after infancy (Bailey, 1994), it is possible that the contribution of paternal characteristics might become more equal to that of maternal characteristics as children grow older.

In contrast to injuries, the expected links between externalizing behaviors and child temperamental characteristics were indeed found. Although this might be partly due to overlapping item-content across the measures of temperamental characteristics and externalizing behaviors, other studies (Lemmery et al., 2002; Lengua et al., 1998) showed that even after the removal of confounded items, there continued to be a significant relationship between temperament and behavior problems.

In interpreting the results of the present study, some methodological limitations have to be mentioned. First, our sample was small and consisted of families with mostly moderate to high socioeconomic status. Future studies should establish whether the findings of the present study can be generalized to families from other social backgrounds and to families with children who exhibit more severe problem behaviors. In addition, our sample included only boys. In our view, focusing on boys was legitimate since boys are at increased risk for both externalizing behaviors and injuries. However, as a consequence it is unknown whether the results can be generalized to girls.

Further, children's externalizing behaviors and minor injuries were reported by the mother only. However, for children's externalizing behaviors a meta-analysis by Duhig, Renk, Epstein & Phares (2000) reported inter-parental agreement to be high, indicating that ratings

by one parent may be sufficient in reporting externalizing behaviors in children. Since in 74% of the participating families in the present study mothers spend more time with their child than fathers, the decision to choose mothers as raters of the child's behavior seems tenable. Nevertheless, the fact that only mothers reported the child outcome measures might partly explain why the maternal model differed from the paternal model. Effects of the paternal characteristics might be stronger if fathers also reported the outcome measures. Therefore, we would recommend future studies to use multiple informants for the child's behaviors.

Next, although a 6-month recall period might be appropriate for recall of more major injuries (Pless & Pless, 1995), such a period might be less appropriate for minor injuries (Peterson et al., 1993). As a result, reports of injuries in the present study might be influenced by maternal recall bias. We tried to reduce this bias by providing mothers with a list of 13 different types of injuries in order to focus their recollection, instead of asking them to make a general estimate of the total number of injuries experienced by their child. However, it is plausible that the number of injuries should be considered as estimates rather than real numbers. Therefore, we would like to recommend that future studies examine minor injuries through the use of telephone interviews with families (e.g., Peterson et al., 1991) or by the use of a diary method (e.g., Schwebel et al., 2002a), which are both considered as effective means to study the ecology of children's minor injuries.

Furthermore, in the regression models of the present study, the  $F$  values of some steps including significant factors were not significant at  $p < .05$ . This failure to reach significance seems to be caused by the relatively small sample size and the inclusion of a wide range of risk factors in the regression models. However the increments in  $R^2$  of these steps range from .05 to .11. Compared with other studies, especially those on the prediction of injuries (e.g., Schwebel & Brezaussek, 2004) these values of  $\Delta R^2$  are moderate to large. In addition, the effects sizes (i.e., betas) of the significant factors within these steps range from .19 to .30, which are also considerably large. Therefore, in line with evolving publication policies (e.g., Wilkinson & The Task Force on Statistical Inference, 1999), we believe that the magnitude of an effect is more informative than is a dichotomous decision based on traditional notions of statistical significance.

Finally, the present study used a cross-sectional design, which limits the scope for drawing firm conclusions about the direction of effects. On the other hand, for parental personality characteristics in particular we can be relatively sure about the direction of influence: since the big five personality measures are shown to exhibit considerable continuity over time (McCrae & Costa, 1994), it is unlikely that young children's externalizing behaviors and injuries influenced parental personality characteristics.

Despite these limitations, the present study constitutes an important step in the research on toddlers' externalizing behaviors and minor injuries. The strengths of this study were mainly the inclusion of fathers in the data collection and using well-validated instruments to assess psychopathology, personality and temperament. Furthermore, the present study not only

replicates important results from previous studies with a younger sample, a different culture and stronger instruments than most existing research, it also extends existing literature on risk factors from various domains for toddlers' externalizing behaviors and minor injuries. First, this study revealed that, even at this young age of 17 months, common risk factors can be identified for externalizing behaviors and minor injuries. In addition, the variance explained by the risk factors included in the present study to explain externalizing behaviors is relatively high (namely 45%). The explained variance in juvenile crime research is equal or lower than found here (Rowe & Flannery, 1994; Vazsonyi et al., 2001; Wiebe, 2004). For injuries, our level of explained variance, namely 17%, is equal to that of other studies. For example, Damashek et al. (2005) also found an explained variance of 17%. However, the age range of their sample lies between 15 and 36 months. So the findings of the present study suggest that prediction of externalizing behaviors and injuries is just as possible in children at the age of 17 months as it is in older children and adolescents. Finally, this study supplied evidence for the importance of studying the role of parental personality characteristics, including self-control.

Our study has several implications for preventive interventions. Two implications relate to early risk assessment. First, this study focused on characteristics which are known during pregnancy (parental characteristics) or could be known within the first years of life. Being aware of these early warning signs that put young children at risk for externalizing behaviors and injuries is crucial for early diagnosis and intervention. Second, the findings of this study showed that the more accumulated risk children experience, the higher the levels of externalizing behaviors and minor injuries. This implies that for screening high risk children it is important to have as broad a picture as possible of children's and parental characteristics and that the focus should be on identifying children who experience multiple risks.

Furthermore, the identification of two common risk factors for externalizing behaviors and minor injuries supplies some evidence for general theories focusing on the interrelatedness of negative outcomes and on the existence of common risk factors. As stated in the introduction to this article, in line with these general theories prevention programs should be broad and pursue a number of goals at the same time instead of focusing on only one type of behavior or negative outcome. This implies that preventive interventions related to children's externalizing behaviors and preventive interventions related to children's injuries might be of mutual benefit and might even be combined. The Nurse-Family partnership is an example of such an intervention which succeeded in reducing antisocial behavior as well as injury rates in children (Olds et al., 1999; Olds et al., 1998). The results of the present study indicate that it might be important for these interventions to target parents low in self-control or conscientiousness. Such interventions could be directed towards educating those parents about adequate parenting behaviors and about the importance of supervising their children and intervening in dangerous situations. In addition, to prevent injuries, safety measures in and around the home may be used to compensate for the possible lack of supervision offered

by parents who score low in conscientiousness or in self-control. Consequently, initiatives that encourage parents to undertake additional environmental modifications to reduce the risk of child injury are recommended.

## CHAPTER 3

### The Interactive Effects of Temperament and Maternal Parenting on Toddlers' Externalizing Behaviors\*

#### Abstract

The present study aimed to determine the potential moderating effects of temperamental traits on the relation between parenting and toddlers' externalizing behaviors. For that purpose, this study examined the interplay between temperament and maternal parenting behaviors in predicting the level as well as the development of toddlers' externalizing behaviors. Participants were 115 boys (Wave 1,  $M = 16.9$  months; Wave 2,  $M = 23.2$  months) and their mothers, who were observed in a 13-minute structured play session at home. With regard to the prediction of the level of externalizing behaviors at Wave 1, main effects were found for children's temperamental characteristics. In addition, maternal negative control interacted significantly with children's inhibitory control in predicting this level of externalizing behaviors. The findings with regard to the development of externalizing behaviors showed that the effects of maternal negative control and lack of maternal sensitivity were stronger for toddlers with a difficult temperament: maternal negative control and lack of maternal sensitivity were related to an increase in externalizing behaviors for temperamentally difficult children only. These results offer support for the goodness-of-fit hypothesis, stressing the idea that the effects of temperament and the social environment depend to a large extent on their interplay.

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\* van Aken, C., Junger, M., Verhoeven, M., van Aken, M.A.G., & Deković, M. (2007). *Infant and Child Development*, 16, 553-572.

## Introduction

Temperamental characteristics are generally considered to be moderately stable, constitutional traits determining the way that children interact with their environments (Goldsmith et al., 1987; Hinde, 1989; Rothbart & Bates, 1998; Sanson, Hemphill, & Smart, 2004). Temperament has been studied by many researchers, shifting from a focus on temperament as a general construct (e.g., Thomas, Chess, & Birch, 1968) to a focus on specific temperamental dimensions or temperamental traits (Andersson & Sommerfelt, 1999; Wright Guerin, Gottfried, & Thomas, 1997). An important reason for this interest in children's temperament is the repeatedly replicated finding that difficult temperament is a precursor of later externalizing behaviors, such as attention problems, aggressive behavior or antisocial behavior (Campbell, 1995; Rothbart & Bates, 1998).

Next to stressing this important contribution of temperament to negative developmental results, temperamental research adheres to the relevance of the goodness-of-fit hypothesis, which is in line with transactional (Sameroff, 1975) and interactional (Lerner & Lerner, 1983) models of child development. This hypothesis refers to the idea that the implications of temperament and the social environment depend to a large extent on their interplay (Dennis, 2006; Thomas & Chess, 1977).

For young children, the quality of parenting is one of the most important components of their social environment. An abundance of empirical evidence has demonstrated the predictive value of parenting behaviors for externalizing behaviors in toddlers. Specifically, non-sensitive responding to children's behavior and intrusive, harsh, negative, and controlling discipline have been associated with elevated levels of young children's externalizing behaviors (Brenner & Fox, 1998; Carlson, 1998; O'Leary, Smith Slep, & Reid, 1999; Rothbaum & Weisz, 1994).

Parental lack of sensitivity and parental negative control may be particularly negative for children with certain temperamental traits. Studies on such possible interactions indeed have found evidence of the importance of investigating these interactions. Table 1 gives an overview of these studies. Some of these studies focused on young children (i.e., infants, toddlers or preschoolers). Bates, Pettit, Dodge and Ridge (1998), for example, reported that toddlers' resistance to control (a measure for unmanageability) predicted later externalizing behaviors more strongly when the mother had been observed to be relatively low in control actions than when she had been high in control actions (i.e., prohibitions, warnings, scoldings). In contrast to this study, Rubin et al. (1998) showed that dysregulated temperament of toddlers was more strongly associated with observed aggression and mother-reported externalizing behaviors for boys with mothers who demonstrated relatively high levels of negative dominance than for other boys. Similarly, a study by Belsky, Hsieh and Crnic (1998) found that infant negative emotionality and maternal parenting interact to predict externalizing behaviors among boys at age 3: parenting proved more predictive of

externalizing problems in the case of children who were highly negative as infants than in the case of those who were low in negativity. Finally, Kochanska (1997) reported that for highly fearful toddlers, maternal gentle discipline promoted conscience, while for fearless toddlers alternative mechanisms (security of mother-child attachment, responsiveness) promoted later conscience, supporting theoretical models of the interplay of temperament and socialization.

Studies focusing on school-aged children, show similar results as studies that focused on young children. For instance, Paterson and Sanson (1999) found that it is the combination of high temperamental inflexibility and high parental punishment which is particularly problematic for the level of externalizing behaviors for 5-6 year old children. Interactive effects between maternal hostility and school-age children's irritable distress as well as children's effortful control, were found by Morris et al. (2002): among children high in irritable distress and children low in effortful control, maternal hostility was associated with externalizing behaviors. A study by Lengua, Wolchik, Sandler and West (2000) on 9-12 year old children of divorced parents, showed that parental rejection was more strongly related to conduct problems for children low in positive emotionality, and that inconsistent discipline was more strongly related to conduct problems for children high in impulsivity. Another study (Colder, Lochman, & Wells, 1997) reported interactive effects between parental monitoring and children's activity level and between parental harsh discipline and children's fear for fourth- and fifth-grade boys: active boys who were poorly monitored and fearful boys who were exposed to harsh discipline exhibited elevated levels of aggressive behaviors. Finally, Prinzie et al. (2003) focused on interactive effects of children's personality characteristics and parenting practices in predicting externalizing behaviors in 5-11 year old children. They reported that children with low scores on benevolence who were exposed to overreactive discipline and children with low scores on conscientiousness who were exposed to coercive parenting behavior exhibited elevated levels of externalizing behaviors.

Most of these studies indicate that certain temperamental characteristics represent vulnerabilities, as a result of which some children are more susceptible to negative parenting behaviors. However, this knowledge is limited for several reasons.

First, most studies focused on either temperament as a general construct or on one or two temperamental traits, with the consequence that knowledge on interactions between temperamental traits and parenting is fragmentary. Second, some studies that focused on young children relied upon questionnaire data only while additional forms of data, for instance observational measures, would be desirable. Third, the majority of studies assessed parenting behaviors, children's temperament and behavior problems concurrently which limits the scope for drawing conclusions about the direction of effects. Furthermore, studies that used multiple time points to predict behavior problems mostly failed to control for the initial levels of these problems.

Table 1

*Overview of Studies on Interactions between Child Temperament and Parenting*

Study	Sample	Independent Variables	Dependent Variables	Main effects	Interaction effects
<i>Young children (i.e., infants, toddlers or preschoolers)</i>					
Kochanska (1997)	Transition from 2-3 years to 4 years	Toddlers' fear (aggregation of observations and mother reports); observed maternal gentle discipline, responsiveness, security of mother-child attachment	Observed conscience	Fearfulness (only at toddler age); maternal parenting	Toddlers' fear x maternal parenting
Bates, Pettit, Dodge and Ridge (1998)	Transition from toddlerhood to school age	Child resistance to control as reported by mothers and observed maternal control actions	Externalizing behaviors as reported by teachers and mothers	Resistance to control and control actions	Child resistance to control x maternal control actions
Belsky, Hsieh and Crnic (1998)	Transition from infancy to age 3	Parent-reported and observed infant negative emotionality and observed parenting (a composite measure of several parenting scales)	Parent-reported externalizing behaviors	Parenting	Infant negative emotionality x maternal parenting
Rubin et al. (1998)	Toddlers	Child dysregulated temperament (a composite of mother-reported and observed measures); observed maternal warmth and negative dominance	Observed aggression	Dysregulated temperament	Child dysregulated temperament x maternal negative dominance
			Mother-reported externalizing behaviors	Dysregulated temperament and maternal negative dominance	Child dysregulated temperament x maternal negative dominance

Table 1

*Overview of Studies on Interactions between Child Temperament and Parenting (continued)*

Study	Sample	Independent Variables	Dependent Variables	Main effects	Interaction effects
<i>School-aged children</i>					
Colder, Lochman and Wells (1997)	Fourth- and fifth-grade children	Child activity level and fear as reported by parents; Parental monitoring and harsh discipline measured by self-report	Aggression as reported by parents	Child fear, poor parental monitoring, harsh discipline	Child activity level x poor parental monitoring; child fear x parental harsh discipline
Paterson and Sanson (1999)	5-6 year old children	Parent-reported child temperamental characteristics; parent-reported parenting practices	Parent- and teacher-reported behavior problems	Child temperamental inflexibility	Child temperamental inflexibility x parental punishment
Lengua, Wolwick, Sandler and West (2000)	9-12 year old children of divorced parents	Mother- and child-reported child negative emotionality, positive emotionality and impulsivity; Mother- and child-reported maternal rejection and inconsistent discipline	Mother- and child-reported conduct problems	Parenting and Temperament	Child positive emotionality x maternal rejection; child impulsivity x maternal inconsistent discipline
Morris et al. (2002)	School-aged children	Mother-reported child irritable distress and effortful control; child-reported maternal psychological control and hostility	Teacher-reported externalizing behaviors	Irritable distress and Effortful control	Child irritable distress x maternal hostility; child effortful control x maternal hostility
Prinz et al. (2003)	5-11 year old children	Parent-reported child personality characteristics; self-reported parenting practices	Parent-reported externalizing behaviors	Child benevolence, conscientiousness and extraversion; dysfunctional parenting	Child benevolence x parental overreactive discipline; child conscientiousness x coercive parenting

This study aims to address these limitations by considering the additive and interactive effects of children's temperamental characteristics (difficult temperament as a general construct as well as several temperamental dimensions) and observed maternal parenting measured in boys of 17 months of age on the level of externalizing behaviors at 17 months of age as well as on the development of their externalizing behaviors between 17 and 23 months of age.

We expect main effects of children's temperament and maternal parenting on toddler's externalizing behaviors. More specifically, we hypothesize a higher level and an increase in externalizing behaviors for toddlers with a difficult temperament (i.e., low inhibitory control, high dispositional frustration, high activity level, and/or low soothability) and for toddlers with mothers who show more negative control during interactions and less sensitivity during these interactions.

In addition, temperament and parenting behaviors are hypothesized to be associated interactively with toddlers' externalizing behaviors: the effects of maternal negative control and lack of maternal sensitivity are expected to be strongest for temperamentally difficult toddlers. Our hypotheses regarding these interactive effects, are partly based on work by Shiner and Caspi (2003), who elaborated several mechanisms through which early temperament may affect later psychopathology. Some of these mechanisms refer to interaction processes between children's temperament and parenting practices.

First, Shiner and Caspi (2003) state that temperament shapes the significance of several learning mechanisms for the child. So, for children varying in temperament, the effects of specific parenting practices will vary. We accordingly hypothesize that the effects of maternal negative control and lack of maternal sensitivity on externalizing behaviors are stronger for children low on inhibitory control and children high on activity level. These children will depend more strongly on their mothers to assist them in regulating themselves (Kochanska, Murray, & Harlan, 2000) and they may be especially vulnerable for hostile and dominating mothers who impose such a rigid structure that the child is not provided with opportunities to learn regulating himself. Similarly, the effect of lack of maternal sensitivity is expected to be stronger for children low on soothability since these children have difficulties recovering from distress, excitement, or general arousal on their own (Putnam, Gartstein, & Rothbart, 2006) and therefore might need their mother to assist them in calming down.

A second mechanism described by Shiner and Caspi (2003) states that temperament shapes the response of adults and peers to the child (i.e., environmental elicitation). Based on this mechanism, in the present study the effect of maternal negative control is hypothesized to be stronger for children characterized by low inhibitory control, high activity level, or high frustration, since these children are supposed to be difficult to manage and consequently they are likely to receive high levels of negative and controlling discipline, which in turn may lead to externalizing behaviors (Colder et al., 1997; O'Leary et al., 1999).

Summarizing, the effects of lack of maternal sensitivity on the level and development of

externalizing behaviors between 17 and 23 months of age are hypothesized to be stronger for children low on inhibitory control, children high on activity level, and children low on soothability. In addition, the effects of maternal negative control on the level and development of externalizing behaviors between 17 and 23 months of age are expected to be stronger for children low on inhibitory control, children high on frustration, and children high on activity level.

## **Method**

### ***Sample and Procedure***

The sample for this study was drawn from Infant and Toddler Clinics in three cities in the Netherlands. In the Netherlands, these clinics follow up all children up to four years of age and they systematically check the child's growth and development. Thus, the sample is considered to be a community sample of typically developing children. Only boys were included because externalizing behavior problems are more common among boys than girls (Rowe, Maughan, & Goodman, 2004). A recruitment letter explaining the goals of the project was sent to 192 families, and followed up by a telephone call. Of these 192 families, 117 (61%) agreed to participate. Two measurement waves were used with a six-months interval. The attrition rate during the study was minimal. Only two families dropped out during the course of the study, both because of migration.

The age of the children ranged from 16 to 19 months ( $M = 16.9$  months,  $SD = .58$  months) at Wave 1 and from 21 to 25 months ( $M = 23.2$  months,  $SD = .62$  months) at Wave 2. Maternal level of education ranged from low (elementary school) to high (college degree or more), with 63% of the mothers having a college degree or more. Most children (97%) lived in intact families.

### ***Instruments***

All instruments that were originally produced in English and of which no standard translation into Dutch was available, were translated into Dutch by means of a back-translation procedure.

*Externalizing Behaviors.* To measure externalizing behaviors, The Child Behavior Checklist 1½-5 (Achenbach & Rescorla, 2000) was used. Mothers were asked to indicate from 0 (*never*) to 2 (*often*) whether items were indicative of the child's behavior. The broad externalizing scale consisted of 24 items, with a Cronbach's alpha of .88 for the first wave and .89 for the second wave. At Wave 1, 78.5% of children scored in the normal range of externalizing symptom severity on the Child Behavior Checklist 1½-5 (Achenbach & Rescorla, 2000), while 9.5% scored in the borderline clinical range ( $t$ -score between 60 and 63) and 12.0% in the clinical range ( $t$ -score greater than 63). At Wave 2, 80.9% of children

scored in the normal range of externalizing symptom severity on the Child Behavior Checklist 1½-5 (Achenbach & Rescorla, 2000). 12.7% of the children scored in the borderline clinical range and 6.4% in the clinical range.

*Child Temperament.* At Wave 1, four temperamental features, i.e., Inhibitory control, Frustration, Activity level and Soothability, were measured with the Early Childhood Behavior Questionnaire (Putnam et al., 2006). Mothers were asked to report on a 7-point Likert scale to which extent each of the 44 items applied to their child (1 = *never* to 7 = *always*). *Inhibitory control* ( $N = 14$  items) refers to the extent to which the child is able to stop, moderate, or refrain from a behavior under instruction. *Frustration* ( $N = 9$  items) indicates how often a child shows negative affect in situations of interruption of ongoing tasks or goal blocking. *Activity level* ( $N = 7$  items) refers to the level of gross motor activity, including rate and extent of locomotion. *Soothability* ( $N = 14$  items) assesses rate of recovery from peak distress, excitement, or general arousal. Cronbach's alpha's for inhibitory control, frustration, activity level and soothability respectively were .90, .72, .66, and .84. For calculating a composite measure of difficult temperament, the scores on inhibitory control and soothability were reversed. Subsequently, these reversed scores and the scores on frustration and activity level were aggregated to form the *composite difficult temperament measure*. Cronbach's alpha for this composite measure was .86.

*Parenting.* Maternal parenting behavior at Wave 1 was assessed in a 13-minute structured play session with the child at home. The mother was asked to have the child play with blocks for five minutes, to 'read' a picture book together with the child for four minutes and to clean up the toys together with the child at the end of the session for another four minutes. The 1990 revision of the Erickson scales was used to measure six dimensions, each at a 7-point rating scale (Egeland, Erickson, Clemenhausen-Moon, Hiester, & Korfmacher, 1990; Erickson, Sroufe, & Egeland, 1985). *Supportive presence* refers to the expression of positive regard and emotional support to the child. *Hostility* includes the expression of anger and discounting or rejecting of the child. *Intrusiveness* assesses the lack of respect for the child's autonomy by interfering with the child's needs, interests or behaviors. *Clarity of instruction* indicates the ability to give instructions in a usable form. *Sensitivity* refers to the timing and coordination of hints in response to the child's efforts and actions. *Confidence* indicates the degree to which the mother seems to believe that she can successfully work with the child in the situation and that the child will behave appropriately. The Erickson-scales were scored by two raters. Inter-coder reliability in terms of intraclass correlations was established on approximately 20% of the videotapes. Intraclass correlations ranged from .72 to .81 ( $M = .77$ ).

Two factors emerged in the factor analysis of observed parenting behavior. *Sensitivity* was the first factor, which included supportive presence, clarity of instruction, sensitivity and confidence. This factor explained 66% of the variance. The second factor was *negative*

*control*, which consisted of hostility and intrusiveness. This factor explained 19% of the variance.

*Control Variables.* Mothers were asked to indicate the *number of hours spend by the child in day-care weekly* and the number of children living in the home (*family size*). To classify the family's *socioeconomic status* (SES) the education and occupation of both parents were used according to the four-factor index developed by Brandis & Hederson (1970).

## **Plan of Analysis**

Multiple regression analyses were performed to determine the additive and interactive effects of children's temperament and maternal parenting on the level of externalizing behaviors at Wave 1 as well as on the change in externalizing behaviors from Wave 1 to Wave 2. In these regression analyses, the predictors were centered and the centered predictor terms were then multiplied to yield the interaction variable (Aiken & West, 1991). The different temperamental measures were examined as a difficult temperament composite measure as well as individually. So, regression models were constructed for the difficult temperament composite measure and for each of the four specific temperamental measures.

For predicting the level of externalizing behaviors at Wave 1, the predictors were entered into the equations in four steps. In the first step, the socio-economic status, hours spend by the child in day-care, and the family size were entered to control for the effects of these variables. In the second step the particular temperament measure was entered, followed by the parenting behaviors of mothers in Step 3. In the final step, the interactions between the particular temperament measure and maternal parenting were entered. For predicting the change in externalizing behaviors, the predictors were entered into the equation in five steps, since in these models the level of externalizing behaviors at Wave 1 was controlled for by including this measure as a predictor in Step 2.

## **Results**

### ***Preliminary Analyses***

Before running the longitudinal analyses, the assumptions of multiple regression analyses were checked. First, the presence of outliers for the dependent and independent variables was assessed. Four cases were identified as influential outliers on externalizing behaviors (standardized residual > 2) and were dropped from the analyses. Second, the normality in the distribution of variables was assessed. In this study, absolute values of skewness ranged from .02 to 1.60. Absolute values of kurtosis ranged from .04 to 2.15. These values do not represent major deviations from normal distributions (Muthen & Kaplan, 1985). Finally, the intercorrelations between the predictors were checked (Table 2). As can be seen in Table 2,

the correlation coefficients among predictors to be entered in the same regression model ranged from .01 to .58, with a median correlation coefficient of .08. This indicates acceptable levels of independency between the predictors.

### ***Relations Between Predictors and Outcome Variables***

Table 2 also presents the correlations between the predictor variables and the outcome variables. Externalizing behaviors at Wave 1 were significantly associated with all temperament measures, but were not significantly related to observed maternal parenting behaviors nor to the control variables.

The control variables and parenting behaviors were also unrelated to children's externalizing behaviors at Wave 2. However, the composite score of difficult temperament as well as the specific temperamental trait frustration at Wave 1 correlated significantly positive with children's externalizing behaviors at Wave 2, while inhibitory control and soothability at Wave 1 correlated significantly negative with children's externalizing behaviors at Wave 2. The specific temperamental trait activity level was not associated with externalizing behaviors at Wave 2.

The correlation coefficient of .80 between externalizing behaviors at Wave 1 and externalizing behaviors at Wave 2, shows high relative stability in externalizing behaviors. As also can be seen in Table 2, the mean level of externalizing behaviors stayed exactly the same over the two measurements waves. This suggests absolute stability in externalizing behaviors.

### ***Additive and Interactive Effects of Parenting and Composite Difficult Temperament Measure***

First, regression models were run for the composite measure of difficult temperament. Table 3 shows the results of the regression model for predicting the level of externalizing behaviors at Wave 1. Overall, 36% of the variance in externalizing behaviors at Wave 1 was accounted for by this regression model ( $F_{8,98} = 8.98; p < .001$ ). The extent to which toddlers engaged in externalizing behaviors at Wave 1, was significantly predicted by difficult temperament at Wave 1. The results also show that maternal parenting has no additive effects in predicting the level of externalizing behaviors at Wave 1. In addition, the composite difficult temperament measure did not interact with maternal sensitivity nor with maternal negative control in predicting externalizing behaviors at Wave 1.

Table 2

*Correlations, Mean Scores, and Standard Deviations for Predictors and Outcome Variables*

	1	2	3	4	5	6	7	8	9	10	11	<i>M</i>	<i>SD</i>
Control Variables Wave 1													
1 SES	1											11.06	2.01
2 Hours in Day-care	.30**	1										13.22	10.63
3 Family Size	.08	-.30**	1									1.70	.91
Predictors Wave 1													
4 Externalizing Behaviors Child	-.18	-.03	.01	1								.61	.31
5 Difficult Temperament Child	-.11	-.02	.10	.58***	1							3.35	.53
6 Inhibitory Control Child	.06	-.04	-.08	-.44***	-.70***	1						3.67	.93
7 Frustration Child	.02	-.02	.23*	.40***	.75***	-.34***	1					3.42	.86
8 Activity Level Child	-.06	.03	.02	.26**	.46***	-.15	.18	1				3.90	.90
9 Soothability Child	.21*	.14	.03	-.30**	-.60***	.11	-.38***	-.11	1			5.85	.63
10 Lack of Sensitivity Mother	-.07	-.06	-.03	.08	.08	.03	.09	-.11	-.14	1		4.53	1.25
11 Negative Control Mother	-.18	-.06	-.07	.12	.16	.04	.12	.08	-.26**	.45***	1	1.74	.82
Outcome Wave 2													
12 Externalizing Behaviors	-.16	-.07	.07	.80***	.45***	-.40***	.30**	.17	-.20*	.13	.11	.61	.29

\*\*\*  $p < .001$ ; \*\*  $p < .01$ ; \*  $p < .05$

Table 3

*Regression Model Predicting Children's Externalizing Behaviors Wave 1 (N = 106)*

Step	Predictors	B	SE B	$\beta$	$\Delta R^2$
1.	Control Variables Wave 1				.04
	Socio-Economic Status	-.03	.03	-.11	
	Hours Day-care	.02	.03	.07	
	Family Size	.00	.03	.01	
2.	Difficult Temperament Child Wave 1	.16	.03	.55***	.31***
3.	Parenting Wave 1				.01
	Lack of Sensitivity	.03	.03	.10	
	Negative Control	-.01	.03	-.05	
4.	Interactions Wave 1				.01
	Difficult Temperament * Lack of Sensitivity	.02	.03	.07	
	Difficult Temperament * Negative control	.00	.02	.01	

\*\*\*  $p < .001$ 

Table 4 shows the results of the regression model for the prediction of externalizing behaviors at Wave 2, again with the composite difficult temperament measure. Overall, 69% of the variance in externalizing behaviors at Wave 2 was accounted for by this regression model ( $F_{9,92} = 22.58$ ;  $p < .001$ ). The extent to which toddlers engaged in externalizing behaviors at Wave 2, was significantly predicted by externalizing behaviors at Wave 1. The results also show that children's temperament and maternal parenting have no additive effects after the level of children's externalizing behaviors at Wave 1 is controlled for. However, children's temperament interacted with maternal sensitivity as well as maternal negative control in predicting externalizing behaviors at Wave 2.

