

The Development of Early Externalizing Problems Among Children from Low-Income Families: A Transformational Perspective

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The present study examined pathways leading to early externalizing problems from age 1 to 3^{1/2} in a design that took advantage of our knowledge of normative progression and normative socialization as well as findings from research on risk. A sample of 130 low-income participants was followed longitudinally from 12 to 42 months using observational measures of developmentally salient parenting and child disruptive behavior to predict early externalizing problems. Results are best accommodated by concepts such as transformation and transaction from developmental psychology. For boys, both child and parent variables predicted later externalizing. For girls and boys, the interaction between child noncompliance and maternal rejection was significant.

KEY WORDS: Externalizing; noncompliance; maternal rejection.

Interest in identifying the antecedents of early externalizing problems is increasing rapidly. The reason for this interest is clear. First, both epidemiological and developmental studies, some starting as early as age 2, have found aggressive behavior to be highly stable, particularly among males (Cummings, Iannotti, & Zahn-Waxler, 1989; Olweus, 1979). From longitudinal studies that have traced the developmental course of child disruptive behavior, it is estimated that approximately 50% continue to show these difficulties throughout the school-age period and into early adolescence (Campbell, 1994, 1995; McGee, Silva, & Williams, 1984; Richman, Stevenson, & Graham, 1982). Second, externalizing problems, especially in their more serious forms occurring during school-age and adolescence, are extremely

costly to society in terms of damaged property and disruption of normal patterns of living. Third, in school-age children and adolescents serious forms of externalizing problems have been found to be highly resistant to change—few interventions consistently have proven to be effective (Kazdin, 1995). Fourth, the period from infancy to preschool is one of the most critical in development. During these years, many developmental trajectories leading to adaptive or maladaptive outcomes begin (Campbell, 1995). For these reasons it is important to examine early precursors of externalizing problems. Delineating developmental trajectories leading to early externalizing problems and later antisocial behavior may suggest important targets and appropriate timing for intervention. Parent and child factors associated with less serious externalizing problems may be more responsive to treatment prior to school entry.

As the study of developmental psychopathology has grown, it has proved profitable to use perspectives from developmental psychology and normative socialization in the study of childhood psychopathology. The pathway of the disrupting or externalizing

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child can best be seen against the background of transformational change, normative progression, and parent-child interaction, including reciprocal and transactional effects between parent and child. The first years of life are marked by constant change in the child's cognitive and physical maturity, more so than in any other period of life. Thus, it is important for researchers to focus their efforts on the child's changing developmental status and concomitant challenges faced by parents. Relatively little research has been conducted with respect to applying such models to the study of early child psychopathology.

With respect to child characteristics shown in the first year, evidence suggests that differences in infant difficulty (i.e., negative emotionality) and activity level may influence caretaker's perceptions of the infant which in turn, influence their practices and the course of behavior problems (Bates, Maslin, & Frankel, 1985). Studies examining the direct effects of difficult temperament on later externalizing behavior problems have shown modest to moderate relations (Maziade, Cote, & Bourderault, 1984; Sanson, Oberklaid, Pedlow, & Prior, 1991). Unfortunately, many of these studies have either relied solely on mothers' reports of infant difficulty and later behavior problems, or used the term *temperament* to describe patterns of child behavior beginning well after infancy. Moreover, few studies have examined temperament characteristics during infancy using a reciprocal model of interaction to examine interplay with parenting behavior. Using a measure of persistent attention-seeking behavior in the face of low maternal responsiveness (Martin, 1981), Shaw, Keenan, and Vondra (1994) found that, for boys, infant persistence at 12 months was related to observed aggression at age 2, which in turn was related to age 3 externalizing problems based on maternal report.

During the first year, parenting is primarily focused around attending to the infant's needs due to the infant's cognitive and physical immaturity. Consistent with this premise, maternal responsiveness has been found to play a critical role in several areas of later child adaptation. Responsivity has been found to be positively associated with later cognitive competence (Bradley & Caldwell, 1980; Cohen & Beckwith, 1979) and social development (Martin, 1981; Waters, Wippman, & Sroufe, 1979), and negatively related to externalizing behavior problems, the latter especially in high-risk samples (Renken, Egeland, Marvinney, Mangelsdorf, & Sroufe, 1989; Shaw et al., 1994).

During the second year, there is an increase in the child's physical mobility and risk of harm to self, siblings, pets, and objects (Shaw & Bell, 1993). A transformational approach would predict that child and parenting factors associated with later externalizing problems also would undergo change. No longer are parents primarily concerned with merely fulfilling the infant's needs. While maintaining a positive relationship, parents also begin exerting their will to protect the infant and other family members' physical well-being. In addition, parents begin to expect greater self-regulatory control so the child can perform developmentally appropriate tasks that require greater social and cognitive competence. This expectation will increase even more during the third year. Since most infants oppose this process (Ausubel, 1958), the second year is marked by increases in noncompliant and aggressive behavior (Shaw et al., 1994).

Consistent with the foregoing transformation, it is during the second year that researchers have begun to find direct linkages between early forms of aggressive or noncompliant behavior and later disruptive behavior (Cummings et al., 1989; Keenan & Shaw, 1994). In the same study noted above, Shaw and colleagues (1994) found that both noncompliance and aggression during the second year were related to externalizing problems at age 3.

As parental control increases during the second year, parental discipline styles gain importance. In fact, parents report the second year to be a time of increased stress, during which patience and coping mechanisms are tested (Fagot & Kavanaugh, 1993). However, few studies have examined the effects of such factors as parental hostility on child behavior prior to preschool age. This is surprising given the amount of research on school-age children which has shown relations between rejection and externalizing problems. A hostile and rejecting style of discipline has been associated repeatedly with child externalizing problems among school-age children and adolescents (see Loeber & Dishion, 1983; McCord, McCord, & Zola, 1959). In a meta-analysis of studies examining relations between juvenile delinquency and parenting, parental rejection emerged as one of the most powerful and consistent predictors (Loeber & Stouthamer-Loeber, 1986).

