

Interactions Between Maternal Parenting and Children's Early Disruptive Behavior: Bidirectional Associations across the Transition from Preschool to School Entry

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Abstract This study was a prospective 2-year longitudinal investigation of associations between negative maternal parenting and disruptive child behavior across the preschool to school transition. Our main goals were to 1) determine the direction of association between early maternal negativity and child disruptive behaviors across this important developmental transition and 2) examine whether there would be different patterns of associations for boys and girls. Participants were 235 children (111 girls; T1; $M=37.7$ months, T2; $M=63.4$ months) and their mothers and teachers. Observational and multi-informant ratings of child disruptive behavior showed differential patterns of stability and associations with measures of parenting risk. Results indicated bidirectional and interactive contributions of externalizing behavior and negative parenting across time.

Results also indicated that risk mechanisms operate similarly for both sexes. Findings support transactional models of disruptive child behavior that highlight the joint contributions of parents and children.

Keywords Disruptive behavior · Gender differences · Parent-child relationship · Reciprocal associations

Aggressive and disruptive behaviors are among the most likely to lead to a referral of a child for mental health services (Hinshaw and Lee 2003). Moreover, childhood conduct problems have been associated with a multitude of adverse developmental outcomes, including poor academic performance, increased risk for school drop-out, delinquency, peer rejection, conflicts with family, and persistent, life-course antisocial behavior (Campbell 2002; Dodge and Pettit 2003; Loeber and Stouthamer-Loeber 1998; Moffitt 2003; Tremblay 2000). Understanding the developmental origins of disruptive behavior problems, then, is an issue of strong theoretical and practical importance. Individual differences in disruptive behavior can be reliably identified in early toddlerhood, and remain moderately stable across early and middle childhood (Alink et al. 2006; Rubin et al. 2003; Smith et al. 2004). However, aggressive and noncompliant behaviors also are common in early childhood and do not necessarily signal risk for persistent problems (Tremblay 2000). For example, Campbell et al. (2000) found that approximately half of preschool children with significant externalizing symptoms no longer manifested these problems at school entry. Therefore, it is important to identify factors that place young children at risk for chronic vs. desisting patterns of problem behavior.

Increasingly, research has focused on the development of disruptive behaviors during the toddler and preschool years

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because this is a time of significant development in many skills. For example, children acquire and master skills in self-regulation, which pave the way for the child's autonomous behaviors and enable them to inhibit inappropriate behavioral responses (Olson et al. 2009; Tremblay 2000). Children who fail to establish adequate self-regulation are at an increased risk for later behavioral maladjustment, including disruptive behaviors, aggression (Gilliom et al. 2002; Keenan 2000; NICHD Early Childcare Research Network [ECCRN], 2004), and noncompliance (Kochanska 2002; Laible and Thompson 2000; Smith et al. 2004). The transition from preschool to school age also marks the transition from negligible to marked gender differences in disruptive behavior. Boys demonstrate more externalizing behaviors and higher levels of noncompliance than girls across the preschool years (Keenan and Shaw 1997, 2003; Kochanska 2002; Laible and Thompson 2000). Thus, exploration of the development of disruptive behavior during this period may illuminate how and why these sex differences emerge. In what follows, we examine risk factors that may increase the likelihood that children enter the school-age years with higher levels of disruptive behavior problems.

Parenting and Children's Disruptive Behaviors

Parents influence the development of children's behavioral adjustment by providing supportive contexts in which to practice early self-regulatory skills (Calkins et al. 1998; Kochanska 2002). Warm, responsive, proactive parenting has been associated with declining child externalizing problems (e.g., Denham et al. 2000; Johnston et al. 2002) and low rates of child noncompliance (Calzada et al. 2004; Dennis 2006; Kochanska and Aksan 1995). Conversely, harsh parental control and hostility have been associated with high levels of children's early externalizing problems (Dodge et al. 1994; Gershoff 2002; NICHD ECCRN, 2004; Patterson 2002;) and noncompliant behaviors (Kochanska et al. 2003; Laible and Thompson 2000).

Similarly, studies on mothers' use of power assertion, characterized by "coercion, salient pressure, forceful or harsh insistence, and negativity and criticism" (Kochanska et al. 2003, p. 949) have found that it is associated with impaired self-regulation and low internalized conduct, as well as increased aggression (Deater-Deckard et al. 1998; Kochanska et al. 2003). Although associations between harsh parental discipline and child problem behavior may be negligible or weak in cultural groups where physical punishment is widely considered a typical child-rearing practice (Deater-Deckard and Dodge 1997; Lansford et al. 2005), parents' frequent use of corporal punishment (such as spanking and swatting) also has been related to high levels of

child externalizing (Friedman and Schonberg 1996). For example, Gershoff (2002) conducted a meta-analysis of 88 studies involving the effects of corporal punishment and found that corporal punishment was associated with 10 of 11 undesirable child constructs, including increased levels of childhood aggression. However, aggressive, noncompliant child behavior has also been shown to elicit negative reactions from caregivers. Thus, it is important to examine children's early contributions to changes in parenting behavior in addition to parents' early contributions to changes in children's disruptive behavior (Crouter and Booth 2003).