To examine the nature of the significant interactions, the effects of parenting behaviors on the outcome variable are estimated at 1 *SD* below the mean (low) and 1 *SD* above the mean (high) on children's temperament (Aiken & West, 1991).

Table 4

*Regression Model Predicting Children's Externalizing Behaviors Wave 2 (N= 101)*

Step	Predictors	B	SE B	$\beta$	$\Delta R^2$
1.	Control Variables Wave 1				.03
	Socio-Economic Status	-.01	.02	-.05	
	Hours Day-care	.00	.02	-.01	
	Family Size	.01	.02	.05	
2.	Externalizing Behaviors Child Wave 1	.25	.02	.85**	.63**
3.	Difficult Temperament Child Wave 1	.02	.02	.09	.00
4.	Parenting Wave 1				.01
	Lack of Sensitivity	.02	.02	.07	
	Negative Control	.02	.02	.07	
5.	Interactions Wave 1				.02
	Difficult Temperament * Lack of Sensitivity	.04	.02	.14*	
	Difficult Temperament * Negative Control	.03	.02	.15*	

\*  $p < .05$ ; \*\*  $p < .001$

Figure 1 shows that the effect of lack of maternal sensitivity was stronger for children with a difficult temperament. Lack of maternal sensitivity was related to an increase in externalizing behaviors for temperamentally difficult children only.

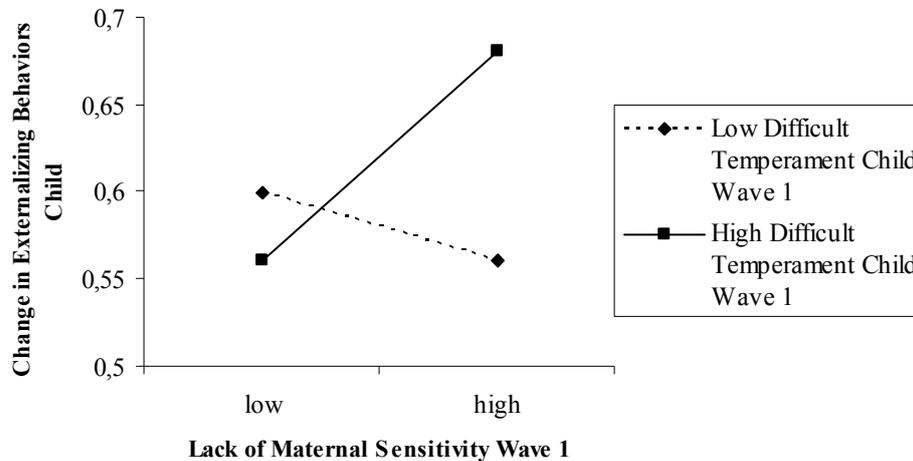


Figure 1. Prediction of Change in Externalizing Behaviors from Interactions between Children’s Temperament and Lack of Maternal Sensitivity

Note. Values of the predictors were chosen 1 SD below and 1 SD above the mean.

Figure 2 shows that the effect of maternal negative control was also stronger for children with a difficult temperament. Maternal negative control was related to an increase in externalizing behaviors for temperamentally difficult children only.

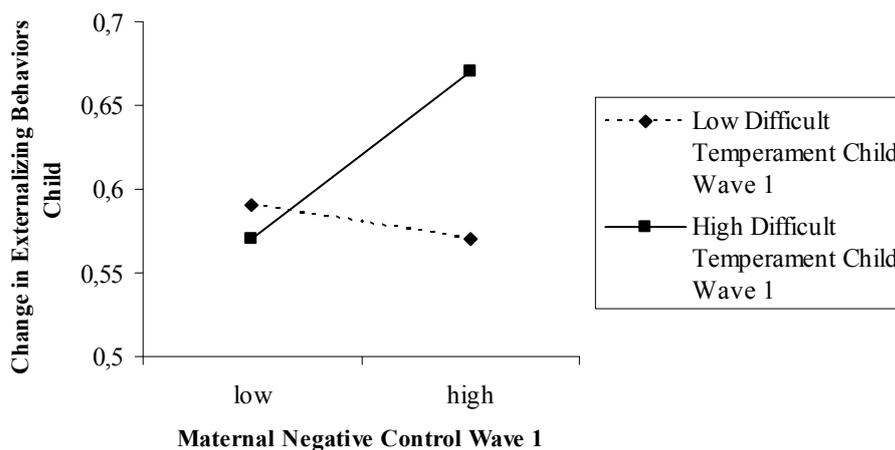


Figure 2. Prediction of Change in Externalizing Behaviors from Interactions between Children’s Temperament and Maternal Negative control

Note. Values of the predictors were chosen 1 SD below and 1 SD above the mean.

### ***Additive and Interactive Effects of Parenting and Specific Temperamental Traits***

Subsequently, regression models were run for each specific temperamental trait separately. For the prediction of externalizing behaviors at Wave 1, significant main effects were found for activity level ( $\beta = .27, p < .01$ ), soothability ( $\beta = -.26, p < .05$ ), inhibitory control ( $\beta = -.38, p < .001$ ), and frustration ( $\beta = .41, p < .001$ ). No main effects were found for maternal parenting. However, maternal negative control interacted significantly with children's inhibitory control ( $\beta = -.26, p < .05$ ) in predicting the level of externalizing behaviors at Wave 1. Examination of this interaction showed that the negative effect of maternal negative control appeared to be stronger for children low on inhibitory control.

The models predicting the change in externalizing behaviors between Wave 1 and Wave 2, did not show significant main effects of temperamental traits, nor parenting behaviors. However, several significant interactions were found. Lack of maternal sensitivity interacted significantly with children's activity level ( $\beta = .22, p < .01$ ) and children's soothability ( $\beta = -.15, p < .05$ ). Maternal negative control interacted significantly with children's inhibitory control ( $\beta = -.15, p < .05$ ), children's frustration ( $\beta = .12, p < .10$ ), and children's activity level ( $\beta = .12, p < .10$ ).

Examination of these interactions, confirmed the findings obtained when the composite measure of difficult temperament was used. The effect of lack of maternal sensitivity appeared to be stronger for children high on activity level and children low on soothability: a lack of maternal sensitivity was related to an increase in externalizing behaviors for children high on activity level and children low on soothability. In addition, the effect of maternal negative control appeared to be stronger for children low on inhibitory control, children high on frustration, and children high on activity level: maternal negative control was related to an increase in externalizing behaviors for children low on inhibitory control, children high on frustration, and children high on activity level.

## **Discussion**

The aim of the current study was to examine the interplay between children's temperamental characteristics and maternal parenting in predicting toddlers' level of externalizing behaviors at 17 months of age and the change in externalizing behaviors between 17 and 23 months of age. Using a longitudinal design, this study tested hypotheses that parenting and temperament would have both additive and interactive effects on the level and development of children's externalizing behaviors.

With regard to the prediction of the level of externalizing behaviors at 17 months, main effects were found for the composite measure of difficult temperament as well as for the specific temperamental traits activity level, soothability, inhibitory control, and frustration. No main effects were found for maternal parenting behaviors. This lack of main effects of parenting behaviors is in contrast with some previous studies (Brenner & Fox, 1998; O'Leary,

Smith Slep, & Reid, 1999). However, a meta-analysis on the associations between parental caregiving and children's externalizing behaviors (Rothbaum & Weisz, 1994), showed that the concurrent association between parenting and externalizing behaviors is less strong for toddlers and preschoolers than for older children. As noted by Rothbaum and Weisz (1994), these findings are consistent with a cumulative reciprocity model of parent-child influence. According to this model, parents' caregiving and children's characteristics are continually exerting a pull on one another and, over time, these behaviors become increasingly interwoven. Since reciprocity between parent and child may be a cumulative process that takes some time to develop, this might explain why for the very young children in the present study no concurrent associations were found between parenting behaviors and externalizing behaviors. In addition, the fact that this mutuality of parent and child influences will take some time to develop, might also explain that only one interaction effect was found between parenting and children's temperament in predicting the level of externalizing behaviors at Wave 1. This interaction effect indicates that the negative effect of maternal negative control is stronger for children low on inhibitory control. The moderating effect of children's inhibitory control in the present study replicated results from Morris et al. (2002), showing that the effect of maternal hostility was stronger for 7-year old children with poor effortful control. Children with poor inhibitory or effortful control have poor developed self-regulation capacities, and may therefore be especially vulnerable for hostile and dominating parents who impose such a rigid structure that the child is not provided with opportunities to learn regulating himself. Morris et al. (2002) offered an alternative explanation for this interactive effect. They state that children with well-developed self-regulation capacities might be more resistant to the deleterious effects on negative (i.e., hostile) parenting, while children with poor developed self-regulation capacities might be provoked to react with aggression when exposed to hostile parenting behaviors.

In addition to investigating the effects on the level of externalizing behaviors, the present study examined the additive and interactive effects on the changes in externalizing behaviors. The results showed that neither children's temperament nor maternal parenting had additive effects on children's externalizing behaviors at 23 months, when controlled for the initial level of externalizing behaviors at 17 months. These findings are in contrast with several studies (Carlson, 1998; O'Leary et al., 1999; Rothbart & Bates, 1998; Sanson et al., 2004). However, some other studies also failed to find main effects of early temperament on later externalizing behaviors (Belsky et al., 1998; Owens, Burkhart, & Joyce, 1995). As argued by Belsky et al. (1998), the absence of main effects does not implicate that these variables do not play any role in the etiology and development of externalizing behaviors. Instead, externalizing behaviors might depend on the interplay between temperamental characteristics and parenting behaviors (Belsky et al., 1998). That is exactly what the results of this study point out, since significant interactions were found between children's temperamental characteristics and maternal parenting behaviors. So, the lack of main effects in the regression

analyses can be qualified by these interaction effects: for some children there is an effect of parenting, for others there is not. In combination for the entire sample this dampens the main effects, apparently causing it to drop below significance.

The effects of maternal negative control and lack of maternal sensitivity were found to be stronger for toddlers with a difficult temperament: maternal negative control and lack of maternal sensitivity were related to an increase in externalizing behaviors for temperamentally difficult children only. These interaction effects were rather powerful. First of all, these interaction effects were found despite the high stability of externalizing behaviors. In addition, as shown in the plots of the interaction effects, the differences in change in externalizing behaviors for the high difficult temperament group were quite large. This magnitude of interaction effects is particularly remarkable given the fact that the children in this sample generally showed normal levels of externalizing behaviors.

Not only the composite measure of difficult temperament, but also the specific temperamental traits interacted with maternal negative dominance and lack of sensitivity in predicting change in externalizing behaviors.

Lack of sensitivity was, as hypothesized, related to an increase in externalizing behaviors for children with higher scores on activity level and children with lower scores on soothability. Highly active children might more strongly need their parents' sensitivity to assist them in regulating their behaviors and children who score low on soothability might more strongly depend on their parents' sensitivity to support them calming down from diverse sources of arousal.

Maternal negative control appeared to be related to an increase in externalizing behaviors for children low on inhibitory control, children high on frustration, and children high on activity level. These results replicated findings from a cross-sectional study by Rubin et al. (1998), who reported a significant interaction between boys' dysregulated temperament (a composite measure of self-control, activity level, social fearfulness, anger proneness, pleasure expression, and interest/persistence) in toddlerhood and maternal negative dominance in predicting externalizing behaviors.

Although this study replicated some interactive effects reported in previous research and confirmed most of our hypotheses regarding interactive effects on the development of externalizing behaviors, one hypothesized interaction was not supported by the results of the present study. Inhibitory control was expected to be a moderator of the effect of maternal sensitivity on externalizing behaviors. Children with a lack of inhibitory control were hypothesized to depend on their parents' assistance in regulating themselves by providing sensitive support, and therefore we expected these children to show an increase in externalizing behaviors when their mother failed to be sensitive and supportive. However, it is possible that for children who lack inhibitory control, opportunities to learn to regulate themselves are more important than actual support, and therefore absence of maternal negative control might be more important than presence of maternal sensitivity.

Several limitations of the present study are worth noticing. First, our sample was relatively small and consisted of families with mostly moderate to high socioeconomic status. Future studies should establish whether the findings of the present study can be generalized to families from other social backgrounds and to families with children who exhibit more severe problem behaviors. In addition, our sample included only boys, since boys are at increased risk for externalizing behaviors. However, data of some studies (e.g., Rubin et al., 1998) suggest that boys and girls may have different vulnerabilities to factors that impact externalizing behaviors. As a consequence it is unknown whether the results can be generalized to girls. Similarly, it is unknown whether the results can be generalized to fathers, since this study did not pay attention to parenting behaviors of fathers.

Further, although this study had a longitudinal design, the interval between Wave 1 and Wave 2 was relatively short. For this reason probably, the level of externalizing behaviors displayed a very high stability, with the consequence that very little variance of externalizing behaviors at Wave 2 was left to be explained by additive and interactive effects of the variables of interest. On the other hand, the age transition from 17 to 23 months of age reflects one of the key periods of person-context reorganizations in terms of an enlargement of linguistic skills and mobility. This transition is accompanied by many challenges for parents (Keenan & Wakschlag, 2000). Therefore, this age transition might be particularly relevant for investigating the influence of parenting practices.

Finally, two warnings should be given with regard to the interpretation of the associations between temperament and externalizing behaviors. The first warning concerns the fact that in the present study mothers filled out questionnaires about both child temperament and child externalizing behaviors, perhaps leading to an overestimation of the associations between these constructs. The results on these associations therefore need to be interpreted with this caveat in mind and findings should be replicated with other measures (for instance observational data) for temperament and/or externalizing behaviors. Second, the interpretation of the associations found between temperamental traits and externalizing behaviors might be complicated by conceptual and item overlap across measures of these constructs. However, other studies (Lemmery, Essex, & Smider, 2002; Lengua, West, & Sandler, 1998) showed that even after the removal of confounded items (i.e., items that showed conceptual or empirical overlap), there continued to be a significant relationship between temperament and behavior problems. This indicates that a possible overlap between the measures in our study probably has not affected our results.

Despite these limitations, the present study expands existing knowledge on interactive effects between parenting and temperament in predicting toddlers' externalizing behaviors. The strengths of this study were mainly the focus on very young children, the inclusion of four temperamental characteristics, and the use of a longitudinal design to predict externalizing behaviors controlling for the initial levels of these problems. In addition, since we used mother report data for the measures of child temperament and externalizing

behaviors, and observation data for maternal parenting behaviors, we minimized the likelihood that the significant interactions were due to shared method variance. Furthermore, this study found support for theoretically based hypotheses with regard to interaction effects and this study replicated interactive effects reported by some previous studies with a very young sample and a different culture. As stated by Whisman and McClelland (2005), replication is particularly important for interaction effects because of several statistical difficulties in detecting interactions. Finally, the high stability of externalizing behaviors found in this study at this very young age already is also a result worth noticing. As noted by Shaw, Gilliom and Giovannelli (2000), there are relatively few studies on the stability of aggressive behaviors and other types of disruptive behaviors in very young children. However, the high stability coefficient found in our study, is consistent with results from the few longitudinal studies on externalizing behaviors in very young children (e.g., Campbell, 1994), since these studies also reported considerable rates of continuity. These findings stress the importance of identifying children at risk as early as possible, in order to prevent the development of persistent behavior problems. Interventions targeted at younger children indeed have been shown to be more efficacious than interventions targeted at older children (Reid, 1993).

The present study showed that certain child temperamental traits may represent vulnerabilities which can result in increasing levels of externalizing behaviors, if they occur in the context of poor parenting. So, the change in externalizing behaviors in very young children depends on the interplay between temperamental features and maternal parenting behaviors, rather than on main effects of parenting or temperament. These findings implicate that efforts to identify children at greatest risk for developing persistent problem behaviors and to design empirically informed interventions to prevent further escalations of problems, should focus on specific constellations of parental and child characteristics and should improve the fit of these parental and child characteristics. For instance, parents of children with temperamental vulnerabilities could be important targets for behavioral parenting interventions which assist these parents in developing effective parenting strategies (e.g., high sensitivity or low negative control).

## CHAPTER 4

### Parental Personality, Parenting and Toddlers' Externalizing Behaviors\*

#### Abstract

This study examined the mediating role of parenting on the relation between parental personality and toddlers' externalizing behaviors. Participants were 112 boys and their parents. The data were analyzed using multilevel modeling and moderated mediation analyses. Several associations were found between parental personality and parenting dimensions. Additionally, several parenting dimensions were associated with children's externalizing behaviors. Emotional stability was the only parental personality trait that was related to children's externalizing behaviors. The effect of maternal emotional stability on children's aggressive behaviors appeared to be mediated by maternal support. For fathers, there appeared to be a direct effect of emotional stability on children's aggressive behaviors. In addition, for both mother and fathers, emotional stability was directly related to children's attention problems.

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## Introduction

Externalizing behaviors in early childhood are often reported to persist (Broidy et al., 2003) and to predict continued problems in later life (Tremblay, 2002). These results highlight the importance of examining the development of early behavior problems in order to understand their determinants. In trying to disentangle possible risk factors for children's negative behavioral outcomes, researchers have often turned to parental characteristics, which are acknowledged to constitute one important part of the 'ecology' of child development (Belsky, 1984; Bronfenbrenner, 1986).

While there is an extensive literature on how parenting behaviors and parental psychopathological characteristics influence young children's externalizing behaviors (Brook, Zheng, Whiteman, & Brook, 2001; DeKlyen, Speltz, & Greenberg, 1998; Gartstein & Fagot, 2003; Phares, 1996), only few studies have explored the role that parental personality characteristics play in predicting these externalizing behaviors (Kochanska, Clark, & Goldman, 1997; Kurdek, 2003; Nigg & Hinshaw, 1998) and to which extent their effects are mediated by parenting behaviors (Kochanska et al., 1997; Prinzie et al., 2004; Prinzie et al., 2005). That is surprising, especially since already in 1984 Belsky proposed that parents' personality characteristics must affect parenting and children's behavioral outcomes (Belsky, 1984). From this point of view, it would be reasonable to hypothesize that parenting behaviors fully or partially mediate the effects of parental personality traits on children's externalizing behaviors. This would also be in line with Patterson's assumption that the impact of parental personality/psychopathology on children's adjustment is mediated by its disruptive impact on dysfunctional parenting practices (Patterson, 2002; Patterson, Reid, & Dishion, 1992).

Therefore, the present study investigates the mediating role of paternal as well as maternal parenting on the relation between parental personality traits and toddlers' attention problems and aggressive behaviors. This study focused on five parenting dimensions that have been associated with externalizing behaviors in the literature: support, positive discipline, psychological control, lack of structure, and physical punishment (Brook et al., 2001; Feldman & Klein, 2003; O'Leary et al., 1999; Stormshak et al., 2000). For measuring parental personality the Big Five Model was used (Goldberg, 1992), comprising of the following five traits of personality: extraversion, agreeableness, conscientiousness, emotional stability, and openness to experience.

### ***Relations between Parenting and Externalizing Behaviors***

*Parental support* (i.e., the degree to which parents are responsive to their child's needs and have positive interactions with their child) and *positive discipline* (i.e., the degree to which parents reinforce good behavior of their child and make use of disciplinary techniques such as induction), are consistently reported to have a positive effect on children's functioning. Feldman and Klein (2003) reported maternal sensitivity and warm control (i.e.,

showing positive affect while providing limits, using encouragement, redirection of attention, and negotiation) to predict toddlers' compliance to the caregiver. In addition, a study by Stormshak and colleagues (2000) showed that low levels of positive interactions were particularly characteristic of parents of children with elevated levels of disruptive behaviors. Furthermore, Kerr and colleagues (2004) found inductive discipline (i.e., reasoning, reminding children of rules, and explaining the impact of children's behaviors on others) to be associated with fewer externalizing problems. A possible explanation for these results might be that when parents are sensitive to their child's needs, when they express warm feelings and when their requests are reasonable and understandable to the child, children are likely to feel secure and accepted and, thereby, to follow parents' suggestions (Chen et al., 2003). *Psychological control* refers to disciplinary techniques such as verbal punishment and withdrawal of attention and/or affection when a child misbehaves. Parents who frequently make use of these techniques are reported to have children with elevated rates of diverse disruptive behavior problems (Danforth, Barkley, & Stokes, 1991; Kuczynski, Kochanska, Radke-Yarrow, & Girnius-Brown, 1987; Stormshak et al., 2000). A psychologically controlling environment manipulates and exploits the parent-child relationship, and consequently limits the child's opportunities to develop a healthy awareness and perception of the self, hereby constraining the development of socially accepted behavior (Barber, 1996). In addition, children of parents who show high levels of verbal punishment are exposed to models of aggressive and unregulated behaviors (Bandura, Ross, & Ross, 1961; Campbell, Shaw, & Gilliom, 2000). Practices belonging to the parenting dimension *lack of structure* (i.e., laxness, overreaction, inconsistency) have also been linked with elevated levels of externalizing behaviors (O'Leary, Smith Slep, & Reid, 1999; Prinzie et al., 2003). Stormshak and colleagues (2000) put forward two possible explanations for these associations. The first explanation was offered by Patterson (1986), who noted that parental failure to be consistent and to follow through with commands may result in reinforcement of non-compliance. An alternative explanation was offered by Wahler and Dumas (1986), who suggested that children whose parents are inconsistent and unpredictable engage in oppositional and defiant behaviors in order to elicit predictable responses of their parent. Finally, *physical punishment* (i.e., the degree to which parents use spanking as a discipline technique) was found in several previous studies to be associated with increased behavior problems (Brook et al., 2001; Stormshak et al., 2000; Strassberg, Dodge, Pettit, & Bates, 1994). This might be explained from a social learning perspective: physical punishment models aggression and might children make expect that hostile and aggressive behaviors have successful outcomes (Campbell et al., 2000). Furthermore, according to Gershoff (2002) physical punishment is thought to prevent internalization of parents' values and those of the society by eroding the attachment bond between the parent and the child. Finally, experience with harsh treatment from parents is expected to bias children's information processing such that harshly treated

children will be hypervigilant to hostile cues, attribute hostile intentions to others and access more aggressive potential responses (Gershoff, 2002).

### ***Relations between Parental Personality, Parenting and Externalizing Behaviors***

In contrast to the relation between parenting and children's externalizing behaviors, there is a relative dearth of literature focused on parental personality traits in relation to parenting behaviors and children's externalizing behaviors.

With regard to the relation between parental personality traits and children's behavior problems, studies consistently show that high parental neuroticism (or low emotional stability) is an important risk factor for children's externalizing behaviors (Kurdek, 2003; Nigg & Hinshaw, 1998; Prinzie et al., 2004; Prinzie et al., 2005). In addition, some studies showed maternal lack of conscientiousness to be a significant contributor to children's externalizing behaviors (Nigg & Hinshaw, 1998; Prinzie et al., 2005; van Aken, Junger, Verhoeven, van Aken, & Dekovic, 2007). With regard to parental agreeableness, results are mixed. Some studies (e.g., Kochanska et al., 1997) showed that low scores on agreeableness were predictive of increased levels of children's behavior problems, whereas Prinzie and colleagues (2004) reported maternal agreeableness to be positively related to externalizing problem behaviors in elementary-school-aged children.

In general, parental personality traits may directly be related to children's development through two possible mechanisms (Kochanska, Clark, & Goldman, 1997). Firstly, children may inherit certain personality characteristics that may lead to elevated levels of externalizing behaviors. For instance, low conscientious parents are characterized by traits as low self-discipline and the tendency to act before thinking (Costa & McCrae, 1992). Their children may inherit a tendency of low inhibitory control, and consequently show increasing levels of externalizing behaviors. Secondly, parents with certain personality traits may model aggressive and unregulated behaviors to their child, and subsequently their child may imitate these behaviors (Bandura et al., 1961; Campbell et al., 2000). For instance, behaviors of low conscientious parents may be characterized by impulsive and poorly regulated acts. Aggressive and inattentive behaviors of young children might be imitations of these behaviors.

In addition to direct associations between parental personality and children's problem behavior, this relation can at least partly be assumed to be mediated by parenting behavior (Belsky, 1984; Patterson, 2002). Studies using the Five Factor Model of personality indeed showed that parental personality is related to parenting. More specifically, previous studies revealed that parents with high scores on extraversion, agreeableness, conscientiousness, emotional stability (or low neuroticism) and, openness displayed more positive, supportive, and responsive parenting and less negative, controlling parenting (Belsky & Barends, 2002; Belsky, Crnic, & Woodworth, 1995; Clark, Kochanska, & Ready, 2000; Losoya, Goldsmith, Callor, & Rowe, 1997; Metsäpelto & Pulkkinen, 2003; Verhoeven, Junger, van Aken,

Dekovic, & van Aken, 2007). In contrast, parents high in negative emotionality and disagreeableness appeared to show more negative affect and more power-assertive and less nurturant parenting (Kochanska et al., 1997), whereas neuroticism was found to be associated with less sensitive, less affective, and less stimulating parenting (Belsky et al., 1995).

However, as stated before, research that explicitly investigates to which extent parenting mediates the effects of parental personality on children's behavioral outcomes, is very scarce. Kochanska, and colleagues (1997) found that parenting variables (a constellation of power assertion, responsiveness/warmth, and adaptive parenting) partially mediated the relation between maternal negative emotionality and mother-reported children's adaptive outcomes. The same study also showed that the effect of maternal disagreeableness on both observed and mother-reported outcomes of children was fully mediated by parenting behaviors. The authors suggest that these links may stem largely from the negative affective component of hostility in disagreeableness. A more recent study by Prinzie and colleagues (2004) on the direct and indirect effects of parent and child personality characteristics found the contrary: they reported a positive association between parental agreeableness and children's externalizing behaviors that appeared to be partially mediated by parental coercion. In addition, their results indicated that the negative association between parental emotional stability and children's externalizing behaviors was partially mediated by parental overreactivity. However, above and beyond the mediating effects, personality traits were also directly linked to externalizing problem behaviors in these elementary-school-age children. A later study by Prinzie and colleagues (Prinzie et al., 2005) on the same sample of children supported these results by showing that the effects of parental personality traits were mediated by negative parenting behaviors, while paternal and maternal emotional stability, conscientiousness, and autonomy (a shortcut for openness) were also directly related to children's externalizing behaviors.

### ***The Contribution and Uniqueness of the Present Study***

The above mentioned studies by Kochanska and colleagues (1997) and Prinzie and colleagues (2004; 2005) provide important knowledge about the mediating role of parenting behaviors on the relation between parental personality traits and children's externalizing behaviors. The present study extends this knowledge in four ways.

A first way in which the present study extends previous research concerns the way parenting was measured. Kochanska and colleagues (1997) combined different parenting dimensions into a global conceptualization of parenting, without considering the effects of specific parenting behaviors, while Prinzie and colleagues (2004; 2005) focused on negative parenting behaviors only. Consequently, these studies did not pay attention to the multi-dimensional nature of parenting (Davidov & Grusec, 2006). In contrast, the present study makes it possible to obtain a more comprehensive view of the specific (mediating) effects of different dimensions of parenting by including several positive as well as negative parenting

dimensions, which are considered to cover a broad range of parenting behaviors.

Secondly, the present study focuses on the role of mothers as well as fathers, instead of mothers only, as in the study by Kochanska et al. (1997). In previous work most attention has been paid to the role of mothers in externalizing behaviors in children, with only very incidental attention to the role of fathers. However, in the last few decades, the interest in the role that fathers play in child development has grown. Previous research indicates that the father-child relationship is distinct from the mother-child relationship. For instance, children preferably seek mothers to comfort and sooth them (Lamb & Lamb, 1976), but prefer fathers as playmates (Clarke-Stewart, 1978). In addition, research has shown that mothers are more responsive and warm in their parenting (Calzada, Eyberg, Rich, & Querido, 2004), whereas fathers are found to be more restrictive (Metsäpelto & Pulkkinen, 2003).

Thirdly, the present study takes into account the interdependence of fathers' and mothers' characteristics. Fathers and mothers from the same family are supposed to resemble each other more than parents from different families (Kenny, 1996). This non-independence of fathers and mothers from the same family can be a result of the fact that they were similar on certain characteristics when they were paired together (i.e., assortative mating) or they resemble each other more because they subsequently influenced each other's personality characteristics and parenting behaviors (Kenny, 1996). While many studies circumvent the issue of interdependence by conducting separate analyses for fathers and mothers from the same family (Campbell & Kashy, 2002), we accounted for this by using the parental dyad as the unit of analysis instead of the individual parent. In addition, to formally test whether mediation effects of parenting differed across fathers and mothers, moderated mediation analyses were conducted (Muller, Judd, & Yzerbyt, 2005).

Finally, the present study extends previous studies by distinguishing attention problems and aggressive behaviors as separate child outcome variables. Both the studies by Kochanska and colleagues (1997) and by Prinzie and colleagues (2005) focused on broadband patterns of problem behaviors. However, past research suggests that hyperactive/inattentive behaviors may be associated with somewhat different etiological factors than aggressive behaviors (Frick et al., 1993; Hoge & Andrews, 1992). For example, cognitive control deficits have been implicated as key factors underlying the behavior problems of hyperactive/inattentive children (Barkley, 1990). In addition, evidence of direct genetic influences is stronger for overactivity/inattention behaviors than for antisocial/externalizing behaviors (Rutter, Silberg, O'Connor, & Simonoff, 1999). This points to the relevance of focusing on specific types of problem behaviors instead of aggregating them into one outcome.