We also were interested in applying Sameroff's (1990) transactional model to the data. The transactional model emphasizes the developing interplay between children's characteristics and experiences

provided by their environments. Sameroff has contended that child characteristics and environmental influences exert reciprocal effects on each other, the combination of which determines later parent and child behavior. Accordingly, children's developmental trajectories can be delineated most accurately by examining the relation of these parent-child interactions over time. In the study of the origins of early externalizing problems, main effects of children's and parent's behavior might have some concurrent impact, but optimal prediction of later disruptive problems should be obtained by tracing how child and parent behaviors interact across time. For example, infants who demand attention from caregivers to help self-regulate may be at risk for later problems *only* if caregivers are unresponsive. Conversely, infants who need less help self-regulating may not be at risk even if caregivers are unresponsive. Thus, it may be most important to delineate specific combinations of parent-child behavior, and the linkages of these behaviors over time, that place children at risk for later problems.

Using a longitudinal sample of low-income, high-risk families, we employed a variety of perspectives from general developmental psychology and socialization to examine the development of early externalizing problems. The present study sought to extend previous findings using several of the same measures as Martin (1981) and Shaw and colleagues (1994) (i.e., maternal responsiveness and infant persistence at age 1, noncompliance at age 2, maternal report of behavior problems at age 3 $\frac{1}{2}$). Child and parenting behaviors were selected based on the child's developmental status. Thus, observations of child persistence and maternal responsiveness were conducted at 12 months, and observations of child noncompliance and maternal rejection at 24 months, to examine the effects of parent-child behavior on maternal reports of child externalizing behavior at ages 2 and 3 $\frac{1}{2}$. In addition, we hypothesized that certain combinations of parent and child behaviors would be particularly disruptive to parent-child relations and subsequent child externalizing problems. Specifically, at 12 months it was hypothesized that the combination of infant persistence and maternal *un*responsiveness would represent the most antagonistic combination of child and parent characteristics. Similarly, at 24 months the combination of child noncompliance and maternal rejection was expected to increase risk status for later externalizing problems. At both time points, aversive child behavior in the face of unresponsive or hostile maternal behavior

was predicted to account for unique variance after considering main effects.

In addition to positing interactive effects of concurrent parent-child behaviors, we hypothesized that the continuity in maladaptive child and parent behaviors over time would be related to greater externalizing problems. Thus, a child who is both persistent during infancy and noncompliant as a toddler should be at greater risk compared to other children, as well as a child whose mother is both unresponsive during infancy and later rejecting.

Finally, we also expected sex differences in the pathways leading to early problem behavior. Boys consistently have been found to demonstrate greater vulnerability to a number of neurodevelopmental and psychological disorders from prenatal development to school age (Eme, 1992; Gualtieri & Hicks, 1985; Zaslow & Hayes, 1986). In an earlier study, Shaw and colleagues (1994) found a greater number and range of correlates that predicted age 2 and 3 disruptive behavior for boys than for girls. This was apparent even though no sex differences were present between the means of predictor and outcome variables, including measures of parental treatment (i.e., maternal responsiveness) as well as early disruptive child behavior (e.g., noncompliance, persistent attention seeking). In the present study, we sought to replicate the previous findings regarding sex differences.

METHOD

Subjects

The participants for the study consisted of a sample of mother-infant dyads recruited from the Women, Infants, and Children (WIC) Nutritional Supplement Program of Allegheny County, Pennsylvania. WIC provides financial support to purchase nutritionally sound food items for low-income families. The sample represents a second cohort of families recruited from WIC, with no overlap of participants from previous publications (Shaw et al., 1994). At the time of recruitment, age of infants ranged from 6 to 11 months with the first assessment completed at 12 months. At the time of the infant's birth, mothers ranged in age from 17 to 39 years, with a mean age of 26. Fifty-seven percent of participants were Caucasian, 39% were African American, and 4% were other (e.g., Hispanic, Asian). Sampling of marital status was not restricted due to the considerable relationship instability within the

sample. At the 12-month visit, 69% were either married or living together, whereas 31% were either divorced, separated, or single. Mean per capita family income was \$261 per month (\$3,132 per year), and the mean Hollingshead socioeconomic status (SES) score was 30, which is indicative of a working class sample.

Mothers of infants were recruited in the waiting rooms of 11 WIC sites in the greater Pittsburgh metropolitan area by one of the principal investigators or members of the project staff. Mothers were informed that the study was a project examining child development and mother-child interaction patterns, and that they would be paid for each lab visit. One-hundred thirty families were seen at 12 months (59 girls and 71 boys). Mothers were contacted 2 weeks before the assessment by mail, and 1 week before by phone, to confirm their appointments. Of the 189 who were asked to take part in the study, 184 (97.3%) agreed to participate, but only 130 (70.6%) of the 184 completed the 12-month assessment. Of the 71 boys and 59 girls seen at 12 months of age, 125 (96.1% of the 130, or 66 boys and 59 girls) participated in the 24-month assessment, and 103 (79.2% of the 130, or 61 boys and 42 girls) participated in the 42-month assessment. Due to insufficient financial resources for the follow-up of the girls, mothers of female participants completed the Child Behavior Checklist (CBCL; Achenbach, 1992) through the mail when children were between 42 to 48 months old, whereas mothers of boys completed the same checklists in person as part of the 42-month laboratory assessment. As a result, retention was substantially lower for female versus male participants; 42 of 60 (70%) females were seen at all assessments versus 64 of 71 (90.1%) males. Because of the sex differences in attrition rates, group difference comparisons of demographic variables by retention status were computed separately by sex. When families who completed 12-, 24-, and 42-month assessments were compared to those who completed assessments only at 12 months, there were no significant differences on per capita income for boys or girls. A similar comparison was made of families who completed all three labs versus those who completed only 12- and 24-month assessments on per capita income, Hollingshead status, and 24-month CBCL Externalizing problems. As a result of errors in videotaping of assessments, sample sizes for specific measures were slightly less than the total sample size at different assessment points.

