

## Predicting Young Children's Externalizing Problems Interactions among Effortful Control, Parenting, and Child Gender

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This study investigated interactions between observed temperamental effortful control and observed parenting in the prediction of externalizing problems. Child gender effects on these relations were examined. The relations were examined concurrently when the child was 3 years old and longitudinally at 4.5 years. The sample included 89 two-parent families and their firstborn children. Children with a low level of effortful control were most at risk of displaying externalizing problems. However, more parental positive control seemed to buffer this risk. Boys were at risk of displaying externalizing problems, but again this was buffered by parental positive control. Effortful control was more strongly related to concurrent externalizing problems in boys than in girls, but girls' effortful control had a greater long-term effect on externalizing problems.

Externalizing problems in preschool-aged children have been demonstrated to be strongly predictive of externalizing problems later in life (Campbell, 1995; Campbell, Shaw, & Gilliom, 2000). Revealing the antecedents of early externalizing problems, such as problems with attention, hyperactivity, and conduct (Keenan & Shaw, 1997), is therefore of great importance. Separate research lines have stressed the importance of individual characteristics of children (e.g., temperament) on the one hand and parenting on the other for the development and stability of early externalizing problems. Few studies have examined how these factors interact (see Gallagher, 2002; Van Aken, Van Lieshout, Scholte, & Haselager, 2002), although recently

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more attention has been paid to interaction effects (e.g., Bradley & Corwyn, 2008; Crockenberg & Leerkes, 2008). The interaction between child factors and family processes is assumed to capture the complexity of developmental processes more precisely than each of these two factors can separately (Kochanska, 1993, 1997). The present study extends prior research by investigating interactions between observed temperamental effortful control and observed parenting in the prediction of externalizing problems when the child was 3 years old and longitudinally at 4.5 years. Furthermore, child gender differences in the relations are studied.

### *Children's Effortful Control*

Children's temperament, particularly the self-regulatory aspect, is expected to be strongly implicated in socialization and to be critical to development (Kochanska, Murray, & Coy, 1997). Effortful control is a self-regulatory construct, which can be defined as the ability to suppress a dominant response and to perform a subdominant response (Rothbart, 1989). It emerges at the end of the first year and is assumed to be evident at 3 years of age (Kochanska, Murray, & Harlan, 2000; Kochanska & Knaack, 2003). Preschoolers with a low level of effortful control are limited in their coping strategies for handling impulses and stresses in the environment. They are less effective in shifting attention from immediate impulse gratification to its subsequent consequences and, as a result, are more likely to show impulsive and disruptive behaviors (Olson, Sameroff, Kerr, Lopez, & Wellman, 2005). A higher level of effortful control, on the other hand, may enable children to inhibit impulses on their own and to regulate their behavior in response to environmental demands. Effortful control has been found to be at least moderately negatively associated with concurrent and later externalizing problems (e.g., Eisenberg, Zhou, Spinrad, Valiente, Fabes, & Liew, 2005; Gartstein & Fagot, 2003; Kochanska & Knaack, 2003; Rothbart, Ahadi, Hershey, & Fisher, 2001; Rubin, Burgess, Dwyer, & Hastings, 2003; Zhou, Hofer, Eisenberg, Reiser, Spinrad, & Fabes, 2007).

### *Parenting*

A child's functioning is not isolated from the environment in which he or she lives (see Magnusson & Stattin, 1998). Parents are expected to play a major role in introducing societal and moral standards and in disciplining, supporting, and guiding the child (Kochanska et al., 2000). Negative controlling parenting is likely to have a damaging effect on young children, interfering with the internalization of sociomoral rules (Kochanska, 1997).

Positive controlling parenting and responsive parenting may prevent the child from developing externalizing problems by affording guidance and support for the internalization of sociomoral rules. Although relations have been found between parenting and externalizing problems, both concurrently and longitudinally (e.g., Belsky, Hsieh, & Crnic, 1998; Eisenberg et al., 2005; Gartstein & Fagot, 2003; Olson et al., 2005), most studies reported small to moderate associations as well as inconsistent findings (see Rothbaum and Weisz [1994] for a meta-analysis).

### *Interaction between Effortful Control and Parenting*

Family processes are likely to lead to different developmental outcomes for children as a function of their temperament (Belsky, 2004; Belsky et al., 1998). Therefore, instead of focusing on either child temperament or parenting, interactions between child temperament and parenting need to be studied in the prediction of externalizing problems. Preschoolers with a high level of effortful control may be more resistant to the effects of negative parenting, protecting themselves from developing externalizing problems because of their ability to control their impulses. Preschoolers with a low level of effortful control may be at additional risk of displaying externalizing problems because of the cumulative effects of family and temperamental risk factors. Moreover, according to Kochanska (1997), children differ in their parenting needs. For children high on effortful control, responsiveness would be sufficient to internalize sociomoral rules, whereas for children low on effortful control, gentle discipline (i.e., positive control) is the best parenting behavior to accomplish internalization, yielding stronger effects on these children.

Recent studies have found interaction effects: maternal negative parenting was related to externalizing problems only in children with a low level of effortful control (e.g., Lengua, 2006; Morris, Silk, Steinberg, Sessa, Avenoli, & Essex, 2002; Rubin, Hastings, Chen, Stewart, & McNichol, 1998; Rubin et al., 2003). Few studies examined interactions between positive parenting and effortful control, but these studies did not find an interaction effect (Gartstein & Fagot, 2003; Olson et al., 2005). Interactions have been found between positive aspects of parenting and broader measures of temperament, with stronger relations found between parenting and externalizing problems for children with difficult temperaments (Bradley & Corwyn, 2008). The studies suggest that parenting behaviors have different effects on children as a function of their temperaments, but it remains unclear whether positive and negative dimensions of parenting are differently related to externalizing problems in young children with different levels of effortful control.

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*Child Gender*

Child gender differences may exist in the associations among effortful control, parenting, and externalizing problems. Although boys were reported to have lower levels of effortful control and more externalizing problems than girls, studies did not find child gender differences in the prediction of externalizing problems from effortful control and related measures (Else-Quest, Hyde, Goldsmith, & Van Hulle, 2006; Leve, Kim, & Pears, 2005; Rubin et al., 2003; Olson et al., 2005). A gender effect in the association between parenting and externalizing problems is likely because of different treatment of girls and boys by their parents. Because in Western society overactivity and defiance are considered as being more normative for boys than for girls, expressions of externalizing symptoms are more likely to be accepted and encouraged in boys than in girls (Keenan & Shaw, 1997). Some studies found associations between parenting and externalizing problems in boys only (Leve et al., 2005; Shaw, Keenan, & Vondra, 1994), whereas other studies found stronger effects for girls (Feinberg et al., 2007) or did not find gender effects (Rubin et al., 1998).

