

## Early Developmental Precursors of Externalizing Behavior in Middle Childhood and Adolescence

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This study examined the infancy- and toddler-age precursors of children's later externalizing problem behavior. Risk constructs included suboptimal patterns of observed caregiver-child interaction and the caregiver's perception of child difficultness and resistance to control. In addition, a novel dimension of caregiver-child relationship quality, the caregiver's perception of her toddler's unresponsiveness to her, was examined as a possible precursor of children's externalizing behavior. Externalizing problem outcomes were assessed throughout the school-age period and again at age 17, using multiple informants. As toddlers, children at risk for later externalizing behavior were perceived as difficult and resistant to control, and relationships with their caregivers were relatively low in warmth and affective enjoyment. Finally, the caregiver's perception of her toddler as emotionally unresponsive to her was a consistent predictor of later externalizing behavior, suggesting that negative maternal cognitions associated with child conduct problems may begin in toddlerhood. These predictive patterns were similar for boys and girls, and with minor exceptions, generalized across different subdimensions of externalizing problem behavior. Our findings underscore the importance of the infancy and toddler periods to children's long-term behavioral adjustment, and indicate the desirability of further research into the nature of caregivers' early perceptions of child unresponsiveness.

**KEY WORDS:** Externalizing; development; infancy; temperament; parenting.

Problems of aggression and impulsivity represent the most persistent and common forms of childhood maladjustment (Institute of Medicine, 1989). Such problems have chronic, serious consequences not only for the symptomatic child, but also for parents, siblings, peers, teachers, neighbors, and society at large. Children with externalizing behavior problems are at elevated risk for academic failures, rejection by peers, conflicts with family and with educators, delinquency, low educational and occupational attainment, and adult criminality (Kazdin, 1987; Loeber, 1990; Patterson, DeBaryshe, & Ramsey, 1989).

Considering the amount of research on externalizing behavior, relatively little is known about its development in early childhood (Robins, 1991). Recent research has shown that serious externalizing problems can be iden-

tified in the toddler and preschool years, and that they persist at moderate levels across the transition to middle childhood (e.g., Campbell, Pierce, March, Ewing, & Szumowski, 1994; Moffitt, 1990). At the same time, however, many young children do not show persistent problem behavior (Campbell, 1990). What early childhood risk factors are predictive of later externalizing problems? The answer to this question is complex and poorly established. Developmental pathways to children's behavior problem outcomes are widely believed to be multifactorial and transactional: They are thought to reflect processes of continuous, dynamic interplay between qualities that children bring to their social interactions and characteristics of the immediate caregiving environment and its social-ecological context (e.g., Greenberg, Speltz, & deKlyen, 1993; Sameroff, 1995). However, there have been relatively few empirical descriptions of pathways between infancy and later externalizing behavior (Shaw & Bell, 1993).

The Bloomington Longitudinal Study (BLS) is one exception. Conceptually rooted in transactional theory, the BLS provides a comprehensive database linking

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biological, developmental, and familial-ecological factors in the first two years of life to individual differences in children's long-term behavioral and developmental outcomes (Bates, Olson, Pettit, & Bayles, 1982). Preliminary analyses of the BLS have emphasized linkages of two interrelated constructs to the development of children's behavior problem outcomes at ages 3, 6, and 8: (a) quality of early caregiving relationships, and (b) patterns of infant/toddler difficultness and resistance to control (Bates & Bayles, 1988; Bates, Bayles, Bennett, Ridge, & Brown, 1991; Bates, Maslin, & Frankel, 1985). Each risk category is briefly discussed below.

### Parent-Child Relationship Factors

In previous analyses of the BLS, two independent dimensions of parent-toddler interaction have been linked to the children's later externalizing problems. First, toddlers who experienced relatively high rates of restrictive interaction with their mothers tended, to a modest degree, to manifest externalizing problems in later childhood (Bates *et al.*, 1991). These data are consistent with other research on the development of externalizing problems (e.g., Campbell *et al.*, 1994). The second parenting dimension concerns the presence of "positive involvement," i.e., warm, supportive, and cognitively stimulating parent-toddler interaction. Toddlers who experienced relatively high rates of positive interaction with their parents tended to manifest the lowest rates of externalizing problem behavior in preschool (Pettit & Bates, 1989) and in middle childhood (Bates *et al.*, 1991). The distinction between punitive parenting and lack of positive parental involvement is important, in that they appear to be orthogonal dimensions of caregiving behavior (Pettit & Bates, 1989). Thus, in examining the antecedents of children's behavior problems, it is essential to assess multiple, co-occurring dimensions of parenting behavior, not isolated factors.

In addition to distinguishing between different dimensions of observed parent-child interaction, we explored the meaning of a relatively novel dimension of maternal cognition: how responsive the mother feels her toddler is to her. Recent research has shown that mothers of aggressive school-age children tend to attribute negative intentionality to their children's problem behaviors (e.g., Bickett, Milich, & Brown, 1996; Dix & Lochman, 1990). For example, Bickett *et al.* (1996) found that mothers of school-age boys with serious conduct problems were more likely to make hostile attributions about their sons' behaviors than were mothers of nonreferred boys. However, prior studies have been cross-sectional and have focused on school-age children with clinically significant

behavior problems. Thus, it is unclear whether negative maternal cognitions are sequelae of long histories of conflicted parent-child relationships, or whether they appear early in life, perhaps functioning as risk factors in the development of child conduct problems. A contribution of the current study was to examine prospective linkages between mothers' perceptions of their toddlers as emotionally unresponsive to them and externalizing problem behavior in middle childhood and adolescence.

A further element to consider in the development of behavior problems is the likelihood that child characteristics play an active role (Bell, 1968). Two interrelated child temperamental characteristics, difficultness and resistance to control, are discussed below in relation to risk of later externalizing problem behavior.

### Child Difficultness and Resistance to Control

In previous analyses of the BLS, two aspects of early child temperamental dispositions have been linked prospectively to children's later externalizing behavior: (a) difficultness, indexing frequent and intense expressions of negative affect, and (b) resistance to control, indexing early forms of unmanageability (Bates, Pettit, Dodge, & Ridge, 1998; Rothbart & Bates, 1998). Early difficultness and resistance to control, as reported by mothers, were the best predictors of maternal ratings of externalizing behavior in the preschool years (Bates & Bayles, 1988; Bates *et al.*, 1985) and again at age 8 (Bates *et al.*, 1991). For example, Bates *et al.* (1991) found that mothers' perceptions of child resistance predicted later externalizing but not internalizing problems, whereas the difficultness scale predicted both dimensions of problem behavior. These findings converge with others that have supported the role of temperamental factors in developing behavior problems (Caspi & Silva, 1995; Henry, Caspi, Moffitt, & Silva, 1996; Lytton, 1990; Sanson, Smart, Prior, & Oberklaid, 1993; Shaw, Owens, Vondra, Keenan, & Winslow, 1996).