Procedures

Two videotaped laboratory assessments were conducted at ages 12 and 24 months, and mothers completed Achenbach Child Behavior Checklist (Achenbach, 1992) in person for boys at 42 months, and through the mail for girls, when children were between 42 and 48 months old. Additionally, on the same day prior to the lab visit at 24 months, all families with boys were visited at home where mothers completed several questionnaires and maternal and child behavior were observed. Unless otherwise specified, mothers were instructed to attend to their infants as they normally would. Each laboratory assessment lasted approximately 2 hours, and was purposefully varied in stress level in order to observe parent and infant behavior across a broad spectrum of contexts (i.e., free play vs. the high-chair task).

Measures

High-Chair Task. When infants were 12 months old, mother-infant dyads were observed in a high-chair task to evaluate maternal responsiveness and infant persistence (Martin, 1981; Shaw et al., 1994). In this situation, the infant is placed in a high chair facing away from the mother (toward a mirror through which the child can see the mother) with nothing to do for 3 min, while the mother completes a questionnaire. The mother is instructed to complete the questionnaire but also to attend to her infant in whatever manner she deems appropriate. The one restriction is that the infant cannot be removed from the high chair. This procedure was adapted from Martin (1981) because it had previously been demonstrated to (1) operationalize the measurement of the process of interaction as an interdependent flow of behavior involving both self and partner influences, (2) record quantitative shifts of all of the partner-directed behavior of each person, (3) discriminate attachment security classification in two samples of low-income participants (Shaw et al., 1995; Vondra, Shaw, & Kevenides, 1995), and (4) show longitudinal relations in the prediction of early externalizing problem behavior (Martin, 1981). In using this method, it is assumed that each individual is affected both by her/his own prior behavior and the behavior of the other person, taking into account bidirectional components of measurement.

Mother and infant behaviors were separately coded on a 1-s time base. Behaviors for mother and

infant consisted of *look at partner*, *smile*, *vocalize*, *touch partner*, and for the infant only, *fuss/cry*. The behaviors were not mutually exclusive; thus, more than one could occur for each partner within any sampling interval. Behavioral frequencies were coded from videotapes by a team of undergraduate research assistants who were blind to the study's hypotheses. Interobserver reliability, based on a random sample of 20% of the interactions, was quantified by kappa coefficients and ranged from .79 (mother vocalize) to .83 (mother look).

Mother and infant behaviors were scaled along an intensity dimension within each 1-s interval by computing a weighted sum of each partner's behavior. A copy of all scaling weights can be found in both the Martin (1981) and Shaw and colleagues (1994) papers, but examples include infant vocalize = 25, infant fuss/cry = 125, infant vocalize + smile + look = 40, mother look = 15, mother look + smile + vocalize + touch = 140. Following Martin and Shaw, time series regression was then used to estimate two parameters for each partner: persistence and responsiveness to the other partner. Infant persistence is the extent to which the infant intensifies the level of attention seeking following unresponsive maternal caregiving. Maternal responsiveness is the extent to which the mother increases attention giving as a function of the level of infant attention seeking—in essence, how contingently responsive the mother is to the infant's requests for interaction. The test statistics used for each variable were the respective beta coefficients from the time series regressions of each dyad's scaled intensity scores.

Child Noncompliance. Following a system devised by Martin (1981) and adapted by Keenan, Shaw, and Aubele (1993), the following behaviors were coded as noncompliant at the 24-month assessment: walking away, changing the task, passive noncompliance (i.e., doing nothing), and struggling or resisting. Noncompliance was coded during three intervals, a 5-min clean-up task and two 3-min problem-solving tasks. During the problem-solving tasks the mother was instructed to spend 3 min working with her child to put a puzzle together, and then 3 more minutes fitting plastic letters in and out of a toy mailbox. The total coding time for noncompliant behavior was 11 min.

A group of undergraduate research assistants, who were blind to other observational coding systems, comprised the noncompliance coding team. Team members were trained for 4 months, during

which they attended weekly meetings and completed homework assignments of coding tapes. To establish adequate reliability, each 5-s interval was reviewed for the presence or absence of codes. Since a composite measure of noncompliant behavior representing all types of noncompliance was used in the present analyses, kappas also were based on agreements across the four types of noncompliant behavior: walking away, changing the task, passive noncompliance, and struggling/resisting. Compositing was deemed appropriate because of the high correlations among the four different codes; all were intercorrelated .92 or more. The kappa for noncompliance was .89.

Rejecting Parenting. Maternal rejecting parenting was measured using the Early Parenting Coding System (EPCS), which was designed to measure a range of parenting behavior typically exhibited in interactions with young children. The EPCS is an observational coding system consisting of nine categories of parenting strategies coded molecularly as well as six global ratings (Winslow, Shaw, Bruns, & Kiebler, 1995). Molecular and global ratings were made from videotaped mother-child interactions during a structured clean-up task at the 24-month lab assessment. For the purposes of the present study, only molecular and global ratings relevant to rejecting parenting were employed. These included two molecular ratings—*verbal/physical approval* and *critical statement*—as well as three global ratings—*hostility*, *warmth*, and *punitiveness*. Hostility was defined as the emotional expression of anger by the mother toward the child as indicated by tone of voice and mannerisms. The warmth rating was an evaluation of the amount of positive affect expressed toward the child. Punitiveness was defined as the extent to which the mother was too strict, demanding, or harsh, considering the child's behavior. Originally, global ratings were made on a 4-point scale; however, it was necessary to convert the punitiveness and warmth ratings to 3-point scales due to difficulties among coders in making more narrowly defined distinctions. Interrater agreement was calculated for each rating individually. For molecular codes, Cohen's kappa coefficients were .87 for approval and .79 for critical statement. For global ratings, kappa coefficients were .94, .83, and .94 for hostility, warmth, and punitiveness, respectively. Coders were blind to scores on all other measures used in the study.