*The Current Study*

In contrast to most prior studies, this study integrates young children's individual characteristics (effortful control and gender) and parenting in order to predict externalizing problems. To prevent method and informant biases, observations were used for the assessment of effortful control and parenting by both parents, and multiple informants were used to measure externalizing problems. In addition, externalizing problems were predicted both concurrently and longitudinally.

The first aim of this study was to examine main effects of child effortful control and parenting at 3 years of age in the prediction of externalizing problems at 3 years and the residualized change in externalizing problems from 3 to 4.5 years (i.e., the prediction of externalizing problems at 4.5 years after controlling for externalizing problems at 3 years) (Mason, Cauce, Gonzales, & Hiraga, 1996). We expected effortful control and parenting to independently predict externalizing problems at 3 years and residualized change in externalizing problems from 3 to 4.5 years. Stronger associations were hypothesized for effortful control than for parenting.

The second aim was to investigate whether parenting interacts with effortful control in the prediction of externalizing problems at 3 years and residualized change in externalizing problems from 3 to 4.5 years. We hypothesized that parenting would more strongly predict externalizing

problems in preschoolers with a low level of effortful control than in preschoolers with a high level of effortful control.

The third aim was to examine child gender effects on the associations. Because of inconsistent findings in the literature, we formulated no hypotheses and instead studied the gender effects exploratively.

## Method

### *Participants*

At Time 1 (T1), 89 two-parent families raising firstborn 3-year-old children (45 boys, 44 girls) and 81 daycare providers or preschool playgroup teachers participated in the study. Mothers' mean age was 34.5 years ( $SD = 4.2$ , range 21–46); fathers' mean age was 36.5 years ( $SD = 4.7$ , range 22–50). All mothers and fathers were the biological parents of the children. In 56% of the families, the child had a younger sibling. On average, couples had been together for 10.3 years ( $SD = 4.7$ , range 3–22). Ninety-eight percent of the fathers and 99% of the mothers had Dutch nationality. The majority of the parents were highly educated (23.9% of the mothers and 30.7% of the fathers had a university education) and worked outside the home. At Time 2 (T2), when the children were 4.5 years old, 74 families and 68 kindergarten teachers participated.

The 17% of the families that dropped out from T1 to T2 differed from the rest of the families on one demographic variable: on average, fathers in the dropout group worked more hours per week outside the home ( $t[79] = -2.11$ ,  $p < .05$ ). No differences were found on the following demographic variables: educational level, nationality, one versus more children, age of parents, and number of years together with partner. Regarding all independent and dependent variables of this study, no differences were found between the families of the children who dropped out and the rest of the families.

### *Procedure*

This study was part of a research project on family dynamics and child adjustment. Families were recruited through day care centers and preschool playgroups in different parts of the Netherlands. After agreeing to participate, day care centers and playgroups distributed letters among parents of preschool-aged children asking them to participate in the study. Parents who indicated willingness to participate were selected if the parents lived together and if the target firstborn child was nearly 3 years old.

In the selected families, home observations and day care center and preschool playgroup observations were used to measure parenting and child effortful control at T1 when the child was 36 months old (range 35–37 months old). After the home and day care center visits, mothers, fathers, and teachers were asked to complete a questionnaire. Parenting was measured during the home visits on the basis of dyadic mother-child play sessions and dyadic father-child play sessions. Each session took about 15 minutes and consisted of unstructured and structured play tasks, most of them followed by a cleanup period. The tasks involved solving a matching game, engaging in a building game, and reading a picture book. In order to prevent the child from becoming bored by the tasks, the matching and building games were similar but not the same in mother-child and father-child interaction. The same picture book was used in both parent-child dyads because each dyad makes up their own story. The sessions were videotaped and afterward were independently coded by a trained coding team.

At day care centers and preschool playgroups, children were observed while they performed 12 tasks measuring effortful control. The session took place in a room where no other children were present. All tasks were presented as games and after each task the child was rewarded regardless of her or his performance. The children received two gifts, which were part of the observation battery. The tasks were independently coded by a team of trained coders.

One and a half years later, at T2, parents were contacted and asked to fill out a questionnaire on externalizing problems. They were also asked to give the kindergarten teacher permission to complete the same questionnaire about their child. After permission had been received, the kindergarten teachers were sent the questionnaire.

### *Measures*

*Externalizing problems at 3 and 4.5 years.* We used the Strengths and Difficulties Questionnaire (SDQ, Dutch version) (Goodman, 1997) for the measurement of externalizing problems at 3 and 4.5 years. The SDQ is a widely used brief behavioral screening questionnaire with psychometrical properties that are comparable to the Child Behavior Checklist (Goodman & Scott, 1999; Muris, Meesters, & Van den Berg, 2003; Van Widenfelt, Goedhart, Treffers, & Goodman, 2003). Furthermore, the SDQ has been shown to be good at detecting externalizing problems in a community sample of children (Goodman & Scott, 1999).

Two scales—conduct problems and hyperactivity—were used to measure externalizing problems. Each scale consisted of 5 items, which moth-

ers, fathers, and preschool teachers or childcare providers (for age 3 children) and mothers, fathers, and kindergarten teachers (for age 4.5 children) had to answer about the child on a 3-point scale (1 = not true, 2 = somewhat true, 3 = certainly true). Examples of items are "Often has temper tantrums or hot tempers" (conduct problems) and "Constantly fidgeting or squirming" (hyperactivity). Cronbach's alpha ranged from .66 (father-reported conduct problems) to .83 (mother-reported hyperactivity) at age 3 and from .66 (mother-reported conduct problems) to .89 (teacher-reported hyperactivity) at age 4.5.

As an indication of the range of psychopathology in this sample, scores were classified as normal, borderline, and abnormal (Goodman, 1997). Regarding conduct problems, at age 3, 75.6% of the children scored in the normal band, 11.7% scored in the borderline band, and 12.9% scored in the abnormal band. At age 4.5, 78.7% of the children scored in the normal band, 10.7% scored in the borderline band, and 10.6% scored in the abnormal band. Regarding hyperactivity, at age 3, 83.7% of the children scored in the normal band, 5.8% scored in the borderline band, and 10.5% scored in the abnormal band. At age 4.5, 89.3% of the children scored in the normal band, 4% scored in the borderline band, and 6.5% scored in the abnormal band. These results were largely equivalent to norms from the United States (National Health Interview Survey, 2004, January 30).