However, although possible temperamental bases for children's externalizing problem behavior have been identified, much further work is needed to understand the ways in which early child difficultness combines with other social and developmental factors, particularly qualities of parent-child interaction, to affect children's later behavior problem outcomes.

### Research Goals

Our primary research goal was to determine the relative contributions of early child behavioral and caregiving

risk factors to the prediction of later externalizing problem behaviors. Measures of child difficulty/resistance to control and of suboptimal caregiver-child relationship patterns were assessed at 6, 13, and 24 months of age, and were related to parent and teacher reports of children's externalizing problem behavior during the school-age years. In addition, we determined whether predictive relationships between toddler-age risk factors and children's school-age behavior problem outcomes generalized to measures of externalizing problem behavior assessed in late adolescence. Hierarchical multiple regression analyses were used to examine the relative contributions of different, infant and toddler-age risk factors to later externalizing behavior, and to determine whether contributions of significant risk factors were primarily additive or interactive in relation to later behavior problem outcomes.

Another goal concerned different subtypes of childhood externalizing problems and their early social-developmental antecedents. In previous analyses, we have predicted to one global dimension of externalizing problem behavior. However, it is unclear whether externalizing problem behavior should be considered one broad dimension of maladjustment, or separate but interrelated dimensions (Hinshaw, 1987; Lahey, Loeber, Quay, Frick, & Grimm, 1992; Loney, 1987). For example, although symptoms of conduct problems and hyperactivity tend to factor-analyze into distinct dimensions of maladjustment, dimensional ratings of these problems tend to be highly intercorrelated, overlap considerably in the diagnosis of clinical cases, and share many common risk factors (Hinshaw, Lahey, & Hart, 1993). Increasingly, however, childhood externalizing problems have been viewed as heterogeneous, as evidenced by the classification of ADHD symptoms into two broad subtypes (American Psychiatric Association, *Diagnostic and Statistical Manual of Mental Disorders*, 4th ed., 1994), and by the differentiation of distinct subtypes of conduct problems (Loeber *et al.*, 1993). The case for emphasizing separate subdimensions of externalizing problems would be strengthened if they could be shown to have different antecedents in patterns of children's prior developmental adaptation. Hence, in the current study, we examined the extent to which different subtypes of externalizing problem behavior had unique antecedents in patterns of parent-child interaction and child behavior.

A final goal was to examine potential gender differences in the early developmental precursors of children's externalizing problems. Although it is well recognized that boys are at elevated risk for externalizing problems, little is known about gender differences in the early development and expression of externalizing behavior. Recent research has indicated that developmental pathways to externalizing problems may differ for boys

and girls, possibly reflecting different socialization practices and/or different patterns of social and cognitive development (Keenan & Shaw, 1997; McFayden-Ketchum, Bates, Dodge, & Pettit, 1996). Thus, in the current report, we asked whether children's later externalizing problems would be associated with gender-differentiated patterns of early life antecedents.

## METHOD

### Participants

Using published birth notices, 168 subjects were recruited when the infants neared 6 months of age. Nearly all mothers were white, and averaged 25 years of age. Based on a 3-point rating of occupational status, family occupations were predominantly middle-class (70%), which included skilled trades, white collar jobs, and student status. Working-class families (13%) and upper-middle class families (16%) comprised the rest of the sample. The sample was fairly evenly divided on infant sex (57% male) and parity (51% firstborn). Further details about the sample are in Bates *et al.* (1982).

Families were recontacted when the children were 13 and 24 months of age. Because attrition/retention patterns are important in understanding the character of a longitudinal sample, we will describe ours in some detail. Participants were not asked to commit to a longitudinal study. Between ages 6 to 13 months, 29 families either declined to participate or moved away from the area. Common reasons given by mothers who declined participation were that they were too busy or that their husbands disapproved. Between 13 and 24 months another 19 families were lost, again primarily because of refusal and moving away. Of the remaining families, few have been permanently lost to refusal, even if not participating in every follow-up study. However, in keeping with the out-migrations occurring in our region of the country, a considerable number of families have moved away since age 2 years and participate mainly through correspondence. At each assessment point, families were paid for their participation.

Subsequent follow-ups included a core sample of 90 to 136 families, varying somewhat according to the year and procedure (Bates *et al.*, 1991). Attrition rates averaged 34% from age 24 months to age 17. To assess whether there were sample selection biases among our participating families, we used MANOVA to compare 116 families who participated in the 17-year follow-up with those who did not participate ( $n = 31$ ). Participating versus nonparticipating families were compared in relation to all major study variables. A significant participation effect was

found,  $F(11, 87) = 3.89, p < .05$ . Subsequent t-tests revealed significant group differences (.05 level) on the following variables: Family SES, POQ Affection and Fun, and POQ Nonpunitive (participants higher) and Negative Control (participants lower). Thus, there was some tendency for families with the lowest levels of demographic and caregiving risk to remain in the study.

### Overview of Procedures

Individual differences in patterns of mother-child interaction were assessed at 6, 13, and 24 months, and were related to maternal and teacher reports of children's externalizing problems at ages 7, 8, 10, and to maternal and adolescent reports at age 17. As predictors of children's later externalizing problems, we used observational measures of three central caregiving constructs: restrictiveness, cognitive stimulation, and warmth. To increase the validity of our assessments, multiple measures of the same caregiving constructs were included at ages 13 and 24 months. In addition, in order to assess negative maternal appraisals of child behavior, we included a questionnaire measure of mothers' perceptions of their toddlers as emotionally unresponsive to them. Finally, maternal report and observational measures of child difficulty and resistance to control were collected throughout the first two years of life, and were related to children's later behavior problem outcomes. Predictor variables used at each age level are briefly summarized in Table I. Specific procedures and measures are described below.