In order to create a single indicator corresponding to rejecting parenting, a principal-components

Table I. Descriptive Statistics for Study Variables

| Variable | Boys | | | | Girls | | | |
|------------------------------|----------|----------|---------------|--------------|----------|--------------------|---------------|--------------|
| | <i>N</i> | <i>M</i> | (<i>SD</i>) | Range | <i>N</i> | <i>M</i> | (<i>SD</i>) | Range |
| 12 Months | | | | | | | | |
| Infant persistence | 63 | 0.0005 | (0.001) | -0.008-0.003 | 51 | 0.0006 | (0.001) | -0.002-0.003 |
| Maternal responsiveness | 63 | 0.007 | (0.016) | -0.060-0.066 | 51 | 0.011 | (0.023) | -0.030-0.134 |
| 24 Months | | | | | | | | |
| Child noncompliance | 58 | 168.60 | (102.09) | 17.00-475.00 | 53 | 154.75 | (113.72) | 0.00-466.00 |
| Rejecting parenting | 61 | 0.06 | (1.07) | -1.34-4.60 | 54 | -0.07 | (0.93) | -1.32-2.66 |
| Child externalizing behavior | 61 | 50.28 | (9.66) | 31.00-83.00 | 51 | 51.80 | (8.85) | 32.00-74.00 |
| 42 Months | | | | | | | | |
| Child externalizing behavior | 61 | 51.36 | (9.44) | 30.00-68.00 | 42 | 47.71 ⁺ | (10.20) | 29.00-70.00 |

analysis was conducted with the five parenting variables using a forced one-factor solution. As expected, only one factor emerged with an initial eigenvalue greater than or equal to 1.0. The Kaiser-Meyer-Olkin measure of sampling adequacy was .67, and the Bartlett test of sphericity was 89.23, $p < .00001$. To increase generalizability, variables were converted to z-scores, then averaged without differential weighting to form the rejecting parenting composite.

Child Behavior Checklist for Ages 2-3. The CBCL (Achenbach, 1992) is a 100-item questionnaire designed to assess behavioral and emotional problems in children ages 2 to 3. Mothers completed the age 2-3 version of the CBCL when children were 2 and 3 1/2-4 years old. Achenbach recommended continuing to use the age 2-3 versus the age 4-16 version of the CBCL when children are between ages 3 and 4 and previous assessments have been conducted (Achenbach, 1992). The questionnaire generates two broad-band factors, Externalizing and Internalizing, the former of which was used for analyses in this study.

RESULTS

Results are presented in the following four stages: (a) descriptive statistics of child behavior and maternal treatment, (b) correlates of age 2 and age 3 1/2 child externalizing problems, and (c) pathways leading to age 2 and 3 1/2 children's externalizing problems. Sex differences in the pathways leading to early disruptive behavior were examined in regression analyses.

Preliminary Analyses

First, means and standard deviations are presented in Table I separately by sex for all child and

parenting behaviors. With the exception of one non-significant trend, no sex differences were found for mean levels of the seven child or parenting behaviors. Specific outliers were removed from analyses after scatterplots and effects on correlational analyses (i.e., changing the correlation coefficient by more than .20) were examined. Only one case met these criterion and was removed from subsequent correlational and regression analyses involving the maternal responsiveness variable. The outlier was a female subject with a score on maternal responsiveness that was 5.3 standard deviations above the sample mean. With the case present, the correlation between maternal responsiveness and 42-month CBCL Externalizing problems was .37 for girls ($p < .01$); after removing this case the same correlation was .15, n.s.

Correlation Analyses

Pearson product-moment correlations among predictor and dependent variables are presented in Table II. Correlations are presented separately by sex based on previous studies showing sex differences in the magnitude of correlations between risk factors and disruptive behavior for boys and girls (Martin, 1981; Shaw et al., 1994). Relations between 12- and 24-month per capita family income, socioeconomic status, marital status, and mother's age, and 24- and 42-month CBCL Externalizing also were examined but are not shown because only one of 24 attained statistical significance. For girls only, SES at 12 months was negatively related to CBCL Externalizing at 24 months ($r = -.31, p < .05$).

For boys, maternal responsiveness at 12 months was negatively related to 24- and 42-month CBCL Externalizing, and maternal rejection at 24 months was positively related to 24-month noncompliance

Table II. Intercorrelations Among Study Variables^a

| Variable | 1 | 2 | 3 | 4 | 5 | 6 |
|---------------------------------|------------------|-------------------|------------------|------------------|------------------|------------------|
| 12 Months | | | | | | |
| 1. Child persistence | - | -.20 ^b | .00 | .12 | .33 ^c | .16 |
| 2. Maternal responsiveness | -.12 | - | -.17 | -.15 | .02 ^a | .15 ^b |
| 24 Months | | | | | | |
| 3. Child noncompliance | .19 ^b | .07 | - | .46 ^e | .15 | .09 |
| 4. Maternal rejection | .11 | -.14 | .33 ^d | - | .25 ^c | .27 ^b |
| 5. Child externalizing behavior | .12 | -.32 ^d | .15 | .17 | - | .66 ^e |
| 42 Months | | | | | | |
| 6. Child externalizing behavior | .29 ^c | -.23 ^c | .38 ^d | .38 ^d | .70 ^e | - |

^aBoys below and girls above diagonal. Subscript roman letters: a—correlation was .15 before removal of outlier; b—correlation was .37 before removal of outlier.