Conduct problems and hyperactivity were significantly correlated for each informant at both times, with a range from  $r = .41$  (father report at age 3) to  $r = .66$  (mother report at age 4.5). The conduct problems and hyperactivity scales were therefore summed to create an externalizing behavior score for each informant at both ages. The scores of all informants loaded on a single factor at age 3 (loadings were .91 for mothers, .89 for fathers, and .81 for teachers) and at age 4.5 (loadings were .93 for mothers, .90 for fathers, and .72 for teachers). The average scores on externalizing problems reported by mothers, fathers, and teachers were therefore used as measures of externalizing problems at ages 3 and 4.5.

*Observed effortful control at 3 years.* Eleven tasks of the Effortful Control Battery (Kochanska et al., 2000) were translated and adapted into Dutch and were pilot tested for the observation of effortful control at 3 years of age. On the basis of the one-factor solution of a principal components analysis of the total sample of this study, five tasks with factor loadings lower than .30 were deleted.

Tasks included were Snack Delay, Wrapped Gift, Gift-in-Bag, Tongue Task, Dinky Toys, and Shapes. The task Snack Delay measures the ability of a child to keep his or her hands on a mat on the table in front of a piece of candy under a transparent cup until the researcher lifts and eventually rings

a bell as permission to pick up the candy. Wrapped Gift assesses the child's ability not to peek when the gift is wrapped behind his or her back and, secondly, not to touch the gift until the researcher returns from getting a bow for the gift. Gift-in-Bag is a similar task in which the child has to wait while the researcher leaves the room for 3 minutes to get a bow for the gift. The Tongue Task measures whether the child can keep candy in his or her mouth without chewing it. Dinky Toys refers to a task that captures the child's ability to keep his or her hands on his or her knees while telling the researcher what toy he or she finds most attractive to play with from a box filled with toys. The Shapes task assesses the ability to focus on a subdominant rather than dominant picture. After practicing names of fruit and the meaning of "big" versus "little," the child is asked to point to the image of a small fruit that is embedded in a dominant picture of a large fruit.

Five coders coded the tasks from videotapes according to Kochanska et al. (2000). Reliability, based on approximately 15% of all cases and capturing all tasks, was computed for all pairs of coders. Following Kochanska et al. (2000), Cohen's kappa was calculated for all aspects of each task using categorical scores (Wouters, 1988), and percentage agreement was calculated for aspects of the tasks using latency scores. The mean kappa was .79, with mean kappa per task ranging from .63 (Gift-in-Bag) to .85 (Wrapped Gift). The mean percentage agreement was 92% (scores coded within the 1 range), ranging per task from 88% (Wrapped Gift) to 99% (Tongue Task). A composite score for effortful control was calculated by averaging standardized task scores.

*Observed parenting at 3 years.* Parenting interactions were measured when children were 3 years old using the videotaped records with the Coparenting and Family Rating System (CFRS) (McHale, 1995). Rating scales were translated into Dutch and were pilot tested. Six dimensions of parenting behavior were measured using a 7-point Likert-type scale. For all tasks, we rated behavior in 3 minutes of family interaction: the first, middle, and last minute of each task. Thus, for each dyadic session, nine ratings per dimension were created. This mesoanalytic way of coding has the advantage over microanalytic systems of containing individually analyzable codes and has the advantage over macroanalytic systems of observing interactions in detail, allowing changes in behavior over time (Lindahl, 2001). The six parenting scales were Warmth, Investment, Limit-Setting, Sensitivity, Provision of Structure, and Negativity (McHale, 1995; Mchale, Kuersten-Hogan, Lauretti, & Rasmussen, 2000). Warmth measures the frequency and intensity of affect shown toward the child by a parent, such as encouragement, smiles, laughter, and physical affection. Investment assesses the extent to which a parent is involved and concerned that the



child behaves or performs tasks correctly. Limit-Setting measures the extent to which a parent prevents the child from wandering away from assigned tasks. Sensitivity refers to the timing and quality of a parent's interventions with the child. Provision of Structure refers to the extent to which a parent structures the task and provides information about it, and Negativity measures the degree to which a parent criticizes, ignores the child, and is overtly annoyed during the session.

Principal components analysis with varimax rotation yielded three parenting factors: Positive Control, Negative Control, and Warmth. For both mothers and fathers, the three-factor solution accounted for 74% of the variance in parenting scores. Factors were created by averaging the scale scores. Positive Control consisted of the scales Provision of Structure, Limit-Setting, and Sensitivity. Negative Control contained Negativity and Investment. The positive loading of Investment on Negative Control can be explained by the aspect of overinvolvement: when a parent is continually interacting with the child, which was rated in most mothers and fathers, it may be intrusive for the child. The factor Warmth consisted of the scale Warmth. All factor loadings were above .51 for mothers and above .64 for fathers.

All parenting scales were coded by two coders. Interrater reliability for each pair of coders was based on approximately 15% of all cases. Gamma was used as a measure of reliability because it is a statistic that controls for chance agreement but is more appropriate than kappa for ordinal data (Liebetrau, 1983; Schoppe, Mangelsdorf, & Frosch, 2001). Mean gamma for maternal parenting was .88, ranging from .81 (Sensitivity) to .96 (Limit-Setting), and mean gamma for paternal parenting was .88, ranging from .79 (Sensitivity) to .92 (Limit-Setting). Because all maternal and paternal parenting factors were significantly associated (Positive Control:  $r = .59, p < .001$ ; Negative Control:  $r = .37, p < .001$ ; Warmth:  $r = .32, p < .01$ ), parenting composite scores were created by averaging mothers' and fathers' scores.

## Results

### *Preliminary Analyses*

The descriptives and correlations among all variables for girls and boys are presented in Table 1. Child gender differences were found for externalizing problems at age 3: boys had more externalizing problems than girls ( $t[84] = 2.34, p < .05$ ). Parents exerted more positive control ( $t[86] = -2.13, p < .05$ ) and displayed more warmth ( $t[86] = -2.03, p < .05$ ) toward girls than toward boys.