### ***Hypotheses***

We expect that, in accordance with previous studies (Kochanska et al., 1997; Prinzie et al., 2004; Prinzie et al., 2005), the effects of parental personality traits on children's externalizing behaviors are partly mediated by their impact on parenting behaviors. At the same time, we

hypothesize direct effects of these personality traits. Because of the relatively strong genetic component of overactivity/inattention behaviors, we expect more direct effects of parental personality for children's attention problems than for aggressive behaviors. Especially parental emotional stability and conscientiousness are expected to be directly related to children's attention problems: parents who score low on emotional stability are characterized by having difficulties controlling urges and coping with various stressors (Costa & McCrae, 1992), while low conscientious parents are characterized by a low self-discipline and the tendency to act before thinking (Costa & McCrae, 1992). Both personality traits may be inherited by children, which may lead to elevated levels of attention problems.

Furthermore, since previous studies suggest that attention problems might be less determined by parenting dimensions than aggressive behaviors (Barkley, 1990), we expect parenting to be more strongly related to aggressive behaviors than to attention problems. At the same time, some studies (Campbell, Pierce, March, & Ewing, 1991; Stormshak et al., 2000) indicate that children's highly active and impulsive behaviors may elicit negative/psychological control from parents, which subsequently evokes even higher levels of these impulsive behaviors. Therefore, while we expect that aggressive behaviors might be related to all parenting dimensions, we hypothesize that attention problems are related to psychological control only.

## **Method**

### ***Sample and Procedure***

Only boys were included in this study since externalizing behaviors are more common among boys than girls (Webster-Stratton, 1996). The sample for this study was drawn from Infant and Toddler Clinics in three cities in the Netherlands. In the Netherlands, these clinics follow up all children from birth up to four years of age and they systematically check the child's growth and development. Thus, the sample is considered to be a community sample of typically developing children. A recruitment letter explaining the goals of the project was sent to 192 families, and followed up by a telephone call. Of these 192 families, 117 (61%) agreed to participate. Frequent reasons for not participating were: failure to reach a family (approximately 25% of the non-participants) or a lack of time or a lack of interest in the topic of the project. Four measurement waves were used with a six-months interval. The attrition rate during the study was minimal: Of the 117 families that started in the study, 112 participated in the final wave.

For the present analyses, only data from the final wave were used. At that wave, the age of the children ranged from 33 to 37 months ( $M = 34.9$  months,  $SD = .71$  months). Fathers and mothers were asked to fill out questionnaires about their parenting behaviors, personality traits and their children's behaviors. All 112 families, among which four families where only the father or only the mother participated, were included in the analyses.

### ***Instruments***

All instruments that were originally produced in English and of which no standard translation into Dutch was available were translated into Dutch by means of a back-translation procedure.

*Externalizing Behaviors.* To measure externalizing behaviors, the Child Behavior Checklist 1½-5 (Achenbach & Rescorla, 2000) was used. Mothers and fathers were asked to indicate from 0 (*never*) to 2 (*often*) whether items were indicative of the child's behavior. The broad externalizing scale consisted of the two subscales attention problems ( $N = 5$  items) and aggressive behavior ( $N = 19$  items). Cronbach's alpha for maternal as well as paternal reports of attention problems was .67. Cronbach's alpha for maternal reported aggressive behaviors was .87 and for paternal reported aggressive behaviors .85.

*Parental Personality Traits.* The Big Five personality traits (Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Openness to Experience) were assessed by a Dutch adaptation (Gerris et al., 1998) of 30 adjective Big Five markers selected from Goldberg (1992). Fathers and mothers were asked to judge their own personality by indicating on a 7-point Likert scale how much they agreed with each adjective, 1 = *very untrue* to 7 = *very true*. *Extraversion* is characterized by active engagement, assertiveness, and talkativeness. *Agreeableness* includes tender-heartedness, friendliness, and willingness to help others. *Conscientiousness* assesses punctuality, order, and degree of organization in goal-directed task behaviors. *Emotional Stability* is characterized by the extent to which the person is emotionally stable or vulnerable to distressing emotions. *Openness to Experience* includes openness of a person to fantasy, esthetics, and ideas. Cronbach's alphas for extraversion, agreeableness, conscientiousness, emotional stability, and openness to experience were .84, .84, .87, .79 and .80 respectively for fathers and .89, .79, .90, .77 and .82 respectively for mothers.

*Parenting.* Fathers and mothers were asked to judge their own parenting behaviors by filling out questionnaires. We used a five-fold classification of parenting consisting of the following dimensions: support, positive discipline, psychological control, lack of structure, and physical punishment. This model was tested by conducting confirmatory factor analyses using structural equation modeling and found to be measurement invariant across mothers and fathers (Verhoeven et al., 2007). Scores for parenting behaviors were assigned by computing mean-scores of all items of the corresponding scales.

*Support.* Two scales were used to assess parental support. The degree to which parents adequately and *responsively* react to the needs, signals, and condition of their child was measured by a subscale from a Dutch parenting questionnaire (Gerris et al., 1993). Parents

rated the frequency of their parenting behavior on a 5-point scale ranging from 1 = *never* to 5 = *always*. The original scale consists of eight items (e.g., “I know very well what my child feels or needs”). Four of the items are not suitable for toddlers, and were consequently deleted from the scale.

The degree to which a parent is involved in *positive interactions* with the child was measured by a 5-item adaptation of Strayhorn and Weidman’s (1988) Parent Practices Scale. Parents were asked to rate the frequency of their positive interactions with their child on a 5-point scale (for example “How often do you and your child laugh together?”), ranging from 1 = *never* to 5 = *many times each day*.

For mothers, the internal consistency of her reported support was .70. For fathers, the internal consistency was .79.

*Positive Discipline.* Two indicators of parental use of positive discipline were assessed. Six items derived from the Alabama Parenting Questionnaire (Frick, 1991; Shelton, Frick, & Wootton, 1996) measured *reinforcement of good behavior*. Parents could indicate how often they praise their child’s good behavior on a 5-point scale, ranging from 1 = *never* to 5 = *always*. For example, “I praise my child when he behaves well”.

The second indicator, *induction*, was measured by a subscale from a Dutch parenting questionnaire, consisting of four items (Gerris et al., 1993). On a 5-point scale, ranging from 1=*never* to 5=*always*, parents indicated how often they point out the consequences of the child’s misbehavior. An example-item is “When my child does not listen to me, I explain to him that it annoys me”.

Cronbach’s alpha for this parental behavior was .60 for mothers and .66 for fathers.

*Psychological Control.* To assess psychological control two scales were used. Four items measured *love withdrawal* (Gerris et al., 1993). Parents were asked to rate on a 5-point scale, ranging from 1 = *never* to 5 = *always*, how often they use withdrawal of attention and/or affection as a technique to discipline their child. One of the four items is, “When my child misbehaves, I pretend that he is not there anymore”.

With 10 items derived from the Discipline-scale of the Parent Behavior Checklist (Fox, 1994), *verbal punishment* was assessed. Parents indicated on a 5-point scale (1 = *never* to 5 = *always*) how often they raise their voice as a response to their child’s misbehavior. For example “I yell at my child for being too noisy at home”.

Internal reliability for the composite measure of psychological control was .68 for mothers and .66 for fathers.

*Lack of Structure.* To assess the degree to which parents provide a structured environment for their child, three scales were used. Two of these scales are from the shortened version of the Parenting Scale (Irvine, Biglan, Smolkowski, & Ary, 1999). The first

scale, *laxness*, describes whether a parent is permissive and inconsistent when providing discipline. This scale consists of six items presenting discipline encounters (“When my child misbehaves....”) followed by two options that act as opposite anchor points for a 7-point scale, where a high score indicates that parents are lax in their parenting. For example, “If my child gets upset when I say ‘no’, I stick to what I said – or the opposite- I back down and give in to my child”.

The second scale, *overreaction*, measures parental tendency to react on child’s transgressing behavior in an unstructured, exaggerated manner. This scale consists of four items with two answer options that act as opposite anchor points. One of the four items is “When my child misbehaves, I handle it without getting upset - or the opposite - I get so frustrated that my child can see I’m upset”. A high score indicates that a parent is often overreacting. The five items of the *inconsistency* scale from the Alabama Parenting Questionnaire (Frick, 1991; Frick, Christian, & Wootton, 1999; Shelton et al., 1996) were used to measure lack of structure in terms of inconsistency in applying discipline. Parents rated themselves on a 5-point Likert-scale, ranging from 1 = *never* to 5 = *always*. An example-item is “You threaten to punish your child and then do not actually punish him”.

For mothers, the internal consistency of lack of structure was .81, for fathers this was .87. Before a score of lack of structure could be assigned, the scales that measured this parenting dimension had to be standardized since they have different rating scales.

*Physical Punishment.* Two scales assessed parental use of physical punishment. Five items were drawn from the Discipline-scale of the Parental Behavior Checklist (Fox, 1994), the other three are items from the Alabama Parenting Questionnaire (Frick, 1991; Shelton et al., 1996). The items measure the frequency in which parents use physical punishment as a manner to discipline their child. On a 5-point scale parents had to indicate how often they use spanking as a discipline-technique, ranging from 1 = *never* to 5 = *always*. Example items are “When my child has a temper tantrum, I spank him”, and “You spank your child with your hand when he has done something wrong”.

Physical punishment was measured with an internal reliability of .77 for mothers and .80 for fathers.

## **Plan of Analysis**

Because mothers and fathers are nested within families, fathers and mothers from the same family are likely to resemble each other more than parents of different families (Kenny, 1996). This was especially the case for parenting dimensions (correlation between fathers’ and mothers’ scores ranged from  $r = .14$  to  $r = .42$ ) and to a lesser extent for personality traits (correlation between fathers’ and mothers’ scores ranged from  $r = .10$  to  $r = .17$ ). Additionally, scores of fathers and mothers on children’s behavior problems were moderately

correlated ( $r = .52$  for attention problems and  $r = .55$  for aggressive behaviors). To account for the interdependence, the data were analyzed using multilevel modeling utilizing the linear mixed-effects model (MIXED) procedure in SPSS. Consequently, the parental dyad was used as the unit of analyses and the data were set up as described by Campbell and Kashy (2002). Specifically, we tried to predict parents' perceptions of their children's outcomes by means of their self-perceived parenting and personality levels. We allowed the average level of children's problem behaviors to vary between families (in multilevel terms, we introduced a random intercept component on the between-family level). To facilitate interpretation of effect sizes, all variables (except gender, which was dummy-coded, father = 0, mother = 1) were standardized prior to analysis.

In testing mediation effects of parenting on the association between parental personality and children's externalizing behaviors, we were interested in mediation effects that are similar across fathers and mothers as well as in mediation effects that are different (i.e., specific) for fathers and mothers. In other words, we were also interested in the moderating effect of parental gender on the mediation effects. In the literature this is referred to as *moderated mediation* (Baron & Kenny, 1986; Muller et al., 2005).

Muller and colleagues (2005) specified four criteria for testing moderated mediation. First, the independent variable (parental personality trait) has to be significantly related to the particular child behavior outcome. Second, the magnitude of this effect should not depend on the moderator (parental gender). Third, either the effect of the independent variable (parental personality trait) on the mediator (parenting dimension) should depend on the moderator (parental gender) or the effect of the mediator (parenting dimension) on the child behavior outcome should depend on the moderator (parental gender), or both. Fourth, if only the effect of the independent variable (parental personality trait) on the mediator (parenting dimension) depends on the moderator (parental gender), then there must be an overall effect of the mediator (parenting dimension) on the child outcome. Parallel to this, if only the effect of the mediator (parenting dimension) on the child behavior outcome depends on the moderator (parental gender), then there should be an overall effect of the independent variable (personality trait) on the mediator (parenting dimension).

In cases where there is no evidence of mediation that is moderated by parental gender (i.e., where there is no evidence of mediation effects that differ across fathers and mothers), we will test whether there exist mediation effects that are *similar* across fathers and mothers. One of the requirements that has to be tested for determining mediation effects that are not moderated by gender and thus are similar across fathers and mothers is that the significant relation between the particular personality trait and children's externalizing behaviors is reduced when the effect of the particular parenting dimension is controlled for (Baron & Kenny, 1986). The procedure by Muller and colleagues (2005) for testing moderated mediation also offers information to test that requirement. If that requirement is met, we also apply the other criteria formulated by Baron and Kenny (1986) to formally test the particular

mediation effect. If that requirement is not met, we can already conclude that there is (also) no mediation that is consistent across fathers and mothers and thus the other criteria are not tested.

## **Results**

### ***Descriptive Statistics and Correlation Analysis***

Table 1 presents means and standard deviations for child outcomes, parental personality traits and parenting dimensions. As can be seen, mothers in this sample reported significantly more child aggressive behaviors and scored significantly higher on extraversion, conscientiousness, support, and positive discipline and significantly lower on emotional stability than fathers.

In order to obtain an indication of the degree to which the sample of the present study is representative, we compared socio-demographic variables, child variables, and parental personality traits of our sample to the distribution of these variables in the general Dutch population (Branje, van Aken, & van Lieshout, 2004; CBS, 2003; Koot, 1993). Summarizing, as can be seen in Table 2, on these indicators the sample of the present study seems to be relatively representative of the Dutch population, except for the level of parental education, for which a bias towards more highly educated families was found.

Table 3 shows the intercorrelations between the variables of interest. For both maternal and paternal reports, children's attention problems and aggressive behaviors appeared to be significantly related. Furthermore, several significant intercorrelations existed between parental personality traits, parenting dimensions and children's externalizing behaviors.

Table 1

*Means and Standard Deviations for Child Outcome Measures, Parental Personality Traits, and Parental Parenting Dimensions*

	Mothers		Fathers		<i>t</i> -value (Paired)
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Child Outcome Measures					
Attention Problems	.57	.38	.57	.38	.06
Aggressive Behaviors	.66	.32	.56	.29	3.62***
Parental Personality Traits					
Extraversion	5.40	1.02	4.86	1.03	3.96***
Agreeableness	5.76	.53	5.63	.68	1.45
Conscientiousness	5.15	1.07	4.83	1.04	2.27*
Emotional Stability	4.81	.93	5.13	.90	-3.14**
Openness	4.73	1.01	4.92	.95	-1.44
Parenting					
Support	4.41	0.32	4.17	.43	5.34***
Positive Discipline	4.25	0.36	4.07	.42	3.51**
Psychological Control	1.86	0.44	1.88	.49	.01
Lack of Structure	0.01	0.53	-.01	.62	.22
Physical Punishment	1.31	0.73	1.36	.43	-1.30

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

Table 2

*Comparison of Data from the Present Study with Dutch Population Characteristics*

	Present study	Population characteristics
Socio-demographic Variables		
Education level college degree or more	65%	30%
Intact families	96%	97%
Child syndrome scores (according to mothers)		
Attention problems borderline clinical range	3.5%	5.1%
Attention problems clinical range	4.3%	3.7%
Aggressive behaviors borderline clinical range	6.1%	4.2%
Aggressive behaviors clinical range	3.5%	4.2%
Parental personality traits (average of mothers and fathers)		
Extraversion	5.13	5.04
Agreeableness	5.70	5.74
Conscientiousness	4.99	4.94
Emotional Stability	4.97	4.64
Openness	4.83	4.67

Table 3

*Intercorrelations among Parental Personality Traits, Parenting Dimensions, and Children's Behavioral Outcomes*

	1	2	3	4	5	6	7	8	9	10	11	12
1 Extraversion	-	.36***	-.14	.25**	.20*	.09	.13	-.20*	-.06	.03	-.16	-.02
2 Agreeableness	.25*	-	.08	.13	.34***	.22*	.38***	-.03	.01	.15	.11	.18
3 Conscientiousness	.03	.02	-	.10	-.05	.10	.05	-.09	-.09	.12	-.01	.02
4 Emotional Stability	.51***	.29**	.08	-	-.01	.17	.18	-.21*	-.28**	-.06	-.23*	-.29**
5 Openness	.28***	-.02	.03	.07	-	.25*	.21*	-.12	-.07	.13	-.01	-.08
6 Support	.18	.22*	.12	.23*	.22*	-	.40***	-.33***	-.43***	-.17	-.09	.03
7 Positive Discipline	.11	.20	.11	.16	.15	.35***	-	-.22*	-.23*	-.05	-.07	.05
8 Psychological Control	-.13	-.23**	-.11	-.31**	-.04	-.24*	-.03	-	.57***	.31**	.24*	.35***
9 Lack of Structure	-.24*	-.20*	-.18	-.37***	-.09	-.38***	-.21*	.45***	-	.30**	.15	.29**
10 Physical Punishment	-.14	-.20*	.05	-.21*	-.11	-.12	-.16	.37***	.20*	-	.08	.07
11 Attention Problems Child	-.01	-.13	-.26**	-.19*	.03	-.33**	-.27**	.35***	.26**	.27**	-	.57***
12 Aggressive Behaviors Child	-.01	-.11	-.24*	-.21*	.11	-.27**	-.11	.43***	.34***	.25**	.62***	-

*Note.* Correlations for mothers are below diagonal; correlations for fathers are above diagonal.

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

***The Unique Contribution of Parental Personality Traits and Parenting Dimensions in Predicting Children's Behavioral Outcomes***

We subsequently examined the unique effects of parental gender and each of the parental personality traits and each of the parenting dimensions on children's behavioral outcomes. These unique influences were determined by conducting separate multilevel regression models for personality traits and parenting dimensions (Table 4). To account for possible parental gender differences in predictive associations, interactions between personality/parenting and parental gender were also included as predictors. Because of the dummy character of the parental gender variable (0 = fathers, 1 = mothers), main effects can be interpreted as the coefficients for *fathers*, whereas the corresponding coefficient for *mothers* can be easily calculated by adding the coefficient representing the parental gender interaction to this figure. For example, the main effect of extraversion on attention problems is  $-.17$  and the interaction effect is  $.25$ , meaning that the value for fathers is  $-.17$  and the value for mothers  $.08$  (i.e.,  $-.17 + .25$ ).

When examining the independent contributions of the parental personality traits, parental emotional stability uniquely predicted both attention problems and aggressive behaviors. Because there was no interaction with parental gender, these effects are consistent across mothers and fathers. None of the other parental personality traits contributed uniquely to the prediction of attention problems or aggressive behaviors.

When examining the independent contributions of parenting dimensions, psychological control appeared to be independently significantly related to attention problems as well as aggressive behaviors. Because there was no interaction with parental gender, these effects are consistent across mothers and fathers. In addition, lack of structure was significantly positively associated with aggressive behaviors, again both in fathers and in mothers. Finally, an interaction effect between support and parental gender was found for the prediction of aggressive behaviors. This effect indicated that for mothers a negative association was found between support and children's aggressive behaviors ( $\beta = .07 - .27 = -.20$ ), whereas for fathers no significant association was found ( $\beta = .07$ ).

Finally, the significant parental gender effect for aggressive behaviors in the personality as well as in the parenting model indicates that mothers perceived more aggressive behaviors of their child than fathers.

Table 4

*Examining the Unique Contribution of Parental Personality Traits and Parenting Dimensions to Children's Behavioral Outcomes*

	Attention Problems	Aggressive Behaviors
	$\beta$	$\beta$
<b>Personality Traits</b>		
Parental gender	-.01	.25*
Extraversion	-.17	.00
Agreeableness	.13	.09
Conscientiousness	-.02	.01
Emotional Stability	-.20*	-.26**
Openness	.04	-.09
Extraversion*Gender	.25	.07
Agreeableness*Gender	-.15	-.16
Conscientiousness*Gender	-.17	-.18
Emotional Stability*Gender	.07	.11
Openness*Gender	.01	.11
<b>Parenting Dimensions</b>		
Parental gender	.10	.31**
Support	.02	.07
Positive Discipline	-.05	-.02
Psychological Control	.24*	.28**
Lack of Structure	.01	.22*
Physical Punishment	.05	-.02
Support*Gender	-.19	-.27**
Positive Discipline*Gender	-.11	.01
Psychological Control*Gender	-.02	-.01
Lack of Structure*Gender	-.05	-.11
Physical Punishment*Gender	.06	.11

*Notes.* Separate regression analyses were conducted for personality traits and parenting

Parental gender: Father = 0; Mother = 1

\*  $p < .05$ ; \*\*  $p < .01$

***Parenting Dimensions as Mediators of the Relation between Parental Personality Traits and Children's Behavioral Outcomes***

As stated above, according to Muller et al. (2005) the first criterion for testing moderated mediation requires that the parental personality trait is significantly related to the particular child behavior outcome. As shown in Table 4, emotional stability was the only parental personality trait that was significantly related to children's behavior outcomes. The second criterion requires that the magnitude of these effects does not depend on parental gender. As can be seen in Table 4, this criterion also holds for the effects of emotional stability.

In order to test the third and fourth criterion formulated by Muller et al. (2005) two regression models were run for each parenting dimension (in other words, for each possible

mediator). In the first model, emotional stability, parental gender, and the emotional stability\*gender interaction were entered as predictors of the particular parenting dimension. In the second model, emotional stability, parental gender, the emotional stability\*gender interaction, the particular parenting dimension, and the parenting dimension\*gender interaction were entered as predictors of the particular child behavior problem (attention problems/aggressive behaviors) (see Table 5).

#### *Mediation Analyses for Attention Problems*

Firstly, Criterion 3 was tested for the prediction of attention problems. This criterion requires that either the effect of emotional stability on the particular parenting dimension or the effect of the particular parenting dimension on the child behavior outcome depends on parental gender, or both. Table 5 shows that the emotional stability\*gender interaction did not significantly predict any of the parenting dimensions. In addition, none of the parenting\*gender interactions significantly predicted attention problems. So, Criterion 3 does not hold for the association between emotional stability and attention problems and consequently we can conclude that there are no gender-specific mediating effects of parenting dimensions on this association.

Subsequently, we used Table 5 to explore whether there exist mediation effects which are not moderated by gender and thus are *similar* across fathers and mothers. One of the requirements for such mediation is that the relation between emotional stability and attention problems is reduced when the effect of the particular parenting dimension is controlled for (Baron & Kenny, 1986). To investigate whether this was the case, the strength of the association between emotional stability and attention problems in the unmediated model was compared to the strength of this association in the mediated models. Since in all mediation models this association was reduced only very marginally and remained significant after controlling for the parenting dimension, we can conclude that, in addition to the lack of mediation effects that differ across fathers and mothers, there is also no evidence of mediation effects that are similar across fathers and mothers. Thus, for both mothers and fathers emotional stability appeared to contribute directly to children's attention problems.

#### *Mediation Analyses for Aggressive Behaviors*

Subsequently, moderated mediation analyses were tested for the prediction of aggressive behaviors. Firstly, Criterion 3 was tested. As we already saw above, the emotional stability\*gender interaction did not significantly predict any of the parenting dimensions. However, the support\*gender interaction significantly predicted aggressive behaviors: support was significantly negatively related to children's aggressive behaviors for mothers only. Consequently, Criterion 3 was met for the associations between emotional stability, support and aggressive behaviors.

Table 5

*Moderated Mediation Analyses for Emotional Stability*

	Un- mediated Model	Model with Support as mediator		Model with Positive Discipline as mediator		Model with Psychological Control as mediator		Model with Lack of Structure as mediator		Model with Physical Punishment as mediator	
	Y	ME	Y	ME	Y	ME	Y	ME	Y	ME	Y
Prediction of Attention (Y)											
X (Emotional Stability)	-.21*	.19*	-.22*	.19*	-.20*	-.24*	-.18*	-.28**	-.18*	-.12	-.19*
MO (Parental Gender)	-.05	.69***	.03	.51***	.02	-.12	-.06	-.08	-.04	-.19	-.03
X*MO (Em. St.*Gender)	.13	-.01	.15	-.05	.13	-.02	.12	.02	.12	-.09	.13
ME (Parenting Dimension)			-.05		-.09		.22**		.10		.10
ME*MO (Parenting*Gender)			-.19		-.11		.02		.03		.06
Prediction of Aggression (Y)											
X (Emotional Stability)	-.23**	.19*	-.26**	.19*	-.23**	-.24*	-.18*	-.28**	-.18*	-.12	-.21*
MO (Parental Gender)	.26*	.69***	.30**	.51***	.28**	-.12	.27**	-.08	.26**	-.19	.28**
X*MO (Em. St.*Gender)	.09	-.01	.14	-.05	.09	-.02	.10	.02	.09	-.09	.10
ME (Parenting Dimension)			.07		-.03		.29***		.23**		.08
ME*MO (Parenting*Gender)			-.32*		-.05		.06		.01		.10

Notes. Y = dependent variable; X = independent variable; MO = moderator variable; ME = mediator variable

Parental gender: Father = 0; Mother = 1

Values are standardized coefficients

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

Finally, Criterion 4 was tested for the association between emotional stability, support and aggressive behaviors. This criterion requires that, next to the interaction effect of support and parental gender on aggressive behaviors, there is an overall effect of the independent variable (emotional stability) on the mediator (support). This indeed appeared to be the case: emotional stability was significantly positively related to support. Summarizing, there appeared to be a mediation effect of support on the association between emotional stability and children's aggressive behaviors for mothers only. Additionally, there was a direct effect of paternal emotional stability on children's aggressive behaviors.

Also here, it could be possible that other parenting dimensions than support mediate the association between emotional stability and children's aggressive behaviors in a way consistent for mothers and fathers. Again, among other requirements, this would require that the association between parental emotional stability and children's aggressive behaviors is reduced when the effect of the particular parenting dimension (positive discipline, psychological control, lack of structure, and/or physical punishment) is controlled for (Baron & Kenny, 1986). To investigate whether this was the case, the strength of the association between emotional stability and aggressive behaviors in the unmediated model was compared to the strength of this association in the mediated models. However, in all mediation models this association was reduced only very marginally or even increased somewhat and remained significant after controlling for the particular parenting dimension. Consequently, there is no evidence of mediation effects of parenting dimensions on the association between emotional stability and aggressive behaviors that are consistent across fathers and mothers.

## **Discussion**

Only few studies have explored the role that parental personality characteristics play in predicting young children's externalizing behaviors and to which extent these effects are mediated by parenting behaviors. Therefore, this study aimed to determine the degree to which parenting behaviors mediate the relationship between parental personality traits and toddlers' attention problems and aggressive behaviors. The results of the present study were generally in line with the hypotheses and consistent with results reported by previous studies (Kochanska et al., 1997; Prinzie et al., 2004; Stormshak et al., 2000), even though this study has been conducted in a different culture. Several associations were found between parental personality traits and parenting dimensions and additionally, several parenting dimensions were associated with children's externalizing behaviors. Emotional stability appeared to be the only parental personality trait that was related to children's externalizing behaviors. The results were partially in line with Patterson's and Belsky's assumptions that the impact of parental personality on children's adjustment is mediated by its impact on parenting practices (Belsky, 1984; Patterson, 2002; Patterson et al., 1992).

The effect of maternal emotional stability on children's aggressive behaviors appeared to be mediated by maternal support. However, parental emotional stability also contributed directly to children's externalizing behaviors. For fathers, the effect of emotional stability on children's aggressive behaviors appeared to be direct. In addition, for both mother and fathers, emotional stability was directly related to children's attention problems.

### ***Direct and Indirect Effects of Personality Traits***

As described above, in consistence with previous research (Kochanska et al., 1997; Prinzie et al., 2004), maternal emotional stability appeared to contribute indirectly to children's aggressive behaviors. Emotional stability of mothers influenced toddlers' aggressive behaviors through the impact on support: mothers who were less emotionally stable provided less support to their child, which subsequently led to elevated levels of children's aggressive behaviors. For fathers, support was not significantly related to children's externalizing behaviors, and thus paternal support had no mediating role in the significant association between paternal emotional stability and children's externalizing behaviors. The finding that maternal and not paternal support has a (mediating) effect on children's aggressive behaviors is consistent with previous studies that showed that children preferably seek mothers to comfort and sooth them (Lamb & Lamb, 1976) and that mothers, more than fathers, fulfil the role of being responsive and warm to their child (Calzada et al., 2004).

Another hypothesis was that parental personality traits would also directly contribute to children's externalizing behaviors. We expected more direct effects of parental personality for children's attention problems than for aggressive behaviors, because of the relatively strong genetic component of overactivity/inattention behaviors (Barkley, 1990; Rutter et al., 1999). Furthermore, we hypothesized that especially parental emotional stability and conscientiousness would to be directly negatively related to children's attention problems. Consistent with the hypothesis of more direct effects on children's attention problems, we indeed found children's attention problems to be directly and aggressive behaviors to be indirectly affected by maternal emotional stability. However, fathers' emotional stability was related directly to both children's attention problems and aggressive behaviors. Prinzie and colleagues (2004) also showed parental emotional stability to be directly negatively related to externalizing behaviors. In addition to the possibility that parental emotional stability may affect children's development through its heritability (Kochanska et al., 1997; Prinzie et al., 2005), parental emotional stability might be directly related to children's externalizing behaviors because of 'modeling'. Parents low on emotional stability have difficulties controlling urges and coping with various stressors (Costa & McCrae, 1992). This may result in uncontrolled reactions to other people. Children may imitate these reactions, resulting in increased levels of externalizing behaviors (Prinzie et al., 2005).

With regard to the expected effect of parental conscientiousness, maternal conscientiousness correlated significantly with children's externalizing behaviors, but this

association was just below significance in the multilevel analyses where we controlled for the other personality traits and the interactions with parental gender.