^b*p* < .100.

^c*p* < .05.

^d*p* < .01.

^e*p* < .001.

(derived from some of the same observational period) and 42-month Externalizing. Infant persistence was positively associated with Externalizing at 42 months, and noncompliance at 24 months was related to 42-month Externalizing. The relation between the CBCL Externalizing factor from 24 to 42 months was high *r* = .70, *p* < .001.

For girls, maternal responsiveness was unrelated to the Externalizing at 24 and 42 months. Maternal rejection at 24 months was significantly associated with noncompliance and Externalizing at 24 months. Infant persistence was positively associated with 24- but not 42-month Externalizing or noncompliance at 24 months. Although the relation between Externalizing at 24 and 42 months was strong (*r* = .66, *p* < .001), the association between 24-month noncompliance and 42-month Externalizing did not attain significance. It is important to note that, although we have presented correlations separately for boys and girls, formal tests of sex differences were conducted in regression analyses, presented in the following sections.

Pathways Leading to Early Externalizing Problems: Regression Analyses

A series of hierarchical multiple regression analyses were computed to predict Externalizing at ages 2 and 3½. Since we also were interested in examining sex differences, interactions between sex and independent variables were included. Independent variables were entered chronologically, and when derived from the same assessment point, child factors were entered prior to parenting factors to account for autoregressive effects. SES also was entered as a control variable to predict 24-month Externalizing because of its significant relation for girls.

Multivariate Pathways to Externalizing Problems from 12-Month Predictors

Results of hierarchical multiple regression analyses for the prediction of 24- and 42- month Externalizing using 12-month predictors are presented in Table III. To examine the prediction of 24-month Ex-

Table III. Prediction of 24-Month Child Behavior Checklist (CBCL) Externalizing Problems from 12-Month Variables: Hierarchical Multiple Regressions; Dependent Variable: CBCL Externalizing Problems at 24 months; Overall *F* (7, 87) = 4.25, *p* < .001

| Independent variable | Multiple <i>R</i> | <i>R</i> ² | <i>R</i> ² change | <i>B</i> | SE _{<i>B</i>} | Beta | <i>t</i> | Significance of <i>F</i> Change |
|----------------------------|-------------------|-----------------------|------------------------------|----------|------------------------|-------|----------|---------------------------------|
| Socioeconomic status (SES) | .18 | .03 | .03 | -0.15 | 0.08 | -0.18 | -1.76 | .08 |
| Child sex | .20 | .04 | .01 | 1.50 | 1.90 | 0.08 | 0.79 | .43 |
| SES × Sex | .32 | .10 | .07 | -0.43 | 0.17 | -1.04 | -2.59 | .01 |
| Persistence | .43 | .18 | .08 | 2,454.00 | 823.60 | 0.31 | 2.98 | .004 |
| Responsiveness | .45 | .20 | .02 | -78.67 | 57.24 | -0.13 | -1.37 | .17 |
| Persistence × Sex | .47 | .22 | .02 | 2,599.58 | 1,747.89 | 0.44 | 1.49 | .14 |
| Responsiveness × Sex | .51 | .25 | .03 | 221.77 | 112.76 | 0.58 | 1.97 | .05 |

Table IV. Prediction of 42-Month Child Behavior Checklist (CBCL) Externalizing Problems from 24-Month Observed Parent and Child Variables: Hierarchical Multiple Regressions; Dependent Variable: CBCL Externalizing Problems at 42 months; Overall $F(7, 83) = 3.36, p < .004$

| Independent variable | Multiple R | R^2 | R^2 change | B | SE_B | Beta | t | Significance of F Change |
|---|--------------|-------|--------------|-------|--------|-------|-------|----------------------------|
| Child's sex | .18 | .03 | .03 | -3.60 | 2.06 | -0.18 | -1.75 | .08 |
| Noncompliance | .30 | .09 | .05 | 0.02 | 0.009 | 0.23 | 2.30 | .02 |
| Maternal rejection | .40 | .16 | .07 | 4.27 | 1.62 | 0.28 | 2.63 | .01 |
| Sex \times Noncompliance | .42 | .18 | .03 | -0.03 | 0.018 | -0.56 | 1.65 | .10 |
| Sex \times Rejection | .42 | .18 | .00 | 0.21 | 3.26 | 0.02 | 0.07 | .95 |
| Noncompliance \times Rejection | .43 | .19 | .01 | 0.01 | 0.01 | 0.18 | 0.80 | .42 |
| Sex \times Noncompliance \times Rejection | .47 | .22 | .03 | 0.06 | 0.03 | 1.28 | 1.88 | .06 |

ternalizing, SES, sex, 12-month infant persistence, 12-month maternal responsiveness, and their two- and three-way interaction terms were used as independent variables. The overall regression equation was significant, $p < .001$. Infant persistence ($p < .01$), the SES \times Child Sex interaction ($p < .02$), and the Maternal Responsiveness \times Child Sex interaction ($p = .05$) significantly predicted 24-month Externalizing. Follow-up analyses of the SES \times Sex interactive effect corroborated the significant inverse relation between SES and Externalizing problems for girls but not boys. Follow-up of the Maternal Responsiveness \times Child Sex interaction indicated that boys with above-median responsiveness had median t -scores on 24-month Externalizing .6 standard deviations lower than girls with above-median responsiveness (for boys, Externalizing t -score = 46, for girls Externalizing t -score = 52).

Similarly to our predictions concerning child persistence and maternal responsiveness, we expected the interaction between noncompliance and rejection to be significant after considering their main effects. Results of hierarchical regression analyses are presented in Table IV. The overall model equation was significant, $p < .01$. Unique variance was accounted for by noncompliance ($p < .03$) and rejecting parenting ($p < .02$).