Externalizing problems at age 3 correlated strongly with externalizing problems at age 4.5 ( $r = .71$  for the total sample;  $r = .65$  for girls, and  $r = .74$

**Table 1.** Descriptives and Correlations among All Variables

	1	2	3	4	5	6	M	SD
1. Externalizing problems 3 years	—	.74***	-.47**	-.32*	.34*	.05	3.01*	1.90
2. Externalizing problems 4.5 years	.65***	—	-.21	-.32*	.32	-.13	2.62	1.78
3. Effortful control	.03	-.39*	—	.22	-.53**	-.09	-.11	.58
4. Positive control	.34*	.20	.22	—	-.21	-.06	5.25*	.55
5. Negative control	.32*	.32	-.29	.21	—	-.01	2.96	.24
6. Warmth	-.20	-.19	.15	-.07	-.32*	—	4.26*	.56
M	2.20*	2.19	.07	5.49*	3.05	4.47*		
SD	1.28	1.66	.49	.50	.37	.39		

*Note.* Values above the diagonal reflect boys, whereas values below the diagonal reflect girls. Significant mean differences between boys and girls are indicated.

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

for boys), suggesting fairly strong stability at preschool age. Child effortful control was negatively associated with concurrent and later externalizing problems. Observed negative control was related to more concurrent and later externalizing problems.

Child gender differences were also found in the correlations with externalizing problems. Effortful control was significantly negatively related to concurrent externalizing problems in boys but not in girls ( $z = -2.34, p < .05$ ). Observed positive control was differently related to concurrent externalizing problems in girls and boys ( $z = -3.05, p < .01$ ) and externalizing problems at 4.5 years in girls and boys ( $z = -2.20, p < .05$ ).

### *Overview of Analyses*

Hierarchical multiple regression analyses were conducted to examine the main and interacting contributions of child gender, effortful control, and parenting in the prediction of externalizing problems. To predict externalizing problems at 3 years of age, we entered child gender at step 1, child effortful control at step 2, and parenting variables at step 3. To predict the residualized change in externalizing problems from 3 to 4.5 years, we conducted the same analyses after controlling for externalizing problems at 3 years (entered at step 1). The longitudinal analyses were performed on a smaller sample ( $n = 74$ ) than the cross-sectional analyses ( $n = 89$ ).

Interaction terms were created by multiplying standardized scores of the parenting behaviors, gender, and effortful control. Interactions with child gender and effortful control were entered at step 4 of the cross-sectional analyses and step 5 of the longitudinal analyses. The interactions were entered one at the time to reduce the number of predictors. The results of the models with a significant interaction effect (beta weights of the final steps) are presented in Table 2 for both the cross-sectional analyses predicting externalizing problems at age 3 and the longitudinal analyses predicting externalizing problems at age 4.5.

Significant interactions were interpreted by plotting regression lines for high and low standardized values ( $\pm 1$  standard deviation from the mean) of effortful control and parenting behaviors and for girls and boys. To graph interactions in the prediction of the residualized change in externalizing problems from 3 to 4.5 years, we created a residualized change score denoting the difference between the score on externalizing problems at 4.5 years and the score that would be predicted based on externalizing problems at 3 years (Mason et al., 1996). Positive residualized scores indicate that children have more than expected externalizing problems at 4.5 years based on their level of externalizing problems at 3 years. Negative residualized scores indicate that

**Table 2.** The Prediction of Externalizing Problems at 3 Years and Residualized Change in Externalizing Problems from 3 to 4.5 Years

	Externalizing Problems at 3 Years				Externalizing Problems at 4.5 years			
	Model 1 <sup>a</sup>	Model 2 <sup>b</sup>	Model 3 <sup>c</sup>	Model 4 <sup>d</sup>	Model 1 <sup>a</sup>	Model 2 <sup>b</sup>	Model 3 <sup>c</sup>	Model 4 <sup>d</sup>
	$\beta$	$\Delta R^2$	$\beta$	$\Delta R^2$	$\beta$	$\Delta R^2$	$\beta$	$\Delta R^2$
Externalizing problems at 3 years	—	—	—	—	—	—	—	—
Gender of child	-.22*	.06*	-.21	.06*	-.22*	.06*	.08	.00
Child effortful control	-.18	.09**	-.23*	.09**	-.18	.09**	-.06	.01
Parenting		.04		.04		.04		.03
Positive control	-.06		-.05		-.08		-.02	
Negative control	.24*		.16		.22		.08	
Warmth	.00		-.01		-.04		-.09	
Interaction	.25*	.06*	.26*	.07*	.27*	.07*	-.29**	.07**

*Note.* The betas that are presented are the beta weights for the final step models. Only significant interactions are shown. The reported significancies of the interaction effects are corrected by using Benjamini and Hochberg False Discovery Rate (Benjamini & Hochberg, 2000).

<sup>a</sup>PC  $\times$  EC, <sup>b</sup>PC  $\times$  Gender, <sup>c</sup>EC  $\times$  Gender.

PC = positive control, EC = effortful control, Gender = child gender.

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

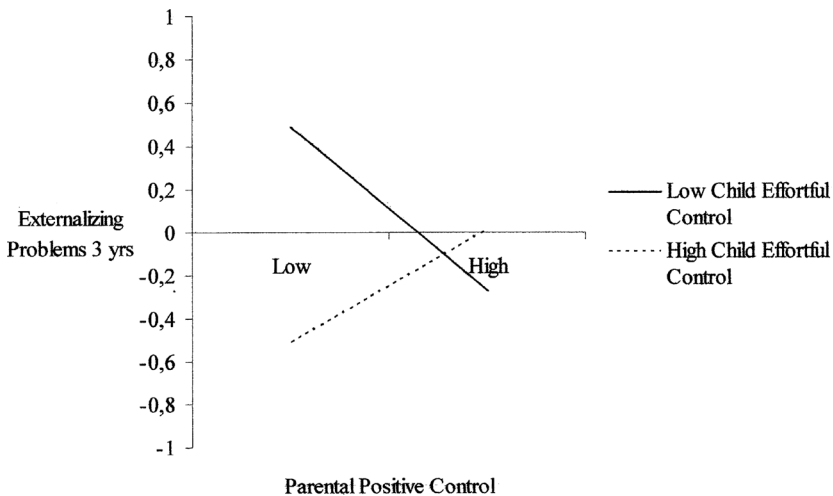
children have less than expected externalizing problems at 4.5 years. Follow-up tests were conducted for post hoc probing of significant interactions (Aiken & West, 1991); that is, we tested whether the slopes of the plotted regression lines were significantly different from zero.

Because of the multiple models tested, we applied the Benjamini and Hochberg False Discovery Rate (Benjamini & Hochberg, 2000) to correct for capitalization of chance. This method is more powerful than traditional family-wise error rates, such as Bonferroni correction. Furthermore, this procedure corrects for Type II error, preventing important findings from being indicated as nonsignificant.