### ***Effects of Parenting***

We hypothesized parenting behaviors to be more strongly related to aggressive behaviors than to attention problems, again since other key factors such as cognitive control deficits and direct genetic influences have been implicated to underlie hyperactive/inattentive behaviors (Barkley, 1990; Rutter et al., 1999). This hypothesis was confirmed by the results: for both mothers and fathers, more parenting behaviors were significantly related to aggressive behaviors than to attention problems.

Concerning the specific parenting dimensions, we hypothesized psychological control to be positively related to attention problems, since hyperactive/inattentive behaviors might elicit psychological control from parents, which might subsequently lead to even higher levels of these hyperactive/inattentive behaviors (Campbell et al., 1991). In this study, we indeed found a positive association between maternal as well as paternal psychological control and toddlers' attention problems.

Consistent with previous studies, for both fathers and mothers psychological control was also found to be positively related to toddlers' aggressive behaviors (Danforth et al., 1991; Stormshak et al., 2000). As Stormshak and colleagues (2000) argue, although parental negative commands and threats may have the aim of pushing children to comply, these commands may be ignored by children, which may result in increased non-compliance (Campbell, 1990), or these commands may elicit increased aggressive acts of defiance (Danforth et al., 1991). In addition, children of parents who show high levels of verbal punishment are exposed to models of aggressive and unregulated behaviors and they may imitate these behaviors (Bandura et al., 1961; Campbell et al., 2000).

Furthermore, maternal and paternal lack of structure were negatively related to children's aggressive behaviors. Possibly, children whose parents are inconsistent and unpredictable, engage in oppositional and defiant behaviors in order to elicit predictable responses of their parent (Wahler & Dumas, 1986). Finally, as described above, maternal support appeared to be negatively related to toddlers' aggressive behaviors, which is in accordance with other studies (Kerr et al., 2004; Stormshak et al., 2000). An explanation might be that children of parents who are responsive and warm to their child are likely to feel secure and accepted and, thereby, to follow parents' suggestions (Chen et al., 2003).

This study had several strengths. Firstly, as recommended by many studies (Broidy et al., 2003; Campbell & Ewing, 1990), the present study focused on very young children. Gathering knowledge on the development and predictors of externalizing behaviors in such young children is important since externalizing behaviors identified in the preschool years appear to persist and to be moderately stable (Broidy et al., 2003; Campbell & Ewing, 1990). However, it is important to realize that all results have to be considered in the light of the very

young age of the participants in this study and we have to keep in mind that the contribution of the specific predictors may change over time. For example, it might be possible that the contribution of parenting declines with age, since the relative weight of other factors (i.e., influences by peers) might increase as children grow older. A second strength of the present study concerns the fact that it acknowledged the multi-dimensional nature of parenting by considering a broad range of parenting behaviors with a focus on negative as well as positive parenting. Thirdly, parental personality traits were measured in terms of the Five Factor Model, which has been shown to capture much of the variation in individual differences (John & Srivastava, 1999). Fourthly, both mothers and fathers filled out questionnaires on personality traits, parenting behaviors and children's behavioral outcomes. As noted by Mangelsdorf et al. (2000), mothers and fathers observe their child in different social contexts and at different times of the day and there is evidence suggesting that child behavior differs systematically across interactions with fathers and mothers. This highlights the importance of using fathers as well as mothers as a source of information regarding child behavior. Finally, the present study takes into account the interdependence of fathers' and mothers' characteristics. While many studies circumvent this issue of interdependence by conducting separate analyses for fathers and mothers from the same family (Campbell & Kashy, 2002), we accounted for this by using a multilevel framework. Furthermore, we applied moderated mediation analyses, which allowed for a formal test of whether mediation effects of parenting differed across mothers and fathers.

Several limitations of the present study should also be noted. First, a cross-sectional design was used, which limits the scope for drawing firm conclusions about the direction of effects. For parental personality characteristics in particular, we can be relatively sure about the direction of influence: since the big five personality measures are shown to exhibit considerable continuity over time (McCrae & Costa, 1994), it may seem unlikely that young children's externalizing behaviors influenced parental personality characteristics. On the other hand, van Aken, Denissen, Branje, Dubas and Goossens (2006) recently found that worries about children's problem behavior did lead to fluctuations in personality in the parents of adolescents. Furthermore, associations between toddlers' externalizing behaviors and parenting behaviors cannot be assumed to mirror unidirectional influences of parents on children. More specifically, it is also probable that externalizing behaviors evoke or select negative reactions. This pattern was expected in particular for attention problems, which were hypothesized to elicit more psychological control from parents. Consequently, longitudinal analyses should verify the causal direction of the effects.

Second, the present study relied upon questionnaire data only. This might have lead to an overestimation of associations between parental personality, parenting, and toddlers' behaviors because of shared method variance. The results on these associations need to be interpreted with this caveat in mind. Additionally, parental personality traits may affect the parents' appraisal of their child's behavior (Kurdek, 2003). Therefore, the link between

parental personality and children's behaviors might partly be an artefact. For instance, parents low in emotional stability are characterized by being anxious and irritable and they are likely to interpret situations as threatening. Consequently, an alternative explanation for the associations between parental emotional stability and children's externalizing behaviors found in the present study might be that parents who score low on emotional stability interpret the exuberance of young children as problematic behavior and subsequently overreport externalizing behaviors (Kurdek, 2003). Future studies might include observational data to tackle these problems.

Third, our sample included only boys. In our view, focusing on boys was legitimate since boys are at increased risk for both externalizing behaviors. However, data of some studies (e.g., Rubin, Hastings, Chen, Stewart, & McNichol, 1998) suggest that boys and girls may have different vulnerabilities to factors that impact externalizing behaviors. As a consequence it is unknown whether the results can be generalized to girls.

Finally, in the present study highly educated parents were overrepresented. Consequently, our sample consisted of families with mostly moderate to high socioeconomic status. Probably, the nonresponders of this study were mainly families with a low socioeconomic status. Future studies should establish whether the findings of the present study can be generalized to Dutch families from other social backgrounds.

Despite these limitations, the present study showed that parental personality, specifically emotional stability, is already predictive of aggressive behaviors as well as attention problems in very young children. This implicates that paying attention to parental emotional stability may help to identify very young children at risk for developing problem behaviors. Identifying children at risk as early as possible is very important since interventions targeted at younger children have been shown to be more efficacious than interventions targeted at older children (Reid, 1993). Since the effect of maternal emotional stability on toddlers' aggressive behaviors appeared to be mediated by supportive parenting, assisting mothers low in emotional stability to adjust their parenting towards a more supportive style might be an effective way to prevent persistent behavior problems in these young children. Moreover, since also other parenting dimensions are predictive for young children's externalizing behaviors (psychological control for both attention problems and aggressive behaviors and lack of structure for aggressive behaviors), interventions to prevent escalations of problems might generally focus on supporting parents of young children to apply more adaptive parenting practices.



## CHAPTER 5

### **The Longitudinal Relations between Parenting and Toddlers' Attention Problems and Aggressive Behaviors\***

#### **Abstract**

The aim of the present study was to examine the normative developmental trajectories of toddlers' externalizing behaviors and several maternal and paternal parenting dimensions. Latent growth models were used to determine intraindividual changes and interindividual differences in these changes. 108 boys were followed from 17 months of age to 35 months of age. A significant linear decrease in attention problems and a significant linear increase in aggressive behaviors were found. Additionally, multivariate models were tested that related the developmental trajectories of externalizing behaviors to the trajectories of the parenting dimensions. The results showed meaningful contemporary relations and relations between over-time trajectories of parenting dimensions and children's externalizing behaviors.

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\* van Aken, C., Junger, M., Verhoeven, M., van Aken, M.A.G., & Deković, M. (in press). *Infant Behavior and Development*.

## Introduction

Stability and change in externalizing behaviors in childhood have been the focus of several recent studies (Broidy et al., 2003; Gilliom & Shaw, 2004; Kraatz Keiley, Bates, Dodge, & Pettit, 2000). By investigating the normative change of externalizing behaviors, researchers have aimed to better understand the development of these behaviors and to gather information that facilitates the development of effective and well-timed interventions (Kraatz Keiley et al., 2000). Recently, researchers moved beyond investigating normative change and started studying individual variability in this change (Gilliom & Shaw, 2004).

Although studies found evidence for the existence of individual variability in trajectories of externalizing behaviors (e.g., Gilliom & Shaw, 2004; Zhou et al., 2007), few studies tested which factors are associated with these trajectories. That is also true for the potential role of parenting, which is generally considered to be one of the most important environmental contributors to early externalizing behaviors (Lengua, 2006; Prinzie, Onghena, & Hellinckx, 2006). However, since not only children's problem behaviors, but also parenting behaviors are developing over time (Dallaire & Weinraub, 2005; Gilliom & Shaw, 2004), it is important to consider relations between over-time trajectories of both constructs. Therefore, the present study focused on associations between change in parenting dimensions and change in two types of toddlers' externalizing behaviors: attention problems and aggressive behaviors. In this study five parenting dimensions were included that have been associated with externalizing behaviors in the literature: support, positive discipline, psychological control, lack of structure, and physical punishment (Brook, Zheng, Whiteman, & Brook, 2001; Feldman & Klein, 2003; O'Leary et al., 1999; Stormshak et al., 2000).

### *Normative Development of Externalizing Behaviors*

Most studies on the normative or average development of externalizing behaviors in childhood focused on children after the age of four years (e.g., Cairns et al., 1989; Stanger, Achenbach, & Verhulst, 1997). While some studies found increasing or stable trajectories for externalizing behaviors from kindergarten through seventh grade (e.g., Loeber et al., 1993), most studies reported decreasing trajectories of externalizing behaviors after four years of age (Cairns et al., 1989; Stanger et al., 1997). Similar patterns of decreasing growth have been found for hyperactivity problems and conduct problems between the school-aged period and adolescence (Nagin & Tremblay, 1999).

The number of studies on the normative development of externalizing behaviors during infancy and toddlerhood is also growing rapidly, with most studies indicating an increase until the second or third year of life, with a decrease after this age (Coie & Dodge, 1998; NICHD, 2004; Shaw, Gilliom, Ingoldsby, & Nagin, 2003; Shaw, Lacourse, & Nagin, 2005). For instance, Tremblay and colleagues (2004) demonstrated that physically aggressive behaviors increase and peak during the 2nd and 3rd year of life, and subsequently decline after the 3rd

birthday. Similarly, Campbell (1995) reported that externalizing problems in nonclinical samples tend to increase from age 2 to 3 and to decrease from age 3. The increase in externalizing behaviors during the very early years might be explained by the emergence of increasing self-awareness and goal-oriented behavior that contribute to a strong push for independence in children (Keenan & Wakschlag, 2000). When this independence clashes with (parental) limits, the child will get frustrated and more frequent episodes of children's non-compliance (Kochanska & Aksan, 1995), anger, negativity, and oppositionality will arise (Keenan & Wakschlag, 2000). The following decrease of these behaviors after the second or third year of life has been attributed to several later age-related changes. For instance, Tremblay and colleagues argue that the decline of physical aggression might be due to the development of self regulation skills and the emergence of alternative strategies to deal with conflicts (Côté et al., 2002; Tremblay, 2000). This view is supported by Brownell and Hazen (1999) who argue that, with the development of social and social-cognitive competence, aggressive strategies are replaced by more mature social-communicative skills. That is, children learn to negotiate to solve conflicts, to seek help of adults, or use more subtle types of aggression such as arguing, name-calling, or social exclusion (Coie & Dodge, 1998; Hartup, 1996).

Normative developmental trajectories describe the expected development of externalizing behaviors for most children. However, there may be considerable individual variation in these developmental pathways. Latent growth models combine individual and group level analyses, and therefore are appropriate for answering questions about normative/average development as well as individual variation in this development (Nagin, 2005; Ram & Grimm, 2007). In addition, growth curve modeling is very well suited for testing whether certain characteristics are related to individual differences in trajectories of development (Nagin, 2005; Ram & Grimm, 2007). And finally, advances in latent growth modeling enabled researchers to model how changes in different constructs are interrelated (Blozis, 2004; Grimm, 2007; Ram & Grimm, 2007). Unfortunately, while several recent studies used latent growth modeling for answering questions about the development of externalizing behaviors after the age of four years (Bongers, Koot, Van der Ende, & Verhulst, 2003; Prinzie et al., 2006), to our knowledge only one study used latent growth modeling to examine the growth trajectory of externalizing behaviors before the age of four years. This concerned a study by Gilliom and Shaw (2004) in which they reported that on average externalizing problems gradually decreased from age 2 to age 6, with significant variability in individual-level trajectories. Like most studies on externalizing behaviors, this study focused on a broadband pattern of externalizing behaviors and consequently does not offer information about the developmental course of specific forms of externalizing behaviors.

### ***Relations between Parenting and Externalizing Behaviors***

There is general consensus among scholars that the multitude of different parental

behaviors can be encapsulated in terms of two broad dimensions: support/warmth and control (i.e., Darling & Steinberg, 1993; O'Connor, 2002). Whereas support is a relatively homogeneous dimension, the dimension of parental control needs some differentiation since the various techniques that parents use to discipline their children are conceptually different and uniquely related to children's behavior (Slater & Power, 1987). Three dimensions of parental control have received considerable attention in past research: positive discipline, psychological control, and physical punishment. In addition to these support and control dimensions, Slater and Power (1987) distinguished another dimension of parenting, i.e., structure.

All these parenting dimensions have been associated with externalizing behaviors in the literature (Brook et al., 2001; Feldman & Klein, 2003; O'Leary et al., 1999; Stormshak et al., 2000).

*Parental support* (i.e., the degree to which parents are responsive to their child's needs and have positive interactions with their child) and *positive discipline* (i.e., the degree to which parents reinforce good behavior of their child and make use of disciplinary techniques such as induction) are consistently reported to have a positive effect on children's functioning (e.g., Feldman & Klein, 2003; Gardner, Sonuga-Barke, & Sayal, 1999; Stormshak, Bierman, McMahon, & Lengua, 2000). A possible explanation might be that when parents are sensitive to their child's needs, when they express warm feelings and when their requests are reasonable and understandable to the child, children are likely to feel secure and accepted and, thereby, to follow parents' suggestions (Chen et al., 2003). *Psychological control* refers to disciplinary techniques such as verbal punishment and withdrawal of attention and/or affection when a child misbehaves. Parents who frequently make use of these techniques, are reported to have children with elevated rates of diverse disruptive behavior problems (Danforth, Barkley, & Stokes, 1991; Stormshak et al., 2000). A psychologically controlling environment manipulates and exploits the parent-child relationship, and consequently limits the child's opportunities to develop a healthy awareness and perception of the self, hereby constraining the development of socially accepted behavior (Barber, 1996). In addition, children of parents who show high levels of verbal punishment are exposed to models of aggressive and unregulated behaviors (Bandura, Ross, & Ross, 1961; Campbell, Shaw, & Gilliom, 2000). *Physical punishment* (i.e., the degree to which parents use spanking as a discipline technique) was also found in several previous studies to be associated with increased behavior problems (Brook, Zheng, Whiteman, & Brook, 2001; Stormshak et al., 2000). This might be explained from a social learning perspective: physical punishment models aggression and might children make expect that hostile and aggressive behaviors have successful outcomes (Campbell et al., 2000). Furthermore, according to Gershoff (2002) physical punishment is thought to prevent internalization of parents' values and those of the society by eroding the attachment bond between the parent and the child. Finally, practices belonging to the parenting dimension *lack of structure* (i.e., the degree to which parents fail to

create a predictable and organized environment for the child, by being lax and inconsistent or by overreacting) have also been linked with elevated levels of externalizing behaviors (O'Leary, Smith Slep, & Reid, 1999; Prinzie et al., 2003). One possible explanation for these associations was offered by Patterson (1986), who noted that parental failure to be consistent and to follow through with commands may result in reinforcement of non-compliance. An alternative explanation was offered by Wahler and Dumas (1986), who suggested that children whose parents are inconsistent and unpredictable engage in oppositional and defiant behaviors in order to elicit predictable responses of their parent.

### ***Incorporating Changes in Parenting and/or Externalizing Behaviors***

Whereas these above mentioned studies used cross-sectional designs or longitudinal designs in which parenting behaviors were used to predict subsequent levels of problem behaviors, some recent studies utilized latent growth modeling or semi-parametric group analyses to examine relations between parenting and child problem behaviors. This enabled them to incorporate changes in parenting and/or externalizing behaviors in their analyses. In a study on the interactive effects between temperament and parenting on the course of externalizing behaviors in children between 2 and 6 years of age, Gilliom and Shaw (2004) found that, for children who scored high on negative emotionality and low on fearfulness, high negative maternal control predicted high, non-decreasing externalizing trajectories. Comparable to these results, Prinzie and colleagues (2006) found that higher scores of parental coercion and overreactivity were related to higher initial levels of aggressive behaviors of school-aged children, while higher scores of parental coercion were also related to a slower decrease of aggressive behaviors. Lengua (2006) examined the predictive value of changes in parenting across three years for school-aged children's adjustment problems at the end of these three years. She found that increases in maternal rejection and inconsistent discipline predicted, partly in interaction with children's temperament, higher levels of externalizing behaviors at the last measurement wave of the study.

In another study, using semi-parametric group analyses in order to model developmental trajectories of conduct problems from ages 2 to 8, Shaw and colleagues (2003) reported that rejecting parenting differentiated children who belonged to a group of children showing persistent conduct problems from those who showed initially high levels of conduct problems, but later desisted. In a later study, Shaw and colleagues (2005) found that this effect of parenting did not apply to hyperactivity/attention problems: while rejecting parenting differentiated children with chronic conduct problems from children with persistent low conduct problems, parenting did not differentiate between children with chronic hyperactivity/attention problems and children with persistent low levels of these problems. These findings are in accordance with studies suggesting that hyperactive/inattentive behaviors may be more strongly related to different etiological factors, among which cognitive control deficits and genetic influences (Barkley, 1990; Frick et al., 1993; Rutter,

Silberg, O'Connor, & Simonoff, 1999).

The abovementioned studies make an important contribution to the developmental study of externalizing behaviors in children. However, there are three limitations of these studies. First, most studies focused on a broadband pattern of externalizing behaviors and consequently did not offer information about the specific developmental course and specific predictors of different forms of externalizing behaviors. Second, these studies focused on a restricted range of parenting behaviors (almost exclusively negative parenting) and did not provide information about effects of positive parenting behaviors on the development of children's externalizing behaviors. Third, to our knowledge, no study examined over-time trajectories, or correlated change, between parenting and specific externalizing behaviors during toddlerhood. However, toddlerhood might be an especially relevant age-period for studying these research questions, since this is a period that is marked by many challenges and changes for both children and their parents: the child's development is characterized by the emergence of self-awareness and goal-oriented behaviors (Scaramella & Leve, 2004). In response to their children's increasing autonomy, and as a natural part of the socialization process, parents have to adjust their child rearing and their parenting tasks broaden. As a consequence, the period from infancy to preschool age is one of the most critical in development (Shaw et al., 2003) and focusing on the covariation of parenting and externalizing behaviors over time during this period, may add an important niche to the literature. Therefore, the present study intended to extend prior work by filling in these gaps of the current literature.

### ***Research Questions of the Present Study***

In the present study we intended to examine intraindividual changes in toddlers' externalizing behaviors and maternal as well as paternal parenting dimensions and interindividual differences in these changes, using latent growth curve modeling. In addition, we related the developmental trajectories of externalizing behaviors to the trajectories of the parenting dimensions.

The focus of this study was on four questions:

First, is there evidence for systematic change (and individual variability in change) in children's attention problems and aggressive behaviors between 17 and 35 months of age? Since the age period before the third year of life is characterized by increasing self-awareness, goal-oriented behavior, independence, and the accompanying frustration in the face of limits (Keenan & Wakschlag, 2000), while the child is not able of self-regulation yet, we expected increasing trajectories for externalizing behaviors.

Second, are the initial levels of parenting dimensions related to the initial levels of children's externalizing behaviors? From prior work on the associations between parenting and externalizing behaviors (e.g., Brook, Zheng, Whiteman, & Brook, 2001; Campbell & Ewing, 1990; Stormshak et al., 2000), we expected initial levels of parental psychological

control, physical punishment, and lack of structure to be positively associated with initial levels of toddlers' externalizing behaviors and initial levels of support and positive discipline to be negatively associated with initial levels of these externalizing behaviors. Overall, parenting dimensions were expected to be more strongly associated with aggressive behaviors than with attention problems, since past research shows that hyperactive/inattentive behaviors may be more strongly predicted by other factors, among which cognitive control deficits and genetic influences (Barkley, 1990; Frick et al., 1993; Rutter et al., 1999; Shaw et al., 2005).

Third, is the initial status of parenting related to the change in children's externalizing behaviors and/or is the initial status of children's externalizing behaviors related to the change in parenting? Nowadays several parent-child interaction models suggest that parenting and children's externalizing behaviors are reciprocally related (e.g., Chamberlain & Patterson, 1995). However, results of empirical studies with regard to the causal direction of effects in the relation between parenting and children's behavior problems are not consistent. For instance Vuchinich, Bank and Patterson (1992) and Gadeyne, Ghesquiere and Onghena (2004) found support for the bidirectionality of influences, while a study by Fite, Colder, Lochman and Wells (2006) only found evidence for child externalizing behaviors predicting parenting. An important issue is that the direction and size of effects may depend on the age of the children. As noted earlier, toddlerhood is a period that is marked by many changes for both children and their parents. During this period, parents' caregiving and children's characteristics will be continually exerting a pull on one another (Rothbaum & Weisz, 1994), which may be the start of an increasing reciprocity between the parent and the child. Therefore, we expect to see some, but still small, effects from parenting on children's behaviors as well as from children's behaviors on parenting.

The fourth and final research question of the present study was: are the changes in parenting behaviors and the changes in children's externalizing behaviors interrelated? The parallel continuities hypothesis (e.g., Caspi, 1993) states that individual behavior will be stable when there is stability in the environment, especially in the parenting or family system. However, if either of the two changes, this may be accompanied by changes in the other part. Consequently, we expected that if either parenting or problem behavior changes, the other construct changes too.

## **Method**

### ***Sample and Procedure***

The data used in the present study were collected as part of a longitudinal project focusing on the development of externalizing behaviors in toddlerhood. Only boys were included since externalizing behaviors are more common among boys than girls and because boys displaying these behaviors are at greater risk for continued behavior problems (Alink et al., 2006; Webster-Stratton, 1996).

The sample for this study was drawn from Infant and Toddler Clinics in three cities in the Netherlands. In the Netherlands, these clinics follow all children from birth up to four years of age and they systematically check the child's growth and development. Thus, the sample is considered to be a community sample. A recruitment letter explaining the goals of the project was sent to all families with a son who was born between October 2002 and February 2003 ( $N = 192$  families). This letter was followed up by a telephone call. Of the 192 families, 117 (61%) agreed to participate. Frequent reasons for not participating were: failure to reach a family (approximately 25% of the non-participants), a lack of time or a lack of interest in the topic of the project. Four measurement waves were used with a six-months interval. The attrition rate during the study was minimal: Of the 117 families that started in the study, 108 participated in each of the four waves.

The age of the children ranged from 16 to 19 months ( $M = 16.9$  months,  $SD = .58$  months) at Wave 1, from 21 to 25 months ( $M = 23.2$  months,  $SD = .62$  months) at Wave 2, from 28 to 32 months ( $M = 28.8$  months,  $SD = .72$  months) at Wave 3 and from 33 to 37 months ( $M = 34.9$  months,  $SD = .71$  months) at Wave 4. Parental level of education ranged from low (elementary school) to high (college degree or more), with 63% of the mothers and 66% of the fathers having a college degree or more. Parents were primarily Dutch (95%). Most children (97%) lived in intact families.

### ***Instruments***

All constructs were measured at each of the four measurement waves. Instruments that were originally produced in English and of which no standard translation into Dutch was available were translated into Dutch by means of a back-translation procedure.

*Externalizing Behaviors.* To measure attention problems and aggressive behaviors, the Child Behavior Checklist 1½-5 (Achenbach & Rescorla, 2000) was used. Mothers were asked to indicate from 0 (*never*) to 2 (*often*) whether items were indicative of the child's behavior. Cronbach's alphas for attention problems ( $N = 5$ ) were on average .67, with a range from .64 to .71. Cronbach's alphas for aggressive behaviors ( $N = 19$ ) were on average .88, with a range from .86 to .90. Correlations between attention problems and aggressive behaviors were .63 ( $p < .001$ ), .62 ( $p < .001$ ), .67 ( $p < .001$ ) and .62 ( $p < .001$ ) at respectively Wave 1, Wave 2, Wave 3, and Wave 4. Relative stability across the four waves for attention problems and aggressive behaviors was respectively .47 ( $p < .001$ ) and .59 ( $p < .001$ ). At the final wave, the majority of children scored in the normal range ( $t$ -score  $< 65$ ) on attention problems (92%) and aggressive behaviors (90%).

*Parenting.* Fathers and mothers were asked to judge their own parenting behaviors by filling out questionnaires. We used a five-fold classification of parenting consisting of the following dimensions: support, positive discipline, psychological control, physical

punishment, and lack of structure. This model was tested by conducting confirmatory factor analyses using structural equation modeling (LISREL 8). The model was found to be measurement invariant across fathers and mothers and produced an adequate fit:  $\chi^2(166) = 205.91$ , RMSEA = .04, NNFI = .93, CFI = .96. All factor loadings were significant at the  $p < .001$  level (Verhoeven et al., 2007). Scores for parenting dimensions were assigned by computing mean-scores of all items the scales consisted of.

*Support.* Two scales were used to assess parental support. The degree to which parents adequately and *responsively* react to the needs, signals, and condition of their child was measured by a subscale from a Dutch parenting questionnaire (Gerris et al., 1993). Parents rated the frequency of their parenting behavior on a 5-point scale ranging from 1 = *never* to 5 = *always*. The original scale consists of eight items (e.g., “I know very well what my child feels or needs”). Four of the items are not suitable for toddlers, and were consequently deleted from the scale.

The degree to which a parent is involved in *positive interactions* with the child was measured by a 5-item adaptation of Strayhorn and Weidman’s (1988) Parent Practices Scale. Parents were asked to rate the frequency of their positive interactions with their child on a 5-point scale (for example “How often do you and your child laugh together?”), ranging from 1 = *never* to 5 = *many times each day*.

For mothers, Cronbach’s alphas for reported support were on average .68, with a range from .61 to .77. For fathers, Cronbach’s alphas for reported support were on average .80, with a range from .78 to .81.

*Positive Discipline.* Two indicators of parental use of positive discipline were assessed. Six items derived from the Alabama Parenting Questionnaire (Frick, 1991; Shelton, Frick, & Wootton, 1996) measured *reinforcement of good behavior*. Parents could indicate how often they praise their child’s good behavior on a 5-point scale, ranging from 1 = *never* to 5 = *always*. For example, “You praise your child when he behaves well”.

The second indicator, *induction*, was measured by a subscale from a Dutch parenting questionnaire, consisting of four items (Gerris et al., 1993). On a 5-point scale, ranging from 1=*never* to 5=*always*, parents indicated how often they point out the consequences of the child’s misbehavior. An example-item is “When my child does not listen to me, I explain to him that it annoys me”.

For mothers, Cronbach’s alphas for reported positive discipline were on average .71, with a range from .60 to .76. For fathers, Cronbach’s alphas for reported positive discipline were on average .74, with a range from .66 to .77.

*Psychological Control.* To assess psychological control two scales were used. Four items measured *love withdrawal* (Gerris et al., 1993). Parents were asked to rate on a 5-point

scale, ranging from 1=*never* to 5=*always*, how often they use withdrawal of attention and/or affection as a technique to discipline their child. One of the four items is, “When my child misbehaves, I pretend that he is not there anymore”.

With ten items derived from the Discipline-scale of the Parent Behavior Checklist (Fox, 1994), *verbal punishment* was assessed. Parents indicated on a 5-point scale (1 = *never* to 5 = *always*) how often they raise their voice as a response to their child’s misbehavior. For example “I yell at my child for being too noisy at home”.

For mothers, Cronbach’s alphas for reported psychological control were on average .72, with a range from .68 to .75. For fathers, Cronbach’s alphas for reported psychological control were on average .73, with a range from .66 to .81.

*Physical Punishment.* Two scales assessed parental use of physical punishment. Five items were drawn from the Discipline-scale of the Parental Behavior Checklist (Fox, 1994), the other three are items from the Alabama Parenting Questionnaire (Frick, 1991; Shelton et al., 1996). The items measure the frequency in which parents use physical punishment as a manner to discipline their child. On a 5-point scale parents had to indicate how often they use spanking as a discipline-technique, ranging from 1 = *never* to 5 = *always*. Example items are “When my child has a temper tantrum, I spank him”, and “You spank your child with your hand when he has done something wrong”.

For mothers, Cronbach’s alphas for reported physical punishment were on average .79, with a range from .74 to .82. For fathers, Cronbach’s alphas for reported physical punishment were on average .79, with a range from .77 to .80.

*Lack of Structure.* To assess the degree to which parents provide a structured environment for their child, three scales were used. Two of these scales are from the shortened version of the Parenting Scale (Irvine, Biglan, Smolkowski, & Ary, 1999). The first scale, *laxness*, describes a parent who is permissive and inconsistent when providing discipline. This scale consists of six items presenting discipline encounters (“When my child misbehaves....”) followed by two options that act as opposite anchor points for a 7-point scale, where a high score indicates that parents are lax in their parenting. For example, “If my child gets upset when I say ‘no’, I stick to what I said – or the opposite- I back down and give in to my child”.