To determine whether continuity in parent and child behavior over time added unique variance to

the prediction of 42-month Externalizing after considering main effects, we examined parent-parent and child-child interactions in regression analyses. Since we were primarily interested in the interactions rather than main effects for these analyses, the reader is referred to earlier analyses for the latter. Specifically, we expected the interaction between low responsiveness and high rejecting, and the interaction between high persistence and high noncompliance to add unique variance after main effects. As seen in Table V, the Sex \times Responsiveness \times Rejection interaction term was significant ($p < .02$). The nature of this interaction is displayed in Fig. 1 using above- and below-median scores on the responsiveness and rejection variables displayed with 42-month Externalizing for boys. Contrary to expectations, boys whose mothers showed *high* responsiveness and high rejecting behavior had an average t -score of 59, whereas boys whose mothers who were high on responsiveness but low on rejecting behavior had a median t -score of 44, 1.5 standard deviations below the high responsive/high rejecting group. The interaction between rejecting parenting and responsiveness was not significant for girls.

In the child factor model, sex was followed in the equation by infant persistence at 12 months, 24-month noncompliance, and two- and three-way interaction terms. Although the overall regression

Table V. Continuity in Parenting as a Predictor of 42-Month Child Behavior Checklist (CBCL) Externalizing Problems: Hierarchical Multiple Regressions; Dependent Variable: CBCL Externalizing Problems at 42 Months; Overall $F(7, 76) = 3.57, p < .003$

| Independent variable | Multiple R | R^2 | R^2 change | B | SE_B | Beta | t | Significance of F Change |
|--|--------------|-------|--------------|---------|--------|-------|-------|----------------------------|
| Child's sex | .18 | .03 | .03 | -3.60 | 2.14 | -0.18 | -1.68 | .10 |
| Responsiveness, 12 months | .20 | .04 | .01 | -47.66 | 68.54 | -0.07 | -0.70 | .49 |
| Rejecting parenting, 24 months | .38 | .15 | .10 | 4.94 | 1.59 | 0.33 | 3.11 | .003 |
| Sex \times Responsiveness | .42 | .17 | .03 | 229.11 | 130.23 | 0.56 | 1.76 | .08 |
| Sex \times Rejection | .42 | .18 | .00 | -0.07 | 3.24 | -0.02 | -0.02 | .98 |
| Responsiveness \times Rejection | .43 | .18 | .01 | 108.38 | 121.49 | 0.11 | 0.89 | .37 |
| Sex \times Responsiveness \times Rejection | .50 | .25 | .06 | -594.93 | 233.99 | -0.90 | -2.54 | .01 |

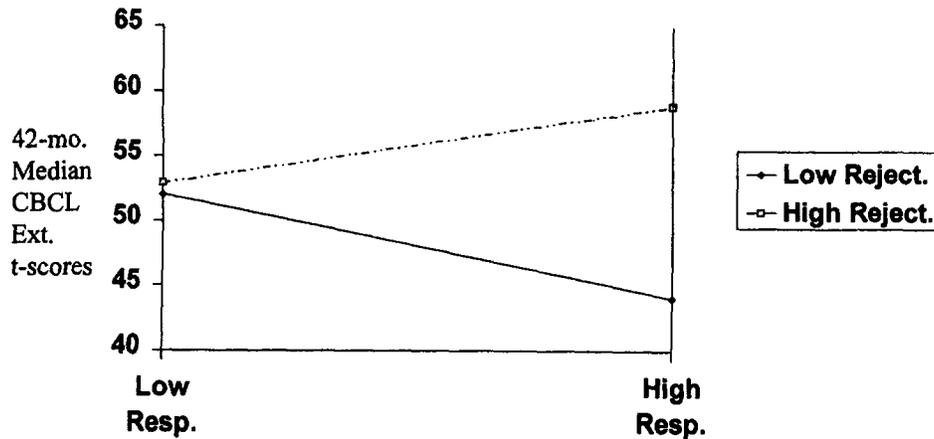


Fig. 1. Interaction between 12-month maternal responsiveness (Resp.) and 24-month rejection (Reject.) in predicting 42-month Child Behavior Checklist (CBCL) Externalizing (Ext.) problems for boys.

equation approached significance, $F(7, 78) = 1.96$, $p < .08$, the Persistence \times Noncompliance interaction was not significant.

One final regression was computed using the 24-month Externalizing factor with other 24-month factors to examine if concurrent observed child and parenting variables add variance to the prediction of 42-month Externalizing once existing problem behavior was taken into account. Results are presented in Table VI. The overall equation was significant, $p < .001$. Results indicated that, in addition to the 24-month Externalizing factor ($p < .001$), child sex ($p < .01$), rejecting parenting ($p < .04$), the Noncompliance \times Rejecting interaction ($p < .005$), and the Noncompliance \times Rejecting \times Child Sex interaction ($p < .008$) explained significant variance. The latter two interactions are displayed in Fig. 2 using above- and below-median scores on noncompliance and rejection shown with 42-month Externalizing for girls and boys. Mother-daughter dyads high on both noncompliance and rejecting parenting (median t -score = 52.0) demonstrated 42-month Externalizing problems .6 to .8

standard deviations higher than mother-daughter dyads with low noncompliance and/or low maternal rejection (median t -scores = 44 to 46). Mother-son dyads high on both noncompliance and rejection showed Externalizing problems (median t -score = 57.5) 1.25 standard deviations higher those low on noncompliance and rejection (median t -score = 45). As illustrated in Fig. 2, although a significant interaction emerged between noncompliance and rejecting parenting, the significant three-way interaction between noncompliance, rejecting parenting, and child sex suggested that, for girls, only the interaction between high rejection and high noncompliance was significant whereas, for boys, noncompliance and rejection exerted main effects. It is important to emphasize that the Noncompliance \times Rejection interaction and the Noncompliance \times Rejection \times Sex interaction were not significant in the original regression equation, although the three-way interaction approached significance. Thus, externalizing behavior at 24 months acted as a suppressor effect.