### *The Prediction of Concurrent Externalizing Problems*

In the prediction of concurrent externalizing problems, a main effect of effortful control was found (see Table 2). Furthermore, one main effect of parenting appeared: more negative control contributed to more concurrent externalizing problems, but the effect of negative control only reached significance in the analysis in which the interaction between positive control and effortful control was tested.

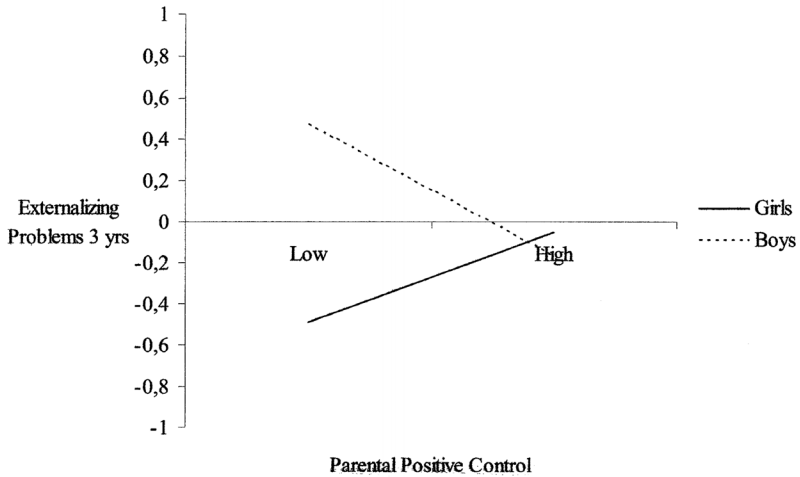
Significant interaction effects were found between effortful control and parental positive control in the prediction of concurrent externalizing problems (Figure 1; see Table 2). The slopes of the lines representing low



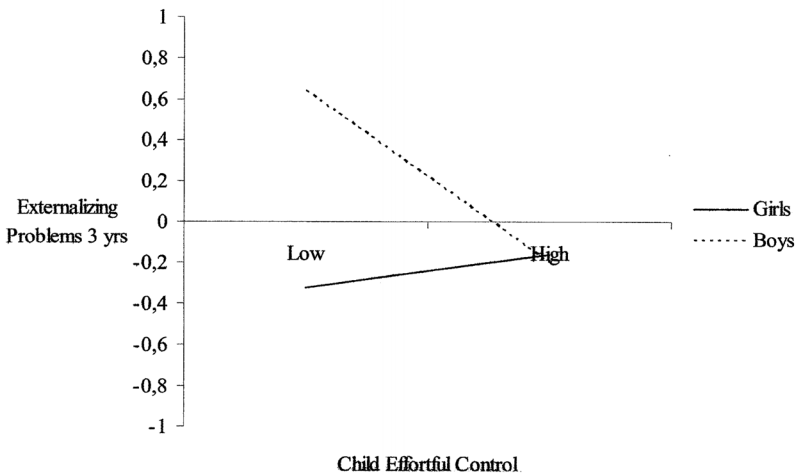
**Figure 1.** Interactions between parental positive control and children's effortful control in the prediction of externalizing problems.

( $\beta = -.47, ns$ ) and high ( $\beta = .17, ns$ ) levels of effortful control were not significantly different from zero. The pattern shows that when parents exerted a high level of positive control in interaction with their child, children showed an average level of externalizing problems independent of their level of effortful control. However, when parents employed a low level of

A



B



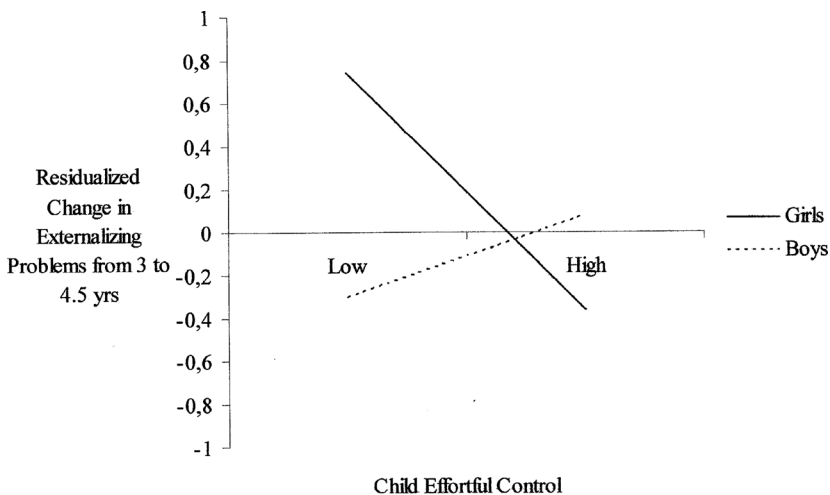
**Figure 2.** Child gender effects on the prediction of concurrent externalizing problems from parental positive control (panel A) and children's effortful control (panel B).

positive control, children with a high level of effortful control had low scores on externalizing problems, and children with a low level of effortful control had high scores on externalizing problems.

With respect to child gender effects in the prediction of concurrent externalizing problems, Table 2 shows a main effect of child gender. Girls were less likely to display externalizing problems. Two interaction effects involving child gender were found. First, child gender interacted with parental positive control in the prediction of concurrent externalizing problems (see Table 2, column 3, and Figure 2, panel A). The slopes of the regression lines significantly differed from zero for girls ( $\beta = .34, p < .05$ ) and for boys ( $\beta = -.32, p < .05$ ). Girls and boys differed in level of externalizing problems only when parents exhibited a low level of positive control. When positive control was low, girls had fewer externalizing problems than boys. Second, child gender interacted with effortful control (see Table 2, column 5, and Figure 2, panel B). The slope of the regression line was significantly different from zero for boys ( $\beta = -.47, p < .01$ ) but not for girls ( $\beta = .03, ns$ ). Where effortful control was low, boys had more externalizing problems than girls. Children with a high level of effortful control displayed few externalizing problems, independent of their gender.

### *The Prediction of Change in Externalizing Problems*

In the prediction of residualized change in externalizing problems from 3 to 4.5 years of age, there were no main effects of effortful control, parenting,



**Figure 3.** Child gender effects on the prediction of residualized change in externalizing problems from 3 to 4.5 years of age from children's effortful control.

and child gender (see Table 2). However, an interaction effect was found between child gender and effortful control (Figure 3). The slope of the regression line was significantly different from zero for girls ( $\beta = -.41, p < .01$ ) but not for boys ( $\beta = .17, ns$ ). The significant interaction indicates that girls who had a low level of effortful control showed greater increases in externalizing problems from 3 to 4.5 years than boys with a low level of effortful control (see Figure 2b). Where there was a high level of effortful control, girls and boys did not differ much in their change in externalizing problems from 3 to 4.5 years.