The second scale, *overreaction*, measures parental tendency to react on child’s transgressing behavior in an unstructured, exaggerated manner. This scale consists of four items with two answer options that act as opposite anchor points. One of the four items is “When my child misbehaves, I handle without getting upset - or the opposite - I get so frustrated that my child can see I’m upset”. A high score indicates that a parent is often overreacting. The five items of the *inconsistency* scale from the Alabama Parenting Questionnaire (Frick, 1991; Frick, Christian, & Wootton, 1999; Shelton et al., 1996) were

used to measure lack of structure in terms of inconsistency in applying discipline. Parents rated themselves on a 5-point Likert-scale, ranging from 1 = *never* to 5 = *always*. An example-item is “You threaten to punish your child and then do not actually punish him”.

Since these three scales that measured lack of structure have different rating scales, the scores on these scales were standardized over the four waves, before assigning a score for lack of structure.

For mothers, Cronbach’s alphas for reported lack of structure were on average .81, with a range from .80 to .83. For fathers, Cronbach’s alphas for reported lack of structure were on average .83, with a range from .78 to .87.

## **Plan of Analysis**

First, univariate Latent Growth Models (LGMs) were fitted to externalizing behaviors and parenting dimensions to determine the form of the growth trajectory that most adequately described intraindividual changes and interindividual differences in these changes in externalizing behaviors and each of the parenting dimensions.

In order to examine growth, 2-factor Latent Growth Models (LGMs) were used. The first factor (the intercept factor) describes the initial level of the particular construct (intercept mean) and individual differences in the initial level (intercept variance). The intercept is a constant for any given individual across time; therefore the factor loadings for problem behavior measures were set at 1 for each wave. The second factor in the LGMs (the slope factor) describes the rate of change (slope mean) and individual differences in growth patterns (slope variance). Two models were tested. In the first basic model (linear growth model) these factor loadings are fixed at the specific values that correspond to a linear time scale (0, 1, 2, and 3). The second model allows possible nonlinearity (nonlinear model). In this model, the constraints on linear growth are relaxed. Because at least two factor loadings on the slope factor must be fixed to two different values to identify the model, the first two loadings are fixed at 0 and 1 and the third and fourth factor are allowed to be freely estimated. A value for the third factor loading larger than 2 would indicate increasing change, a value smaller than 2 would indicate decreasing change. Similarly, a value for the fourth factor loading larger than 3 would indicate increasing change, a value smaller than 3 would indicate decreasing change. The error terms in the models were allowed to correlate with each other if doing so significantly improved the overall model fit. The parameters of growth (intercept mean, slope mean, intercept variance, slope variance, and error terms) were estimated using structural equation modeling (LISREL 8), with the covariance matrix as input.

The models were then compared using a standard “decrement-to-chi-square” test in which the respective goodness of fits (and degrees of freedom) of the two models are differenced (Willett & Sayer, 1994). For each construct, the model that best describes (in parsimony and goodness of fit) the actual growth curve is then selected.

In the second step of data analysis, the best-fitting model for each of the variables was used to examine longitudinal relations between parenting dimensions and externalizing behaviors in multivariate LGMs. In each multivariate LGM, three latent growth curves (one for the particular parenting dimension, one for attention problems and one for aggressive behaviors) were included. Consequently, 10 multivariate latent growth models were used: one for each of the five maternal parenting dimensions and one for each of the five paternal parenting dimensions. In these models the error terms of the same scales at different time points were allowed to correlate with each other if doing so significantly improved the overall model fit (Cole & Maxwell, 2003). In the multivariate latent growth models we intended to estimate 1) correlations among the intercepts of parenting dimensions and children's externalizing behaviors (contemporary relations), 2) correlations between intercepts and slopes of parenting dimensions and children's externalizing behaviors (over-time correlations) and 3) correlations among slopes of parenting dimensions and children's externalizing behaviors (correlated change). Significant intercept variation and significant slope variation were considered to provide justification for including predictor variables to explain this variation in intercepts or slopes (Byrne & Crombie, 2003). Therefore, only intercepts and slopes with a significant variance were examined in relation to intercepts and slopes of other variables.

## Results

### *Univariate Latent Growth Models*

Table 1 presents the parameter estimates of the best-fitting univariate models for children's externalizing behaviors and paternal as well as maternal parenting dimensions. Fit indices for these models indicated an acceptable to good fit to the data. The model for children's aggressive behaviors produced a good fit:  $\chi^2(5) = 5.80$ ,  $p = .33$ , CFI = 1.00, NNFI = 1.00, RMSEA = .04. Most fit indices of the model for children's attention problems also indicated an acceptable fit, except the RMSEA:  $\chi^2(4) = 8.83$ ,  $p = .07$ , CFI = .98, NNFI = .96, RMSEA = .11. Since the 90 percent confidence interval of the RMSEA was rather large (.00; .17) and since the other fit measures indicated good fit, we decided to consider the fit of this model as acceptable. For maternal parenting dimensions, chi-squares ranged from 1.30 to 6.16 with a mean of 3.10 for models with 2 to 5 degrees of freedom,  $p > .05$ ; the CFI ranged from .99 to 1.00 with a mean of .998; the NNFI ranged from .99 to 1.02 with a mean of 1.01; and the RMSEA ranged from .00 to .05 with a mean of .01. For paternal parenting dimensions, chi-squares ranged from .95 to 8.69 with a mean of 4.71 for models with 4 to 6 degrees of freedom,  $p > .05$ ; the CFI ranged from .98 to 1.00 with a mean of .996; the NNFI ranged from .98 to 1.02 with a mean of 1.00; and the RMSEA ranged from .00 to .07 with a mean of .02.

The mean estimates for the intercepts in Table 1 show the initial mean scores on the particular variables. As also can be seen in Table 1, the variance for the intercept factors was significantly different from zero for all variables, which indicates that there were systematic

individual differences in the initial (Wave 1) scores on all variables of interest.

The mean estimates for the slopes in Table 1 describe the rate of predicted mean change. In order to obtain an indication of the degree of predicted change, the changes from baseline to end point are presented as change in standard deviations (last column of Table 1). Therefore, for each construct the difference was computed between the predicted score at Wave 1 and the predicted score at Wave 4. Subsequently, this difference was divided by the standard deviation of the particular construct at Wave 1. With Cohen's convention (1977), a change  $< 0.4 SD$  is considered a small change, whereas changes in the range of  $0.4 SD$  to  $0.7 SD$  are considered medium-size changes, and changes  $> 0.7 SD$  are considered large.

Change in both attention problems and aggressive behaviors appeared to be best described by a linear growth curve, with children's attention problems revealing a significant decrease over time and aggressive behaviors showing a significant average increase over time (the direction of the change is indicated by the sign of the slope mean estimate). However, according to the change in standard deviations, the mean changes in both attention problems and aggressive behaviors are considered to be small. The changes in maternal lack of structure and paternal psychological control were also best described by a linear trajectory, with a significant average increase over time. However, according to the Wave 3 and Wave 4 slope factor loadings of maternal psychological control and maternal as well as paternal positive discipline, change in these variables was best described by a nonlinear trajectory. These variables increased (according to the positive mean slopes) from Wave 1 to Wave 4, with the largest increase from Wave 1 to Wave 2, and smaller increases from Wave 2 to Wave 3 (estimated factor loading smaller than 2) and from Wave 3 to Wave 4 (estimated factor loading smaller than 3). As indicated by the change in standard deviations, the mean changes in maternal positive discipline and psychological control as well as the mean change in paternal positive discipline are considered large (changes  $> .70 SD$ ), with small changes for the other parenting dimensions (changes  $< .40 SD$ ). No significant changes were found for maternal as well as paternal support, maternal as well as paternal physical punishment, and paternal lack of structure.

The factor variances indicate whether there were significant individual differences in the rate of change. In contrast to children's aggressive behaviors, individual differences in the rate of change were found for children's attention problems. In addition, for maternal positive discipline and maternal physical punishment as well as for paternal support, there appeared to be such significant systematic differences in the rate of change.

Table 1

*Results of The Univariate Growth Curve Models*

	Best-fitting Model	Slope loading at T3 <sup>a</sup>	Slope loading at T4 <sup>a</sup>	Intercept		Slope		Predicted change in <i>SD</i>
				<i>M</i>	$\sigma^2$	<i>M</i>	$\sigma^2$	
Child Outcomes								
Attention Problems	Linear	2.00	3.00	.62	.10***	-.03*	.01**	.24
Aggressive Behaviors	Linear	2.00	3.00	.61	.07***	.02*	.00	.19
Maternal Parenting								
Support	Non-linear	1.08	1.85	4.46	.06***	.01	.00	.08
Positive Discipline	Non-linear	1.17	1.38	3.80	.25**	.33***	.13**	1.94
Psychological Control	Non-linear	1.41	1.76	1.46	.10***	.23***	.03	1.86
Physical Punishment	Linear	2.00	3.00	1.36	.13***	-.01	.01*	.04
Lack of Structure	Linear	2.00	3.00	-.05	.38***	.05**	.01	.38
Paternal Parenting								
Support	Linear	2.00	3.00	4.19	.12***	-.01	.01*	.07
Positive Discipline	Non-linear	1.58	1.88	3.69	.18***	.20***	.01	1.18
Psychological Control	Linear	2.00	3.00	1.62	.12***	.10***	.01	.70
Physical Punishment	Linear	2.00	3.00	1.41	.12***	-.02	.00	.08
Lack of Structure	Linear	2.00	3.00	-.08	.46***	.02	.01	.15

<sup>a</sup>T1 = 0, T2 = 1 in all models

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

### ***Multivariate Latent Growth Models***

In the multivariate models, the trajectories of the mother-reported externalizing behaviors were related to the growth trajectories of the paternal and maternal parenting dimensions.

The fit of the 10 multivariate latent growth models was acceptable to good. Chi-squares ranged from 89.54 to 100.12 with a mean of 92.51 for models with 52 to 58 degrees of freedom; the CFI ranged from .95 to .97 with a mean of .96; the NNFI ranged from .95 to .96 with a mean of .95; and the RMSEA ranged from .06 to .11 with a mean of .08.

### ***Contemporary Correlations Between Parenting Dimensions and Externalizing Behaviors***

Significant intercept variation provides justification for including predictor variables to explain this variation (Byrne & Crombie, 2003). Since all variables had a significant intercept variance, the intercept of each variable was examined in relation to the intercept of the other variables. These correlations are shown in Table 2. All maternal parenting dimensions, except maternal positive discipline, were significantly and in predicted direction related to both attention problems and aggressive behaviors. None of the paternal parenting dimensions correlated significantly with children's attention problems or aggressive behaviors.

### ***Over-Time Intercept-Slope Correlations***

Next, we examined the intercept of each parenting dimension and each externalizing behavior as a predictor of the slope of the other to provide an indication of the direction of effect between parenting and children's externalizing behaviors. Again, since all variables had a significant intercept variance, from each variable the intercept was examined as a predictor of the slopes of other variables. However, only children's attention problems, maternal positive discipline, maternal physical punishment, and paternal support had a significant slope variation. Therefore, only the slopes of these variables were examined in relation to the intercepts of other variables. The results indicated that none of the over-time intercept-slope correlations was significant.

### ***Correlated Change in Parenting Dimensions and Externalizing Behaviors***

Finally, we investigated correlations between slopes of parenting dimensions and slopes of externalizing behaviors to test whether changes in parenting dimensions were related to changes in children's externalizing behaviors. Again, only variables with a significant slope variation were included in these analyses. Consequently, we examined the relation of the slope of children's attention problems with the slopes of maternal positive discipline, maternal physical punishment, and paternal support. The slope of maternal positive discipline was not significantly related to the slope of children's attention problems (unstandardized coefficient = -.01, standardized coefficient = -.25,  $p > .05$ ). However, the slopes of maternal physical punishment and paternal support appeared to be associated with the slope of attention problems: although on average maternal physical punishment did not decrease significantly,

those mothers who did report a greater decrease in physical punishment, also reported a greater decrease in their children's attention problems (unstandardized coefficient = .01, standardized coefficient = .55,  $p < .01$ ). And although on average paternal support did not decrease significantly, those fathers who did report a higher rate of decrease in support, appeared to have children with a slower rate of decrease in attention problems (unstandardized coefficient = -.01, standardized coefficient = -.46,  $p < .05$ ).

Table 2

*Correlations between Intercepts of Parenting Dimensions and Intercepts of Children's Externalizing Behaviors*

	Attention Problems		Aggressive Behaviors	
<b>Maternal Parenting</b>				
Support	-.40**	(.01)	-.39**	(.01)
Positive Discipline	-.11	(.02)	-.15	(.01)
Psychological Control	.48***	(.01)	.36***	(.01)
Physical Punishment	.27*	(.01)	.25*	(.01)
Lack of Structure	.28*	(.03)	.31**	(.02)
<b>Paternal Parenting</b>				
Support	-.09	(.01)	.04	(.01)
Positive Discipline	.14	(.01)	.11	(.01)
Psychological Control	.07	(.01)	.06	(.01)
Physical Punishment	.01	(.01)	-.02	(.01)
Lack of Structure	.05	(.03)	.05	(.02)

*Note.* Values are standardized coefficients and standard errors (between the brackets) from the latent growth curve models. \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

### ***Additional Analyses***

Since paternal reports of children's externalizing behaviors were available only at Waves 3 and 4, it was not possible to model latent growth curves based on paternal reports. Especially for the associations between maternal parenting and maternal reports of externalizing behaviors, this might have lead to possible artefacts. In order to obtain an indication of the degree to which relating parenting dimensions and child outcomes that have been reported by the same informant might lead to inflated associations, we conducted some additional analyses. More specifically, for Waves 3 and 4 we correlated both the paternal and the maternal parenting dimensions with both the paternal and the maternal reports on externalizing behaviors, and compared the magnitude of these correlations using a t-test for the difference of two dependent correlations from the same sample (<http://home.clara.net/sisa/correl.htm>). To get more robust variables, we aggregated each score for Wave 3 and Wave 4.

Table 3

*Correlations between Parenting Dimensions and Children’s Externalizing Behaviors (Average Scores across Waves 3 and 4)*

	Attention Problems			Aggressive Behaviors		
	Mother-report ( <i>r</i> )	Father-report ( <i>r</i> )	T-test ( <i>t</i> )	Mother-report ( <i>r</i> )	Father-report ( <i>r</i> )	T-test ( <i>t</i> )
<b>Maternal Parenting</b>						
Support	-.30**	-.21*	-.97	-.28**	-.10	-2.04*
Positive Discipline	-.25*	-.26**	.11	-.10	-.12	.22
Psychological Control	.28**	.19*	.96	.38***	.33***	.59
Physical Punishment	.20*	.13	.74	.24*	.13	1.23
Lack of Structure	.19*	.29**	-1.07	.28**	.36***	-.93
<b>Paternal Parenting</b>						
Support	.03	-.06	.93	.02	.07	-.54
Positive Discipline	.05	-.10	1.56	.13	.06	.77
Psychological Control	.08	.26**	-1.92	.10	.38***	-3.31***
Physical Punishment	-.08	-.03	-.52	.00	.06	-.65
Lack of Structure	.04	.18	-1.47	.04	.30**	-2.99**

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

The results in Table 3 show that for the association between maternal parenting and externalizing behaviors, largely the same pattern of results was obtained when correlating the parenting dimensions to mother-reported versus to father-reported child outcomes, with the exception of a higher correlation between maternal support and mother-reported (instead of father-reported) aggressive behaviors. This suggests that relating maternal parenting to maternal reports of externalizing behaviors in the latent growth curves in most cases did not lead to an overestimation of associations. For fathers, these differences were significant in only two cases: paternal psychological control and paternal lack of structure correlated significantly higher with father-reported than with mother-reported aggressive behaviors. However, since paternal parenting was related to mother-reported child outcomes in the latent growth models, this bias did not affect the results of these models.

**Discussion**

This longitudinal study examined intraindividual changes in toddlers’ attention problems and aggressive behaviors and interindividual differences in these changes, using latent growth curve modeling. A significant linear decrease in attention problems and a significant linear increase in aggressive behaviors were found. Subsequently, we related these externalizing trajectories to the growth trajectories of paternal as well as maternal parenting dimensions.

Consequently, the present study took the important step of examining how changes in parenting dimensions are related to changes in children's externalizing behaviors. The results showed meaningful contemporary relations and relations between over-time trajectories of parenting dimensions and children's externalizing behaviors.

### ***Normative Development of Toddlers' Externalizing Behaviors***

The results indicated that the mean change in both attention problems and aggressive behaviors between 17 and 35 months of age appeared to be best described by a linear growth curve, with significant developmental decrease for children's attention problems and significant increase for aggressive behaviors. It should be noted that, although these changes are statistically significant, they are rather small (change in  $SD < .40$ ). However, we have to keep in mind that these changes concern changes on the group level. In other words, although there are only small changes for the group as a whole, there may be larger changes on the individual level. This is especially the case for attention problems, where significant individual differences in the rate of change were found. These findings specify and add to previous studies that focused on the development of early externalizing behaviors in general (Campbell, 1995; Gilliom & Shaw, 2004). More specifically, our results point out the importance of treating different forms of externalizing behaviors as separate constructs, since they appear to follow different trajectories.

The increase in aggressive behaviors is in line with our hypotheses and consistent with findings from other studies (e.g., Shaw et al., 2003; Tremblay et al., 2004). As described in the introduction of this paper, this increase during the very early years is often considered to be a result of the frustration the toddler experiences when his increasing independence clashes with (parental) limits (Keenan & Wakschlag, 2000). However, in contrast to our expectations, the present study also found that, while aggressive behaviors increase during toddlerhood, attention problems decrease during this period. How can we explain these findings? The explanation might be found in the fact that attention problems and aggressive behaviors are predicted by partly different underlying capacities. For instance, aggressive behaviors appear to be predicted by self-regulatory skills and internalisation of social values and norms (e.g., Gartstein & Fagot, 2003; Zhou et al., 2007). Since children begin to be capable of self-regulation at 36 months only (Kopp, 1982), aggression may keep increasing until that moment. For attention problems, skills such as sustained attention are considered to be important predictors (Ruff & Rothbart, 1996). A dramatic increase of attention is observed around 18 months. During this period children become able to manage their attention in the face of distracting features (Ruff & Rothbart, 1996). Since the maturation of sustained attention precedes the maturation of self-regulatory skills, the decrease of attention problems might precede the decrease of aggressive behaviors.

***Relations between Parenting and Toddlers' Externalizing Behaviors***

Most relations that were found between parenting and toddlers' externalizing behaviors concerned contemporary relations. The initial level of maternal support was significantly negatively related to the initial levels of toddlers' attention problems as well as aggressive behaviors, while the initial levels of maternal psychological control, lack of structure, and physical punishment were significantly positively related to the initial levels of toddlers' attention problems as well as aggressive behaviors. These relations were all in the predicted direction and in consistence with previous studies (e.g., Brook et al., 2001; Stormshak et al., 2000). However, these findings do not confirm our hypothesis that parenting behaviors would be more strongly related to aggressive behaviors than to attention problems. For fathers, parenting dimensions were unrelated to the initial levels of externalizing behaviors. The finding that paternal parenting less strongly affects child outcomes than maternal parenting is consistent with previous findings (Hart, DeWolf, Wozniak, & Burts, 1992). These findings might be explained by the fact that mothers are more involved with their child, especially when the child is very young (McBride & Mills, 1993). Since in 74% of the participating families in the present study mothers spend more time with their child than fathers, this seems a reasonable explanation. On the other hand, the difference in effects between fathers and mothers might have been 'blown up': both maternal and paternal parenting were investigated in relation to mother-reported externalizing behaviors. As a consequence, the relations between maternal parenting and children's externalizing behaviors have possibly been inflated because of informant bias. However, the additional analyses in the present study suggested that relating maternal parenting to maternal reports of externalizing behaviors did not lead to a meaningful overestimation of associations.

Over time, parenting and externalizing behaviors did not influence each other. Change in externalizing behaviors could not be attributed to interindividual differences in the initial levels of parenting. Similarly, change in parenting was not caused by interindividual differences in toddlers' initial levels of externalizing behaviors. It might be possible that parents and children mutually influence each other within short periods of time (Fite et al., 2006; Granic & Lamey, 2002). In other words, it may be that parenting and externalizing behaviors have a shorter time window of influence than could be identified in the present study because of the relatively long lag between assessments. In that case, the contemporary relations found between parenting and toddlers' externalizing behaviors, could reflect bidirectional or unidirectional influences within a time frame too short for this study to capture.

Nonetheless, some evidence was found for concomitant change in parenting and externalizing behaviors. A higher rate of decrease in maternal physical punishment was related to a higher rate of decrease in children's attention problems. In addition, a higher rate of decrease in paternal support was related to a slower rate of decrease in children's attention problems. These concomitant changes may be due to the changes in parenting or in attention

problems, but could also be caused by other factors. For instance, stressful events within or outside the family influence parenting (Pett, Vaughan, & Wampold, 1994) as well as child behaviors (Najman et al., 1997). In addition, concomitant change may also be due to developmental changes in parenting and/or child behaviors: for instance, attention problems might decrease in toddlerhood because of maturation of sustained attention (Ruff & Rothbart, 1996), while simultaneously maternal physical punishment possibly might decrease because mothers obtain other, more adaptive, and adequate parenting skills. In any case, our findings indicate that individual differences in some parenting dimensions and individual differences in children's attention problems are meaningfully related. These results offer some support for the parallel continuities hypothesis, which states that individual behavior will be stable when there is stability in the environment and that if either of the two changes, this may be accompanied by changes in the other part (e.g., Caspi, 1993).

Several limitations of the present study are worth noticing. First, our sample was relatively small and consisted of families with mostly moderate to high socioeconomic status. Future studies should establish whether the findings of the present study can be generalized to families from other social backgrounds and to families with children who exhibit more severe problem behaviors. In addition, our sample included only boys, since boys are at increased risk for externalizing behaviors. However, data of some studies (e.g., Rubin et al., 1998) suggest that boys and girls may have different vulnerabilities to factors that impact externalizing behaviors. As a consequence it is unknown whether the results can be generalized to girls. Further, the intervals of six months only between the waves of the present study might have lead to an overestimation of stability in the development of parenting and children's externalizing behaviors. On the other hand, the age transition from 17 to 35 months of age reflects one of the key periods of person-context reorganizations in terms of an enlargement of linguistic skills, mobility, and autonomy. This transition is accompanied by many challenges for parents (Keenan & Wakschlag, 2000). Therefore, this period might be particularly relevant for investigating associations between parenting practices and children's developmental outcomes. A final limitation is that the present study relied upon questionnaire data only. Consequently, the trajectories of externalizing behaviors and parenting behaviors will reflect both perceptions and objective behaviors. In addition, because of shared method variance, the reliance on questionnaires might have lead to an overestimation of stability in parenting and externalizing behaviors and to an inflation of the associations between these constructs. These results therefore need to be interpreted with this caveat in mind.

Despite these limitations, the present study expands existing knowledge on the associations between parenting and toddler's externalizing behaviors. Firstly, the present study acknowledged the multi-dimensional nature of parenting, by considering a broad range of parenting behaviors with a focus on negative as well as positive parenting. Secondly, attention was given to maternal as well as paternal parenting. Thirdly, this study examined the growth trajectories of attention problems and aggressive behaviors, while most previous

studies on toddlers focused on broad band patterns of externalizing behaviors. And finally, this is one of the first studies that considers relations between over-time trajectories of parenting and young children's externalizing behaviors. This is important since both children's problem behaviors and parenting behaviors are developing over time (Dallaire & Weinraub, 2005; Gilliom & Shaw, 2004).

Summarizing, the present study described trajectories that reflect the normative development of mother-reported attention problems and aggressive behaviors in toddlerhood. Change in both attention problems and aggressive behaviors between 17 and 35 months of age appeared to be best described by a linear growth curve, with a significant developmental decrease for children's attention problems and a significant increase for aggressive behaviors. In addition, the results showed meaningful contemporary relations and relations between over-time trajectories of parenting dimensions and children's externalizing behaviors.



## CHAPTER 6

### **Are Parental Reports of Children's Temperament biased by Parental Personality?\***

#### **Abstract**

The present study focused on parental personality as a source of rating biases in parental reports of child temperament. Participants were 112 toddler-boys and their parents. In the first analytic approach, a structural equation model was tested to assess the impact of personality traits on parents' reports of children's self-control. In the second approach, it was investigated whether the agreement between parent-reported and observed child self-control was stronger for parents with certain personality traits. The results indicated that for highly conscientious fathers there was a stronger agreement between father-reported and observed child self-control. However, overall the results suggested that parental personality traits have little distorting effect on parents' reports of children's temperament, supporting the value of parental reports.

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## Introduction

Currently, several approaches are in use in the measurement of temperament and behavior problems in childhood, including parent reports, teacher reports, and laboratory and home observations. The most widely used measures are parental reports, although there is disagreement about the value of these reports (Mangelsdorf, Schoppe, & Buur, 2000). This disagreement largely stems from the only weak-to-modest correspondence that studies found between parental reports and observations of young children's behaviors and temperament, typically ranging from .20 to .40 (Mangelsdorf, 1992; Seifer, Sameroff, Barrett, & Krafchuk, 1994; Vaughn, Taraldson, Crichton, & Egeland, 1981).

Advocates of using parents as a source of information about children's behaviors and temperament conclude that evidence to date is supportive of the use of parent-report measures. For instance, they have argued that parents know their child better than anyone else and that they observe their child across a wider range of situations and across more extended periods of time than other informants (Mangelsdorf et al., 2000; Rothbart & Bates, 1998). Furthermore, they point to results indicating that parental assessments have superior predictive validity compared to independent assessments of temperament (Pesonen et al., 2004). These researchers state that the relatively weak correlations between parent reports and observations of children's behaviors and temperament are not necessarily due to problems with parent ratings, but may be caused by flawed observer ratings as well (Rothbart & Bates, 1998). In contrast, other researchers strongly doubt the validity of parental reports (Seifer et al., 1994). These critics of parental reports are inclined to argue that the low agreement between observation-based measures and parental reports is due to biased parental perceptions (Seifer et al., 1994). First, they put forward that parents often lack information about the behaviors or development of 'the average child' and, as a consequence, parents may not have sufficient baseline information needed to make accurate judgements about their own child in comparison with other children (Seifer et al., 1994). Second, parents' extensive knowledge about their children's earlier development may influence their reports (Sawyer, Streiner, & Baghurst, 1998) and third, parents possibly describe their child in socially desirable light. Finally, it has been argued that parental characteristics distort their perceptions of their children's behaviors (Seifer et al., 1994). As a result, there has been considerable debate about the question whether reports of high levels of children's behavior problems obtained from parents with certain psychopathological symptoms or certain personality traits reflect true high levels of problem behaviors or whether these reports mainly reflect distortions in parents' perceptions of their children's behavior (Kroes, Veerman, & De Bruyn, 2005; Sawyer et al., 1998). In the present study the focus was on parental personality traits as a source of possible rating biases in parental reports.

A considerable amount of research has explicitly focused on assessing perceptual distortion elicited by parental depression, anxiety, distress, aggression as well as other

psychopathological symptoms (Briggs-Gowan, Carter, & Schwab-Stone, 1996; Fergusson, Lynskey, & Horwood, 1993; Sawyer et al., 1998). The greatest deal of work has been conducted on the influence of maternal depression in particular. In a review on the assumption that depressed mothers have distorted perceptions of their children's behavior problems, Richters (1992) concluded that evidence of maternal bias was thin. Since this review, several studies did find evidence for the existence of maternal bias in the reporting of depressed and anxious mothers about child behavior problems (Najman et al., 2000), while some others found no or only very small distorting effects (e.g., Sawyer et al., 1998). However, most recent studies on the influence of parental psychopathology on parental reports of children's behavior problems reported combined effects, suggesting that parental psychopathology may lead to a real increase in children's behavior problems as well as to an over-reporting of these problems (Briggs-Gowan et al., 1996; Chilcoat & Breslau, 1997; Fergusson et al., 1993; Kroes, Veerman, & De Bruyn, 2003).

In contrast to perceptual distortion caused by parental psychopathology, very scarce attention has been given to the influence of parental personality traits on parents' reports of children's functioning (Kroes et al., 2005). Several studies at least suggest distorting effects of personality traits for self-perception, for instance on the domains of quality of life and health (Goodwin & Engstrom, 2002; Kempen, Jelicic, & Ormel, 1997). However, as Funder (1999) notes in a review of personality judgment research, apart from the effects of depression and anxiety, which can be considered as expressions of the personality trait neuroticism, the effect of personality on the ability to observe behavior of others accurately has not been systematically studied. An exception is a study by Kroes and colleagues (2005), that focused on the impact of the Big Five parental personality traits on reports of school-aged children's behavior problems. Their results showed that high levels of informant neuroticism and low levels of informant extraversion and openness were related to higher ratings of child behavior problems in the case of professionals who work with children, but not in the case of mothers.