Table VI. Prediction of 42-Month Child Behavior Checklist (CBCL) Externalizing Problems Using 24-Month Factors: Hierarchical Multiple Regressions; Dependent Variable: CBCL Externalizing Problems at 42 months; Overall $F(8, 82) = 16.86$, $p < .001$

| Independent variable | Multiple R | R ² | R ² change | B | SE _B | Beta | t | Significance of F Change |
|---|------------|----------------|-----------------------|-------|-----------------|-------|-------|--------------------------|
| CBCL Externalizing, 24 months | .65 | .43 | .43 | 0.69 | 0.08 | 0.65 | 8.16 | .0001 |
| Child's sex | .70 | .48 | .06 | -4.69 | 1.52 | -0.24 | -3.09 | .003 |
| Noncompliance | .71 | .50 | .02 | 0.01 | 0.007 | 0.13 | 1.73 | .09 |
| Rejecting parenting, | .73 | .53 | .03 | 2.67 | 1.24 | 0.18 | 2.15 | .03 |
| Sex \times Noncompliance | .74 | .54 | .01 | -0.02 | 0.01 | -0.43 | -1.69 | .09 |
| Sex \times Rejection | .74 | .54 | .00 | -1.03 | 2.46 | -0.10 | -0.42 | .67 |
| Noncompliance \times Rejection | .77 | .59 | .04 | 0.03 | 0.01 | 0.49 | 2.94 | .004 |
| Sex \times Noncompliance \times Rejection | .79 | .62 | .03 | 0.06 | 0.02 | 1.33 | 2.78 | .007 |

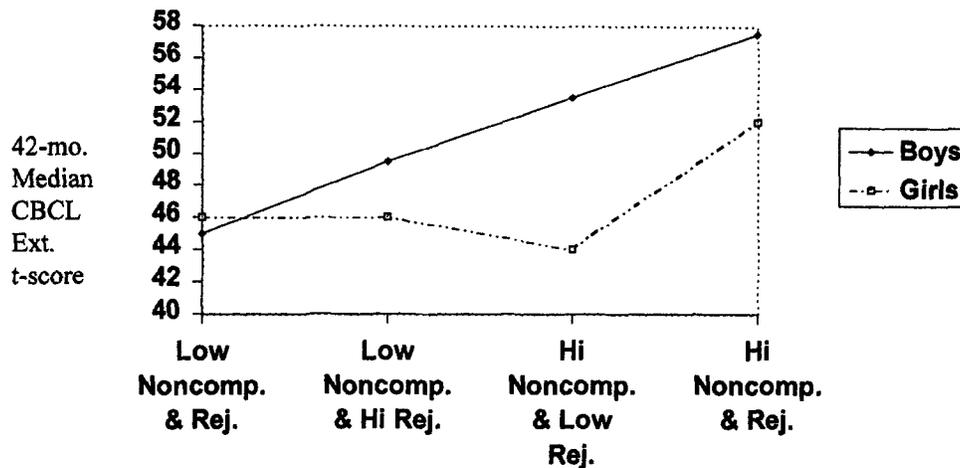


Fig. 2. Interaction between child sex, 24-month child noncompliance (Noncomp.) and maternal rejection (Rej.) in predicting 42-month Child Behavior Checklist (CBCL) Externalizing (Ext.) problems.

DISCUSSION

Confronted with rapid and complex changes, the developmentalist is tempted to apply the same label to different forms emerging at different times. The present study was structured so that temporal links between very different parent-child systems could be studied. As can be seen, most relations across time corresponded with what one would expect applying a transformational perspective, particularly for boys. For boys, maternal responsiveness was related to Externalizing at 24 and 42 months, and, for both sexes, rejecting parenting at 24 months was related to 42-month Externalizing. Infant persistence and child noncompliance also were related to later Externalizing problems for boys. In terms of interactive effects found for boys, high responsiveness at 12 months and high rejecting behavior at 24 months were associated with median Externalizing scores at 42 months approaching the borderline clinical range. For girls, main effects of predictor variables on Externalizing were less consistently demonstrated. However, infant persistence and maternal rejection were associated with Externalizing at 24 months. Furthermore, for girls and boys, the interaction of high maternal rejection and high child noncompliance was associated with Externalizing scores significantly higher than having none or one of these risk factors present.

The modest linkages between responsiveness and rejecting parenting, and between infant persistence and noncompliance, were not unexpected given the differences in constructs, the rapid rate of develop-

mental change between 12 and 24 months, and situational factors which may affect the stability of observed parent-child interactions. The transition from infancy to toddlerhood marks a developmental period during which parents and children must react to new demands placed by one on the other. Children are striving for some independence from parental constraints, while parents are beginning to set limits on children's behavior. Thus, a formerly responsive mother may have difficulty managing her toddler, resulting in expressed frustration and hostility. Similarly, a temperamentally easy infant might become obstinate in the face of new parental restrictions.

The most consistent predictor of early externalizing problems across sex was maternal rejection. It also was involved in many of the interactive effects that were present. Reviews of research on parenting have indicated that maternal rejection is associated with children's maladjustment across a variety of domains. For example, children who experience rejection are more likely than nonrejected children to become juvenile delinquents (Loeber & Stouthamer-Loeber, 1986), to express aggression and hostility in interactions with others, and to suffer from low self-esteem (Rohner & Nielson, 1978). Maternal rejection implicitly involves a lack of warm and contingent caregiving, but also includes active disdain of the child. From a social learning perspective, in a parent-child dyad characterized by few parental positive behaviors directed toward the child, rejecting parents might inadvertently reinforce children's oppositional and aggressive behavior by attending only to negative

behavior. The child also may learn that the only way to stop a parent's noncontingent rejecting behavior is to act aversively enough to make the parent withdraw from confrontation, thereby increasing the likelihood of coercive parent-child interactions (Patterson, 1982). In addition, rejected children may fail to internalize moral values pertaining to concern for the rights and well-being of others. Parental warmth has been considered an important component of children's willingness to accept messages from parents regarding moral behavior (Grusec & Goodnow, 1994).