## Discussion

The present study extended previous research by investigating interaction effects besides main effects of child temperamental effortful control and parenting in the prediction of young children's externalizing problems. Relations were examined both concurrently and longitudinally. We focused on observed positive as well as negative parenting behaviors. In addition, we examined child gender effects on these associations, which appeared to be a relatively unexplored research area. The findings highlight the importance of interactions between effortful control and parenting behaviors in the prediction of externalizing problems. Parental positive control did not affect all children in the same way, but its effect seemed to depend on the level of effortful control of the child. Furthermore, child gender effects were found in the studied associations. In the following section, the results of the three aims of this study are summarized and discussed. Next, limitations and tools for future research are presented.

The first aim of this study was to examine main effects of child effortful control and parenting at 3 years of age in the prediction of externalizing problems at 3 years and the residualized change in externalizing problems from 3 to 4.5 years. In the cross-sectional analyses we found that as we hypothesized, effortful control independently contributed to externalizing problems, after controlling for child gender. Children with a higher level of effortful control were less likely to display externalizing problems, which has also been found in previous studies (e.g., Gartstein & Fagot, 2003; Kochanska & Knaack, 2003; Olson et al., 2005; Rothbart et al., 2001; Rubin et al., 2003).

In general, parenting did not contribute as a main effect to concurrent externalizing problems. Only one significant main effect of parental negative control was found. More negative and intrusive behaviors shown by the parents toward their child was associated with more externalizing problems, which corresponds with prior findings (Belsky, Hsieh, & Crnic, 1998;



Eisenberg et al., 2005; Gartstein & Fagot, 2003; Olson et al., 2005). No main effects appeared for parental positive control and warmth. The greater contribution of effortful control, compared to parenting, to concurrent externalizing problems is in line with our expectations, based on prior studies that found effortful control to be more strongly associated with externalizing problems than parenting behaviors (Gartstein & Fagot, 2003; Morris et al., 2002; Rubin et al., 1998, 2003).

Weak associations between parenting and externalizing problems may be due to the different methods used to assess these constructs: observation versus parent report. Earlier research also found weaker relations between parenting and child outcomes when different measurement methods were used (Gartstein & Fagot, 2003; Olson et al., 2005). The two methods measure different aspects of behavior: questionnaire data reflect memories of behavior generalized over time and contexts, whereas observations tap situation-specific behavior or face-to-face interactions (Kerig, 2001). The concept of effortful control may be more delineated and more straightforward to observe than family processes. However, the results of this study need to be replicated before we can draw any conclusions.

The longitudinal analyses showed that effortful control and parenting did not contribute to a change in externalizing problems from 3 to 4.5 years. Externalizing problems appeared to be fairly stable between 3 and 4.5 years, as was found in other studies (see Campbell, 1995). This study showed that parent and child factors are especially important for externalizing problems at a young age.

The second aim was to investigate whether parenting interacts with effortful control in the prediction of concurrent and changing externalizing problems. We hypothesized that parenting would more strongly predict externalizing problems in preschoolers with a low level of effortful control than in preschoolers with a high level of effortful control. Cross-sectionally, it was indeed found that when parents employed a high level of positive control, children showed an average level of externalizing problems, independent of their level of effortful control. On the other hand, when parents exerted a low level of positive control, children with a high level of effortful control scored low on externalizing problems, whereas children with a low level of effortful control were likely to score high on externalizing problems. We also tested this interaction effect for mothers and fathers separately, and a similar pattern of findings emerged.

Our results suggest that positive controlling strategies buffer the negative effect of a low level of effortful control on concurrent externalizing problems, which is a plausible finding (Belsky, 1997; Kochanska, 1997). Positive control consists of direct parental responses of and attempts to

guide the child's behavior. Children with a low level of effortful control, who have difficulty in managing impulses and emotions, probably benefit from more constructive limit-setting, structure, guidance, and sensitivity in accomplishing internalization of sociomoral rules and regulating their behavior. Children with a high level of effortful control, who can manage their impulses and emotions on their own, apparently do not benefit from positive control in the internalization of sociomoral rules. The findings are consistent with Kochanska's (1997) line of thought that children with different temperaments differ in their parenting needs.

We also expected to find interactions between negative control and effortful control because of accumulation of effects of negative socialization and difficult temperament (Belsky et al., 1998; Morris et al., 2002; Rubin et al., 1998, 2003). There were no interaction effects, as was also found in some other studies (Gartstein & Fagot, 2003; Olson et al., 2005). The main effect of negative control showed that negative control affects all groups of children. We may have found an accumulation of effects of negative parental control and effortful control if we had observed other negative controlling behaviors in parents. In this study, negative control was observed by rating critical comments, annoying and ignoring behaviors, and intrusiveness of the parent in interaction with his or her child, which are mild forms of negative control. More severe forms of negative control, such as harsh and punitive parenting, in combination with a low level of effortful control may be more strongly related to externalizing problems. However, these behaviors have seldom been observed in a community sample.

The third aim was to explore child gender effects on the associations among effortful control, parenting, and externalizing problems. Girls generally displayed fewer externalizing problems than boys, which corresponds with the literature (Keenan & Shaw, 1997). An interaction effect was found between parental positive control and child gender in the prediction of concurrent externalizing problems. When parents displayed a low level of positive control, girls showed few externalizing problems, whereas boys showed a higher level of externalizing problems. When parents employed a high level of positive control, there were no differences between girls and boys in externalizing problems. Again, post hoc analyses showed that this pattern was similar for both mothers and fathers. The different relation between low positive control and externalizing problems in girls and boys may be caused by differential treatment by their parents. Parents may respond more quickly to externalizing behaviors in girls than in boys because these behaviors are considered as more atypical for girls (Keenan & Shaw, 1997). Furthermore, as with high-risk children with a low level of effortful control, boys are more likely to show externalizing prob-

lems and may benefit from positive control in displaying a lower level of externalizing problems.