Another striking point in the literature is that most studies on biased perception by parents focused on children's behavior problems. Previous studies showed that agreement between informants is stronger for disturbing and socially undesirable behaviors (Christensen, Sullaway, & Margolin, 1992; Mangelsdorf et al., 2000). Since temperamental characteristics are considered to be more subtle, less disturbing and consequently less directly observable than behavior problems, it might be possible that reports of temperamental traits are more vulnerable for perception bias effects than behavior problems. This emphasizes the relevance of explicitly studying the degree to which parental reports of children's temperamental traits are biased. Additionally, since other studies report that agreement on child temperament ratings is smaller with decreasing age (Mangelsdorf et al., 2000), focusing on perceptual distortion by parents of very young children might be especially relevant.

Therefore, the present study aimed to determine the degree to which parents' personality traits distort their perceptions of their toddlers' temperament. Temperament has been defined

as ‘individual differences in reactivity and self-regulation assumed to have a constitutional basis’ (Rothbart, Ahadi, & Evans, 2000; Rothbart & Derryberry, 1981). In the present study the focus was on the self-regulatory dimension of temperament, which has been suggested to be critical to several domains of child development (Calkins, 1994; Gartstein & Fagot, 2003; Kochanska, Murray, & Coy, 1997). Various conceptualizations of self-regulation consist, emphasizing different capacities of children. The key concept of this study was self-control, which reflects delay of gratification or the ability to inhibit behavioral reactions (Kopp, 1982).

While most studies focused on distorted perception of mothers (Briggs-Gowan et al., 1996; Fergusson et al., 1993; Kroes et al., 2005), the present study included both mothers and fathers. Since the Five-Factor Model of personality has been shown to capture much of the variation in individual differences (John & Srivastava, 1999; McCrae & Costa, 1999), the focus of this study was on the distorting effects of all five traits of personality: extraversion, agreeableness, conscientiousness, emotional stability, and openness to experience.

We employed two analytic approaches to assess whether parental reports of children’s self-control are biased by parental personality. In the first approach, a structural equation model was tested that simultaneously examined the relationships of parental personality traits with a latent variable assuming to measure the ‘true’ level of children’s self-control and with errors in parental reports of children’s self-control (Sawyer et al., 1998). In other words, this model simultaneously tested the degree to which differences in parental personality traits are related to real differences in children’s self-control and the degree to which differences in parental personality traits are related to errors in parental reports of children’s self-control. To obtain a measure for the ‘true’ level of child self-control (i.e., free of errors present in reports from individual informants), paternal as well as maternal ratings of children’s self-control were incorporated in a latent variable of child self-control.

In the second approach, we focused on the agreement between parents’ reports and observational measures of children’s self-control. Here, we investigated whether the agreement between parent-reported and observed child self-control is stronger for parents with certain parental personality traits.

## **Method**

### ***Sample and Procedure***

The data used in the present study were collected as part of a longitudinal project on the development of externalizing behaviors in toddlerhood. Only boys were included since externalizing behaviors are more common among boys than girls and because boys displaying these behaviors are at greater risk for continued behavior problems (Alink et al., 2006; Webster-Stratton, 1996).

The sample for the present study was drawn from Infant and Toddler Clinics in three cities in the Netherlands. In the Netherlands, these clinics follow up all children from birth up

to four years of age and they systematically check the child's growth and development. Thus, the sample is considered to be a community sample. A recruitment letter explaining the goals of the project was sent to all families with a son who was born between October 2002 and February 2003 ( $N = 192$  families). This letter was followed up by a telephone call. Of the 192 families, 117 (60.9%) agreed to participate. Frequent reasons for not participating were: failure to reach a family (approximately 25% of the non-participants), a lack of time or a lack of interest in the topic of the project. Four measurement waves were used with a six-months interval. The attrition rate during the study was minimal: Of the 117 families that started in the study, 112 participated in the final wave.

For the present analyses, only data collected at the final wave were used. For 98 families, next to questionnaire data, also observational measures were available. At that wave, the age of the children ranged from 33 to 37 months ( $M = 34.9$  months,  $SD = .71$  months).

## ***Instruments***

### *Parent Reports*

*Parental Personality Traits.* The Big Five personality traits (Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Openness to Experience) were assessed by a Dutch adaptation (Gerris et al., 1998) of 30 adjective Big Five markers selected from Goldberg (1992). Fathers and mothers were asked to judge their own personality by indicating on a 7-point Likert scale how much they agreed with each adjective, 1 = *very untrue* to 7 = *very true*. *Extraversion* is characterized by active engagement, assertiveness, and talkativeness. *Agreeableness* includes tender-heartedness, friendliness, and willingness to help others. *Conscientiousness* assesses punctuality, order, and degree of organization in goal-directed task behaviors. *Emotional Stability* is characterized by the extent to which the person is emotionally stable or vulnerable to distressing emotions. *Openness to Experience* includes openness of a person to fantasy, esthetics, and ideas. Cronbach's alphas for extraversion, agreeableness, conscientiousness, emotional stability, and openness to experience were .84, .84, .87, .79 and .80 respectively for fathers and .89, .79, .90, .77 and .82 respectively for mothers.

*Child Self-control.* Child Self-control was measured by the scale Inhibitory Control from the Early Childhood Behavior Questionnaire (Putnam, Gartstein, & Rothbart, 2006). Mothers and fathers were asked to report on a 7-point Likert scale to which extent each of the 14 items applied to their child (1 = *never* to 7 = *always*). Inhibitory control ( $N = 14$  items) refers to the extent to which the child is able to stop, moderate, or refrain from a behavior on instruction (e.g., "When asked not to, how often did your child touch an attractive item anyway"). Cronbach's alpha was .90. for mothers' reports and .88 for fathers' reports.

### *Observational Measures*

*Child Self-control.* Three delay-of-gratification tasks, based on tasks used by Vaughn, Kopp and Krakow (1984) were used to measure the child's level of self-control. All three tasks were administered during a home visit. The experimenter seated the child in a chair at a high table. Mothers were present at the tasks, but were asked not to interfere and to avoid eye-contact with the child.

*Snack delay task.* The experimenter explained to the child that they were going to play a game with raisins (or other food, if the child did not like raisins), that would be hidden one at a time under an array of three cups. The child was told to wait to find the raisin until the experimenter gave permission to find it. The procedure of this task was divided in two segments. First, six short trials were given (maximum length 30 seconds), followed by a single long trial (maximum length 120 seconds). Prior to the first trial, the experimenter gave the child a raisin (or other food object), to ascertain the child's interest in the food reward. After this test, the experimenter called the child's attention to the next raisin and the cups, and put the raisin under one of the cups, making sure that the child watched while the raisin was hidden. The experimenter then said: "Wait to get the raisin". After 30 seconds, the experimenter told the child he could get the raisin and eat it. After the raisin was consumed, the experimenter started the next trial, repeating the procedure and instructions. Two scores were derived from these six short trials: 1) the number of trials during which the raisin was not touched and 2) the number of trials during which the raisin was not eaten. After completing the six short trials, the child was told that they were going to play the game one more time. The experimenter repeated the procedure, but now waited 120 seconds to give permission to find the raisin (or until the child ate the raisin). Two scores were derived from this trail: 1) the number of seconds until the cup was touched and 2) the number of seconds until the raisin was eaten.

*Toy delay task.* The experimenter showed an attractive toy-car to the child. After playing with the toy-car for a few seconds and pointing out some features of the toy-car to the child, the experimenter told the child that she would be leaving the room for a while. The experimenter placed the toy-car within arm's reach of the child and instructed the child "Just wait, do not touch the car while I am gone!". The experimenter then left the room. The trial lasted for 2,5 minutes, or until the child touched the toy-car. One score was derived from this task: the number of seconds between the last instruction of the experimenter before leaving the room and the moment that the child touched the toy-car.

*Present delay task.* The experimenter showed an attractive wrapped package to the child and said: "Look what I have. It's a present and it is for you!". The experimenter told the child that she had some paper work to complete and that she would like the child to refrain from touching the present until her work was finished. The trial lasted for 2,5 minutes before giving the child permission to open the present. One score was derived from this task: the

number of seconds the child waited before touching the present.

The tasks were coded from videotapes by two raters. Reliability was based on approximately 10% of all cases, which were scored independently by both raters. Intraclass correlations for the timed measures ranged from .89 to 1.00 (mean = .93). There were no disagreements for the delay variables scored for the six short trials of the food reward task.

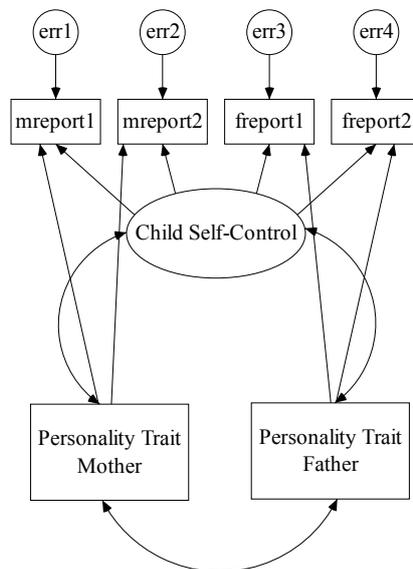
The one-factor solution of a principal components analysis showed factor loadings ranging from .41 to .81 (mean = .65). A composite score for observed child self-control was calculated by averaging standardized task scores. Cronbach's alpha was .71.

## **Plan of Analysis**

As stated before, two analytic approaches were used to assess whether parental reports of children's self-control are biased by parental personality. In the first approach, a structural equation model was tested that simultaneously examined the relationships between parental personality traits, the 'true' level of child self-control and errors in parental reports of children's self-control. The parameters were estimated using AMOS. The model was based on the structural equation models developed by Fergusson, Lynskey and Horwood (1993) and Sawyer, Streiner and Baghurst (1998). The model (see Figure 1), that was constructed for each parental personality trait separately, assumes that mothers' and fathers' reports of child self-control are indicators of a latent variable which reflects the children's 'true' level of self-control. In order to identify the model, more than two indicators were necessary. Therefore, for both mother- and father-reported child self-control two indicators were used: one based on the even items and one based on the odd items. Using a latent criterion variable to rate children's self-control has the advantage that it combines reports from two informants, and thus does not depend on the perception of only one parent (Fergusson et al., 1993). It is assumed that the latent variable is correlated with both paternal and maternal personality. These correlations reflect the associations between parental personality and the 'true' level of children's self-control. In addition, the model assumes that paternal personality influences fathers' reports and that maternal personality influences mothers' reports of child self-control. These paths are the critical parameters of interest, because they reflect the extent to which parental personality modifies parents' reports of children's self-control.

In the second approach, we investigated whether the strengths of associations between parent-reported and observed child self-control depend on certain parental personality traits. In other words, the moderating effect of parental personality on the relation between parent-reported and observed child self-control was tested. For each specific personality trait, a separate multiple regression model was constructed to determine these moderating effects. In these regression analyses, observed child self-control was entered as the dependent variable with father- or mother-reported child self-control, the particular personality trait and the interaction variable as predictors. Prior to this, parent-reported child self-control measures and

the personality traits were centred and the centred predictor terms were then multiplied to yield the interaction variable.



*Figure 1.* Model illustrating direct and indirect effects of parental personality on reports from mothers and fathers describing children’s self-control.

*Note.* mreport1 = mother-reported child self-control even items; mreport2 = mother-reported child self-control odd items; freport1 = father-reported child self-control even items; freport2 = father-reported child self-control odd items; err1, err2, err3, and err4 = error terms.

## Results

### *Descriptive Statistics and Correlation Analysis*

Table 1 presents means, standard deviations and intercorrelations for all variables of interest. Father-reported and mother-reported child self-control were significantly interrelated. Furthermore, maternal personality (i.e., maternal conscientiousness and emotional stability) was significantly related to mother-reported child self-control, but not to father-reported child self-control. Remarkably, also for paternal personality (i.e., agreeableness and emotional stability) significant associations were found with mother-reported child self-control only. Finally, observed child self-control was not related to parent-reported child self-control nor to any of the parental personality traits.

Table 1

*Correlations, Mean Scores, and Standard Deviations Variables of Interest*

	1	2	3	4	5	6	7	8	9	10	11	12	<i>M</i>	<i>SD</i>
1 Observed Child Self-Control	1												-0.01	.65
2 Mother-reported Child Self-Control	.04	1											4.32	.85
3 Father-reported Child Self-Control	.16	.50***	1										4.45	.82
4 Extraversion Mother	-.10	.07	-.10	1									5.40	1.02
5 Agreeableness Mother	.06	.09	.12	.25**	1								5.76	.53
6 Conscientiousness Mother	.15	.23*	.17	.03	.02	1							5.15	1.07
7 Emotional Stability Mother	-.12	.25**	.16	.51***	.29**	.08	1						4.81	.93
8 Openness Mother	-.06	-.03	-.14	.28**	-.02	.03	.07	1					4.73	1.01
9 Extraversion Father	.12	.03	-.09	.16	-.01	.14	.21*	.17	1				4.86	1.03
10 Agreeableness Father	-.09	-.21*	-.08	.04	.17	.00	-.01	-.01	.36***	1			5.63	.68
11 Conscientiousness Father	-.17	.04	-.01	-.07	-.02	.16	.06	.10	-.14	.08	1		4.83	1.04
12 Emotional Stability Father	-.01	.20*	.16	.06	-.06	.15	.15	.16	.25**	.13	.10	1	5.13	.90
13 Openness Father	.04	.00	.01	.00	.21*	-.04	-.08	.10	.20*	.34***	-.05	-.01	4.92	.95

\*\*\*  $p < .001$ ; \*\*  $p < .01$ ; \*  $p < .05$

***Analytic Approach 1: The Relationships between Parental Personality Traits and Errors in Parental Reports of Child Self-Control***

The model identified in Figure 1 did not achieve an adequate fit. The modification indices suggested that a substantial improvement in model fit could be achieved by allowing error terms 2 and 4 and 3 and 4 to be correlated with each other. When these paths were included, fit indices indicated a good fit to the data: chi-squares ranged from .21 to 3.91 with a mean of 2.57 ( $df = 2$ ),  $p > .05$ ; the CFI ranged from .99 to 1.00 with a mean of .99; and the RMSEA ranged from .01 to .09 with a mean of .06.

Table 2 shows the standardized estimates of the model coefficients. As can be seen, for none of the parental personality traits significant associations existed between mothers' and fathers' scores.

The coefficients (factor loadings) linking the parental reports of child self-control to the latent construct, ranged from .40 to 1.03.

The correlations between the latent construct and the measures of parental personality traits represented the estimated correlations between the particular parental personality trait and children's self-control corrected for errors of measurement and for the effects of personality on parents' reports of child self-control. These correlations ranged from -.01 to .27. Only maternal and paternal emotional stability were significantly related to the level of children's self-control: fathers and mothers who scored higher on emotional stability had children with a higher score on self-control.

Finally, as noted before, the paths linking the parental personality traits to the corresponding parental reports of children's self-control are the most critical parameters of interest. These paths reflected the effect of parental personality on parents' reports, independent of any "true" relationship between parental personality and children's self-control. The size of the coefficients ranged from .02 to .21, none of which was significant. Thus, none of the parental personality traits significantly modified parents' reports of children's self-control. This indicates that parental personality does not distort parents' perceptions of their toddlers' temperament.

***Analytic Approach 2: The Moderating Effect of Parental Personality Traits on the Agreement Between Parent-reported and Observed Child Self-Control***

As shown in Table 1, parent-reported child self-control was not significantly related to observed child self-control. In order to determine whether parental personality moderated the agreement between parent-reported and observed child self-control, regression models were run for each specific personality trait separately. Table 3 shows the results of these regression models. The only significant model was the model that examined the effect of paternal conscientiousness. The results of this model indicated a significant moderating effect of paternal conscientiousness on the association between father-reported and observed child self-control.

To interpret the nature of the significant moderator effect, the relation between father-reported and observed child self-control is estimated at 1 *SD* below the mean (low) and 1 *SD* above the mean (high) on father-reported self-control (Aiken & West, 1991).

Figure 2 shows that for highly conscientious fathers, there is a strong positive relationship between father-reported and observed child self-control, whereas for less conscientious fathers there is a slightly negative relationship between these measures. In other words, for highly conscientious fathers there is a stronger agreement between father-reported and observed child self-control.

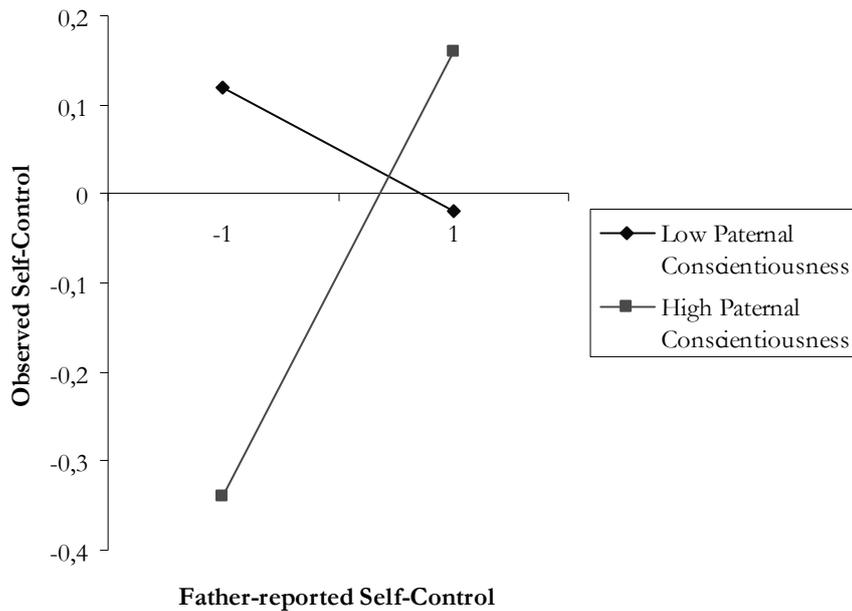


Figure 2. The Moderating Effect of Paternal Conscientiousness on Father-Reported and Observed Child Self-Control.

Note. Values of the predictors were chosen 1 *SD* below and 1 *SD* above the mean.

Table 2

*Model Parameter Estimates*

Path	Model				
	Extraversion	Agreeableness	Conscientiousness	Emotional stability	Openness
Personality Trait Mother/Personality Trait Father (r)	.16 (.09)	.16 (.03)	.16 (.10)	.15 (.07)	.10 (.09)
Parental reports Child Self-Control/Latent variable Child Self-Control ( $\lambda$ )	.47-.99 (.09-.14)	.44-1.01 (.09-.13)	.45-1.03 (.09-.15)	.40-.97 (.09-.10)	.43-1.00 (.09-.10)
Personality Trait Mother/Latent variable Child Self-Control (r)	-.17 (.15)	.15 (.08)	.27 (.17)	.21* (.06)	-.19 (.16)
Personality Trait Father/Latent variable Child Self-Control (r)	-.02 (.08)	-.19 (.05)	.05 (.08)	.20* (.07)	-.01 (.08)
Personality Trait Mother/mreport1 ( $\beta$ )	.20 (.13)	-.09 (.27)	-.11 (.14)	.04 (.16)	.18 (.15)
Personality Trait Mother/mreport2 ( $\beta$ )	.21 (.14)	-.06 (.28)	-.12 (.16)	.02 (.14)	.14 (.13)
Personality Trait Father/freport1 ( $\beta$ )	-.08 (.07)	-.04 (.11)	-.05 (.07)	.09 (.08)	-.06 (.07)
Personality Trait Father/freport2 ( $\beta$ )	-.07 (.07)	.05 (.11)	-.02 (.07)	.02 (.08)	.08 (.08)

*Note.* Values are standardized coefficients and standard errors (between the brackets)

\*  $p < .05$

Table 3

*Regression Models Investigating the Moderating Effect of Parental Personality on the Agreement between Parent-reported and Observed Child Self-Control*

Predictors	Model									
	Extraversion		Agreeableness		Conscientiousness		Emotional Stability		Openness	
	$F(3,89) = .39$ for M $F(3,88) = 1.26$ for F		$F(3,89) = .15$ for M $F(3,88) = .23$ for F		$F(3,89) = .72$ for M $F(3,88) = 3.05^*$ for F		$F(3,89) = .62$ for M $F(3,88) = .66$ for F		$F(3,89) = .17$ for M $F(3,88) = .59$ for F	
	<i>B</i>	$\beta$	<i>B</i>	$\beta$	<i>B</i>	$\beta$	<i>B</i>	$\beta$	<i>B</i>	$\beta$
Mothers										
Reported Child Self-Control	.03	.04	.02	.08	.00	.07	.04	.06	.02	.03
Personality Trait	-.07	-.11	.03	.07	.10	.07	-.08	-.13	-.04	-.06
RSC*P	.01	.01	.02	.07	.00	.07	.03	.04	.02	.03
Fathers										
Reported Child Self-Control	.10	.15	.10	.16	.09	.14	.10	.15	.09	.14
Personality Trait	.08	.13	-.06	-.09	-.07	-.11	-.02	-.03	.02	.02
RSC*P	.07	.08	.10	.14	.16	.22*	.02	.03	.03	.03

Note. M = Mothers, F = Fathers, RSC = Reported Child Self-Control, P = Personality Trait

\*  $p < .05$

## Discussion

There has been a great deal of controversy regarding the value of parental reports of children's behaviors and temperament. Critics of the use of parental reports argue that parental characteristics may distort parental perceptions of their children's behaviors (Seifer et al., 1994). The present study aimed to determine whether parental personality traits bias parental reports of children's self-control, representing the self-regulatory dimension of temperament. Two analytic approaches were employed to assess these possible distorting effects.

In line with previous research in which agreement between fathers and mothers concerning children's temperament was found to be higher than agreement between parents' reports and observation measures (Majdandzic & Van den Boom, 2007; Mangelsdorf et al., 2000; Rothbart & Bates, 1998), our results showed that whereas maternal and paternal reports of child self-control were significantly interrelated, parent-reported child self-control was not significantly related to observed child self-control. This low congruence between questionnaire and observational measures of child self-control might be due to different biases operating on both methods of assessment as well as to contextual differences between the questionnaires and the observation measures (Rothbart & Goldsmith, 1985).

Our first analytic approach directly examined whether parental personality traits bias parental reports of children's self-control. Results pointed out that none of the parental personality traits had a significant effect on parents' reports of children's self-control. These findings indicate that parental personality traits do not significantly modify or distort parents' perceptions of their children's temperament. However, maternal and paternal emotional stability were found to be significantly related to the 'true' level of children's self-control: fathers and mothers who scored higher on emotional stability had children with a higher score on self-control. This relationship between parental emotional stability and children's self-control might be a direct one (i.e., by heritability or by modeling of behaviors), or could at least partly be assumed to be mediated by parenting behaviors (Belsky, 1984; Patterson, 2002; van Aken et al., 2007). In interpreting the results of this analytic strategy, we have to keep in mind that although the latent variable of child self-control (representing the 'true' level of self-control) is free of errors present in reports from individual informants, it might not be free from errors shared by both parents (i.e., 'shared perception bias'). After all, interpersonal agreement may be a result of objectively perceivable child characteristics, but it may also be inflated as a result of parents' discussions about the child's behavior (Bates, 1980).

In the second analytic approach, we focused on the agreement between parents' reports and observational measures of children's self-control. Results showed that in most cases correspondence between parent reports and observations of child self-control did not depend on parental personality traits. Only for paternal conscientiousness a significant moderating effect was found: for highly conscientious fathers there was a stronger agreement between

father-reported and observed child self-control. This suggests a distorting effect of low paternal conscientiousness on fathers' reports of children's self-control. While previous studies suggested neuroticism, extraversion, and openness to have distorting effects on informants' ratings (Funder, 1999; Kroes et al., 2005), this effect has not been reported for conscientiousness in previous literature. However, the suggestion that less conscientious fathers are less accurate reporters of their child's functioning when filling out questionnaires seems plausible, since less conscientious people are characterized by lower scores on punctuality and accuracy (McCrae & Costa, 1999).

However, what remains to be explained is why we did not find distorting effects for parental neuroticism, extraversion, and openness, in contrast to some other studies (Funder, 1999). A plausible explanation may be found in the sample of the present study, that consisted of parents with possibly less extreme scores on personality traits. For instance, whereas some previous studies focused on clinical samples, the sample of our study consisted of relatively well-functioning parents who may be more emotionally stable and less vulnerable to distressing emotions. This might explain why we did not find a distorting effect of parental neuroticism on parents' perception of toddlers' self-control. In addition, the parents from our sample had mostly moderate to high socioeconomic status. People who are relatively highly educated may be more outgoing and open to experiences (i.e., to have higher scores on extraversion and openness), as a consequence of which they might be more likely to accept individual differences in children's temperament or have less rigid expectations of what constitutes normal behavior.

Some other warnings have to be given with regard to the interpretation of the present results. The first warning concerns the agreement between parent-reported and observed child self-control in the present study. Although also other studies found low to moderate associations between parent reports and observation measures of children's self-control (Majdandzic & Van den Boom, 2007; Mangelsdorf et al., 2000; Vaughn et al., 1981), the convergence between these measures might have been stronger when the similarity of the context in which parents and observers rated children would have been optimized (Hagekull, Bohlin, & Lindhagen, 1984; Mangelsdorf et al., 2000). Although our main aim was to assess whether the agreement differed for parents with different personality traits, and this low congruence did not affect our main conclusions, it still remains a finding deserving further study. A second warning has to be given with regard to the relatively small sample size of the present study, which may have limited the opportunity to detect significant (distorting) effects.

The present study had several strengths. This study is one of the first that expands research on perceptual distortion to a more general examination of the influence of various personality characteristics by investigating the distorting effects of each of the Big Five personality factors. Additionally, the present study paid attention to biased perception of child temperament in contrast to most previous studies that focused on biased parental perceptions

of children's behaviors problems. Furthermore, whereas in existing literature on the validity of parental reports fathers are very under-represented, our study included fathers as well as mothers. And finally, in the present study two analytic strategies were applied to investigate the degree to which parental personality traits lead to biased parental reports of children's temperament, both showing similar results.

The results of the present study may have important implications for the discussion with regard to the value of parental reports. Overall, the results indicate that parental personality traits have little distorting effect on parents' reports of children's temperament, which applies for both mothers and fathers. As a consequence, these results support the value of parental reports obtained from parents in the community. However, future research should more systematically investigate other factors that potentially influence parental reports.

# **CHAPTER 7**

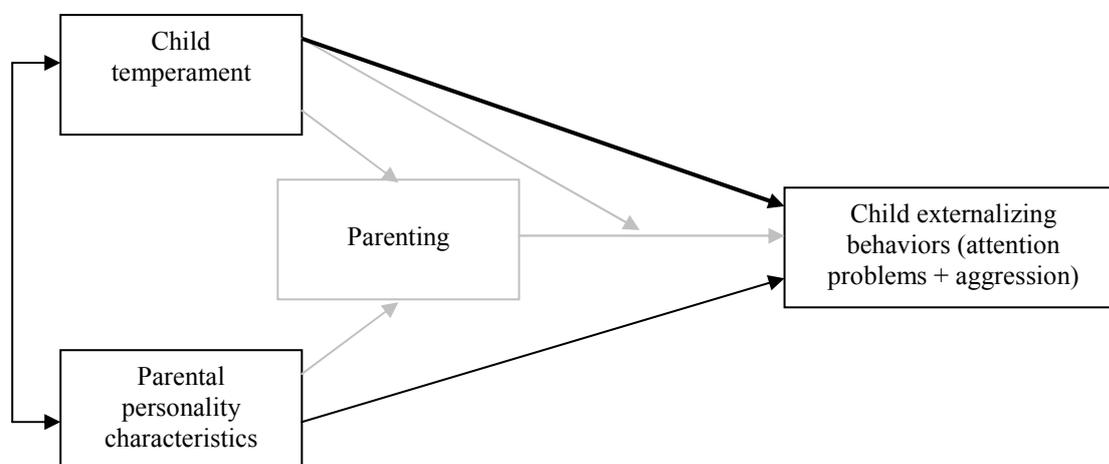
## **General Discussion**

The aim of the present thesis was to determine risk factors on the domains of child and parental characteristics for toddlers' externalizing behaviors. The investigation of the associations between child characteristics, parental characteristics, and child externalizing behaviors was guided by four general key issues: (1) The relative contribution of child and parental characteristics in the prediction of toddlers' externalizing behaviors, (2) The associations between parenting and toddlers' externalizing behaviors, (3) The specificity of relations between parental/child characteristics and different negative child outcomes, and (4) The value of parental reports of toddlers' temperament.

In this concluding chapter the results regarding these key issues/research questions will be presented and discussed, followed by a general conclusion. Additionally, we will reflect on the limitations of the studies presented in this thesis. Finally, we will describe future directions.

### **The relative contribution of child and parental characteristics in the prediction of toddlers' externalizing behaviors**

- ✓ *Results (Figure 1): both child temperament and parental personality/psychopathology have unique contributions to the prediction of the level of toddlers' externalizing behaviors. However, child temperament seems to be more important than parental characteristics.*



*Figure 1. The relative contributions of child temperament and parental characteristics (examined in Chapter 2)*

In previous studies, both child and parental characteristics have been found to be related to children's externalizing behaviors (Gartstein & Fagot, 2003; Nigg & Hinshaw, 1998). Most of these studies focused on either the impact of children's temperamental characteristics or the impact of parental personality traits and/or parental psychopathological symptoms. However, child and parent characteristics are expected to be interrelated. Therefore, in Chapter 2 of the

present thesis the contributions of child temperament and parental characteristics (i.e., personality traits, self-control, and psychopathological symptoms) to children's externalizing behaviors at 17 months of age were examined simultaneously to draw conclusions regarding the relative importance of these factors.