In general, sex differences were the exception, not the rule. However, they were found with respect to relations between maternal responsiveness and early externalizing problems. In two prior studies using the same measure of maternal responsiveness during infancy (Martin, 1981; Shaw et al., 1994), longitudinal relations with later externalizing problem behaviors also were found only for boys. The results from the high-chair task suggest that boys appear to be more affected by a lack of contingent maternal responsiveness during infancy. Although attachment theorists have posited that maternal responsiveness is salient in the formation of preschool- and school-age behavior problems (Greenberg & Speltz, 1988; Lyons-Ruth, Easterbrooks, Davidson Cibelli, & Bronfman, 1995), they have not recognized or hypothesized sex differences in infants' reactions to caretakers. It appears that boys may be more susceptible to these effects than girls. Using the Strange Situation to assess infant attachment with high-risk samples, boys have been found to be rated as insecure-disorganized more often than girls (Carlson, Cicchetti, Barnett, & Braunwald, 1989; Dowdell-Hommerding, Shaw, & Krieger, 1993; Lyons-Ruth, Repacholi, McLeod, & Silva, 1991), which in turn, has been associated with a higher risk of elevated externalizing problems at preschool age (Lyons-Ruth, Alpern, & Repacholi, 1993; Shaw et al., 1995). These results are consistent with other data showing boys' greater vulnerability to a number of neurodevelopmental and psychological disorders from prenatal development to school age (Eme, 1992; Gualtieri & Hicks, 1985). In this case, differences in the quality of early maternal responsiveness appear to place boys at greater risk for early externalizing problems.

For both girls and boys, mother-infant dyads who demonstrated above-median scores on both factors had *t*-scores significantly greater than those with low maternal rejection and low noncompliance on

Externalizing at 42 months. For boys, the results were consistent with an additive model. For girls, there appeared to be an interactive effect. These results are theoretically congruent with Patterson's (1982) model of coercive parent-child interactions. Patterson (1986) has found that it is the evolving interplay between inept parenting practices and non-compliant child behaviors that fuels coercive cycles of interaction, which in turn, promote the escalation of more serious antisocial behavior. Patterson's characteristics of parental ineptitude involved harsh discipline and low involvement, while child noncompliant behaviors included those aversive to caregivers (e.g., whining, yelling, and disapproval).

For boys, the significant interaction between maternal unresponsiveness and maternal rejection in predicting 42-month externalizing problems highlights the importance of using multiple measures to assess parenting characteristics. Although it may seem paradoxical that high maternal rejection in conjunction with *high* maternal responsiveness would significantly increase the risk of clinically elevated externalizing problems, it suggests what the responsiveness measure assesses less carefully—the quality of the responsiveness. That is, boys with mothers who were highly responsive but not rejecting showed Externalizing *t*-scores 1.5 standard deviations below those in mother-son dyads where mothers were “responsive” and rejecting. The responsiveness measure emphasizes the timing of the maternal response more than its quality; thus, it would be possible to receive a high rating on responsiveness without providing qualitatively sensitive reactions to the child's distress. For example, a mother could respond to the infant's crying by yelling at him. A review of high-responsive and high-rejecting mother's behavior during the high-chair task was consistent with this notion. High-rejecting mothers at 24 months who were rated as high responsive during the high-chair task at 12 months appeared to show high reactivity and frustration with children's attention-seeking behavior. In contrast, high responsive, low-rejecting mothers tended to be consistently warm throughout the high-chair task despite increasingly aversive child behavior. Crockenberg and McClusky (1986) found similar evidence for shifts toward less maternal responsiveness in early infancy. However, it is also possible that heightened maternal responsiveness at 12 months was a reaction to persistent infant behavior in which the mother gave up by 24 months as she became essentially rejecting.

It was also surprising in the case of boys that mothers low on responsiveness and high on rejecting had sons who showed Externalizing scores within the normal range (median = 53.0). Theoretically, it was expected that the combination of inattentiveness and hostile behavior would have the most deleterious effects on child outcome, promoting the development of greater aversive and disruptive child behavior. However, it may be that being unresponsive is also associated with a low level of activity level in general, including hostile behavior. Thus, mothers who are nonresponsive and rejecting may be less active in using rejecting strategies with children than mothers who are more responsive but also rejecting.

Two limitations of the study need to be mentioned. First, though sample sizes are comparable to other investigations using labor-intensive parent-child interaction procedures, the cohort is relatively small when considering sex differences. This is especially true for the sample of girls, for which attrition and the mode of assessment were different than for boys at 42 months. It is also important to discuss the generalizability of the study's findings to other populations. The participants represent a low-income community sample, rather than a clinical sample. By recruiting families from WIC, the range of dysfunction was most likely restricted, as all participating families were involved in a program designed to improve the quality of their children's nutritional needs. Thus, we believe our results may be limited to relatively high-functioning low-income families.

In summary, the results provide confirmatory evidence that, for boys, precursors of early externalizing behavior problems can be identified in the first and second years of life, with both parenting and child factors making independent contributions to the prediction of 24- and 42-month externalizing problems. The results also support the utility of using developmentally contextual models in identifying early precursors of externalizing problem behavior, as evidenced by the independent contributions of child and parent factors at two time points. The results cannot be attributed to a reporting bias, because predictor and outcome variables were derived from independent sources. Less clear are the early precursors of externalizing behavior problems for girls. The only consistent predictor of girls' externalizing that could not be explained by reported bias was the interaction between high noncompliance and rejecting parenting.

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