**Table I.** Summary of BLS Predictor Variables

	6 mo.	13 mo.	24 mo.
1. Observational measures of mother-child interaction			
Affectionate contact	X		
Teaching		X	
Management		X	
Affection and caregiving		X	
Infant persists		X	
Verbal stimulation			X
Negative control			X
Affection			X
POQ affection and fun			X
POQ nonpunitive interaction			X
Child trouble			X
2. Parent ratings of child characteristics			
ICQ difficult	X	X	X
ICQ resistant to control		X	X
MPQ unresponsiveness		X	X
MPQ troublesome			X

### Home Observations

At 6 months of age, mother-infant interaction was assessed naturalistically during two 3-hour home visits by women trained as observers. Events were tallied on a continuous basis, using Datamyte electronic event recorders and a code book of 9 infant and 18 mother behaviors. Interobserver reliabilities, calculated over 25 joint visits using Pearson correlation, averaged 0.85 across all codes. Factor analyses of the observation data were conducted separately for mother and infant behaviors (Bates *et al.*, 1982). The main maternal behavior scale, Mother Affectionate Contact, was used in the current study because it indexed warm maternal responsiveness to the infant. The scale had a reliability coefficient of 0.91 and was defined by an unweighted combination of the following molecular variables: proximal vocalization—sweet, musical quality; affectionate touch; bounce/jiggle/rock; put to shoulder; smile; and hold.

At 13 months of age, 139 mother-infant pairs participated in follow-up procedures. Home observation data were collected in one 3-hour session using a second codebook appropriate to this age. In order to reduce the possibility of bias, an observer usually did not visit the same family at two successive ages. Interobserver reliabilities (calculated using Pearson correlation) over 25 joint visits averaged 0.85 across all codes. Main dimensions of maternal behavior involved relative frequencies of didactic verbal interaction, restrictive, control-oriented interaction, and affectionate caregiving (see Pettit & Bates, 1989, for a detailed description of these data reduction procedures). The following factor scales were included in the current report: (a) Mother Teaching (scale reliability coefficient = 0.86; mother names objects, questions, offers and demonstrates toys for the infant, praises infant's behavior, and draws attention to objects); (b) Mother Management (scale reliability coefficient = 0.92; mother prohibits, scolds, or warns infant, directs infant's behavior, takes objects away from infant); and (c) Affection and Caregiving (scale reliability coefficient = 0.92; mother kisses infant, smiles at infant, engages in social-expressive speech, and provides physical needs caregiving). In addition, the child behavior factor, Persists, was extracted for use as an observational index of child difficulty, because it indexed the frequency with which infants persisted after maternal prohibitions and touched or played with nontoy objects (scale reliability coefficient = 0.84).

At 24 months of age, 120 mother-infant pairs participated in follow-up procedures. Two, 3-hour home observations were conducted within approximately one week, using a third, age-appropriate codebook. Interobserver reliabilities (calculated using Pearson correlation),

computed over 32 joint visits, averaged 0.81 across all codes. Twenty-three child and 28 mother behavior frequency codes were averaged across days and factor-analyzed separately. The following factor scales, computed as for measures at previous age levels, indexed relative frequencies of mother-child verbal/teaching interactions, disciplinary interactions, and affectionate play episodes (Lee & Bates, 1985): (a) Mother Verbal Stimulation (scale reliability coefficient = 0.82; mother requests information, refuses request, corrects child's speech, answers question, complies with request, praises child, makes maturity demand); (b) Mother Negative Control (reliability coefficient = 0.75; mother scolds, warns, physically punishes, restrains, prohibits, repeats prohibition) and (c) Mother Affection (reliability coefficient = 0.77; laughs/smiles at child, engages in playful conversation, praises child, holds child, plays game). In addition, the child behavior factor Trouble (reliability coefficient = 0.75; child approaches prohibited object; child engages in prohibited action) was extracted as an observational measure of child difficultness. At the end of the second home visit, observers recorded their global impressions of each dyad on the 30-item Post Observation Questionnaire (POQ), a reliable and validated rating measure of caregiver-toddler interaction (Olson, Bates, & Bayles, 1982, 1984). Scales summarizing the relative frequency of warm, mutually enjoyable mother-toddler interaction (POQ Affection and Fun;  $\alpha = .89$ ; interrater  $r = 0.81$ ), and the mothers' use of nonpunitive versus harsh, coercive discipline (POQ Nonpunitive,  $\alpha = 0.92$ ; interrater  $r = 0.83$ ), were extracted for use in the current study.

### Parent Ratings of Child Characteristics

At ages 6, 13, and 24 months, mothers completed the age-appropriate form of the Infant Characteristics Questionnaire (ICQ), a measure of temperament (Bates, Freeland, & Lounsbury, 1979; Bates & Bayles, 1984). Measures of two constructs were extracted for use in the current study: difficultness and resistance to control. At all ages the main child difficultness factor is a measure of frequent and intense negative emotionality, changeable mood, unsootheability, and social demandingness (Lee & Bates, 1985). In addition, at ages 13 and 24 months there is a resistance to control of activity dimension, indexing the mother's perception of her toddler's level of behavioral unmanageability (e.g., "doesn't stop when told 'no'"; protests control).

Mothers also completed the Maternal Perceptions Questionnaire (MPQ), a measure of toddlers' behavioral and developmental status that has proven reliable and valid

in previous research (Olson, Bates, & Bayles, 1982, 1989). Two scales were extracted for use in the current study: Unresponsiveness and Troublesome. Unresponsiveness (ages 13 and 24 months) indexed the mother's perception of her toddler as emotionally unresponsive to her. For example, this scale included items such as "My child doesn't come to me as often as I would like"; "I wish my child were more affectionate to me"; "My child would rather play by him/herself than with me"; and "I often find it hard to get my child's attention," with negative loadings for "When I approach my child s/he often seems glad to see me" and "My child likes being around me the most." Internal consistency reliability coefficients (alphas) for this scale were 0.90–.91; test-retest stabilities (2–3 week interval) were 0.76 and 0.80; and the 13 to 24 month stability coefficient was  $r = .48$ ,  $p < .001$ . The Troublesome scale (24 months only) indexed individual differences in child noncompliance and defiance. Scale items included "My child gets angry at me a lot"; "My child is often defiant and hard to control"; "It seems that my child is always getting into trouble around the house"; and "My child seems to have a lot of conflicts with other children" ( $\alpha = .89$ ). Although the Unresponsiveness and Troublesome scales share a common element of negative perception of the child's behavior, they comprised separate factor-analytic dimensions at ages 13 and 24 months, and were modestly intercorrelated (e.g.,  $r = .30$ ,  $p < .01$  at age 24 months).