In general, the domain of child temperamental characteristics (explaining 31% of the variance) appeared to be the most important domain for predicting toddlers' externalizing behaviors, followed by the domains of maternal characteristics (explaining 12% of the variance) and paternal characteristics (explaining 5% of the variance).

With regard to *child temperamental characteristics*, two temperamental traits were significantly related to children's externalizing behaviors. Children who are low on inhibitory control (e.g., children who are not able to stop, moderate, or refrain from a behavior on instruction), showed higher levels of externalizing behaviors. Additionally, children with high scores on frustration (e.g., children who show negative affect in situations where ongoing tasks are interrupted or goals blocked) appeared to display higher levels of externalizing behaviors. These findings are in line with results reported in other studies (Calkins, 1994; Sanson, Hemphill, & Smart, 2004), which also showed that children who have difficulties regulating their impulses and emotions are at increased risk for behavior problems.

Above and beyond the contributions of child characteristics, *parental characteristics* were also predictive of children's externalizing behaviors. Maternal conscientiousness was negatively associated with children's externalizing behaviors. In other words, mothers who are planful, organized, and persistent have children with lower scores on externalizing behaviors. In addition, mothers with high levels of externalizing behaviors, reported their children to have elevated levels of externalizing behaviors as well. For fathers, a low level of self-control was predictive of children's externalizing behaviors. Thus, children of fathers who are characterized by impulsivity and risk-seeking behavior are at increased risk for developing externalizing behaviors. In considering possible explanations for the association between these parental personality traits and children's externalizing behaviors, several pathways can be considered. First, there may be a direct relationship between parental personality characteristics and children's externalizing problems, for example through modeling of behaviors or through genetic transfer. Second, this association might be mediated by the parent-child relationship or by parenting practices. Personality characteristics and psychopathological characteristics in parents have indeed been shown to hamper parenting processes and thereby to increase externalizing problems in children (e.g. Kochanska, Clark, & Goldman, 1997). These mediating effects of parenting were the focus of the next research question. Finally, the effect of parental personality on children's externalizing behaviors might be mediated by factors on the family-level. This might especially be the case for the effect of maternal conscientiousness, since the study presented in Chapter 4 showed that the effect of maternal conscientiousness reduced to non-significance when we controlled for

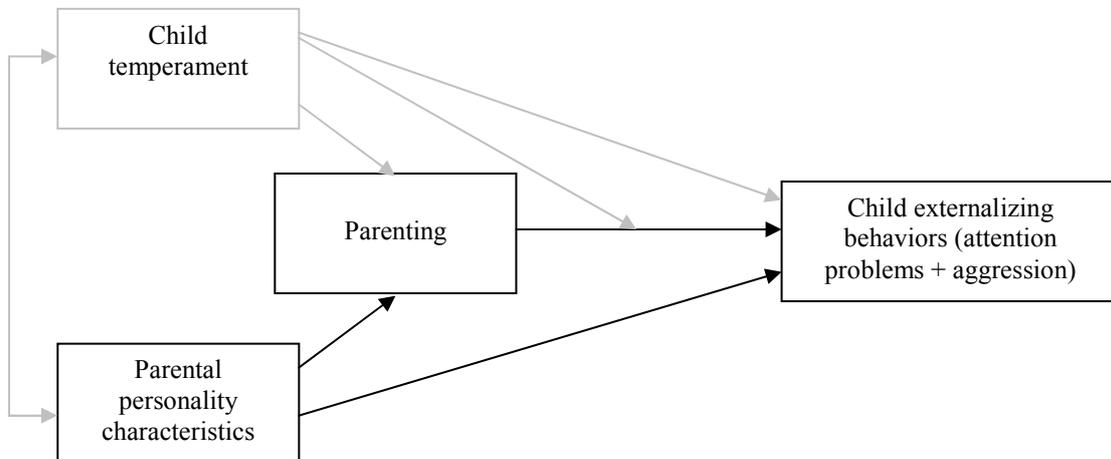
factors on the family-level. For instance, a low conscientiousness of mothers may contribute to a less structured family life, which in turn may affect children's adjustment.

### **The associations between parenting and toddlers' externalizing behaviors**

The second main research question concerned the associations between parenting and toddlers' externalizing behaviors. Collins and colleagues (2000) described several issues that should be addressed by future research on the role of parenting. Among these issues are the investigation of interactions between parenting and child temperamental traits and the use of longitudinal designs to study the relationship between parenting and child development. These and other important issues with regard to the associations between parenting and children's externalizing behaviors were given attention in the present thesis.

#### ***The mediating role of parenting***

- ✓ *Results (Figure 2): parental personality traits partially affect toddlers' externalizing behaviors through the impact on parenting. Above and beyond these indirect effects, parental personality is also directly associated with externalizing behaviors in toddlerhood.*



*Figure 2. The mediating role of parenting (examined in Chapter 4)*

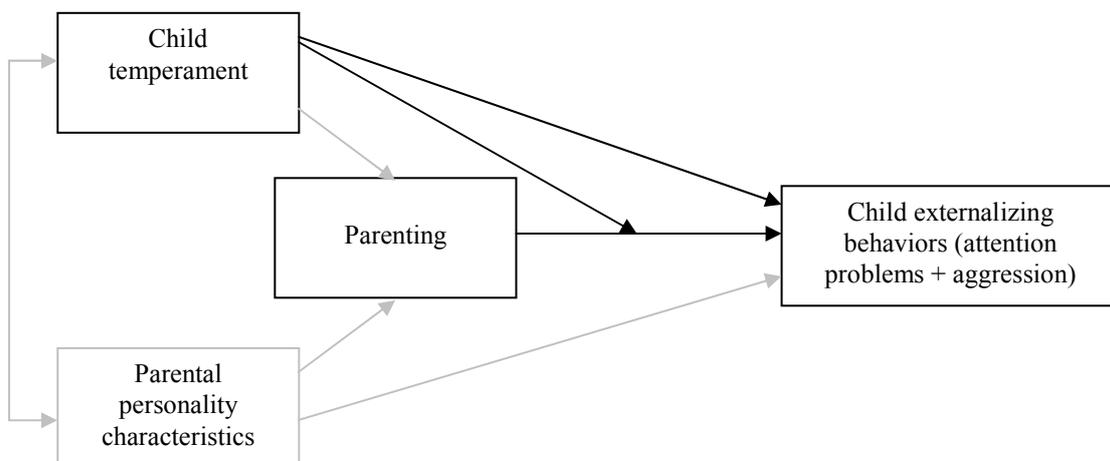
Although several ecological models of child development (e.g. Belsky, 1984) presume that parental personality affects children's development through their effects on parenting, few studies explicitly investigated this mediating role of parenting (Kochanska et al., 1997; Prinzie et al., 2004; Prinzie et al., 2005). Therefore, in Chapter 4 we examined the mediating role of five maternal and paternal parenting dimensions on the relation between parental personality traits and toddlers' externalizing behaviors (i.e., attention problems and aggressive behaviors) at 35 months of age. Several associations were found between parenting

dimensions and children's externalizing behaviors. Paternal and maternal psychological control predicted both children's attention problems and aggressive behaviors. In addition, paternal and maternal lack of structure as well as maternal support were predictive of children's aggressive behaviors. Emotional stability was the only parental personality trait that was found to be related to children's attention problems/aggressive behaviors. The effect of maternal emotional stability on children's aggressive behaviors appeared to be mediated by maternal support: mothers who were less emotionally stable, provided less support to their child, which subsequently led to elevated levels of children's aggressive behaviors. For fathers, there appeared to be a direct effect of emotional stability on children's aggressive behaviors. In addition, for both mother and fathers, emotional stability was directly related to children's attention problems.

In sum, our results were partially in line with models suggesting that the impact of parental personality on children's adjustment is mediated by its impact on parenting practices (Belsky, 1984; Patterson, 2002; Patterson, Reid, & Dishion, 1992). However, consistent with previous studies (Kochanska et al., 1997; Prinzie et al., 2005), above and beyond these mediating effects of parenting, parental personality is also directly linked to externalizing behaviors in young children. This direct link might point to a genetic transfer of certain characteristics, as well as to modeling of behaviors by the parent to the child (Kochanska, Clark, & Goldman, 1997).

### ***The interaction between parenting and child temperament***

- ✓ *Results (Figure 3): parenting does not affect externalizing behaviors of all children to the same extent. Rather, poor parenting is particularly detrimental for temperamentally difficult children.*



*Figure 3. The interaction between parenting and child temperament (examined in Chapter 3)*

Although it is a generally accepted idea that the contribution of parenting may vary as a function of the attributes of the child, there has been little progress in detailing models of how specific child temperamental traits moderate the influences of parenting (Bates, Pettit, Dodge, & Ridge, 1998).

In the present thesis (Chapter 3), for the prediction of the level of concurrent externalizing behaviors at 17 months only main effects were found of children's temperamental characteristics (inhibitory control, frustration, soothability, and activity level). No main effects were found of observed maternal parenting behaviors. An interaction effect between maternal negative control and children's inhibitory control indicated that maternal negative control did matter in predicting externalizing behaviors, but especially for children who had problems controlling their behaviors.

We also examined the interactive effects of parenting and temperament on the change in externalizing behaviors between 17 and 23 months of age. Externalizing behaviors appeared to show a strong rank order stability between 17 and 23 months of age. Although on the group level there was also absolute stability in the level of externalizing behaviors, for children with certain temperamental traits maternal parenting predicted considerable change in the level of externalizing behaviors: a lack of maternal sensitivity was related to an increase in externalizing behaviors for children with higher scores on activity level and children with lower scores on soothability. Highly active children might more strongly need their parents' sensitivity to assist them in regulating their behaviors and children who score low on soothability might more strongly depend on their parents' sensitivity to support them calming down from diverse sources of arousal. Additionally, maternal negative control appeared to be related to an increase in externalizing behaviors for children low on inhibitory control, children high on frustration, and children high on activity level. The finding that these children are especially vulnerable for a hostile and dominating mother, might be explained by the fact that they in particular need opportunities to learn regulating themselves, a process that is hampered by mothers who impose rigid structures.

Summarizing, the results presented in Chapter 3 found support for theoretically based hypotheses with regard to interaction effects and this study replicated interactive effects reported by some previous studies with a very young sample (Morris et al., 2002; Rubin et al., 1998). Overall, the results showed that poor parenting can result in increasing levels of externalizing behaviors for temperamentally vulnerable children. At the same time, these results indicate that certain child temperamental traits can protect against the negative effects of poor parenting practices.

### ***Longitudinal relations between parenting and externalizing behaviors***

- ✓ *Results (Figure 4): parenting practices predict subsequent changes in toddlers' externalizing behaviors. Additionally, changes in parenting are accompanied by changes in toddlers' externalizing behaviors and vice versa.*

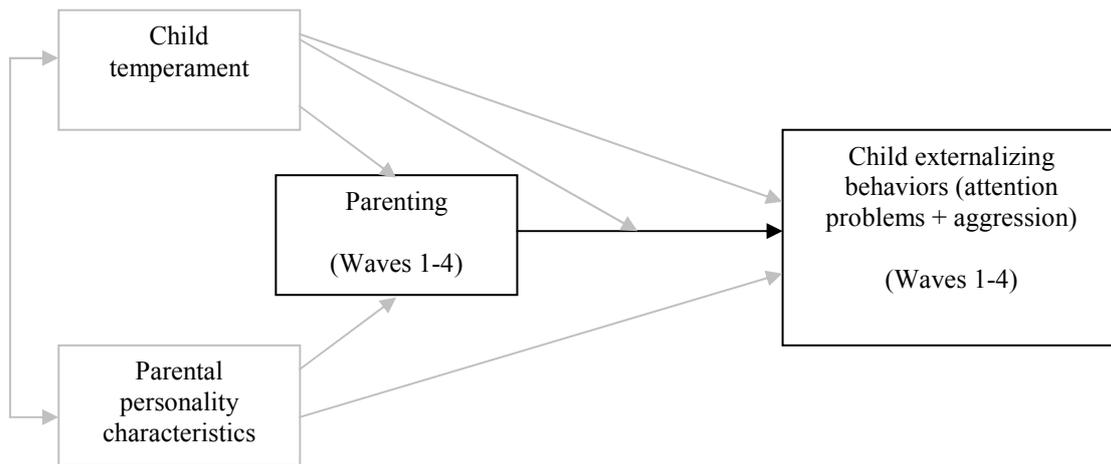


Figure 4. The longitudinal relations between parenting and externalizing behaviors (examined in Chapters 3 and 5)

Although there is an abundance of evidence regarding the existence of relationships between parenting and externalizing behaviors in children, we still know little about the direction of causality of these associations. Significant longitudinal relations between parenting and child adjustment after taking into account their concurrent relation, provide indirect evidence that parenting affects child adjustment (Collins et al., 2000). Next to this issue of causality, longitudinal designs are important to obtain information about the interrelatedness of over-time trajectories of parenting and children's behaviors. This might be especially relevant for the investigation of associations between parenting and externalizing behaviors during toddlerhood, since this period is marked by many challenges and changes for both children and their parents.

The study presented in Chapter 3 showed that (for temperamentally difficult children) the longitudinal relation between observed maternal negative control and lack of sensitivity and toddlers' externalizing behaviors held even after controlling for the earlier level of children's externalizing behaviors. Thus, this study delivered evidence for parenting affecting children's adjustment over time. The analyses of this study do not rule out the possibility that children elicit different parental responses, but they do provide evidence that the associations between parenting and children's externalizing behaviors are not solely due to the effects of children on parenting behaviors.

To pursue this issue further, in Chapter 5 the normative developmental trajectories of toddlers' attention problems and aggressive behaviors and several maternal and paternal parenting dimensions were studied. Change in both attention problems and aggressive behaviors between 17 and 35 months of age appeared to be best described by a linear growth curve, with children's attention problems revealing a significant decrease over time and aggressive behaviors showing a significant average increase over time. About half of the parenting dimensions also showed a significant change over time, whereas the average level

of the other parenting dimensions did not change. In contrast to the results presented in Chapter 3, Chapter 5 indicated that the changes in child externalizing behaviors could not be attributed to interindividual differences in the initial levels of parenting. Similarly, changes in parenting were not caused by interindividual differences in toddlers' initial levels of externalizing behaviors. There might be several explanations for this difference in results of Chapters 3 and 5. First, the results presented Chapter 3 indicated that parenting was related to the change in externalizing behaviors for temperamentally difficult children only. However, because of power problems, the study in Chapter 5 did not take into account interaction effects between parenting and children's temperament. This might explain why this study failed to find effects of parenting on the change in externalizing behaviors. Second, the time span used in Chapters 3 and 5 was not similar. Whereas the study in Chapter 3 used a time-span of 6 months, the study in Chapter 5 used a time span of 18 months. It might be possible that parents and children mutually influence each other within relatively short periods of time (Fite, Colder, Lochman, & Wells, 2006; Granic & Lamey, 2002), as a consequence of which these effects can be better captured in studies using a shorter time span.

The study in Chapter 5 also examined whether the changes in parenting and children's externalizing behaviors were interrelated. Some evidence was found for concomitant change in parenting and externalizing behaviors. A higher rate of decrease in maternal physical punishment was related to a greater decrease in children's attention problems. And a higher rate of decrease in paternal support, appeared to be related to a slower rate of decrease in children's attention problems. These results offer some support for the parallel continuities hypothesis, which states that individual behavior will be stable when there is stability in the environment and that if either of the two changes, this may be accompanied by changes in the other part (e.g. Branje, van Aken, & van Lieshout, 2004; e.g. Caspi, 1993). These concomitant changes may be due to the changes in parenting or in attention problems, but could also be caused by other factors. For instance, stressful events within or outside the family influence parenting (Pett, Vaughan, & Wampold, 1994) as well as child behaviors (Najman et al., 1997). In addition, concomitant change may also be due to developmental changes in parenting and/or child behaviors.

### ***Differences between mothering and fathering***

- ✓ *Results (Figure 5): for very young children, maternal parenting is more strongly associated with externalizing behaviors than paternal parenting. During toddlerhood the influence of fathers seems to become more similar to that of mothers. Consequently, later in toddlerhood disciplining techniques of both mothers and fathers affect children's externalizing behaviors. However, mothers' warmth more strongly predicts children's externalizing behaviors than fathers' warmth.*

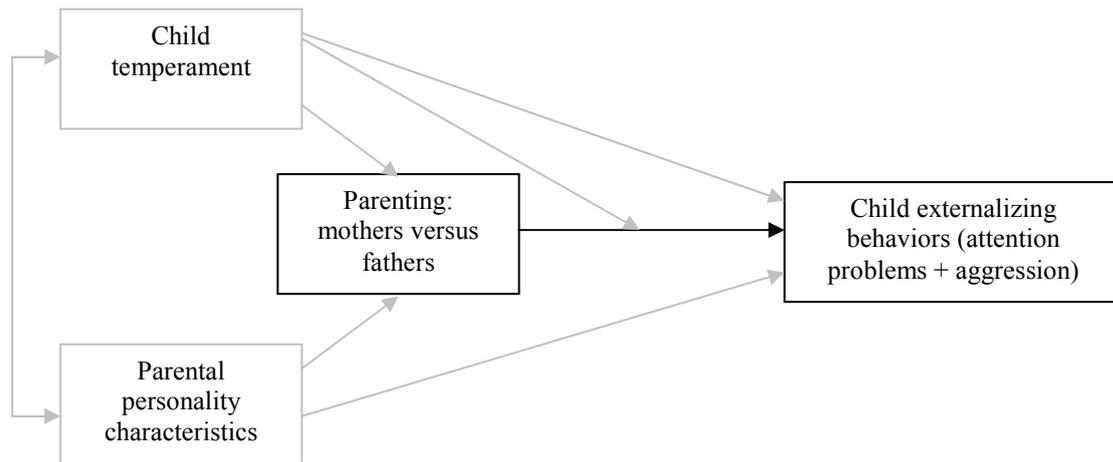


Figure 5. Differences between mothering and fathering (examined in Chapters 4 and 5)

In Chapter 2, differences were found between the contribution of maternal versus paternal personality traits to toddlers' externalizing behaviors. Similarly, there may be differences in the role that maternal and paternal parenting practices play in affecting children's adjustment. In previous work, most attention has been paid to the role of mothers in externalizing behaviors in children, with only very incidental attention to the role of fathers (Parke, 2002). However, because children develop strong attachments to fathers as well as mothers (Lamb, 1977) and because fathers' involvement is increasing, we might expect fathers also to play a significant role in the emergence of children's externalizing behaviors. Moreover, fathers' parenting might affect children's externalizing behaviors in a different way than mothers' parenting (DeKlyen, Biernbaum, Speltz, & Greenberg, 1998). Therefore, in the studies presented in Chapters 4 and 5, the mean levels of paternal and maternal parenting practices, as well as the contribution of both maternal and paternal parenting to toddlers' externalizing behaviors were examined.

Chapter 4 showed that fathers and mothers reported similar levels of psychological control, lack of structure, and physical punishment. However, mothers appeared to display higher levels of support and positive discipline than fathers. Thus, mothers were more frequently involved in positive parent-child interactions and displayed higher levels of sensitivity and responsiveness towards the child's signals and needs. Additionally, mothers more frequently reinforced good behavior of their child and more frequently gave explanations for why certain behavior is unwanted. With regard to the associations between parenting and child externalizing behaviors, Chapter 4 showed that both maternal and paternal psychological control predicted high levels of toddlers' attention problems and aggressive behaviors at 35 months of age. Additionally, both maternal and paternal lack of structure predicted high levels of toddlers' aggressive behaviors. Above these effects, maternal support affected children's aggressive behaviors. For fathers, no effect of support was found. The findings that mothers display higher levels of support and that maternal and not paternal

support has an effect on children's aggressive behaviors are consistent with previous studies that showed that children preferably seek mothers to comfort and sooth them (Lamb & Lamb, 1976) and that mothers, more than fathers, fulfil the role of being responsive and warm to their child (Calzada, Eyberg, Rich, & Querido, 2004).

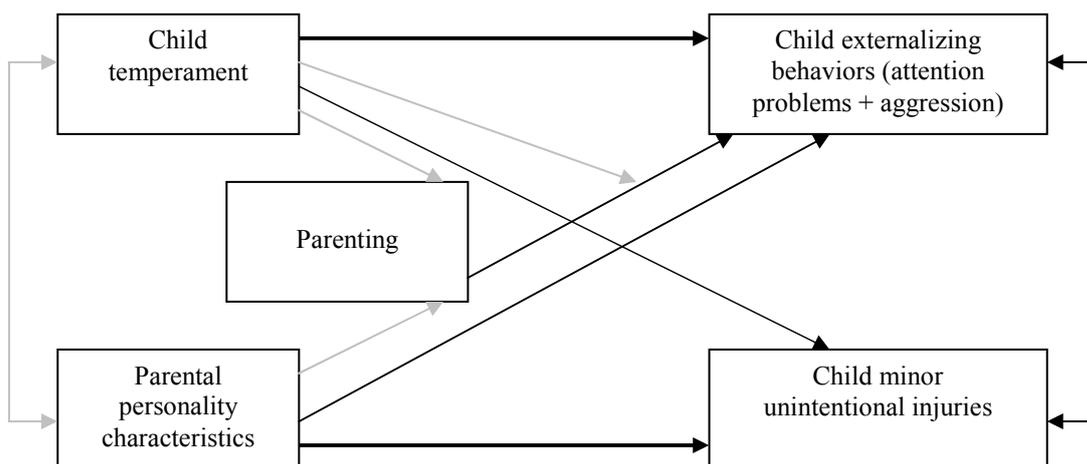
In contrast to the results discussed in Chapter 4, the study in Chapter 5 showed that whereas the levels of maternal support, psychological control, physical punishment en lack of structure were significantly related to the levels of children's attention problems and aggressive behaviors, for fathers no contemporary relations were found between parenting and children's externalizing behaviors. There are some possible explanations for this discrepancy in results with regard to the contribution of fathers. First, Chapters 4 and 5 used divergent methodological designs. In Chapter 4 paternal parenting was related to father-reported child externalizing behaviors, whereas in Chapter 5 paternal parenting was related to mother-reported child externalizing behaviors. Consequently, the associations between paternal parenting and children's externalizing behaviors in Chapter 4 might have been inflated because of informant bias. However, additional analyses described in Chapter 5 indicated that relating paternal parenting to father-reported child behaviors did not lead to an overestimation of associations. An alternative explanation for the difference in results might be found in the age of the children. In Chapter 4 parent-child associations were investigated when the children were 35 months of age, while the contemporary parent-child relations in Chapter 5 reflected the associations at the time the children where 17 months of age. It might be that the contribution of paternal parenting becomes more important when children grow older. This idea is supported by studies showing that the involvement of fathers increases after infancy (Bailey, 1994). Summarizing, the results presented in this thesis suggest that for very young children maternal parenting is more important than paternal parenting. During toddlerhood the influence of fathers might become more similar to that of mothers. Consequently, later in toddlerhood both maternal and paternal discipline techniques are associated with toddlers' externalizing behaviors. However, mothers' warmth more strongly predicts children's externalizing behaviors than fathers' warmth.

In Chapter 5, we also investigated whether the changes in children's externalizing behaviors were related to the changes in parenting. As described above, for mothers it was found that a greater decrease in physical punishment was related to a greater decrease in their children's attention problems. Remarkably, for fathers it was found that a higher rate of decrease in support was related to a slower rate of decrease in attention problems. This latter result seems to be different from the findings reported in Chapter 4, where paternal support was found to have no significant effect. However, this apparent discrepancy might be explained by the difference in research questions that were addressed. In Chapter 4, we examined how individual differences in parenting were related to individual differences in child externalizing behaviors at a particular moment in time. In Chapter 5, we used a longitudinal design to investigate the associations between changes in parenting and changes

in children's externalizing behaviors. Thus, although at a particular moment in time paternal support is not related to children's attention problems, changes in these constructs over time are interrelated. This does not necessarily mean that change in paternal support leads to change in children's attention problems or vice versa. Rather, the interrelated change might be due to other factors as well as to developmental changes in paternal parenting and children's attention problems.

### The specificity of relations between parental/child characteristics and different negative child outcomes

- ✓ *Results (Figure 6): there is both specificity and non-specificity in the relation between risk factors and different types of child outcomes. Parental personality seems to be a common risk factor for various types of negative child outcomes, whereas child temperament and parenting seem to be specific risk factors, differently related to different child outcomes.*



Figures 6. The specificity of relations between parental/child characteristics and different negative child outcomes (examined in Chapters 2, 4, and 5)

An important issue in the literature concerns the controversy between researchers who point to findings showing that a common set of social and behavioral influences contributes to the development of the entire range of problems (Biglan, Mrazek, Carnine, & Flay, 2003; Flay & Petraitis, 1994; Gottfredson & Hirschi, 1990) and researchers who emphasize specificity in the relation between risk factors and different types of behavior problems. This debate has also implications for the development of (preventive) interventions. For instance, according to general theories, prevention programs should be broad and pursue a number of goals at the same time instead of focusing on only one type of behavior or negative outcome (Biglan et al., 2003). In contrast, if preventive interventions are based on specific theories, these programs should be risk-specific.

In order to determine *common* and *specific* risk factors for various forms of negative outcomes during toddlerhood, in Chapter 2 we compared risk factors for externalizing behaviors with risk factors for an associated negative child outcome, namely unintentional injuries. Additionally, in Chapters 4 and 5 risk factors for different subtypes of externalizing behaviors (i.e., attention problems and aggressive behaviors) were compared.

The study presented in Chapter 2 focused on risk factors on the domains of child temperament, parental personality and parental psychopathology. It was found that maternal low conscientiousness and paternal low self-control predicted elevated levels of both children's externalizing behaviors and unintentional injuries. As noted before, the association between these parental personality traits and children's externalizing behaviors might be mediated by the parent-child relationship or be a direct one, for example through modeling of behaviors or through genetic transfer. The association between parental personality and children's injuries might be explained by the role of safety measures and/or supervision: mothers who are more conscientious and fathers who have more self-control might take more safety measures in and around the home and/or might more adequately intervene when their children engage in dangerous activities (Dal Santo, Goodman, Glik, & Jackson, 2004; Morrongiello & House, 2004). Anyhow, children of parents with a low score on conscientiousness or self-control are at increased risk for problems on more than one domain. In addition to these two common risk factors for externalizing behaviors and injuries, children's inhibitory control and dispositional frustration as well as maternal externalizing symptoms were found to be specific risk factors, affecting children's externalizing behaviors only.

Chapter 4 examined the contribution of parental personality traits and parenting dimensions to two types of externalizing behaviors: attention problems and aggressive behaviors. With regard to the contribution of parental personality traits, no difference was found in risk factors for attention problems and aggressive behaviors. Maternal and paternal emotional stability were related to both attention problems and aggressive behaviors. However, the process by which emotional stability predicted children's adjustment differed somewhat for attention problems and aggressive behaviors. Both maternal and paternal emotional stability were found to be directly related to attention problems. The association between paternal emotional stability and aggressive behaviors also appeared to be a direct one. However, the effect of maternal emotional stability on children's aggressive behaviors was found to be mediated by maternal support. With regard to the contribution of parenting, we expected parenting to be more strongly related to children's aggressive behaviors since previous studies suggested that other factors (i.e., genetic influences and cognitive control features) might be more important in predicting hyperactive/inattentive behaviors (Barkley, 1990; Frick et al., 1993; Rutter, Silberg, O'Connor, & Simonoff, 1999). In Chapter 4 we indeed found that for both mothers and fathers more parenting behaviors were significantly related to aggressive behaviors than to attention problems. Whereas aggressive behaviors

were found to be predicted by several parenting dimensions (maternal and paternal psychological control, maternal and paternal lack of structure, and maternal support), attention problems were predicted by maternal and paternal psychological control only. This result is in line with previous studies that suggested that hyperactive/inattentive behaviors might elicit psychological control from parents, which subsequently might lead to even higher levels of these hyperactive/inattentive behaviors (Campbell, Pierce, March, & Ewing, 1991).

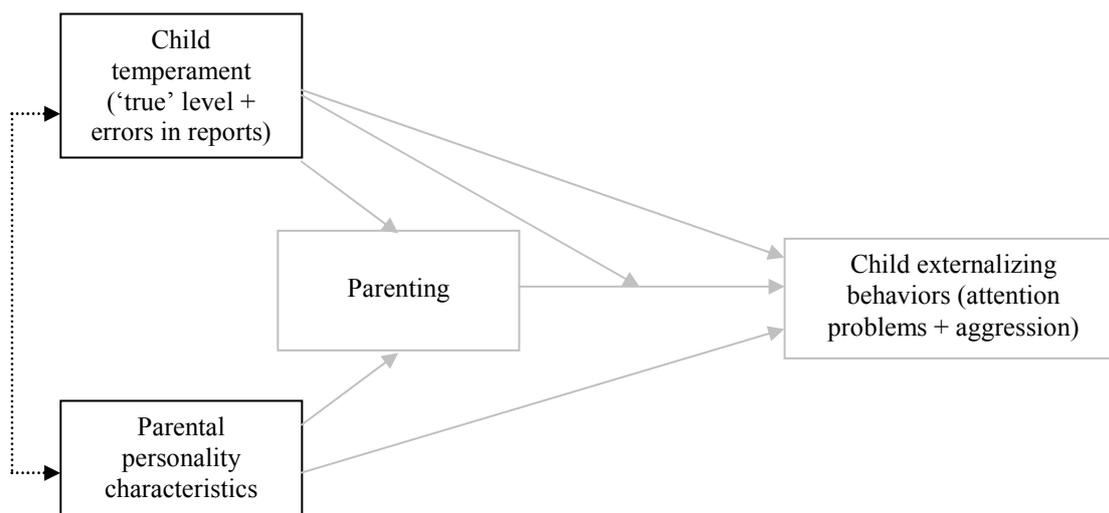
In contrast to the results presented in Chapter 4, in Chapter 5 also the levels of children's attention problems were found to be associated with the levels of a wide range of parenting dimensions (i.e., maternal support, psychological control, physical punishment, and lack of structure). This might be explained by the fact that, due to the relatively small sample size, it was not possible to include all parenting dimensions simultaneously in the latent growth models used in Chapter 5. Consequently, the effects of some parenting dimensions reported in this Chapter may be spurious (e.g., the association between children's attention problems and maternal support might be a result of the association of both with maternal psychological control). In contrast, in Chapter 4 the effects of all parenting dimensions were investigated simultaneously. In other words, the analyses used in Chapter 4 made it possible to draw conclusions about the relative influence of each parenting dimension. Therefore, we tentatively conclude that, in line with previous studies (Shaw, Lacourse, & Nagin, 2005), the results of the present thesis suggest that parenting is more predictive of aggressive behaviors than of attention problems. With regard to the effects of specific parenting dimensions, psychological control seems to be related to both attention problems and aggressive behaviors, while other parenting dimensions are related to aggressive behaviors only.