Child Characteristics Associated with Increased Risk for Disruptive Problem Behaviors

Individual differences in "difficult" temperament emerge early in life and pose significant challenges to caregivers (Rothbart and Bates 2006). Young children who are frequently impulsive, noncompliant, and aggressive tend to elicit upper limit controls and negative emotion from caregivers (Scaramella and Leve 2004; Smith et al. 2004). However, risk for persistent behavior problems is influenced by interactions between child and parent characteristics that transpire across early childhood (Bates et al. 2009; Olson et al. 2009; Sameroff 2009). For example, Smith and colleagues (2004) found evidence for reciprocal associations between maternal behaviors and child noncompliance. Specifically, the use of maternal negative control predicted increases in child noncompliance between ages 2 and 4 years, particularly for children already displaying moderate to high levels of noncompliance. Likewise, increases in child noncompliance from age 2 to age 4 predicted increases in maternal negative control. Such findings highlight bidirectional relationships between parent and child behaviors and suggest that these behaviors begin to interact early on, promoting stable patterns of child noncompliance.

Similarly, child gender emerges as a risk factor for disruptive behavior problems during the preschool period. Researchers have proposed a number of individual characteristics that explain gender differences in the development of disruptive behaviors, including faster rates of development for girls in biological, language, and socio-emotional skills (see Keenan and Shaw 1997, 2003, for a review) and gender differences in temperamental reactivity, irritability, and modulation (Dennis 2006; Keenan and Shaw 1997; Stifter et al. 1999). However, most longitudinal studies have revealed few gender differences in rates of difficult temperament (e.g., irritability, reactivity, or intensity) until the age of 4, when rates for girls tend to decrease and rates for boys decrease to a lesser degree or increase (Prior et al. 2001; Shaw et al. 1994). Therefore, parents' socialization of their children is thought to be critical. For instance, parents

may make more of an effort to socialize girls to be non-aggressive than they do boys (Keenan and Shaw 1997, 2003; Zhou et al. 2002). Mothers have been observed to be more controlling and harsh with boys than with girls (McKee et al. 2007; Webster-Stratton 1996) and to display more warmth to daughters than to sons (Zhou et al. 2002). In addition, boys and girls respond differentially to their parents' behaviors. For example, McFayden-Ketchum et al. (1996) found that boys were more likely than girls to respond with oppositional behaviors to maternal control events. Boys also have shown greater vulnerability to a diverse range of physical and behavioral disorders in early development (Keenan and Shaw 1997).

The Current Study: Rationale and Research Questions

The current study was a prospective longitudinal investigation of associations between negative maternal parenting and noncompliant and externalizing child behavior across the period between early preschool and school entry. In line with transactional conceptualizations of development (e.g., Sameroff 2009; Shaw and Bell 1993), we examined bidirectional influences between mothers and young children across an important developmental transition. Our study was designed to address several gaps in the literature on parent and child contributions to the development of disruptive behavior problems (cf. Pardini 2008). First, despite theoretical and empirical support for reciprocal negative exchanges between parents and children (e.g., Patterson 2002), the majority of research in developmental psychopathology has continued to treat children as passive recipients of environmental impacts (Crouter and Booth 2003; Pardini 2008). Those studies that have been conducted typically have focused on brief periods of time, leading to uncertainty about stability of bidirectional effects across meaningful periods of development (Pardini 2008). Second, the preschool period also is a time when important gender differences in disruptive behavior problems emerge and stabilize. However, most longitudinal studies of bidirectional influences have focused on boys only, or have not been designed to test for gender-specific associations (Hipwell et al. 2008). In the current study, relatively equal numbers of boys and girls were included. Third, previous studies often have used the same informant to provide information about parenting practices and child behavior (Pardini 2008), which can introduce measurement confounds. Thus, in the present study, we included both observational and parent report measures of child and parent behaviors, as well as measures of child behavioral adjustment in the home and school settings.

Our main research goal was to examine the direction of association between early maternal negativity and child

disruptive behaviors across the transition from preschool to school. We expected that longitudinal associations would be bidirectional such that higher levels of negative parenting would predict increases in children's disruptive behavior in home and school contexts, and children's disruptive behavior would predict increased negative parenting. We also questioned whether there would be different patterns of predictive associations for boys and girls, but did not make specific hypotheses given the mixed findings in the literature.

Method

Participants

Participants were 235 children (111 girls) and their parents and teachers who were part of a longitudinal study of young children at risk for school-age conduct problems (Olson and Sameroff 1997). The study began in 1999 and has been reviewed and approved annually by the Behavioral Sciences Institutional Review Board. Most families (95%) were recruited from newspaper announcements and fliers sent to day care centers and preschools; others were referred by preschool teachers and pediatricians. To recruit children with a range of behavioral adjustment levels, two different ads were placed in newspapers and child care centers: one focusing on hard-to-manage toddlers and the other on normally developing toddlers. We excluded children for whom severe individual or familial risk factors might overwhelm the subtler effects in question (e.g., those with serious chronic health problems, mental retardation, and/or pervasive developmental disorders, those whose families were in the initial stages of divorce, and/or those whose families experienced severe economic hardship).