### Measures of Externalizing Problems During the School-Age Years

When children were 7, 8, and 10 years of age, mothers completed the Achenbach Child Behavior Checklist (Achenbach & Edelbrock, 1983) and teachers completed the Teacher Report Form (TRF; Achenbach & Edelbrock, 1986), a school-appropriate version of the CBCL. Sample sizes ranged from 99 to 136 for the mother-report data, and from 81 to 120 for the teacher report data.

For a variety of reasons, adult ratings of children's behavioral maladjustment may fluctuate significantly from year to year. In order to achieve robust and reliable indices of children's behavioral adjustment during the school-age years, parent and teacher ratings of hyperactivity and aggression were averaged between ages 7, 8, and 10. The resulting composite scales had high internal reliability:  $\alpha$ s were 0.89 for Hyperactivity ( $M = 11.17$ ,  $SD = 7.31$ ) and 0.90 for Aggression ( $M = 28.06$ ,  $SD = 17.31$ ). Similarly, the teacher rating scales Overactivity ( $M = 5.98$ ,  $SD = 4.87$ ), Inattention ( $M = 21.60$ ,  $SD = 16.44$ ), and Aggression ( $M = 21.07$ ,  $SD = 19.16$ ) were

significantly intercorrelated between ages 7 to 10, with *alphas* ranging from 0.50 to 0.60 (Inattention). These correlations parallel within-age correlations in both error-corrected size and the expectable tendency of parents to be more consistent than teachers (who changed each year and saw the child at different stages). T-scores on the aggregated scales ranged from 34 to 82 (4 and 5 cases exceeded T-scores of 70 on the parent and teacher indices, respectively). Median T-scores on the total parent and teacher scales were 47.13 and 48.17, respectively.

### Measures of Externalizing Problems at Age 17

Mothers completed the Achenbach CBCL when their children were 17 years of age. The Aggression ( $M = 4.98$ ,  $SD = 4.88$ ) and Hyperactivity (this scale is constructed separately for boys and girls; girls'  $M = 1.81$ ,  $SD = 2.50$  and boys'  $M = 3.21$ ,  $SD = 3.06$ ) subscales were extracted for use in the current study. In addition, adolescents completed the parallel Achenbach Youth Self-Report and Profile (YSR; Achenbach, 1991), and the Aggression ( $M = 8.51$ ,  $SD = 4.14$ ) and Attention Problems ( $M = 5.31$ ,  $SD = 3.07$ ) subscales were extracted. T-scores on the parent (median = 46.44) and adolescent (median = 48.90) externalizing scales ranged from 30 to 82; four cases exceeded T-scores of 70 on each scale. Sample sizes ranged from 90 to 116 for parent report data, and from 81 to 104 for adolescent report data.

### Continuity in Externalizing Problems Between Middle Childhood and Late Adolescence

Interrelationships between measures of externalizing behavior assessed across time and across different informants are shown in Table II. There were moderate levels of continuity in parent perceptions of externalizing

problems between middle childhood and late adolescence. Although parents' school-age reports did not predict later adolescent self-reports of externalizing problem behavior, teachers' reports were modestly predictive of this outcome.

## RESULTS

Initial steps in data analysis were to examine relationships between the composite scales of children's later school-age externalizing problem behaviors and antecedent measures of child temperamental and caregiving risk. Next, we determined whether early developmental predictors of children's school-age externalizing problems also predicted measures of externalizing problem behavior assessed in late adolescence. Finally, hierarchical multiple regression analyses were used to examine the relative contributions of different, early childhood risk factors to children's later externalizing behavior, and to determine whether contributions of significant risk factors were primarily additive or interactive in relation to later externalizing behavior outcomes.

### Infancy and Toddler-Age Correlates of Externalizing Behavior Across the School-Age Period

In this section, we examined early precursors of children's externalizing problem behaviors assessed across the school-age period by mothers and by teachers. Preliminary analyses revealed that the correlational patterns were similar for boys and girls. Thus, correlations based on the full sample are reported below. Finally, where significant correlations were found, Bonferroni's adjusted probabilities were computed using SYSTAT (Wilkinson, 1989) to guarantee that the family comparison error rates did not exceed relevant critical values for determining significance.

#### Family SES and Child Gender

As an initial step in data analysis we computed correlations between family SES, child gender, and school-age measures of externalizing behavior. Variations in family SES were unrelated to later mother and teacher reports of externalizing problem behavior. Likewise, child gender was unrelated to later maternal reports of externalizing problems. However, child gender did correlate modestly with teachers' reports of externalizing behavior, in the expected direction of girls showing less school-based problem behavior than boys ( $r = -.22$ ,  $p < .05$ ).

**Table II.** Continuity of Externalizing Problem Ratings Across Time and Informants

	Ages 7–10		Age 17	
	Parent CBCL (1)	Teacher CBCL (2)	Parent CBCL (3)	Adolescent YSR (4)
1	1.0	.21*	.42***	.12
2		1.0	.10	.24*
3			1.0	.45***
4				1.0

\*  $p < .05$ .

\*\*  $p < .01$ .

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

**Table III.** Intercorrelations Between Measures of Early Difficultness/Resistance to Control and Externalizing Problem Behavior Across the School-Age Period<sup>a</sup>

	Mother reports			Teacher reports			
	AGG	HA	TOT	AGG	IAT	ACT	TOT
Age 6 months							
Difficultness (ICQ)	.22*	.31**	.24*	.13	.02	.00	.18*
Age 13 months							
Difficultness (ICQ)	.15	.17	.16	.20	.07	.06	.10
Persistent (ICQ)	.28*	.20*	.30**	.13	.08	.07	.11
Persists (observation)	.01	.04	.02	.39*	.18	.39*	.37*
Age 24 months							
Difficultness (CCQ)	.12	.25*	.28*	.12	.17	.17	.15
Unstoppable (CCQ)	.21*	.28*	.22*	.02	.04	.05	.04
Troublesome (MPQ)	.37**	.42**	.34**	.20*	.00	.18	.21*
Trouble (observation)	.10	.07	.07	.01	.03	.02	.04

<sup>a</sup>AGG = aggression; HA = hyperactivity; TOT = total externalizing; IAT = inattention; ACT = overactivity.