Summarizing, when comparing the risk factors for externalizing behaviors and unintentional injuries as well as when comparing the risk factors for different subtypes of externalizing behaviors (i.e., attention problems and aggressive behaviors), both common and specific risk factors were found. This implicates that preventive interventions related to different negative child outcomes might include general program components aimed at common risk factors, as well as risk-specific program components.

### **The value of parental reports of toddlers' temperament**

- ✓ *Results (Figure 7): parental personality traits have little distorting effect on parental reports of toddlers' temperament, supporting the value of parental reports of children's adjustment.*

Next to examining the associations between toddlers' externalizing behaviors and child and parental characteristics, the present thesis paid attention to a methodological issue, namely the value of parental reports of children's temperament.



*Figure 7.* Parental personality as a source of rating biases in parental reports of child temperament (*examined in Chapter 6*)

In contrast to perceptual distortion caused by parental psychopathology, very scarce attention has been given in previous literature to the influence of parental personality traits on parents' reports of children's functioning (Kroes, Veerman, & De Bruyn, 2005).

The study in Chapter 6 aimed to determine whether parental personality traits bias parental reports of children's temperament. The focus was on children's self-control, representing the self-regulatory dimension of temperament. Two analytic approaches were used to determine the possible distorting effects of parental personality traits on parental reports of children's self-control. The first analytic approach directly examined whether parental personality traits bias parental reports of children's self-control. Results pointed out that none of the parental personality traits had a significant effect on parents' reports of children's self-control. In the second analytic approach, we focused on the agreement between parents' reports and observational measures of children's self-control. Overall, the congruence between parent-reported and observed child self-control was small and non-significant. Results showed that in most cases correspondence between parent-reports and observations of child self-control did not depend on parents' scores on the personality traits. Only for paternal conscientiousness a significant moderating effect was found: for highly conscientious fathers there was a stronger agreement between father-reported and observed child self-control. This suggests a distorting effect of low paternal conscientiousness on fathers' reports of children's self-control. Less conscientious people are characterized by lower scores on punctuality and accuracy (McCrae & Costa, 1999), as a consequence of which fathers with lower scores on conscientiousness might be less accurate reporters of their child's functioning. In contrast to some other studies (Funder, 1999), we did not find support for distorting effects of parental neuroticism, extraversion, and openness. We have to keep in mind that this might be explained by the sample of the present study, that consisted of

relatively well-functioning and mostly highly educated parents. More distorting effects of parental personality might be found in samples consisting of parents who are less emotionally stable and have a lower socioeconomic status.

Summarizing, overall our results indicate that parental personality traits have little distorting effect on parents' reports of children's temperament, which applies for both mothers and fathers. As a consequence, these results support the value of parental reports obtained from parents in the community.

## **General conclusion**

The present thesis focused on risk factors on the domains of child and parental characteristics for toddlers' externalizing behaviors. It was found that toddlers' externalizing behaviors are predicted by both child temperament and parental personality traits and psychopathological symptoms. However, child temperament seemed to be more important than parental characteristics in predicting these externalizing behaviors. The findings of the studies presented in this thesis also demonstrated that an exclusive focus on main effects of child and parental characteristics only partly unravels the ways in which these characteristics affect children's externalizing behaviors. Parental personality traits partially affected toddlers' externalizing behaviors through the impact on parenting. Above and beyond these indirect effects, parental personality was also directly associated with externalizing behaviors in toddlerhood. Parenting did not affect all children to the same extent; poor parenting was found to be particularly negative for children with certain vulnerable temperamental traits. Longitudinal data provided evidence that parenting practices predict subsequent changes in the level of toddlers' externalizing behaviors. Additionally, changes in parenting were found to be accompanied by changes in toddlers' externalizing behaviors and vice versa. For very young children maternal parenting was stronger associated with child externalizing behaviors than paternal parenting. During toddlerhood the influence of fathers seemed to become more similar to that of mothers. Consequently, later in toddlerhood disciplining techniques of both mothers and fathers affected children's externalizing behaviors. However, mothers' warmth more strongly predicted children's externalizing behaviors than fathers' warmth. With regard to different types of child problem behaviors, both common and specific risk factors were found. Finally, parental personality traits appeared to have little distorting effect on parental reports of toddlers' temperament, supporting the value of parental reports of children's adjustment.

## Limitations

In interpreting the results presented in this thesis, some limitations have to be mentioned. First, there are some limitations concerning our sample. For instance, due to the use of time-consuming observation measures, our sample was relatively small. This may have limited the power to detect significant effects or to identify longitudinal changes in the variables of interest. Additionally, our sample included only boys, since boys are at increased risk for externalizing behaviors. Data of some studies (e.g. Rubin et al., 1998) suggest that boys and girls may have different vulnerabilities to factors that impact externalizing behaviors. As a consequence it is unknown whether the results can be generalized to girls. Our sample was also relatively homogeneous, consisting of relatively well-functioning families with mostly moderate to high socioeconomic status and children with generally normal levels of problem behaviors. However, the most plausible effect of this homogeneous sample is a reduction of variance in externalizing behaviors and in the predictors, resulting in lower correlations (Dekovic, Janssens, & van As, 2003). In other words, it is most likely that the associations that might be found in samples including more children with severe problem behaviors are even stronger than the findings reported in this thesis.

Another limitation is the reliance on questionnaires filled out by parents. Although we included observation measures in the studies presented in Chapters 3 and 6, the remaining studies relied on questionnaire-data only. These parent reports will reflect both perceptions and objective behaviors. In addition, because of shared method variance, the reliance on questionnaires might have lead to an overestimation of stability in the constructs and to an inflation of the associations between these constructs.

Furthermore, in investigating whether there is specificity in the relation between risk factors and child outcomes, intercorrelations among these different child outcomes should be taken into account (Caron, Weiss, Harris, & Catron, 2006). Results that appear to indicate non-specific relations to multiple negative child outcomes, may also represent indirect effects of risk factors through unassessed covariance between the different child outcomes. Whereas such covariance between the different types of child outcomes was taken into account the study presented in Chapter 5, this was not done in the studies presented in Chapters 2 and 4. However, additional analyses showed a same pattern of common risk factors when this covariance was controlled for.

A final limitation concerns the comparison of mother and father effects. Because of the interdependence of parents of the same family (Kenny, 1996), maternal and paternal characteristics should be considered in one model in order to formally test differences in the effects of mothers and fathers. However, because father data were not systematically gathered in all waves, in some studies father and mother effects were studied separately. Future studies could use structural equation models in which maternal and paternal effects are included in one model and that statistically test whether there are significant differences in these effects.

## Future directions

Recently, interest has emerged into links between temperament, personality, and psychopathology (Ahadi & Rothbart, 1994). Temperament and personality are increasingly being integrated, both conceptually and empirically (Nigg, 2006). However, there is still a lack of consensus with regard to the question whether temperament and personality are conceptually different or whether they only differ in developmental stage. For conceptual as well as developmental process relations between temperament, personality, and psychopathology, numerous suggestions have been made (Clark, 2005; Nigg, 2006; Shiner & Caspi, 2003). These have been summarized as four basic models: a) a spectrum model in which temperament is a subclinical manifestation of psychopathology; b) a vulnerability model that states that certain temperamental traits constitute a risk factor for psychopathology while other are a buffer against psychopathology; c) a pathoplastic model according to which temperament is assumed to alter the course of a disorder; d) and a scar effects model that states that pathological processes alter temperament or personality. However, the literature on this issue does still not allow for drawing strong conclusions about the merits of these models. Future studies should elaborate on the precise nature of the relations between temperament, personality, and psychopathology and search for broad and common dimensions that represent individual differences in temperament, personality, and psychopathology.

The present thesis showed that the impact of parenting depends on child temperamental characteristics. Similarly, influences within broader contexts (e.g., neighborhood, cultural context) can shape and moderate the effect of parenting on children's adjustment (Collins et al., 2000). The ecological perspective emphasizes these interactive and synergistic nature of the links between family and other influences (Bronfenbrenner & Morris, 1998). Next to possible moderating effects of characteristics of the broader context on the effects of parenting (Darling & Steinberg, 1997), parenting influences and influences within broader contexts might be related in other ways. For instance, parenting might mediate the associations between broader social, cultural, and economic contexts and children's behavior (Conger et al., 1994). Additionally, parents might adjust their parenting strategies to suit the demands of the neighborhood context within which they live (Furstenberg et al., 1997). Thus, future studies should consider parenting influences on young children in the light of the simultaneous influence of relevant social spheres such as characteristics of day care facilities, neighborhood characteristics, parents' economical position, and parents' social network.

Although the present thesis found support for the value of parental reports of children's temperament, the controversy with regard to the generally low to moderate congruence between observational measures and parent reports of temperament is still unsolved. Therefore, this remains a issue deserving further study. Additionally, more reflection is needed on the question for which purposes and under which circumstances parent reports or observation measures should be used. Some researchers have advocated to combine different

measures of child temperament in order to obtain more robust indices (Rothbart & Bates, 1998). However, since different measures are often not significantly interrelated and may relate differently to certain outcome measures, this may not be the best strategy. As shown by Majdandzic and Van den Boom (2007), a promising way to combine measures without losing information from the separate measures is to use structural equation models, which correct for measurement error. In these models, observed and parent-rated temperament can be modelled by separate latent constructs, which can each be related to an outcome measure (Hayden, Klein, & Durbin, 2005).

The studies presented in this thesis are part of a broader study. There are several research questions that remain to be studied. At this moment, an additional data collection is being conducted on the same subjects. Promising issues that can be addressed with these new data include how psycho physiological measures of child temperament relate to behavioral measures of temperament and how children's externalizing behaviors and temperamental characteristics develop when children enter school.

Finally, even the longitudinal design used in the present thesis does not totally rule out the possibility that the changes in one construct (e.g., child externalizing behaviors) are caused by an unknown variable instead of the other variable of interest (e.g., parenting). Future studies could conduct intervention studies in which parents are randomly assigned to behavior-change treatment groups. If the intervention produces changes in the parents' behaviors and if the degree of changes in turn is associated with changes in the child's behavior, the evidence for the causal influence of parenting is compelling (Collins et al., 2000).

The findings of the current thesis also have implications for prevention and intervention programs. The most compelling finding of this thesis is that parenting has different effects on different types of children. This implicates that intervention efforts to improve parents' parenting practices should always pay attention to the characteristics of the individual child. Additionally, since the effect of parental personality on toddlers' externalizing behaviors appeared to be partly mediated by parenting behaviors, assisting parents to adjust their parenting might be an effective way to prevent persistent behavior problems in young children of parents with less favorable personality traits. Furthermore, the present thesis showed that different types of problem behaviors have some etiological factors in common, indicating that preventive interventions related to different negative child outcomes might be of mutual benefit and might even be partially combined.

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## Summary

Recent theories and models on child development emphasize that the child and his or her environment are not two separate entities, but form a system with continuously ongoing, bidirectional processes of interaction (Bronfenbrenner, 1986; Scaramella & Leve, 2004; Shaw & Bell, 1993). According to these theories, both person characteristics and environmental characteristics have to be taken into account in order to understand individual development. In line with these theories, the present thesis focused on the ways in which child characteristics and parental characteristics interplay in affecting an important negative outcome in toddlerhood; externalizing behaviors. Additionally, attention was given to a methodological issue, namely the value of parental reports of children's temperament. To investigate these issues, five empirical studies were conducted.

Participants of these studies were 117 toddler boys and their parents. Families were recruited through Infant Welfare Clinics in three cities in the Netherlands. In the Netherlands, Infant Welfare Clinics follow up all children from birth up to four years of age and they systematically check the child's growth and development. Thus, the sample is considered to be a community sample. The families were followed from the moment the children were 17 months of age until they were 35 months old. Toddlerhood is one of the most critical periods in development with many changes for both children and their parents. In order to keep track with these changes, four measurement waves with 6-months intervals were used. Consequently, information from these families was gathered when the child was approximately 17, 23, 29, and 35 months of age. Parents completed questionnaires on their own personality characteristics and parenting behaviors, and on the child's temperamental characteristics, externalizing behaviors, and unintentional injuries. Additionally, home observations were used to measure maternal parenting and children's self-control.

*Chapter 2* concerned a cross-sectional study on the determinants of children's externalizing behaviors and minor unintentional injuries at 17 months of age. More specifically, the aim of this study was to investigate risk factors belonging to the domains of child temperamental characteristics and parental personality characteristics and to determine whether common risk factors can be identified for externalizing behaviors and minor injuries. The domain of child characteristics appeared to be the most important domain for predicting toddlers' externalizing behaviors, whereas the domain of parental characteristics appeared to be the most important domain for predicting toddlers' minor injuries. The results of this study showed two common risk factors: maternal low conscientiousness and paternal low self-control. Thus, children of mothers who are less conscientious and children of fathers who have a low self-control, are at risk for multiple negative outcomes. In addition, children's inhibitory control and dispositional frustration as well as maternal externalizing symptoms contributed to children's externalizing behaviors only. Furthermore, the results of this study

pointed out that the more accumulated risk children experience, the higher the levels of externalizing behaviors and minor injuries.

*Chapter 3* presented a study on the moderating effects of four temperamental traits on the relation between observed maternal parenting and toddlers' externalizing behaviors. These effects were examined concurrently, when the child was 17 months old, and longitudinally, at 23 months of age. For the prediction of the level of concurrent externalizing behaviors at 17 months, only main effects were found of children's temperamental characteristics. Children with a low level of inhibitory control, a low level of soothability, a high level of frustration, or a high activity level were found to be at risk for high levels of externalizing behaviors. Additionally, an interaction effect between maternal negative control and children's inhibitory control indicated that maternal negative control did matter in predicting externalizing behaviors, but especially for children who had problems controlling their behaviors. The findings with regard to the development of externalizing behaviors between 17 and 23 months of age showed that child temperament and maternal parenting had no main effects on this development. However, child temperament interacted with both maternal negative control and lack of maternal sensitivity: maternal negative control and lack of maternal sensitivity were related to an increase in externalizing behaviors for temperamentally difficult children only.

*Chapter 4* focused on the mediating role of parenting in the relation between parental personality and toddlers' externalizing behaviors (i.e., attention problems and aggressive behaviors) at 35 months of age. Several associations were found between parenting dimensions and children's externalizing behaviors. Paternal and maternal psychological control predicted both children's attention problems and aggressive behaviors. In addition, paternal and maternal lack of structure as well as maternal support were predictive of children's aggressive behaviors. Emotional stability was the only parental personality trait that was related to children's externalizing behaviors. The effect of maternal emotional stability on children's aggressive behaviors appeared to be mediated by maternal support. Mothers who were less emotionally stable provided less support to their child, which subsequently led to elevated levels of children's aggressive behaviors. For fathers, there appeared to be a direct effect of emotional stability on children's aggressive behaviors. In addition, for both mothers and fathers emotional stability was directly related to children's attention problems.

The longitudinal study described in *Chapter 5* examined the normative developmental trajectories of toddlers' attention problems and aggressive behaviors and several maternal and paternal parenting dimensions. Change in both attention problems and aggressive behaviors between 17 and 35 months of age appeared to be best described by a linear growth curve, with children's attention problems revealing a significant average decrease over time and aggressive behaviors showing a significant average increase over time. About half of the parenting dimensions also showed a significant change over time, whereas the average level of the other parenting dimensions did not change. Several contemporary relations were found

between parenting dimensions and toddlers' externalizing behaviors. Furthermore, also evidence was found for concomitant change in parenting and externalizing behaviors. A higher rate of decrease in maternal physical punishment was related to a higher rate of decrease in children's attention problems. And a higher rate of decrease in paternal support, appeared to be related to a slower rate of decrease in children's attention problems.

*Chapter 6* described a study that aimed to determine whether parental personality traits bias parental reports of children's temperament. The focus was on children's self-control, representing the self-regulatory dimension of temperament. Both parent reports and observational measures of self-control were included in this study. The results showed that whereas maternal and paternal reports of child self-control were significantly interrelated, parent-reported child self-control was not significantly related to observed child self-control. Two analytic approaches were employed to assess the possible distorting effects of parental personality. The first analytic approach, using a structural equation model, directly examined whether parental personality traits bias parental reports of children's self-control. Results pointed out that none of the parental personality traits did significantly modify or distort parents' perceptions of their children's temperament. In the second approach, it was investigated whether the agreement between parent-reported and observed child self-control was stronger for parents with certain personality traits. Only for paternal conscientiousness a significant moderating effect was found: for highly conscientious fathers there was a stronger agreement between father-reported and observed child self-control. However, overall the results suggested that parental personality traits have little distorting effect on parents' reports of children's temperament, supporting the value of parental reports.

Taken together, the main conclusion that can be drawn from the studies presented in this thesis is that an exclusive focus on main effects of child and parental characteristics only partly unravels the ways in which these characteristics affect children's externalizing behaviors. Therefore, it is important to integrate person and environmental characteristics and to take into account interactive and mediating effects. Furthermore, the results presented in this thesis indicate that attention should be paid to the contributions of both mothers and fathers, the specificity of relations between risk factors and negative child outcomes, and the longitudinal relations between these constructs.



## Samenvatting (Summary in Dutch)

Recente theorieën en modellen met betrekking tot de ontwikkeling van kinderen benadrukken dat het kind en zijn of haar omgeving niet twee afzonderlijke entiteiten zijn, maar dat zij een systeem vormen door continue wederzijdse beïnvloeding (Bronfenbrenner, 1986; Scaramella & Leve, 2004; Shaw & Bell, 1993). Volgens deze theorieën moeten onderzoeken naar individuele ontwikkeling daarom naar zowel persoonskenmerken als omgevingskenmerken kijken. Aansluitend op deze theorieën was het doel van dit proefschrift het onderzoeken van het samenspel van kind- en ouderkenmerken in de beïnvloeding van een belangrijke negatieve uitkomst in de peuterleeftijd: externaliserend gedrag. Daarnaast is aandacht besteed aan een methodologische kwestie, namelijk de waarde van ouderrapportages van het temperament van kinderen. Om de centrale onderzoeksvragen te beantwoorden, zijn vijf empirische studies uitgevoerd.

De deelnemers aan deze studies waren 117 jongetjes in de peuterleeftijd en hun ouders. De gezinnen werden geworven via consultatiebureaus in drie steden in Nederland. Deze consultatiebureaus volgen in Nederland alle kinderen vanaf hun geboorte tot het moment dat zij vier jaar zijn en zij controleren systematisch de groei en ontwikkeling van de kinderen. De steekproef van dit onderzoek kan dus beschouwd worden als een niet-klinische steekproef. De gezinnen werden gevolgd vanaf het moment dat de kinderen ongeveer 17 maanden waren tot het moment dat de kinderen ongeveer 35 maanden waren. De peutertijd is één van de meest belangrijke ontwikkelingsperiodes, met vele veranderingen voor zowel de kinderen zelf als voor de ouders. Om deze veranderingen in kaart te kunnen brengen, werden er vier meetmomenten gebruikt met intervallen van zes maanden. Er werd dus informatie verzameld op de momenten dat de kinderen ongeveer 17, 23, 29 en 35 maanden oud waren. Ouders vulden vragenlijsten in over hun eigen persoonskenmerken en opvoedingsgedragingen en over de temperamentkenmerken, externaliserende gedragingen en ongevallen van hun kind. Daarnaast werden thuisobservaties gebruikt om opvoeding door moeders en zelfcontrole van kinderen te meten.

*Hoofdstuk 2* betreft een cross-sectionele studie naar de determinanten van externaliserend gedrag en ongevallen van kinderen op de leeftijd van 17 maanden. Het doel van deze studie was het onderzoeken van risicofactoren op het gebied van temperamentkenmerken van het kind en persoonskenmerken van de ouders en het opsporen van gemeenschappelijke risicofactoren voor externaliserend gedrag en ongevallen. Het domein van de kindkenmerken bleek het belangrijkste te zijn voor de voorspelling van externaliserend gedrag, terwijl het domein van ouderkenmerken het belangrijkste domein bleek te zijn voor de voorspelling van ongevallen. Twee gemeenschappelijke risicofactoren werden gevonden: een lage consciëntieusheid van moeder en een lage zelfcontrole van vader. Kinderen van moeders die

weinig consciëntieus zijn en kinderen van vaders die een lage zelfcontrole hebben, lopen dus een verhoogd risico op meerdere negatieve uitkomsten. Daarnaast bleken ook de niveaus van inhibitiecontrole en frustratie van kinderen en het niveau van externaliserende symptomen van moeders gerelateerd te zijn aan het externaliserend gedrag van kinderen. Bovendien lieten de resultaten van deze studie zien dat het aantal risicofactoren waaraan een kind blootgesteld wordt van belang is voor het bepalen van het risico dat een kind loopt op externaliserend gedrag en ongevallen.

*Hoofdstuk 3* bevat een studie naar de modererende effecten van vier temperamentkenmerken op de relatie tussen geobserveerde opvoeding door moeder en het externaliserend gedrag van peuters. Deze effecten werden cross-sectioneel bekeken (voor het niveau van externaliserend gedrag op 17 maanden) en longitudinaal (voor de ontwikkeling van externaliserend gedrag tussen 17 en 23 maanden). Voor de voorspelling van externaliserend gedrag op 17 maanden werden alleen hoofdeffecten gevonden van de temperamentkenmerken van het kind. Kinderen die een lage inhibitiecontrole hebben, lastig te kalmeren zijn, snel gefrustreerd zijn en een hoog activiteitsniveau hebben, bleken een verhoogd risico te hebben op hoge niveaus van externaliserend gedrag. Daarnaast werd een interactie-effect gevonden tussen negatieve controle door moeder en de inhibitiecontrole van het kind: negatieve controle bleek het niveau van externaliserend gedrag te voorspellen, maar dat bleek vooral het geval te zijn voor kinderen die moeite hadden om hun impulsen en gedrag te controleren. De resultaten met betrekking tot de ontwikkeling van externaliserend gedrag tussen 17 en 23 maanden lieten zien dat het temperament van het kind en opvoeding door moeder geen hoofdeffecten hadden op deze ontwikkeling. Temperament van het kind interacteerde echter wel met zowel negatieve controle door moeder als gebrek aan sensitiviteit van moeder: negatieve controle en een gebrek aan sensitiviteit van moeder waren alleen voor kinderen met een moeilijk temperament gerelateerd aan een toename van externaliserend gedrag.

*Hoofdstuk 4* richtte zich op de mediërende rol van opvoeding in de relatie tussen persoonlijkheid van ouders en externaliserend gedrag (uitgesplitst in aandachtsproblemen en agressief gedrag) van peuters op de leeftijd van 35 maanden. Er werden verschillende relaties gevonden tussen opvoedingsdimensies en het externaliserend gedrag van kinderen. Psychologische controle door vaders en moeders voorspelde zowel het niveau van aandachtsproblemen als het niveau van agressief gedrag. Daarnaast waren gebrek aan structuur van zowel vader als moeder en ondersteuning/warmte door moeder voorspellend voor het niveau van agressief gedrag. Emotionele stabiliteit was de enige ouderlijke persoonlijkheidstrek die gerelateerd was aan het externaliserend gedrag van kinderen. Het effect van emotionele stabiliteit van moeders op het agressieve gedrag van het kind bleek gemedieerd te worden door de ondersteuning/warmte die moeder bood. Moeders die minder emotioneel stabiel waren boden minder ondersteuning/warmte aan hun kind, dat vervolgens leidde tot hogere niveaus van agressief gedrag bij het kind. Voor vaders bleek er een direct

effect te zijn van emotionele stabiliteit op het agressief gedrag van het kind. Daarnaast was emotionele stabiliteit van zowel vaders als moeders direct gerelateerd aan de aandachtsproblemen van het kind.

Het longitudinale onderzoek dat in *Hoofdstuk 5* werd beschreven, onderzocht de normatieve of gemiddelde ontwikkeling van aandachtsproblemen en agressief gedrag van peuters en van verschillende opvoedingsdimensies van vaders en moeders. Verandering in aandachtsproblemen en agressief gedrag tussen 17 en 35 maanden bleek het best beschreven te worden door een lineaire groeicurve. Het gemiddelde niveau van aandachtsproblemen bleek significant af te nemen, terwijl het gemiddelde niveau van agressief gedrag significant toenam. Ongeveer de helft van de opvoedingsdimensies liet ook een significante verandering over tijd zien, terwijl het gemiddelde niveau van de andere opvoedingsdimensies gelijk bleef. Er werden meerdere relaties gevonden tussen de niveaus van opvoedingsdimensies en de niveaus van externaliserend gedrag van peuters. Daarnaast bleken de veranderingen in opvoeding en externaliserend gedrag deels met elkaar samen te hangen. Een sterkere afname van fysieke straf door moeder was gerelateerd aan een sterkere afname van aandachtsproblemen. En een sterkere afname van ondersteuning/warmte door vader bleek gerelateerd te zijn aan een minder sterke afname van aandachtsproblemen.

*Hoofdstuk 6* beschreef een studie die als doel had om te onderzoeken of persoonlijkheidskenmerken van ouders leiden tot een vertekening van hun rapportage van het temperament van hun kind. Deze studie richtte zich daarbij op de zelfcontrole van kinderen, een maat voor de zelfreguleringsdimensie van temperament. Zowel ouderrapportages als observaties van zelfcontrole werden in deze studie gebruikt. De resultaten lieten zien dat vader- en moederrapportages van de zelfcontrole van het kind significant met elkaar samenhangen, maar dat de ouderrapportages niet significant gerelateerd waren aan de observatiemaat van zelfcontrole. Twee analytische benaderingen werden ingezet om de mogelijke vertekende effecten van persoonlijkheid te beoordelen. De eerste analytische benadering, waarbij gebruik werd gemaakt van een *structural equation model*, onderzocht op een directe manier of persoonlijkheidskenmerken van ouders leiden tot een vertekening van hun rapportages van de zelfcontrole van hun kind. De resultaten lieten zien dat dit voor geen van de persoonlijkheidskenmerken van ouders het geval was. In de tweede analytische benadering werd bekeken of de overeenkomst tussen de ouderrapportages en de observaties van zelfcontrole van kinderen sterker was voor ouders met bepaalde persoonlijkheidskenmerken. Alleen voor de mate van consciëntieusheid van vaders werd een dergelijk moderatie effect gevonden: voor vaders die erg consciëntieus waren werd een sterkere overeenkomst gevonden tussen de vader rapportage en de observatiemaat van zelfcontrole van het kind. In het algemeen geven de resultaten echter aan dat persoonlijkheidskenmerken van ouders slechts weinig vertekend effect hebben op hun rapportages van het temperament van hun kind. Dit ondersteunt de waarde van ouderrapportages.

Samenvattend is de belangrijkste conclusie die getrokken kan worden op basis van de studies die in dit proefschrift beschreven zijn, dat een exclusieve gerichtheid op de hoofdeffecten van kind- en ouderkenmerken slechts gedeeltelijk laat zien hoe deze kenmerken samenhangen met het externaliserend gedrag van kinderen. Het is daarom van belang om in onderzoek persoons- en omgevingskenmerken te integreren en rekening te houden met interactieve en mediërende effecten. Daarnaast geven de resultaten die in dit proefschrift gepresenteerd zijn aan dat aandacht besteed moet worden aan de bijdragen van zowel moeders als vaders, aan de specificiteit van relaties tussen risicofactoren en negatieve kinduitkomsten en aan de longitudinale relaties tussen deze constructen.

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## **Curriculum Vitae**

Chantal van Aken was born in 's-Hertogenbosch on October 4, 1978. After completing secondary education (Gymnasium, Jeroen Bosch College in 's-Hertogenbosch) in 1997, she studied Educational Sciences at Utrecht University and graduated cum laude in 2001. For two years, she worked as a mental health promotion and prevention worker at Altrecht GGZ and GGZ Eindhoven. In 2003 she entered a PhD-program at the Department of Developmental Psychology of Utrecht University. From 2003 to 2008 she worked on her PhD-project, which was conducted in close collaboration with the Department of Educational Sciences of the University of Amsterdam. From 2005 to 2007 she also worked as a lecturer at the Department of Developmental Psychology of Utrecht University. Since January 2008 Chantal works as a researcher at the Consumer Safety Institute in Amsterdam.