Children were screened by asking mothers to complete the Child Behavior Checklist/2–3 (Achenbach 1992) and recruitment oversampled for children in the medium-high to high range of the Externalizing Problems scale. Thus, at initial observation, children represented the full range of externalizing symptom severity on the CBCL/2–3: 39% were 1 SD or more above the mean (T scores >60), 30% were up to 1 SD above the mean ($50 < T < 60$), and 31% were below the mean ($T < 50$). Parents provided informed written consent for their participation and children provided verbal assent prior to participation in laboratory tasks.

Children were assessed at two time points: age 3 (T1; $N=235$, age range=27 to 45 months, $M=37.7$, $SD=2.7$ months), and age 5 ½ – 6 years (T2; $N=227$), age range=52 to 71 months, $M=63.4$, $SD=2.7$ months). At T2, all children in the study had made the transition to kindergarten. By T2, eight participants had dropped out of the study. Of these children, 25% fell into the lowest risk group, 50% fell into the moderate risk group, and 25% into

the high risk group. These participants did not differ in makeup from the rest of the sample in terms of gender, SES, behavior problems, or parenting behaviors.

According to mothers, families were representative of the demographics of this mid-size college town. The majority of children were of European American heritage (86%). Most other mothers identified their children as African American (5%) or biracial (8%). The majority of mothers indicated that they were married (89%), 3% indicated they were living with a partner, 5% identified themselves as single (never married), and 3% as divorced. Fifty-five percent of mothers worked outside the home full-time. Nineteen percent of mothers and 24% of fathers had received high school educations with no further educational attainment; 46% of mothers and 34% of fathers had completed four years of college with no further training; and 35% of mothers and 42% of fathers had completed some additional graduate or professional training. The median annual family income was \$52,000, ranging from \$20,000 to over \$100,000. Families had mean scores of 7.58 (range=2–9, $SD=1.59$) on Hollingshead's (1975) occupational scale, indicating that the majority of parents' occupations fell into the minor professional category.

Procedures

Self-report measures Parents were administered questionnaires and assessments in their homes by a female social worker. Following the home assessment, parents were provided a packet of questionnaires which contained questions pertaining to parenting and discipline style, as well as ratings of children's behavioral adjustment. Parents were allowed to fill out the packets on their own time and return them by mail or experimenter pick-up. Families were given \$100 for each wave in which they participated. Likewise, preschool and kindergarten teachers were asked to contribute ratings of children's behavioral adjustment. Those who agreed were mailed a packet of questionnaires and were given gift certificates for their participation.

Parent-child clean-up task In a session separate from the interview, the home examiner invited parents and children to engage in a number of tasks for approximately 45 min, which were videotaped. Tasks included working together on challenging puzzles and free play with toys. Children engaged in these tasks with one parent at a time and tasks were performed in the same order for all children. Then, the examiner instructed the parent: "Have your child pick up all the toys and put them in this basket. You can help her do this in any way, such as with your words, but you cannot actually put any toys away yourself." Parent and child were given unlimited time to complete this task (range= ≤ 1 to 20 min). In order to utilize a larger sample of children's and

parents' behaviors, data from mothers were analyzed in the current study.

Measures

Self-report of discipline style During the home interview, mothers reported how frequently they and their husbands had physically disciplined their child (e.g. spank, grab, shake) during the last 3 months (Dodge et al. 1994). Possible answers included "never" (0), "once/month" (1), "once/week" (2), "daily" (3), and "several times daily" (4). We adapted this measure by creating a rank order scale based on the frequency with which the mother reported that her child received physical punishment from either parent (Kerr et al. 2004). Thirty-six rankings were possible. The lowest rank was assigned to children who received no physical punishment from either their mother or father. Children assigned the next lowest rank received no physical punishment from one parent, but were physically punished once per month by the other parent. Children who experienced physical punishment several times daily from both parents received the highest rank.

Observational measures of maternal affect Maternal negative affect was assessed from videotapes of the parent-child clean-up task. Negative affect was coded in 1-minute intervals on a 3-point scale indicating "not present" (1); "present, but mild" (2); and "high" (3). The latter two affect categories were combined to create a single "present" category due to low base rate occurrence of the "high" category across mothers. In order to account for variation in clean-up times between the dyads, negative affect was represented as the proportion of time mothers displayed negative affect during the task. All data was coded in equal amounts by two independent coders and reliability subjects were distributed throughout the entire sample. Reliability was established on 30% of the sample. $Kappa$ based on agreement for parent negative affect was 0.92.

Composite measure of negative maternal parenting A composite measure of negative maternal parenting at each time point was created in order to incorporate multiple sources of mothers' negative parenting. Preliminary analyses indicated that mothers' observed affect and reports of harsh physical discipline were significantly correlated at both time points, $r(224)=0.24$, $p<0.001$ at time 1; $r(181)=0.25$, $p<0.01$ at time 2. Thus, an aggregate measure of negative maternal parenting was created by standardizing reports of harsh physical discipline and observed negative affect using the means and standard deviations from T1 and averaging the scores at each time point.