In addition, child gender interacted with effortful control. Boys' effortful control was more strongly related to concurrent externalizing problems than girls' effortful control. Contrary to this effect found cross-sectionally—that boys' effortful control but not girls' effortful control was immediately shown in the externalizing behaviors—girls' effortful control appeared to have a greater long-term effect on externalizing problems: a lower level of effortful control in girls at 3 years of age contributed to an increase in externalizing problems from 3 to 4.5 years. However, from a statistical point of view, because boys had higher mean levels of externalizing problems than girls at age 3, girls had more potential to increase over time, which may explain the different gender effects found cross-sectionally and longitudinally. In sum, although some studies did not find the relation between effortful control and externalizing problems to differ between girls and boys (Olson et al., 2005; Rubin et al., 2003), this study found that child gender does play a role.

In the interpretation of the results, the characteristics and limitations of this study need to be kept in mind. First, the participating families were primarily white, middle to upper-middle class, dual income, and well functioning, and the children did not show a large range in externalizing problems. The nature of the associations may differ in different kinds of family samples, such as ethnically diverse, low-class, and clinically distressed families. For example, as we found in our relatively high socioeconomic status sample with two-parent families that positive control plays a major role in externalizing problems in young children, in samples consisting of more diverse and clinically distressed families, parental negative control may be more important. Negative parenting was also found to be important in some other studies (Belsky et al., 1998; Gartstein & Fagot, 2003).

Second, although we tried to create different situations for the observation of parenting behaviors by administering structured and unstructured tasks and playful and stressful tasks, the situations may not have elicited enough variance in negative parenting behaviors.

Third, because we conducted multiple analyses and the sample size of this study was small, the possibility of chance findings may have enhanced. The interaction effects should be interpreted with caution. However, the found interaction effects should also be considered important, as can be found in the literature that interaction effects are difficult to detect and that the reduction in model error due to adding a product term appears to be low even when reliable interaction effects are found (McClelland & Judd, 1993; Whisman & McClelland, 2005). We furthermore reduced capitalization of

chance by applying the Benjamini and Hochberg False Discovery Rate (Benjamini & Hochberg, 2000).

Fourth, although we studied externalizing problems longitudinally, we used only two measurement moments. Future research should start at a younger age and should measure both the child variables and parenting behaviors several times in order to create a more complete picture of the predictors of externalizing problems and change in externalizing problems in early childhood.

Despite these shortcomings, this study has its unique strengths. Interactions between young children's effortful control and parenting are often overlooked in the literature. Furthermore, very few studies use a multimeasure construct of effortful control as well as multimethod data, as was done in this study. The findings showed that externalizing problems in young children can never be fully understood when children's individual characteristics and parenting behaviors are examined separately: the effects of parenting behaviors appeared to depend on the child's individual characteristics and vice versa. More specifically, children with a low level of effortful control were found to be most at risk of displaying externalizing problems. However, more positive control by mothers and fathers seemed to buffer this risk. In addition, boys were at risk of displaying externalizing problems, but again this was buffered by positive control by mothers and fathers. Effortful control was more strongly related to concurrent externalizing problems in boys than in girls. However, girls' effortful control had a greater long-term effect on externalizing problems: a low level of effortful control in girls at 3 years of age predicted an increase in externalizing problems from 3 to 4.5 years. Children's effortful control, gender, and parenting behaviors are shown to be important variables, which need to be considered in interaction with one another, in the prediction of young children's externalizing problems.

## References

- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Newbury Park, CA: Sage.
- Belsky, J. (1997). Variation in susceptibility to environmental influence: An evolutionary argument. *Psychological Inquiry*, 8, 230–235.
- Belsky, J. (2004). Differential susceptibility to rearing influence: An evolutionary hypothesis and some evidence. In B. Ellis & D. Bjorklund (Eds.), *Origins of the social mind: Evolutionary psychology and child development* (pp. 139–163). New York: Guilford.
- Belsky, J., Hsieh, K. H., & Crnic, K. (1998). Mothering, fathering, and infant negativity as antecedents of boys' externalizing problems and inhibition at age 3

- years: Differential susceptibility to rearing experience? *Development and Psychopathology*, *10*, 301–319.
- Benjamini, Y., & Hochberg, Y. (2000). On the adaptive control of the False Discovery Rate in multiple testing with independent statistics. *Journal of Educational and Behavioral Statistics*, *25*, 60–83.
- Bradley, R. H., & Corwyn, R. F. (2008). Infant temperament, parenting, and externalizing behavior in first grade: A test of the differential susceptibility hypothesis. *Journal of Child Psychology and Psychiatry*, *49*, 124–131.
- Campbell, S. B. (1995). Behavior problems in preschool children: A review of recent research. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *36*, 113–149.
- Campbell, S. B., Shaw, D. S., & Gilliom, M. (2000). Early externalizing behavior problems: Toddler and preschoolers at risk for later maladjustment. *Development and Psychopathology*, *12*, 467–488.
- Crockenberg, S. C., & Leerkes, E. M. (2008). Predicting aggressive behavior in the third year from infant reactivity and regulation as moderated by maternal behavior. *Development and Psychopathology*, *20*, 37–54.
- Eisenberg, N., Zhou, Q., Spinrad, T. L., Valiente, C., Fabes, R. A., & Liew, J. (2005). Relations among positive parenting, children's effortful control, and externalizing problems: A three-wave longitudinal study. *Child Development*, *76*, 1055–1071.
- Else-Quest, N. M., Hyde, J. S., Goldsmith, H. H., & Van Hulle, C. A. (2006). Gender differences in temperament: A meta-analysis. *Psychological Bulletin*, *132*, 33–72.
- Feinberg, M. E., Kan, M. L., & Hetherington, E. M. (2007). The longitudinal influence of coparenting conflict on parental negativity and adolescent maladjustment. *Journal of Marriage and Family*, *69*, 687–702.
- Gallagher, K. C. (2002). Does child temperament moderate the influence of parenting on adjustment? *Developmental Review*, *22*, 623–643.
- Gartstein, M. A., & Fagot, B. I. (2003). Parental depression, parenting and family adjustment, and child effortful control: Explaining externalizing behaviors for preschool children. *Applied Developmental Psychology*, *24*, 143–177.
- Goodman, R. (1997). The Strength and Difficulties Questionnaire: A research note. *Journal of Child Psychology and Psychiatry*, *38*, 581–586.
- Goodman, R., & Scott, S. (1999). Comparing the Strengths and Difficulties Questionnaire and the Child Behavior Checklist: Is small beautiful? *Journal of Abnormal Child Psychology*, *27*, 17–24.
- Keenan, K., & Shaw, D. (1997). Developmental and social influences on young girls' early problem behavior. *Psychological Bulletin*, *121*, 95–113.
- Kerig, P. K. (2001). Introduction and overview: Conceptual issues in family observational research. In P. K. Kerig & K. M. Lindahl (Eds.), *Family observational*