\*  $p < .05$ .

\*\*  $p < .01$ .

### Early Caregiving Relationships

The 6-month measure of caregiving behavior was unrelated to ratings of school-age externalizing behavior. However, 13-month toddlers who were perceived by their mothers as highly unresponsive to them (MPQ Unresponsiveness) received relatively high maternal ratings of hyperactivity and aggression ( $r_s = .40$  and  $.25$ ,  $p_s < .01$  and  $.05$ , respectively). Similarly, 13-month toddlers who experienced relatively low levels of maternal affection (home observation scale) received relatively high teacher ratings of overactivity across the school-age years,  $r = -.44$ ,  $p < .01$ .

The 24-month correlates of children's school-age externalizing problems were similar to those reported above. Toddlers who were perceived as highly unresponsive received relatively high maternal ratings of hyperactivity ( $r = .58$ ,  $p < .001$ ) and aggression ( $r = .36$ ,  $p < .01$ ) across the school-age years. Conversely, toddlers who experienced relatively low rates of positive affective mother-child exchanges (POQ Affection and Fun) received relatively high teacher ratings of overactivity ( $r = -.30$ ,  $p < .05$ ) and aggression ( $r = -.42$ ,  $p < .05$ ) across the school-age years.

### Child Difficultness and Resistance to Control

Next, we examined the extent to which early measures of child difficultness predicted school-age externalizing problems. Included as predictors were maternal reports of infant and toddler negative emotionality and

resistance to control, as well as observational indexes of toddler resistance to maternal control in the home setting. Links between early child difficultness and later maladjustment were consistently patterned across the first two years of life.

As shown in Table III, maternal reports of infant difficultness at age 6 months were significantly correlated with later maternal reports of school-age hyperactivity and aggression, but not with teacher reports of externalizing problem behavior. Similarly, at 13 months, the mother's perception of her toddler as persistent in testing and resisting maternal control (ICQ Persistent) was significantly correlated with later maternal reports of aggression. Moreover, toddlers who manifested high resistance to maternal control during the home visit (observation scale Persists) received relatively high teacher ratings of overactivity and aggression across the school-age years.

Finally, at 24 months, toddlers who were perceived by mothers as highly resistant to control (ICQ Unstoppable) received relatively high ratings of later hyperactivity. Similarly, toddlers who were perceived by mothers as extremely difficult to manage (MPQ Troublesome) received high maternal ratings of later hyperactivity and aggression. To a modest degree, this association generalized to later teacher reports of externalizing problems. However, the observational index of child difficultness (child Trouble) did not predict individual differences in later externalizing behavior.

In summary, we found antecedents of children's school-age externalizing problems in aspects of caregiver-child relationships and of toddler difficultness and resistance to control. In the following section, we

**Table IV.** Early Mother-Child Relationship Correlates of Externalizing Behavior at Age 17<sup>a</sup>

	Maternal CBCL				Adolescent YSR		
	AGG	HA-B	HA-G	TOT	AGG	ATTN	TOT
Age 6 months							
Affectionate contact	-.22*	-.13	-.17	-.22	-.26*	-.14	-.24*
Age 13 months							
Teaching	-.07	-.09	-.07	-.08	-.35*	-.09	-.27*
Management	-.05	-.14	-.04	-.06	-.24*	-.23*	-.26*
Affection	-.04	-.01	-.13	-.04	-.22*	-.15	-.22
Unresponsiveness	.24*	.09	.07	.20*	.15	.22*	.20*
Age 24 months							
Verbal stimulation	.06	.00	.12	.11	-.14	-.09	-.13
Restrictive control	.07	.07	-.15	-.11	-.09	-.07	.10
Affection	-.09	-.02	-.15	-.10	-.23*	.00	.09
POQ affection and fun	.00	.07	.08	.02	.07	.03	.00
POQ nonpunitive	.01	.11	.19	.09	.09	.12	.09
Unresponsiveness	.40**	.18	.41**	.38**	.33*	.29*	.33*

<sup>a</sup>AGG = aggression; HA-B = hyperactivity—boys; HA-G = hyperactive/immature—girls; TOT = total externalizing; ATN = attentional problems.

\*  $p < .05$ .

\*\*  $p < .01$ .

examined the generalizability of these interrelationships to the late adolescent period.

### Infancy and Toddler-Age Correlates of Externalizing Behavior at Age 17

Previous analyses revealed significant relationships between early risk factors and children's school-age externalizing behavior. In this section, we examined the infancy and toddler-age correlates of maternal and adolescent externalizing problem ratings at age 17. Analyses were computed separately in relation to different subtypes of externalizing problem behavior. Initially, these correlations were computed separately for boys and girls. In cases where the patterns were similar across genders, full sample relationships are reported below. Finally, as before, the possibility that significant bivariate relationships primarily reflected family-wise error rates was controlled for by computing Bonferroni-adjusted probabilities.

#### Family SES and Child Gender

Initially, we determined whether family SES and child gender were significantly correlated with externalizing problem outcomes at age 17. Variations in family SES were unrelated to maternal reports of adolescent externalizing behavior. However, relatively low family SES did predict, to a modest degree, adolescent self-reports of aggression ( $r = .22$ ,  $p < .05$ ) and attentional problems ( $r = .23$ ,  $p < .05$ ). Finally, child gender was unrelated

to later maternal and adolescent reports of externalizing problems.

#### Early Caregiving Relationships

There were consistent interrelationships between measures of early caregiving relationships and parent and self-ratings of externalizing behavior at age 17. As shown in Table IV, infants who experienced low levels of affectionate caregiving at age 6 months received relatively high parent ratings of aggression at age 17, and rated themselves more highly in later aggressive conduct disturbances than others. Similarly, 13-month toddlers who experienced relatively low rates of maternal teaching and affection and relatively high rates of maternal control perceived themselves as more aggressive than others at age 17. Moreover, low mother-toddler affection at age 24 months also predicted high self-perceived aggression at age 17, affirming the generalizability of this pattern across different developmental periods. Finally, consistent with findings reported above, toddlers who were perceived by mothers as highly unresponsive to them at ages 13 and 24 months received relatively high parent and self-ratings of externalizing problems in late adolescence.