Child noncompliance Observational measures of noncompliance were coded from videotapes of the parent-child clean-up task using Kochanska's (2002) scale that included measures for passive noncompliance, refusal, and defiance. The predominant form of noncompliance was coded for each 1-minute interval and only one code was given for each minute. Passive noncompliance occurred when children did not participate in the task and ignored parental prompts. Refusal was characterized as overt but non-aversive refusal to participate or follow parental directives, such as saying "no" or negotiating with the parent. Examples of negotiation included, "You should do it," or "I'm going to play with the toys first." Finally, defiance was coded when the child's noncompliance was accompanied by anger, whining, tantrums, and/or physical aggression. Child noncompliance was represented by the percentage of time spent being noncompliant across the whole of the task. Reliability was computed on 30% of the sample using two independent coders. Given that we were interested in children's overall level of noncompliant behavior, a single noncompliance category was created by combining passive noncompliance, refusal, and defiance. *Kappa* based on agreement across all categories of noncompliance was 0.83 and ranged from 0.80 to 0.86.

Child externalizing behavior Mothers completed age-relevant forms of the Child Behavior Checklist (CBCL/2–3; Achenbach 1992; CBCL/4–18; Achenbach 1991), preschool teachers completed the Caregiver/Teacher Report Form (CTRF/2–5; Achenbach 1997) and kindergarten teachers completed the Teacher Report Form (TRF; Achenbach and Rescorla 2001). Each well-standardized and reliable form measured child behavioral and emotional problems and asked informants to rate the child on items that described a child's behavior over the previous 2 months using a 3-point scale (2="very true or often true of the child"; 1="somewhat or sometimes true"; 0="not true"). For the purposes of this study, only the Externalizing subscale was used.

Preliminary analyses indicated that mother and teacher reports of externalizing behavior were not significantly correlated at age 3, $r(187)=0.13$, n.s., but were strongly intercorrelated at age 6, $r(164)=0.51$, $p<0.001$. It has been well established that the most meaningful indices of children's externalizing behavior incorporate data from home and school contexts (e.g., Campbell 2002). Thus, an aggregate dependent measure of child externalizing behavior at age 6 was created in order to reflect children's problem behavior in multiple contexts. Mothers' and teachers' reports of child externalizing behavior at age 6 were composited ($\alpha=0.65$). This was not done for the majority of analyses at age 3 because mothers' and teachers' reports were independent (Kerr et al. 2007).

However, an aggregated measure of mothers' and teachers' reports at age 3 was used in regression analyses for ease of interpretation.

Socioeconomic status The Hollingshead four-factor index was used to assess family socioeconomic status (Hollingshead 1975). Mothers' and fathers' occupational status and education was obtained via self-report. Occupational status was coded on a 9-point qualitative scale, ranging from farm laborers/menial service workers to higher executives, proprietors of large businesses, and major professionals. Mothers' and fathers' education was coded on a 7-point qualitative scale, ranging from less than seventh grade to graduate or professional training. SES was computed by summing the parent's occupation score multiplied by five with the parent's education score multiplied by three.

Results

Overview

Table 1 provides the means and standard deviations for all study variables, presented separately by child gender. Preliminary analyses indicated that measures of negative maternal parenting, child noncompliance, and child externalizing behavior were skewed due to low base rates of behavior. Consequently, the negative maternal parenting

Table 1 Means and Standard Deviations of Study Variables, Presented Separately by Child Gender

Measure	Boys		Girls	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Child Noncompliance				
Age 3 (T1)	13.64	25.56	13.91	23.24
Age 6 (T2)	11.47	24.11	11.63	24.70
Child Externalizing				
Age 3 Mother Report (T1)	11.84	7.37	11.17	7.27
Age 3 Teacher Report (T1)	12.00	13.80	7.88	10.41
Age 6 (T2)	6.67	6.91	4.60	5.41
Negative maternal parenting				
Age 3 (T1)	0.05	0.85	-0.09	0.60
Age 6 (T2)	-0.20	0.62	-0.31	0.50

Means and standard deviations for child and mother variables are measures of composite variables prior to transformation. Child noncompliance=proportion of time spent noncompliant; Child externalizing=separate measures of mother and teacher reports at T1 and an aggregate measure of mother and teacher reports at T2; Negative maternal parenting=aggregate measure of reports of harsh physical discipline and observed negative affect

and child noncompliance variables were transformed using procedures recommended by Affifi et al. (2007). Data were transformed by adding a constant then obtaining a logarithmic (base 10) transformation of each variable. This procedure was not appropriate for the child externalizing behavior indices because they had greater dispersion than the other two variables. Thus, child externalizing behavior indices were transformed using square root transformations. Transformed variables demonstrated an appropriate skew and did not violate assumptions of normality or equality of variance. Therefore, transformed variables were used in subsequent analyses.