- coding systems: Resources for systemic research* (pp. 1–22). Mahwah, NJ: Erlbaum.
- Kochanska, G. (1993). Toward a synthesis of parental socialization and child temperament in early development of conscience. *Child Development, 64*, 325–347.
- Kochanska, G. (1997). Multiple pathways to conscience for children with different temperaments: From toddlerhood to age 5. *Developmental Psychology, 33*, 228–240.
- Kochanska, G., & Knaack, A. (2003). Effortful control as a personality characteristic of young children: Antecedents, correlates, and consequences. *Journal of Personality, 71*, 1087–1112.
- Kochanska, G., Murray, K., & Coy, K. C. (1997). Inhibitory control as a contributor to conscience in childhood: From toddler to early school age. *Child Development, 68*, 263–277.
- Kochanska, G., Murray, K. T., & Harlan, E. T. (2000). Effortful control in early childhood: Continuity and change, antecedents, and implications for social development. *Developmental Psychology, 36*, 220–232.
- Leve, L. D., Kim, H. K., & Pears, K. C. (2005). Childhood temperament and family environment as predictors of internalizing and externalizing trajectories from ages 5 to 17. *Journal of Abnormal Child Psychology, 33*, 505–520.
- Lengua, L. J. (2006). Growth in temperament and parenting as predictors of adjustment during children's transition to adolescence. *Developmental Psychology, 42*, 819–832.
- Liebetrau, A. M. (1983). *Measures of association*. Beverly Hills, CA: Sage.
- Lindahl, K. M. (2001). Methodological issues in family observational research. In P. K. Kerig & K. M. Lindahl (Eds.), *Family observational coding systems: Resources for systemic research* (pp. 23–32). Mahwah, NJ: Erlbaum.
- Magnusson, D., & Stattin, H. (1998). Person-context interaction theories. In W. Damon (Series Ed.) and R. M. Lerner (Vol. Ed.), *Handbook of child psychology: Vol. 1. Theoretical models of human development* (pp. 685–760). New York: Wiley.
- Mason, C., Cauce, A. M., Gonzales, N., & Hiraga, Y. (1996). Neither too sweet nor too sour: Problem behavior in African American adolescents. *Child Development, 67*, 2115–2130.
- McClelland, G. H., & Judd, C. M. (1993). Statistical difficulties of detecting interactions and moderator effects. *Psychological Bulletin, 114*, 376–390.
- McHale, J. P. (1995). Coparenting and triadic interactions during infancy: The roles of marital distress and child gender. *Developmental Psychology, 31*, 985–996.
- McHale, J. P., Kuersten-Hogan, R., Lauretti, A., & Rasmussen, J. L. (2000). Parental reports of coparenting and observed coparenting behavior during the toddler period. *Journal of Family Psychology, 14*, 220–236.

- Morris, A. S., Silk, J. S., Steinberg, L., Sessa, F. M., Avenoli, S., & Essex, M. J. (2002). Temperamental vulnerability and negative parenting as interacting predictors of child development. *Journal of Marriage and Family, 64*, 461–471.
- Muris, P., Meesters, C., & Van den Berg, F. (2003). The Strengths and Difficulties Questionnaire (SDQ): Further evidence for its reliability and validity in a community sample of Dutch children and adolescents. *European Child and Adolescent Psychiatry, 12*, 1–8.
- National Health Interview Survey (2004, January 30). *SDQ frequency distribution for American 4–7 year olds*. Retrieved March 17, 2008, from <http://www.sdqinfo.com/bbb3.pdf>.
- Olson, S. L., Sameroff, A. J., Kerr, D. C. R., Lopez, N. L., & Wellman, H. M. (2005). Developmental foundations of externalizing problems in young children: The role of effortful control. *Development and Psychopathology, 17*, 25–45.
- Rothbart, M. K. (1989). Temperament and development. In G. A. Kohnstamm, J. E. Bates, & M. K. Rothbart (Eds.), *Temperament in childhood* (pp. 187–247). New York: Wiley.
- Rothbart, M. K., Ahadi, S. A., Hershey, K. L., & Fisher, P. (2001). Investigations of temperament at three to seven years: The Children's Behavior Questionnaire. *Child Development, 72*, 1394–1408.
- Rothbaum, F., & Weisz, J. R. (1994). Parental caregiving and child externalizing behavior in nonclinical samples: A meta-analysis. *Psychological Bulletin, 116*, 55–74.
- Rubin, K. H., Burgess, K. B., Dwyer, K. M., & Hastings, P. D. (2003). Predicting preschoolers' externalizing problems from toddler temperament, conflict, and maternal negativity. *Developmental Psychology, 39*, 164–176.
- Rubin, K. H., Hastings, P., Chen, X., Stewart, S., & McNichol, K. (1998). Intrapersonal and maternal correlates of aggression, conflict, and externalizing problems in toddlers. *Child Development, 69*, 1614–1629.
- Schoppe, S. J., Mangelsdorf, S. C., & Frosch, C. A. (2001). Coparenting, family process, and family structure: Implications for preschoolers' externalizing behavior problems. *Journal of Family Psychology, 15*, 526–545.
- Shaw, D. S., Keenan, K., & Vondra, J. I. (1994). Developmental Precursors of externalizing behavior: Ages 1 to 3. *Developmental Psychology, 30*, 355–364.
- Van Aken, M. A. G., Van Lieshout, C. F. M., Scholte, R. H. J., & Haselager, G. J. T. (2002). Personality types in childhood and adolescence: Main effects and person-relationship transactions. In L. Pulkkinen & A. Caspi (Eds.), *Paths to successful development: Personality in the life course*. Cambridge: Cambridge University Press.

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- Van Widenfelt, B. M., Goedhart, A. W., Treffers, P. D. A., & Goodman, R. (2003). Dutch version of the Strengths and Difficulties Questionnaire. *European Child and Adolescent Psychiatry, 12*, 281–289.
- Whisman, M. A., & McClelland, G. H. (2005). Designing, testing, and interpreting interactions and moderator effects in family research. *Journal of Family Psychology, 19*, 111–120.
- Wouters, L. (1988). An IBM-PC program to compute kappa or weighted kappa. Amsterdam: University of Amsterdam.
- Zhou, Q., Hofer, C., Eisenberg, N., Reiser, M., Spinrad, T. L., & Fabes, R. A. (2007). The developmental trajectories of attention focusing, attentional and behavioral persistence, and externalizing problems during school-age years. *Developmental Psychology, 43*, 369–385.



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