#### Child Difficultness and Resistance to Control

In the final set of bivariate analyses, we examined interrelationships between measures of difficult infant and



**Table V.** Interrelations between Measures of Early Difficultness/Resistance to Control and Externalizing Behavior at Age 17<sup>a</sup>

	Maternal CBCL				Adolescent YSR		
	AGG	HA-B	HA-G	TOT	AGG	ATT	TOT
Age 6 months							
Difficult (ICQ)	.22*	.33**	-.08	.22*	.01	.02	.03
Age 13 months							
Difficult (ICQ)	.17	.18	.00	.11	.10	.10	.09
Persistent (ICQ)	.25*	.20*	.06	.25*	.11	.11	.15
Persists (observation)	.02	.03	.07	.04	.08	.15	.01
Age 24 months							
Difficult (CCQ)	.18	.23	.07	.20*	.05	.24*	.12
Unstoppable (CCQ)	.20*	.06	.06	.20*	.12	.03	.16
Troublesome (MPQ)	.19*	.25	.11	.19*	.10	.28*	.11
Trouble (observation)	.07	.08	.14	.09	.09	.04	.05

<sup>a</sup>AGG = aggression; HA-B = hyperactive—boys; HA-G = hyperactive/immature—girls; TOT = total externalizing; ATT = attentional problems.

\*  $p < .05$ .

\*\*  $p < .01$ .

toddler behavior and externalizing behavior at age 17. As shown in Table V, infants who were perceived as fussy and difficult to manage at age 6 months received relatively high maternal ratings of hyperactivity and aggression at age 17. Likewise, toddlers who were perceived as resistant to control at ages 13 and 24 months received relatively high parent ratings of aggression in late adolescence. Finally, toddlers who received high scores on the Difficult/Demanding and Troublesome scales at age 24 months rated themselves as more inattentive than others at age 17, and were perceived by parents as relatively high in aggression. However, the observational indices of child difficultness did not predict variations in adolescent externalizing behavior.

### Multivariate Pathways to Externalizing Behavior

A series of hierarchical multiple regression analyses were computed to predict externalizing problem behavior across the school-age period and at age 17. These analyses were used to examine the relative contributions of different, early risk factors to later externalizing behavior, and to determine whether contributions of significant risk factors were primarily additive or interactive in relation to later behavior problem outcomes. In cases where family SES or child gender had significant bivariate relationships with the outcome variable, these measures were entered first. Next, we determined whether measures of caregiving risk made significant incremental contributions to the variance in children's later behavior problem scores, beyond variance accounted for by measures of toddler difficultness

and resistance to control. For example, the MPQ Unresponsiveness scale was previously identified as a strong correlate of maternal reports of children's later externalizing problems. However, it is conceivable that high scores on this scale primarily reflect the mother's perception that her toddler was difficult to manage. Consequently, we asked whether Unresponsiveness would make a unique and significant contribution to later externalizing problem reports after controlling for measures of toddler resistance to control.

### Prediction of School-Age Externalizing Behavior

First, we examined multivariate predictors of maternal ratings of externalizing problem behavior. Initially, regression analyses were conducted separately for each narrow-band externalizing problems scale. However, we found highly similar results across different subtypes of externalizing problem behavior, and thus we used, as dependent measures, the total maternal and teacher externalizing problem scores. On the first step, we entered ratings of toddler difficultness; on the next step, ratings of toddler unresponsiveness; and on the final step, the interaction term of these two variables. As shown in Table VI, both ratings of toddler difficultness and of toddler unresponsiveness made significant incremental contributions to the variance in maternal ratings of externalizing problems across the school-age period. However, the interaction term failed to reach significance.

Next, we considered the prediction of teacher ratings of externalizing problems. Based on results of the bivariate

**Table VI.** Hierarchical Multiple Regression Analyses: Unique Variance in School-Age Externalizing Behavior Accounted for by Different Infancy and Toddler-Age Predictor Sets

	$R^2$	$R^{2\text{chg}}$	$F^{\text{chg}}$	$p$
1. Maternal ratings (7–10 years)				
Step 1: Child resistance to control	.17	.17	6.28	<.001
Step 2: MPQ unresponsiveness	.28	.11	8.71	<.001
Step 3: Resistance to control X unresponsiveness	.28	.00	.36	n.s.
2. Teacher ratings (7–10 years)				
Step 1: Child gender	.05	.05	5.15	<.05
Step 2: Child resistance to control	.08	.03	2.61	<.10
Step 3: Mother-child affection	.12	.05	2.51	<.10
Step 4: Gender X resistance to control	.12	.00	.02	n.s.
Step 5: Gender X mother-child affection	.15	.02	2.39	n.s.
Step 6: Resistance to control X mother-child affection	.15	.00	.03	n.s.

analyses, these predictor variables were entered on the following steps: (1) child gender; (2) ratings of toddler difficulty; (3) observed affectionate mother-child interaction; and (4–6) the two-way interaction terms of these variables. As shown in Table VI, child gender made a significant contribution to the variance in teachers' ratings of school-age externalizing behavior. However, the contribution of toddler difficulty and of observed variations in mother-child affection made only marginally significant contributions to this outcome, and the interaction terms failed to reach significance.

#### *Prediction of Externalizing Behavior at Age 17*

This section focuses on the multivariate prediction of externalizing problem behavior at age 17. Because maternal ratings of adolescent aggression and hyperactivity had different patterns of bivariate correlates, they were treated as separate dependent variables. These predictor variables were entered on the following steps: (1) ratings of toddler difficulty; (2) observed variation in mother-infant affectionate contact; (3) ratings of toddler unresponsiveness; and (4–6), the two-way interaction terms of these variables. As shown in Table VII, all three variables made significant incremental contributions to the variance in maternal ratings of adolescent aggression ( $n$ s ranged from 90–116). However, the interaction terms failed to reach significance.

Next, we analyzed predictors of maternal ratings of inattention-hyperactivity, a CBCL subdimension that contains separate scales for adolescent boys and girls ( $n$ s ranged from 49–63 and from 41–53 for females and males, respectively). As shown in Table VII, there were no significant predictors of maternal ratings of hyperactivity in adolescent boys, nor were there any significant interaction

terms. However, ratings of toddler unresponsiveness made a significant incremental contribution to maternal ratings of hyperactivity in adolescent girls. There were no other significant predictors or interaction effects.