Analyses were conducted in three stages. First, change in mean levels of negative maternal parenting, children's observed noncompliance, and adult ratings of child externalizing behavior were examined using repeated measures ANOVAs. Stability of individual differences in negative maternal parenting, child noncompliance, and reports of child externalizing behavior was examined using zero-order correlations. Separate analyses were conducted since change in both mean levels of behavior and patterns of individual differences have been shown to impart important, non-redundant information about children's development (Smith et al. 2004; Tremblay 2000). Next, concurrent and longitudinal associations between SES, negative maternal parenting, children's noncompliance, and reports of child externalizing behavior were computed using Pearson correlations. Finally, hierarchical regression analyses were performed to illuminate the direction of associations between child and maternal behaviors as predictors of change across the transition from early preschool to school. A total of four regression analyses were performed; two regression analyses examined early negative parenting as a predictor of child behavior, and two examined early child behavior as a predictor of mothers' negative parenting. In each set of regression analyses, potential interactions between early negative parenting and child behavior were also considered.

Stability of Negative Maternal Parenting and Children's Disruptive Behaviors

Repeated measures ANOVAs were performed to determine whether mean levels of mothers' negative parenting, child noncompliance, and child externalizing behavior changed over time. In each analysis, child age was the within-subjects variable and child gender was the between-subjects variable. In the analysis examining mothers' negative parenting, results indicated a significant main effect for age, $F(1,172)=30.17, p<0.001$. Examination of the means indicated that mean levels of mothers' negative parenting decreased over time. No other significant main or interaction effects were obtained. Likewise, a significant main effect for age was obtained for child noncompliance, $F(1,187)=5.96, p<0.05$. Examination of the means showed that children's mean level of noncompliance with mothers increased over time. No other significant main or interaction effects were obtained. Finally, the analyses examining mothers' and teachers' reports of child externalizing behavior were significant. Results indicated a main effect for age in mothers' reports of externalizing behavior, $F(1,213)=116.67, p<0.001$, with mothers' reports of externalizing behavior decreasing over time. Similarly, results indicated main effects for age in teachers' reports of externalizing behavior, $F(1,133)=52.71, p<0.001$, as well as child gender, $F(1,133)=5.22, p<0.05$. Examination of the means indicated that levels of child externalizing behavior decreased over time and that boys received higher ratings of externalizing behavior than girls.

Stability of individual differences in mothers' negative parenting, child noncompliance, and child externalizing behavior was examined using Pearson correlations. Preliminary analyses using Fisher's r -to- z tests indicated that stability coefficients did not differ significantly between boys and girls; thus, correlations were computed using the whole sample. As shown in Table 2, individual differences in mothers' negative parenting were moderately stable

Table 2 Intercorrelations of SES, Negative Maternal Parenting, and Children's Disruptive Behaviors

	1	2	3	4	5	6	7	8
1. SES	–	–0.04	–0.11	–0.15*	–0.18**	–0.01	–0.05	–0.12
2. Noncompliance (T1)		–	0.13*	0.25**	0.22**	0.14 ⁺	0.20*	0.16*
3. Externalizing Behavior (Mother T1)			–	0.12	0.22**	0.15*	0.43**	0.15*
4. Externalizing Behavior (Teacher T1)				–	0.21**	0.25**	0.36***	0.28**
5. Negative maternal parenting (T1)					–	0.09	0.29***	0.39***
6. Noncompliance (T2)						–	0.15 ⁺	0.13 ⁺
7. Externalizing Behavior (T2)							–	0.37***
8. Negative maternal parenting (T2)								–

⁺ $p<0.10$; * $p<0.05$; ** $p<0.01$; *** $p<0.001$

across time. Similarly, individual differences in both mothers’ and teachers’ reports of externalizing behavior across the preschool to school transition were moderately stable. On the other hand, individual differences in children’s noncompliance were not stable over time.

Associations between Negative Maternal Parenting and Children’s Disruptive Behaviors

Concurrent and longitudinal associations between SES, mothers’ negative parenting, child noncompliance, and adults’ reports of child externalizing behavior were computed. Given that Fisher’s *r*-to-*z* tests indicated that correlations did not differ significantly between boys and girls (*z*’s ranged from 0.13 to 1.16, all *p*’s n.s.), correlations were computed using the entire sample.

Concurrent associations As shown in Table 2, during the preschool period, SES was modestly negatively associated with teachers’ reports of preschool externalizing behavior and mothers’ negative parenting. In addition, mothers’ negative parenting was positively associated with both observations of noncompliance and mothers’ and teachers’ reports of externalizing behavior. Finally, child noncompliance was positively associated with reports of externalizing behavior. During the kindergarten period, mothers’ negative parenting was positively associated with reports of externalizing behavior, and was marginally associated with child noncompliance. Correlations between children’s noncompliance in the home setting and reports of externalizing behavior also were marginally positive.

Longitudinal associations Mothers’ negative parenting at age 3 was positively correlated with aggregated mothers’ and teachers’ reports of externalizing behavior at age 6. Also, child noncompliance at age 3 was positively associated with reports of externalizing behavior and with mothers’ negative parenting at age 6. Finally, mothers’ and teachers’ reports of child externalizing behavior at age 3 were positively correlated with child noncompliance at age 6, as well as mothers’ negative parenting at age 6. No other significant correlations were obtained.

Negative Maternal Parenting Predicting Children’s Disruptive Behaviors

Two regression analyses were performed to illuminate contributions of mothers’ negative parenting on observations of child noncompliance and reports of externalizing behavior. Following Aiken and West (1991), all predictor variables were centered prior to analyses. Child noncompliance at age 6 was used as the dependent variable in one regression analysis, and reports of child externalizing behavior at age 6 were used as the dependent variable in the other analysis. In each analysis, control and predictive variables were entered in the following order: child gender, SES, and age 3 child behavior (noncompliance or externalizing behavior, respectively) were entered as a block on the first step, age 3 negative maternal parenting was entered on the second step, and the interaction of age 3 negative maternal parenting and age 3 child behavior was entered on the third step. As noted previously, mothers’ and teachers’ reports of child externalizing behavior reports were combined for ease of interpretation despite a weak correlation between the two reports.

The model predicting child noncompliance at age 6 from early negative parenting was not significant, $F(5,181)=1.03$, n.s. However, the model predicting children’s externalizing problem behavior at age 6 from early negative parenting was significant, $F(5,119)=9.32$, $p<0.001$; $R^2=0.28$. As shown in Table 3, higher levels of early externalizing behavior accounted for a significant proportion of the variance in subsequent externalizing behavior, and higher levels of early negative parenting positively predicted higher levels of externalizing behavior. In addition, the interaction between mothers’ early negative parenting and children’s early externalizing behavior was significant. Post-hoc analyses of simple slopes (Holmbeck 2002) were used to examine the moderating effect of children’s early externalizing behavior on the relationship between mothers’ early negative parenting and children’s future externalizing behavior. As shown in Fig. 1, higher levels of early negative parenting predicted increases in reports of externalizing behavior when early reports of externalizing behavior were high ($B=0.47$, $p<0.01$) and

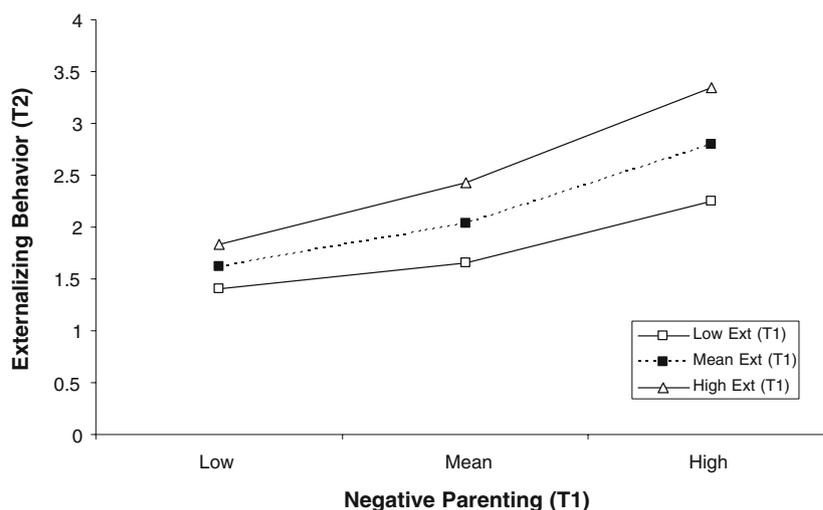
Table 3 Summary of Hierarchical Regression Analysis for Mothers’ Early Negative Parenting Predicting Child Externalizing Behavior

Variables	β	R ²	ΔR^2	ΔF	F
1. Child Gender	-0.05	0.22	0.22	11.07***	
SES	-0.01				
Child Externalizing (T1)	0.37***				
2. Negative Parenting (T1)	0.19*	0.25	0.04	6.12*	
3. Child Externalizing x Negative Parenting (T1)	0.18*	0.28	0.03	4.66*	
Model					9.32***

Betas are standardized betas from the final step

* $p<0.05$; *** $p<0.001$

Fig. 1 Simple slope analyses of mothers' early negative parenting predicting subsequent reports of externalizing behavior



Note: For ease of interpretation, the transformed variables are plotted so that the linear effect of the interaction can be shown. Since variables were centered prior to analyses, Mean = 0, Low = 1 SD below, and High = 1 SD above.

moderate ($B=0.26$, $p<0.05$), but not when early reports were low ($B=0.06$, n.s.).

Children's Disruptive Behaviors Predicting Negative Maternal Parenting

Two regression analyses were performed to examine contributions of early child problem behavior to changes in negative maternal parenting. All predictor variables were centered prior to analyses. Mothers' negative parenting at age 6 was the dependent variable for each analysis. In each analysis, control and predictive variables were entered in the following order: child gender, SES, and age 3 negative parenting were entered as a block on the first step, age 3 child behavior (noncompliance or externalizing behavior, respectively) was entered on the second step, and the interaction of age 3 child behavior and negative maternal parenting was entered on the third step.

The model predicting change in mothers' negative parenting at age 6 from early observations of noncompliance and negative parenting was significant, $F(5,167)=6.48$, $p<0.001$; $R^2=0.16$. However, only mothers' early negative parenting contributed significantly to the model and accounted for a significant proportion of the variance in subsequent levels of negative parenting ($\beta = 0.37$, $p<0.001$; $\Delta R^2=0.16$).