Finally, we examined adolescent self-ratings of externalizing behavior. Preliminary analyses revealed highly similar patterns of multivariate predictors for the narrow-band aggression and inattention scales, and thus the total externalizing problems score was used. These predictor variables were entered in the following order: (1) family SES; (2) ratings of toddler difficulty; (3) observed variations in mother-toddler affection and maternal nonpunitiveness; (4) rating of toddler unresponsiveness; and (5–10) the 2-way interaction terms of these variables. As shown in Table VII, variations in family SES made a significant contribution to the variance in later adolescent ratings of externalizing problems. Although contributions of child difficulty and of parent-toddler interaction failed to reach significance, ratings of toddler unresponsiveness did make a significant incremental contribution to self-rated externalizing problems. However, the interaction terms failed to reach significance.

## DISCUSSION

Our main goal was to identify the relative contributions of different infancy and toddler-age risk factors to the long-term prediction of child and adolescent externalizing behavior. Secondary goals involved determining whether narrow-band patterns of problem behavior within the externalizing spectrum had different patterns of developmental antecedents, and whether the early predictors of externalizing behavior were differentially patterned for boys and girls.

**Table VII.** Hierarchical Multiple Regression Analyses: Unique Variance in Adolescent Externalizing Behavior Accounted for by Different Infancy and Toddler-Age Predictor Sets

Parent ratings	$R^2$	$R^{2\text{chg}}$	$F^{\text{chg}}$	$p$
1. Aggression				
Step 1: Child resistance to control	.05	.05	5.05	<.05
Step 2: Close contact	.12	.07	7.37	<.001
Step 3: MPQ unresponsiveness	.22	.10	11.64	<.001
Step 4: Resistance to control X close contact	.23	.01	.20	n.s.
Step 5: Resistance to control X unresponsiveness	.23	.00	.00	n.s.
Step 6: Close contact X unresponsiveness	.26	.03	3.29	<.10
2. Hyperactivity: Boys				
Step 1: Child resistance to control	.04	.04	2.24	n.s.
Step 2: Close contact	.07	.03	1.64	n.s.
Step 3: MPQ unresponsiveness	.07	.00	.40	n.s.
Step 4: Resistance to control X close contact	.07	.00	.20	n.s.
Step 5: Resistance to control X unresponsiveness	.10	.03	1.61	n.s.
Step 6: Close contact X unresponsiveness	.10	.00	.13	n.s.
3. Hyperactivity: Girls				
Step 1: Child resistance to control	.00	.00	.05	n.s.
Step 2: Close contact	.03	.03	1.49	n.s.
Step 3: MPQ unresponsiveness	.20	.17	8.47	<.001
Step 4: Resistance to control X close contact	.20	.00	.40	n.s.
Step 5: Resistance to control X unresponsiveness	.21	.01	.53	n.s.
Step 6: Close contact X unresponsiveness	.23	.02	1.07	n.s.
Adolescent ratings: Total externalizing				
Step 1: Family SES	.05	.05	3.94	<.05
Step 2: Child resistance to control	.06	.01	.91	n.s.
Step 3: Mother-child affection	.07	.01	.89	n.s.
Step 4: Unresponsiveness	.16	.09	7.85	<.01
Step 5: SES X resistance to control	.16	.00	.29	n.s.
Step 6: SES X affection	.16	.00	.60	n.s.
Step 7: SES X unresponsiveness	.17	.01	1.06	n.s.
Step 8: Resistance to control X affection	.17	.00	.81	n.s.
Step 9: Resistance to control X unresponsiveness	.19	.02	3.02	<.10
Step 10: Affection X unresponsiveness	.19	.00	.02	n.s.

### Infancy and Toddler-Age Correlates of Later Child Externalizing Behavior

As expected, children at risk for later externalizing problems experienced caregiver-child relationships that were relatively low in warmth/affective enjoyment. Contrary to expectation, high levels of restrictive caregiving were weak and inconsistent predictors of externalizing problems. However, a variable indexing mothers' perceptions of their caregiver-child relationships consistently predicted later externalizing problems, as reported by mothers and by adolescents. The central feature of the Unresponsiveness scale is the caregiver's perception of rejection by her child (Olson *et al.*, 1982, 1989). Recent research has shown that in relation to mothers of non-referred children, mothers of aggressive school-age children are more likely to infer hostile intentionality when providing causes for negative child behavior (Bickett *et al.*,

1996; Dix & Lochman, 1990). To the best of our knowledge, these data are the first to show that maternal perceptions associated with child conduct problems may begin in early toddlerhood.

We also found consistent interrelationships between qualities of child difficultness and resistance to control and later externalizing problems. As early as 6 months of age, infants who were perceived as difficult to manage received relatively high maternal and teacher externalizing problem ratings during the school-age years and high maternal and self-ratings of this outcome at age 17. Similarly, toddlers who were persistent in testing and in resisting maternal control tended to receive high maternal ratings of later hyperactive and aggressive problem behavior, and in some cases, the predictor variables encompassed both observational and maternal report measures. In showing that there is significant long-term continuity in maternal reports of child difficultness, these findings converged with prior

reports of the BLS (Bates *et al.*, 1991) and with those of other investigators (Sanson *et al.*, 1993; Shaw *et al.*, 1996).

### Gender- and Subtype-Specific Antecedents

Because of a dearth of prior research, attention should be given to the possibility that boys and girls may differ in the development of externalizing behavior (Keenan & Shaw, 1997). Thus, we examined the possibility that early antecedents of children's later externalizing problems may be differentially patterned for boys and girls. Generally, however, we found similar interrelationships between measures of toddler temperament and later externalizing behavior for boys and girls. Recently, Shaw *et al.* (1998) also reported relatively few gender differences in developmental antecedents of externalizing problem behavior.

By showing that the same types of early risk factors predicted externalizing problems in girls and boys, these data do not preclude the possibility that there are significant gender differences in early pathways to externalizing behavior. As Keenan and Shaw (1997) have shown, male gender is a significant risk factor for behavior problem persistence across the transition from preschool to school, and the caregiving antecedents of externalizing problem trajectories have been found to differ between boys and girls (McFayden-Ketchum *et al.*, 1996). Thus, in further research, it may be fruitful to examine antecedents of gender-differentiated patterns of behavior problem continuity.