The model predicting mothers' negative parenting at age 6 from reports of early externalizing behavior and negative parenting also was significant, $F(7,130)=4.90$, $p<0.001$; $R^2=0.21$. Even though mothers' early negative parenting contributed substantially to the model ($\beta = 0.33$, $p<0.001$; $\Delta R^2=0.15$), early levels of child externalizing behavior contributed significantly, with higher levels of preschool

externalizing behavior predicting higher levels of mothers' negative parenting at school entry ($\beta = 0.22$, $p<0.01$; $\Delta R^2=0.05$).

Discussion

The genesis of disruptive behavior is widely believed to reflect reciprocal patterns of negative exchanges between parents and children (e.g., Patterson 2002; Shaw and Bell 1993). However, most research studies in developmental psychopathology have not examined how children's behaviors actively impact the social environment (Crouter and Booth 2003; Pardini 2008). The period between early preschool and school entry is a particularly compelling time to examine joint contributions of parents and children to the development of persistent disruptive behavior (Olson et al. 2009). Although impulsive, noncompliant, and aggressive behavior is relatively common during the early preschool years, most children develop adequate self-regulatory skills by the time they enter school (Tremblay 2000). Even so, *individual differences* in disruptive behavior stabilize across the preschool period: roughly half of young children show high levels of externalizing symptoms that persist into the school-age years (Campbell 2002). The quality of early parent-child relationships is thought to provide a critical context for understanding why some children persist in their problem behavior, while others develop normally (Bates et al. 2009). Thus, understanding the development of disruptive problem behavior requires attention to children's and parents' contributions to the quality of their relationship systems across this important transition period. Addressing gaps in the literature, our main goal was to

examine the direction of association between early maternal negativity and child disruptive behaviors across the transition from preschool to school.

Children's Disruptive Behaviors across Time

We examined two different indices of disruptive child behavior: maternal and teacher reports of externalizing problems and observations of children's noncompliant behavior vis-à-vis their mothers during standard forced compliance tasks. Affirming a substantial body of previous research, mean levels of child externalizing behavior decreased across the preschool period (Alink et al. 2006; Miner and Clarke-Stewart 2008; Smith et al. 2004; Tremblay et al. 2004). Also, individual differences in child externalizing problems were moderately stable across this important transition period (Alink et al. 2006; Smith et al. 2004). Thus, our study fully supported the picture of child externalizing problems described above: against a backdrop of normative increases in the development of self-regulation, individual differences in disruptive behaviors begin to crystallize.

Examining observed levels of child noncompliance across time revealed a much less coherent story. Unexpectedly, rates of child noncompliance showed small but significant increases across time. Moreover, individual differences in noncompliant behavior were not stable across the preschool to school transition. These data suggest that noncompliance reflects developmental dynamics that differ from broader constructs of externalizing behavior (Bronson 2000; Smith et al. 2004). For example, Smith and colleagues also found that observed levels of child noncompliance did not decrease between ages 2 and 4 years, perhaps reflecting normative variability in the development of regulatory competence. However, it also is important to note that noncompliant behavior was assessed during short, videotaped home observations of children's behavior with their mothers, whereas ratings of child externalizing behavior reflected more pervasive, heterogeneous, and persistent patterns of problem behavior. One possibility is that noncompliant and externalizing behaviors may become more qualitatively distinct over time and have unique trajectories of development. In support, findings showed that children's observed noncompliance and adult reports of externalizing behavior were correlated in preschool, but were not correlated during kindergarten. Another possibility is that our measure of noncompliance was influenced by variability in parenting strategies related to the task (e.g., how parents directed children to clean-up) or other specific situational factors during the observation (e.g., reactions to being videotaped). In future work, more research is needed to address the processes by which real-time parent-child interaction patterns in early childhood contribute to the

stability of individual differences in children's behavior problems over time (Olson and Lunkenheimer 2009).

Concurrent Associations among Negative Parenting and Children's Disruptive Behaviors

Consistent with the literature (e.g., Gershoff 2002; Kochanska et al. 2003; Laible and Thompson 2000; NICHD 2004; Smith et al. 2004), mothers' negative parenting during the preschool period was associated with boys' and girls' noncompliance, as well as mothers' and teachers' reports of externalizing behavior. Mothers' negative parenting during the kindergarten period was also associated with adult reports of externalizing behavior, but was no longer associated with children's noncompliance. We have speculated that child noncompliance during home tasks may reflect a more normative expression of child resistance than ratings of externalizing behavior. In fact, children's noncompliant behavior is best predicted by parenting practices that occur immediately before the behavior (Forehand et al. 1978; Williams and Forehand 1984), which suggests that decreases in mothers' negative parenting may have contributed to weakened associations between parenting and noncompliance. In contrast, child externalizing behavior during the school entry period can be distressing for parents due to the increased negative feedback they receive about their child from school personnel and other parents (Gross et al. 2008). This distress, coupled with the negative coercive cycle that often accompanies externalizing, aggressive behavior (e.g., Patterson 2002; Scaramella and Leve 2004), may make it difficult for mothers to modify negative parenting in response to externalizing behavior.

Bidirectional Associations among Negative Parenting and Children's Disruptive Behaviors

Findings confirmed our expectation that there would be bidirectional associations between mothers' negative parenting and children's externalizing behavior over time. Change in children's externalizing behavior in multiple contexts was predicted by mothers' early negative parenting; in turn, change in negative maternal parenting was predicted by children's early externalizing behavior. In addition, negative parenting during the preschool period interacted with children's early externalizing behavior to predict kindergarten reports of externalizing behavior. Specifically, mothers' early negative parenting predicted change in children's future externalizing behavior when early reports were high and moderate, but not when they were low. Prior studies have shown that the combination of negative parenting practices and high levels of early child problem behavior is an especially potent predictor of subsequent externalizing behavior (Miner and Clarke-

Stewart 2008; Rubin et al. 2003; Smith et al. 2004). Consistent with prior theory (Patterson 2002; Scaramella and Leve 2004), mothers' more negative, punitive style and children's externalizing behavior begin to interact as early as the preschool years to establish a negative coercive cycle that is maintained through school entry. In fact, preschoolers' externalizing behavior predicted mothers' negative parenting in kindergarten. Thus, young children are active agents of change in their environments and contribute to the quality of future parent-child interactions.

Gender Differences in the Development of Children's Disruptive Behaviors

The preschool period is a time when important gender differences in disruptive behavior problems fully emerge and stabilize and are thought to reflect complex patterns of reciprocal parent-child influences (e.g., Keenan and Shaw 1997, 2003; Patterson 2002). However, most longitudinal studies of bidirectional influences have focused on boys only, or have not been designed to test for gender-specific associations (Hipwell et al. 2008). First, our findings confirmed many other reports showing that boys had higher levels of externalizing behavior than girls at school entry (Alink et al. 2006; Keenan and Shaw 1997, 2003; Rubin et al. 2003). At age 3, preschool teachers rated boys more highly on externalizing problem behaviors than girls. However, mothers of preschool-age children did not perceive sons to be higher in disruptive behavior than daughters, and boys and girls were equally likely to show noncompliant behavior with their mothers during clean-up tasks. These findings were not unique. Other authors have found that mothers report equivalent rates of disruptive behavior in preschool boys and girls (Degnan et al. 2008), as well as equivalent rates of observed noncompliance in at-risk samples (Brumfield and Roberts 1998; Smith et al. 2004).

In light of boys' elevated risk for school-age externalizing problems, we questioned whether associations between maternal and child behavior were differentially patterned for boys and girls, possibly reflecting different mechanisms of influence. Our findings revealed that associations between maternal and child behavior did not differ significantly between boys and girls. Thus, as a whole our data supported Moffitt's (2003) conclusion that although boys are at elevated risk for disruptive behavior problems, risk mechanisms operate similarly for both sexes.

Limitations

There were some limitations to this study. First, the majority of children came from middle class, two-parent households. Thus, our findings cannot be generalized to

children growing up in different economic and family circumstances such as low-income or single-parent households. Second, although children in this constrained community sample were overselected for high levels of disruptive behavior, most did not have behavior problem scores in the clinical range of impairment. Findings may not generalize to young children who have been diagnosed with disruptive behavior disorders. Third, although inclusion of an observational measure of child noncompliance was a strength of the study, children's compliance behavior was assessed using a single measure and only mother-child interactions were analyzed. In future studies it would be helpful to include multiple measures of child noncompliance, as well as measures of children's compliance behavior with fathers. Finally, although prospective longitudinal analyses were conducted in this study, only two time points of data were available. In future studies it would be helpful to assess parent-child interactions across three or more time points in order to analyze complex patterns of change across time.

Conclusion

Relatively few studies have addressed the development of children's early disruptive behavior problems using designs that include both child and parent contributions, as well as both boys and girls. Our findings showed that mothers' negative parenting practices during preschool predicted change in kindergartener's externalizing behavior in home and school contexts, while children's preschool externalizing behavior at home and school predicted change in mothers' negative parenting practices during kindergarten. Moreover, children contributed as actively as their mothers to these negative exchanges. Thus, across the important developmental transition from early preschool to school entry, the interplay between negative parent and child behaviors appears to be a particularly potent risk for the crystallization of entrenched patterns of distressed parent-child interactions. Early reciprocal negativity between mothers and their young children also is critical for understanding growth in the child's behavioral maladjustment that spans multiple settings. Inclusion of both girls and boys revealed that although boys were at elevated risk for manifesting disruptive behavior problems, reciprocal patterns of influence held for both sexes. These findings strongly affirm the need for transactional conceptualizations of the development of children's disruptive behavior problems (Sameroff 2009). In addition, these findings suggest the need for prevention/intervention efforts that begin during the early preschool years, if not sooner. Finally, further studies may benefit from the inclusion of both fathers and mothers, as well as from assessments of

children's negative behavior that combine microlevel and macrolevel approaches to measurement. For example, whereas parent and teacher reports represent relatively stable macro-assessments of children's behavior, child noncompliance progresses on a moment-to-moment basis in ways that may be nonlinear, which require specialized analytic techniques derived from dynamic systems (DS) theories (e.g., Lunkenheimer and Dishion 2008).

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