Finally, we asked whether different subtypes of externalizing problem behavior had unique patterns of infancy and toddler-age antecedents. Early developmental correlates and predictors were not differentially patterned in relation to subdimensions of externalizing problems (e.g., hyperactivity vs. aggression) assessed during the school-age years. However, at age 17, there were clear differences in the early developmental antecedents of parents' reports of aggression versus hyperactivity, but these differences did not extend to adolescent self-reports. Thus, while our data offer relatively weak support for the notion that subdimensions of externalizing problems may have unique patterns of antecedents, they do suggest that greater differentiation of externalizing problem subdimensions may occur in adolescence than in earlier periods.

### Relative Contributions of Different Early Risk Factors to Later Externalizing Behavior

Hierarchical multiple regression analyses were used to identify relative contributions of different early devel-

opmental risk factors to children's later externalizing behavior. Overall, results supported a multiple risk conceptualization of the antecedents of long-term externalizing problems, in which distinct categories of risk were additive rather than interactive in relation to later behavior problem outcomes.

The mother's perception of her toddler as hard to manage (resistant to discipline; always "getting into things") made significant contributions to the variance in both maternal and teacher ratings of school-age externalizing behavior. Moreover, perceived unmanageability also predicted maternal ratings of externalizing behavior in late adolescence. Thus, these data provide robust additional support for the long-term predictive validity of parent perceptions of child difficultness.

These findings also raise questions about the meaning of parent perceptions of child difficultness and resistance to control. Given that our most consistent findings were between predictor and outcome variables assessed by the same informant, does this mean that patterns of continuity in child difficultness are artifacts of parental biases? In previous research with the BLS sample, Bates and Bayles (1984) showed that these parent perception measures had empirically supported objective and subjective components, and that the subjective elements in maternal reports did not overshadow elements reflecting objective appraisals of child behavior. Moreover, in the current study, there were modest relationships between parent perceptions of difficultness and resistance to control and later teacher and adolescent self-reports of externalizing problem behaviors. In addition, several investigators have reported relationships between laboratory based assessments of impulsivity and uncooperativeness in early childhood and externalizing problems in adolescence (Caspi & Silva, 1995; Henry *et al.*, 1996). At the same time, there is substantial situational specificity in patterns of child maladjustment, indicating the desirability of including multiple informants and assessment settings in future studies of this nature. Finally, it is difficult, if not impossible, to clearly distinguish between constructs of difficult temperament and early appearing behavior problems (Rothbart & Bates, 1998). Because individual differences in difficultness and resistance to control appear early in life, show moderate levels of stability, and reflect general constructs of self-regulation, we construed them as aspects of temperament.

We also considered the relative contributions of measures of caregiving risk. Generally, predictive relationships between parent-child relationship measures and later externalizing problem reports were differentially patterned across informants. Observational indexes of nonaffectionate mother-toddler interaction did not make a significant

incremental contribution to school-age maternal and teacher ratings of externalizing problem behavior, after considering the contribution of perceived child unmanageability. However, lack of close, affectionate mother-child contact at age 6 months was incrementally predictive of parent and adolescent ratings of externalizing problems at age 17. Although prior research has highlighted restrictive parenting as a critical factor in the development of externalizing problems, these data underscore the potential importance of low levels of warm, supportive, mutually enjoyable interaction (Campbell, Pierce, Moore, Marakovitz, & Newby, 1996; Pettit, Bates, & Dodge, 1997; Rothbaum & Weisz, 1994). They also show that patterns of caregiving risk may be identified as early as 6 months of age, well before coercive parent-toddler transactions become established.

Finally, maternal perceptions of child unresponsiveness were consistent predictors of mother's ratings of school-age externalizing behavior, and of maternal and adolescent self-ratings of externalizing problems at age 17. This measure made significant incremental contributions to the variance in later externalizing problem ratings, even after other co-occurring risk factors had been controlled for. It is noteworthy, however, that maternal perceptions of child unresponsiveness did not predict variations in later teacher ratings of externalizing behavior, again affirming the situational specificity of our findings.

The Unresponsiveness index is conceptually and empirically related to the child difficultness construct, in that both scales share a common element of negative perception of the child's behavior (Olson *et al.*, 1982). However, given the modest correlation between the Unresponsiveness and Troublesome scales, most caregivers do not appear to interpret their toddler's difficult behavior as a personal rebuff. Thus, perceptions of child unresponsiveness represent a distinct dimension of parental experience, and one that is predictive of behavior problem continuity in the eyes of both mothers and adolescents.

By showing that negative maternal cognitions about child behavior occur as early as 13 months and predict externalizing behavior through late adolescence, these data indicate a need for further research into the meaning of this relatively novel dimension of parental experience. Given the content of the Unresponsiveness scale, we suspect that the "subjective" component outweighs others. This hypothesis could be explored further by relating variations in Unresponsiveness to measures of maternal emotional distress and/or personality disturbance. Similarly, mothers who perceive their toddlers as highly unresponsive to them may also manifest insecure-unresolved attachments to their own caregivers on the Adult Attachment Inventory, as this dimension of parental experience has predicted

aggressive behavior in young children (Lyons-Ruth, 1996). Alternatively, caregivers could be describing toddlers who are temperamentally prone to low affective and social responsiveness, a hypothesis that could be tested by relating high scores on Unresponsiveness to objective measures of child behavior vis-a-vis the caregiver.

Limitations of our study should be noted. Although we examined multiple early risk factors in relation to children's later adjustment, participating families were primarily middle-class. Moreover, analyses of attrition patterns over the 17-year time span indicated some tendency for families with the lowest levels of demographic and caregiving risk to selectively remain in our study. Thus, our findings may not generalize to families experiencing high levels of economic hardship and other associated risks. Second, given that most children in our study received behavior problem scores within the normal range, our findings should not be generalized to clinically referred groups of children. Third, as noted above, although teacher and adolescent reports were included at different assessment points, many of our findings hinged on maternal reports of both predictor and outcome. For example, once child gender was accounted for, prediction from infant outcomes to externalizing behavior at school was quite limited. Finally, although there were significant links between early developmental risk factors and later behavior problem outcomes, the total variance explained by the multiple regression analyses was relatively low.

In conclusion, results supported a multiple risk conceptualization of the early childhood antecedents of later externalizing problems (see, also, a recent report by Deater-Deckard, Dodge, Pettit, & Bates, 1998). Lack of affectionate caregiver-child interaction and child difficultness and resistance to control were associated with externalizing problems in middle childhood and again in late adolescence. In addition, the caregiver's perception of her toddler's unresponsiveness to her was the strongest predictor of adolescent externalizing problems, indicating the desirability of further research into parents' early perceptions of child behavior.

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